GEOLOGY AND STRUCTURAL HISTORY OF THE SANTA GERTRUDIS DEPOSIT, SONORA MEXICO

Expositor	Día	Hora	Sala
Rafael Figueroa y Anna Fonseca	Viernes 26	13:00 – 13:30	Sala A

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The Santa Gertrudis gold and silver project is located in the Santa Teresa mining district of Sonora, approximately 180 km north of Hermosillo and 40 km east of Magdalena de Kino. Between 1991 and 2000, it produced just over 500,000 oz of gold from 18 open pits. The history of the project began in the 1970´s with small-scale mining operated by local families. The first company in the area was Roca Roja. Followed by Phelps Dodge who acquired the Santa Gertrudis project, Phelps Dodge discovered the central deposits and mined from 1991 until 1994. other companies like Campbell, Sonora Copper LLC, Sonora Gold Corporation, and Teck controlled parts of the district in some given time until 2007 when Animas Resources consolidated the district for the first time and explored until 2014 when GoGold Resources acquired Animas and continued exploring until the sale in November 2017 to Agnico Eagle Mines Ltd.

The project geology consists of Cretaceous carbonate and siliciclastic rocks of the Morita, Mural, and Cintura formations of the Bisbee Group. Gold and Silver mineralization styles include sediment-hosted, epithermal, and intrusive-related. Since the beginning, Phelps Dodge recognized similarities with the Carlin type deposits of Nevada. The Carlin model is still employed today especially the alterations styles and structural regime.
In several areas of the project, the typical alteration zonation seen in the Carlin type deposits has been identified, from distal to proximal; high Manganese content that is likely related to the alteration fronts, calcite lining fractures, limestone decalcification, and silica replacement (jasperoids). Other good indicators for mineralization are the presence of white micas, iron oxides (hematite and goethite), quartz veins/veinlets, and iron-rich carbonates (ankerite, siderite).

Detailed structural interpretations of airborne magnetic data, followed by field-based kinematic analysis suggest that the district underwent two pre-mineralization ductile compressional events, one syn-mineralization extensional and one post-mineralization extensional deformation events. The earliest deformation corresponds to the Laramide orogeny that produced many NW-SE-trending thrusts,

associated back thrusts and folds. The second deformation event produced sparse N-S trending thrusts. The third and syn-mineralization deformation corresponds to a post-Laramide extension, that inverted NW and N-S trending thrusts into normal faults and also produced E-W-trending faults. The last post-mineral deformation corresponding to the Basin and Range extension that reactivated the NW and E-W trending faults as reverse-dextral and sinistral-reverse, respectively.

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