PRELIMINARY ASSESSMENT
TECHNICAL REPORT

Idaho-Maryland Mining Corporation

SECTION 9

Mineralization

9.0 MINERALIZATION

Mineralization at the Idaho-Maryland Mine comprises two types: the traditional gold mineralization and the industrial mineral feedstock for production of ceramics.

9.1 Gold 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 measurable in feet (Glen Waterman, per.comm. 1996; Jack Clark, per.comm. 1994; Leland Hammill, per.comm. 1995). Other constituents occur in minor to trace amounts and comprise carbonates, sericite, chlorite, mariposite, albite, and scheelite. Sulfide minerals are ubiquitous in the quartz veins (1 to 4 visual percent) and consist primarily of pyrite. In order of abundance, galena, chalcopyrite, and various tellurides are present in trace concentrations. Recent electron microprobe studies of ore specimens collected in the 1940s have identified telluride minerals including hessite, petzite, and coloradoite. Sphalerite and arsenopyrite are 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 and vein arrays, (2) mineralized black slate bodies, (3) mineralized diabasic slabs, and (4) altered, mineralized phyllonites. These are discussed in more detail below.

9.1.1 Gold-Quartz Veins

Quartz Veins and 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 in thickness. The largest vein ore shoot was 650 ft in vertical extent and plunged continuously at a shallow angle for 5,600 ft.

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, the dominant accessory mineral, constitutes 1% to 2% of the vein mineralization. The schistose vein wallrock commonly contains gold mineralization up to 10 ft into either or both walls of the vein. The mineralized wallrock is strongly carbonate altered. Accessory pyrite was reported in the wallrocks at similar concentrations to those found in the vein. Gold tenor of the quartz vein deposits ranged from 0.10 to 10.00 oz/ton for individual stopes.

Large Quartz Stockwork Vein Deposits

This type of mineralization consists of a reticulated mass of steep and shallowly dipping quartz veins and veinlets in the Waterman Resource. 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 in strike length, 950 ft in dip length, with an average true thickness of 75 ft. The maximum true thickness is 122 ft.

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. 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. The stockwork zone has irregular walls caused 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.

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 with the down rake projection being the long axis of the deposits. An extreme example is the mineralized wedge at the Id2 and 3 Vein junction, which has been documented on seven mine levels from the Idaho 1600 to 3000 levels, suggesting a rake length of over 3,300 ft. Other examples include mineralized wedges at the following junctions: Id 3 Vein-25 Vein, Id 109 Vein-177, Br9 Vein-10 Vein, Br2 Vein-6 Vein, and Br2 Vein-32 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 also present. Expected gold tenor of mineralized wedge ores is in the range of 0.10 to 0.40 oz/ton. Visual estimation of vein density determines the boundaries. Variations in the plunge inclination have been assumed to control the fracture intensity and economic boundaries.

9.1.2 Mineralized Black Slate Deposits

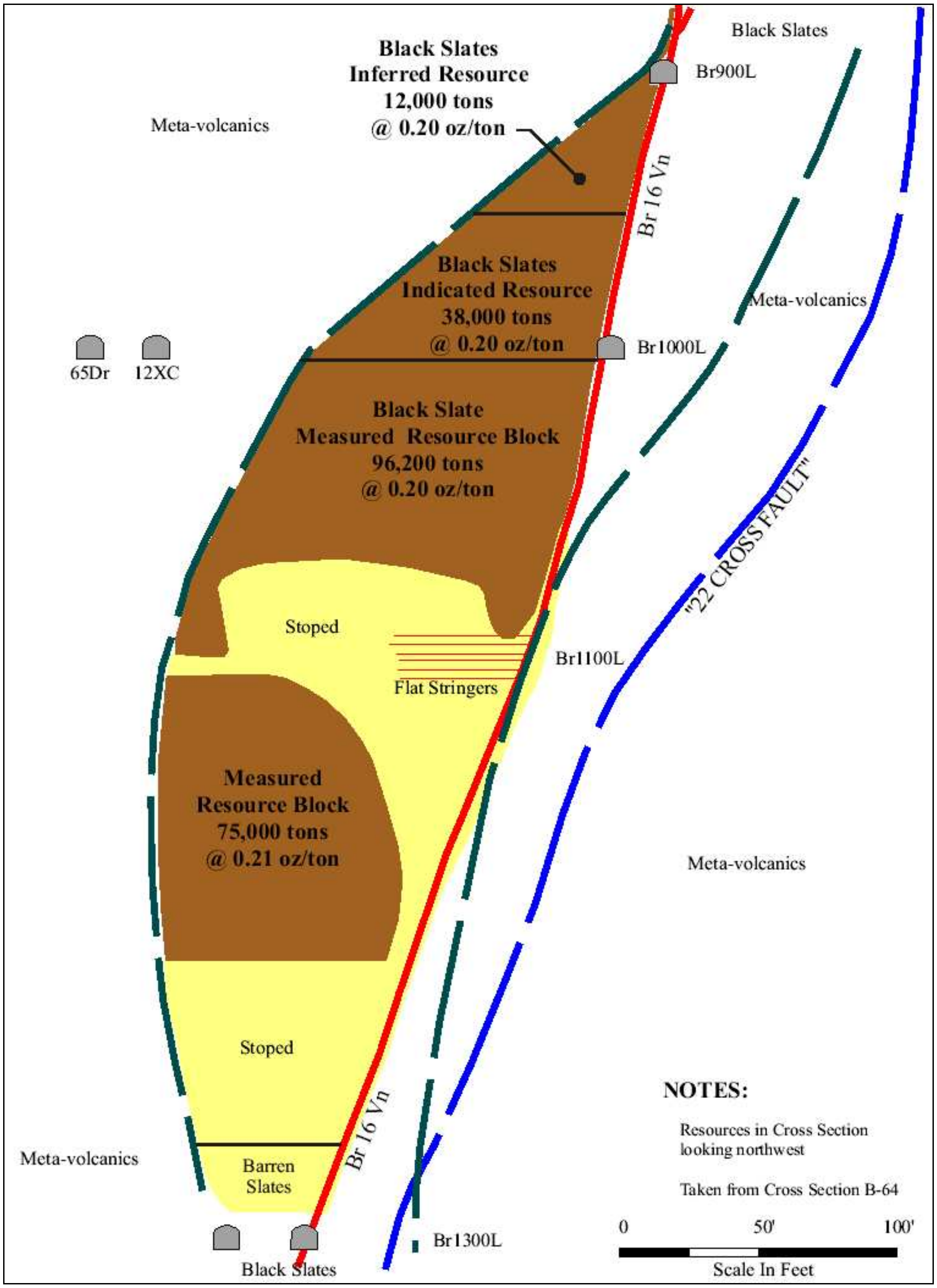
Graphitic black slate bodies (see Figure 9-1) have produced approximately 5% of the gold at the Idaho-Maryland Mine. The mineralized black slate bodies develop exclusively out into the hanging wall of a tabular quartz vein, coincident with an important set of northwest-trending, steeply dipping cross faults. Three known mineralized slate bodies range from 20 ft to 100 ft in thickness and constitute large bulk-mineable oreshoots in the mine. The maximum dimensions are 300 ft 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" 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 mineral was 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" in dimension without vein quartz were found "puddle" in low spots along highly graphitic flat planes. The gold tenor of this ore averaged 0.20 to 0.25 oz/ton. Mill records indicate that recoveries of gold from black slate ores averaged 80%, the highest for all the mineralization types.

9.1.3 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 elongate melange 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 in thickness, with a maximum length of 400 ft measured along the shallow plunge of the body. Diabasic slabs occur throughout the Idaho Deformation Corridor but only become mineralized where they are cut by strong faults on their bottom end or have strong faults along their footwall contacts.

Mineralized versus unmineralized diabase bodies are easily distinguished. The diabase is visually massive and the igneous textures are holocrystalline and well-preserved where unmineralized. Igneous textures become vague and chlorite content increases as a ground mass constituent imparting a green color to the mineralized diabase. The chlorite can have a preferred orientation, which can impart a faint foliation to the massive diabase (Schlberg, 1936). Pyrite is ubiquitous in mineralized diabase as subhedral to euhedral cubes with a unique embayed “moth-eaten” appearance. Regardless of grade, gold occurs in coarse pieces in this mineralization type. In some cases, the gold particles can be nearly the entire width of the thin quartz veinlet hosting it. Quartz veinlets displaying slip planes on one or both sides are considered favorable, demonstrating the presence of episodic fault displacement.

Figure 9-1: Mineralized Black Slate Deposits – Br 16 Vein Area



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 0.10 to 1.00 oz/ton for individual bodies. Large resources of this type remain in place at the Idaho-Maryland with most grading 0.10 to 0.22 oz/ton.

9.1.4 Mineralized Phyllonites

Mineralized phyllonites are laminar to braided, carbonate-sericite-chlorite-pyrite altered proto-mylonites hosted within the serpentinite melange matrix or mafic meta-volcanics. 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 include abundant carbonate, chlorite, and sericite. The lone accessory mineral is disseminated euhedral porphyroblastic pyrite. The gold tenor of the mineralized schists averaged 0.10 to 1.0 oz/ton in individual stopes.

9.2 Industrial Minerals Resources (Ceramics Feedstock Material)

One of the main criteria for suitable feed rock/minerals for the Ceramext™ process is overall composition. The key to high temperature extrusion is to develop a liquid silicate phase that provides the plasticity needed for extrusion and forming to occur. There must be an adequate amount of liquid, and its viscosity must be low enough to allow the overall viscosity of the liquid/solid mix to support extrusion. This is influenced primarily by temperature. In general, if there are fluxing oxides such as Na_2O and/or K_2O, liquid forms at workable temperatures and very acceptable viscosities result. In the Idaho-Maryland case, most of the rock/tailings materials contain major amounts of the sodium-rich feldspar albite. This provides the needed liquid at elevated temperature, even though other components in the rock/tailings, such as quartz, are very refractory and generally remain as crystalline phases during processing.

The Lower Volcanic Unit (LVU) of the Lake Combie Complex contains a large volume of rather homogenous, albite-rich, refractory element-poor material in the form of metamorphosed plutonic, hypabyssal intrusive, and related extrusive units. These mafic to intermediate rocks are located in the Brunswick Slab. The primary rock types in the area outlined as a potential ceramics feedstock resource are 70% meta-andesite hypabyssal intrusions and flows, 17% meta-diabase and 9% meta-gabbro. The defined deposit area contains only a small number of thin shear zones and faults.

9.2.1 Meta-Andesite

Metamorphosed andesite (including basaltic andesite) comprises volcanic flow and flow breccia units, tuffs and related hypabyssal intrusions. Whole rock analyses show silica (SiO_2) contents ranging from 47 to 55 wt. %, sodium (Na_2O) contents of 3 to 4 wt. %, and sodium to calcium ratios (Na_2O:CaO) of 0.28 to 0.65. The average specific gravity is 2.84. The meta-andesite is situated mostly in the eastern half of the resource.

Meta-andesite hypabyssal intrusions: Andesitic hypabyssal intrusive rocks appear to be the most abundant type of meta-andesite. The rocks are non-porphyritic to porphyritic and very fine-grained. They range from having no foliation to being moderately foliated. Primary alteration minerals are chlorite and carbonate, with minor sericite, albite, epidote and silica. Only trace sulfides are present (pyrite and rare pyrrhotite).

Meta-andesite flow and flow breccia units: The flow and related breccia rocks are the second most abundant type of andesitic rocks in the deposit. Flows are the predominant phase, which are intercalated with narrow flow breccia zones. These porphyritic to aphanitic rocks are massive (unfoliated) to schistose. Primary alteration is chlorite and carbonate, with local minor albite, silica, sericite and epidote. Trace to 2% sulfides are present (pyrite and rare chalcopyrite).

9.2.2 Meta-Diabase

Metamorphosed diabase intrusive units consist of aphanitic to porphyritic massive sills and dikes. Primary alteration minerals are carbonate and chlorite, with minor albite. Sulfide content ranges up to 5% and comprises pyrite and trace chalcopyrite. Whole rock analyses show a tight SiO_2 range of 49 to 52 wt. %, 2.5 to 3.5 wt. % Na_2O, and sodium to calcium ratios (Na_2O:CaO) of 0.22 to 0.37. Average specific gravity is 2.91. The meta-diabase units are more abundant towards the center of the deposit.

9.2.3 Meta-Gabbro

Metamorphosed gabbro units comprise mostly leucocratic phases. Units are variably porphyritic and range from being massive to displaying an oriented fabric. This fabric could be relict cumulate layering or represent a foliation. Alteration consists of sausserization to albite, carbonate, chlorite and lesser sericite. Trace sulfides are observed (pyrite). Magnetite is ubiquitous. Whole rock analyses show a tight SiO_2 range around 48 wt. %, 1.7 to 2.2 wt. % Na_2O, and sodium to calcium ratios (Na_2O:CaO) of 0.14 to 0.22. Average specific gravity is 2.97. The meta-gabbro is most common at the western end of the resource.