



# EMGOLD MINING CORPORATION

## TECHNICAL REPORT

### 9.0 MINERALIZATION

The veins consist primarily of quartz, which is milky white, massive to banded, sheared, and brecciated. Gold occurs as native gold, ranging from very fine grains within the quartz to leaves or sheets along fractures. Other constituents occur in minor to trace amounts and comprise calcite, sericite, mariposite, magnesite, and scheelite. Sulfide minerals are ubiquitous in the quartz veins (1 to 4 visual percent) and consist primarily of pyrite. Galena, chalcopyrite, and various tellurides are present in trace concentrations. Sphalerite and arsenopyrite are only rarely observed.

The varying styles of mineralization present at the Idaho-Maryland Project are typical of those commonly found in mesothermal lode gold deposits worldwide. At least four basic types of mineralization have been recognized to contain significant gold deposits. In order of importance, these include (1) gold-quartz veins, (2) mineralized black slate bodies, (3) mineralized diabasic slabs, and (4) altered, mineralized ultramafic schists. These are discussed in more detail below.

#### 9.1 Gold-Quartz Veins

##### 9.1.1 Quartz Veins & Immediate Wallrocks

Quartz veins and their immediate wallrocks (Figures 7-3 and 8-1) have produced over 80% of the gold at the Idaho-Maryland Mine. The gold-bearing quartz veins are structurally complex, strike in all compass directions, and have attitudes that range from horizontal to vertical. The economic veins ranged from 1 to 25 ft (0.3 to 7.6 m) in thickness. The largest vein ore shoot was 650 ft (200 m) in vertical extent and plunged continuously at a shallow angle for 5,600 ft (1.7 km).

The morphology of the veins varied from tabular veins and stringer zones, to oblique-extension veins exhibiting exotic centipede structures. The veins are generally tabular, ribboned to massive quartz, and contain minor gangue and accessory minerals. Vein gangue includes minor carbonate phases along selvages (ankerite, calcite, dolomite, and ferrodolomite), sericite, chlorite, and albite. Pyrite is by far the dominant accessory mineral, constituting 1% to 2% of the ore. The mineralized, schistose vein wallrock commonly constituted ore, locally up to 10 ft (3 m) into either or both walls of the vein. The gold-bearing wallrocks contained large quantities of carbonate, with lesser sericite, chlorite, and albite. Accessory pyrite was reported in the wallrocks at similar concentrations to those found in the vein. Gold tenor of the quartz vein ores ranged from 0.10 to 10.00 oz/ton (3 to 350 g/t) for individual stopes.



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### 9.1.2 Large Quartz Stockwork Vein Deposits

Partial mining of a large quartz stockwork vein deposit accounted for 1.5% of total gold production from the Idaho-Maryland Mine. This large resource was delineated in the late 1940s and remains unexploited. This type of mineralization consists of a reticulated mass of steep and shallowly dipping quartz veins and veinlets. Vein quartz constitutes 20% to 80% of the mineralized rock by volume. The overall shape of the zone mimics the orientation of the shallowly dipping veins in the set. The dimensions of this body are 250 ft (75 m) in strike length, 950 ft (290 m) in dip length, with an average true thickness of 75 ft (23 m). The maximum true thickness is 122 ft (37 m).

The quartz stockwork veined mineralization shares common characteristics with the other Idaho-Maryland mineralization types. The intermediate meta-volcanic host rocks are bleached and pervasively ankerite + sericite + chlorite + pyrite altered. A minor quantity of disseminated pyrite was the only accessory mineral reported. Coarse particulate free gold was present, but occurred less frequently in stockwork ores compared to all other mineralization types. Gold tenor for stockwork veined material is in the range of 0.10 to 0.20 oz/ton (3 to 7 g/t). The stockwork zone had irregular walls that were determined visually by the degree of shattering and the intensity of subsequent vein filling.

The primary control for stockwork veined bodies was related to bends in the plane of the adjacent Weimar Fault. Shattering was directed into the brittle meta-volcanic wallrock at these locations.

### 9.1.3 Tensional Vein Arrays

Tensional vein arrays localized in wedge areas between intersecting faults have contributed an unknown percentage of the gold production at the mine. Stacked arrays of shallow-dipping quartz veins can constitute large, potentially bulk mineable deposits. Known examples have plan dimensions of (50 x 50 ft to 50 x 220 ft (15 m x 15 m to 15 m x 70 m), with the down rake projection being the long axis of the deposits. An extreme example is the mineralized wedge at the Id2 Vein to Id3 Vein junction, which has been documented on seven mine levels from the Idaho 1600 to 3000 levels, this suggesting a rake length of over 3,300 ft (1,000 m). Other examples include mineralized wedges at the following functions: Id3 Vein to Id25 Vein, Idaho Fault–L Fault, Br9 Vein to Br10 Vein, Br2 Vein to Br6 Vein, and Br2 Vein to Br32 Vein. The ore minerals, gangue minerals, accessory minerals, and alteration types are all similar to those described for the stockwork vein mineralization type, and coarse free gold is noted as is customary in all mineralization types at the mine. Expected gold tenor of mineralized wedge ores is in the range of 0.10 to 0.40 oz/ton (3 to 14 g/t). Visual



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estimation of vein density determines the boundaries. Variations in the plunge inclination have been assumed to control the fracture intensity and economic boundaries.

### 9.2 Mineralized Black Slate Deposits

Graphitic black slate bodies (see Figure 9-1) have produced approximately 5% of the gold at the Idaho-Maryland Mine. The mineralized black slate bodies develop exclusively out into the hanging wall of a tabular quartz vein, coincident with an important set of northwest-trending, steeply dipping cross faults. Three known mineralized slate bodies range from 20 to 100 ft (6 to 30 m) in thickness and constitute large bulk-mineable oreshoots in the mine. The maximum dimensions are 300 ft (90 m) in vertical height and horizontal length. Very coarse gold is contained within a stacked array of highly graphitic flat fault planes of 0.2" to 2.0" (0.5 to 5 cm) thick, flat quartz veinlets that cut the steeply dipping meta-sediments. The host rock ranges from slate to medium-grained wacke. The only reported gangue minerals were heavy amounts of graphite and trace vein carbonate. Accessory fine-grained pyrite occurred in minor amounts up to 1%. The ore mineral was coarse particulate free gold. Flat plates up to 3" x 4" (5 x 10 cm) in dimension without vein quartz were found puddled in low spots along highly graphitic flat planes. The gold tenor of this ore averaged 0.20 to 0.25 oz/ton (7 to 9 g/t). Past employees have indicated that simple screening of the +6" (+15 cm) fraction would have doubled the millhead grade of this material. Mill records indicate that recoveries of gold from black slate ores averaged 80%, the highest for all the mineralization types.

### 9.3 Mineralized Diabasic Slabs

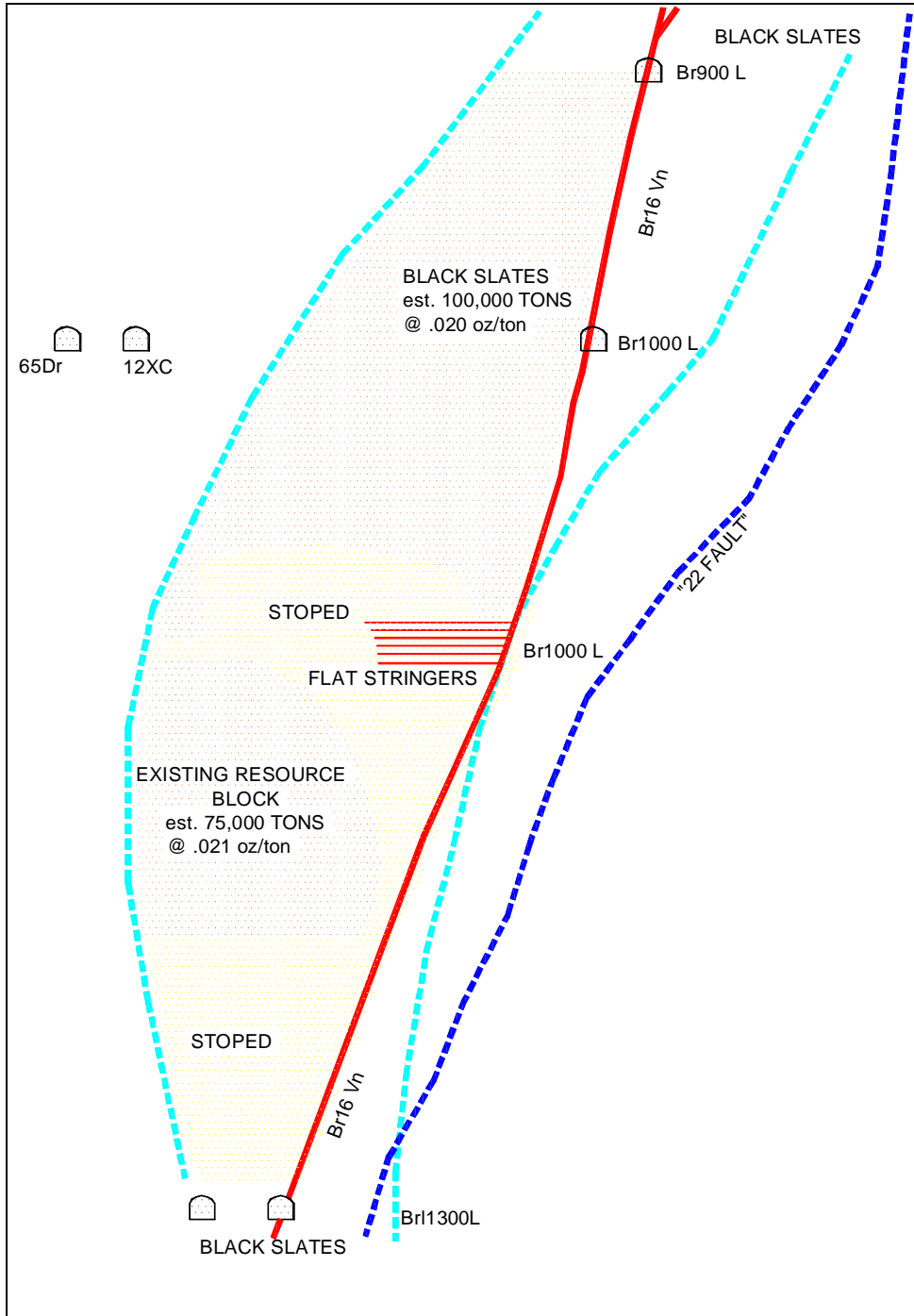
Mineralized diabasic slabs (see Figure 8-1) have produced approximately 3% of the gold mined from the Idaho-Maryland deposit. The mineralized diabasic bodies are foliated, folded, and deformed mélange slabs that have no predictable occurrence within the mine. They were generally discovered in exploratory core drilling and crosscuts. Mineralized diabasic slabs range from 3 to 36 ft (1 to 11 m) in thickness, with a maximum length of 400 ft (120 m) measured along the shallow plunge of the body. Stringer zones of quartz veinlets can constitute up to 10% of the volume. Gangue minerals included abundant carbonate phases, chlorite, and sericite. Euhedral cubic pyrite was the only reported accessory mineral, and gold was the only ore mineral. The gold tenor of mineralized diabase was 0.20 to 1.0 oz/ton (7 to 35 g/t) for individual bodies. Gold recoveries were reported to be similar to those for the quartz vein ores.



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Figure 9-1: Mineralized Black Slate Deposits – Vein BR16 Area





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### 9.4 Mineralized Ankerite or Talc Schists

Mineralized ankerite or talc schists (Figure 7-3) that developed along shear zones have produced less than 1% of the gold at the Idaho-Maryland deposit. They were hosted in an altered ultramafic *mélange* matrix and in altered intermediate meta-volcanics of *mélange* slabs. At the Idaho 2000 level, the Idaho 3 Vein showed rapid gradation from a vein quartz lode to a mineralized schist lode, with stringer zones of quartz veinlets constituting 0% to 10% of the volume. Gangue minerals included abundant talc or carbonate, and the lone accessory mineral was disseminated pyrite. Free gold, found along foliation planes, was the only ore mineral produced. The gold tenor of the mineralized schists averaged 0.10 to 1.0 oz/ton (3 to 35 g/t) in individual stopes.