



APPENDIX

APPENDIX A KETZA RIVER MINE, GEOLOGY AND GEOCHEMISTRY



Ketza River Holdings Ltd.
Ketza River Mine
Geology and Geochemistry

The current Water License Application QZ04-063 has been prepared to maintain and monitor the existing Tailings Pond Facility at the Ketza River Minesite. The application is not to carry out mining or operate the mill facility. The following is a summary of the geological setting in the Cache Creek valley where the Tailings pond is located.

Geology of the Ketza River Property

The property is underlain by Lower Cambrian carbonate and clastic sedimentary rock units. The Lower Cambrian units (Map Units 1a, 1b, 1c, 1d, and 1e) form a conformable sequence unconformably overlain by black shale of Late Cambrian age (Figure).

Unit 1d is host to all replacement type manto mineralization on the claims. The lower contact is gradational and arbitrarily defined where the well bedded limestone becomes the major component. The unit is from 120 to 180 metres thick. The limestone is a grey, uniformly bedded, clean limestone with distinctive Archeocyathid fossils (FSLT) occurring near the top of the unit. An internal stratigraphy has been recognized in the minesite area. The internal beds are separated on the basis of textures (stratigraphic column). Beds of massive fine grained light grey limestone (MSLT), blue fine grained crystalline limestone (BXLT), thin and wispy silt banded limestone (WBN), and silty black limestone (BSLT) are recognizable in drill core and outcrop. The unit is locally dolomitized (DOLT), recrystallized and orange weathering in the vicinity of mineralization. The limestone is resistant and forms prominent cliffs and ridges throughout the region. The carbonate component of these rocks is acid neutralizing

Structural Geology

The stratigraphic sequence is disrupted by thrust faults and related folds, cut by multiple sets of steeply dipping normal faults. Faulting near the deposits is complex and probably controlled the location of the mineralization and provided conduits for oxidizing fluids. Intense folding has resulted in overturned stratigraphy on fold limbs. The Peel and Ridge Zone ore deposits is a single ore body deformed by a southeast-overturned fold (Figure). The Ridge Zone ore body is cut off by the Peel fault, a thrust fault that juxtaposes Lower Cambrian argillite (unit 1a) against Lower Cambrian limestone (unit 1d). The orientation of the Peel fault changes from near vertical east of the Ridge zone to nearly horizontal west of the ridge zone. The Peel fault is undoubtedly a reactivated thrust fault which pre-dates the block faulting. The fault has been traced westward to the area of the Lab deposit. Northwest-trending normal faults cut the Peel fault.

Metallogeny

The gold deposits at Ketza River are interpreted to be genetically related to a blind mid-Cretaceous to Tertiary aged stock centred beneath the Ketza Uplift. Steeply dipping faults coeval with uplift and doming during intrusion of this stock are believed to have been the principal ore localizing features. The intersection of stratigraphy, thrust faults, and steep faults control the distribution of the pyrrhotite-arsenopyrite +/- siderite manto and vein showings. The intersecting fault structures formed in response to the doming effects of postulated mid Cretaceous intrusive activity.

The mineralization is epigenetic with deposition occurring as manto type replacement of limestone along fractures or bedding planes or quartz-sulphide veins and vein stockwork zones in brecciated and altered clastic rocks. The style of sulphide emplacement was controlled by the local structural intensity and by the competency and chemical reactivity of the host rocks.

The chemically reactive limestones of Unit 1d are an ideal host for manto replacement mineralization. Upon gaining access to the limestone along major fissure conduits, ore forming fluids were guided by smaller scale structural openings including secondary faults, minor thrusts, fractures, jointing and bedding surfaces. The fluids enlarged the openings by processes of hydrothermal boring or corrosion. The thickest and most extensive mineralization was emplaced in areas with the highest density of structural discontinuities such as the hinge of the synclinal fold within a blue crystalline limestone (BXLT) bed. The mineralized mantos occur in at least three stratigraphic levels. The mantos have a "tube-like" geometry which locally form a series of interconnected elongate structures. The average gold grades of the deposits along Cache Creek indicate that the highest grades occur in the deposits closest to the hornfelsing zone enclosing the Ketzia Uplift. Gold values are highest in the thick, central parts of the individual mantos gradually decreasing into the thinner parts of the body. Gold within the sulphide ore lenses is generally irregularly distributed over the vertical thickness.

Gold Mineralization

There are two types of gold deposits on the Ketzia River property: (a) manto type replacement sulphide/oxide deposits, and (b) sediment hosted type disseminated sulphide with quartz-sulphide fissure vein and stockwork systems. The mantos are hosted by favourable limestone beds within deformed limestone south of the Peel Fault. The vein stockwork, disseminated, and silicified sulphide deposits occur in the Lower Cambrian argillite, phyllite, siltstone, quartzite, limestone and calcareous beds north of the Peel Creek.

Preliminary evaluation of the geochemical data indicates a strong positive correlation between Au and As with a moderate positive correlation of Au with the Ag, Bi, and Sb. This correlation is typical of intrusion related gold deposits.

Three oxide manto deposits in the Cache Creek valley were developed and mined by Canamax. The deposits consisted of irregular interconnected veins, pods, and tubular bodies separated by barren limestone within the distinctive BXLT horizon. The BXLT horizon is approximately 20 metres thick but undergoes a dramatic thickening along the hinge of the fold especially where the Peel and Ridge zones join.

The oxide mineralization is most prevalent within a panel of intense faulting and fracturing trending northwesterly through the Peel/Ridge to Break deposits. Oxidation of the sulphide deposits has resulted in remobilisation of the gold and reconcentration near the hangingwall of the mantos as opposed to the irregular distribution of gold in the sulphide mantos. The oxidization process may have occurred during the sulphide formation or closely overlapping and the heat of the hydrothermal process resulted in the remobilisation of the gold. The oxidation of the pyrrhotite bodies may have generated enough heat to produce the same effect. In order for deep supergene oxidation to occur, as it did in the Peel and Ridge zones, the primary sulphide deposits must have been accessible to subterranean watercourses carrying a strong flow of oxygenated water. Oxide mineralization occurs buried beneath sulphide mineralization suggesting oxygenated ground water must have utilized the hydrothermally created channels to oxidize the sulphide.

Auriferous massive sulphide mantos have been intersected at two horizons, one above and one below the BXLT bed. The Peel west massive sulphide manto is hosted by a massive limestone bed (MSLT) approximately 15 metres above the BXLT horizon. The lower magnetite/sulphide/oxide mineralization occurs in a massive limestone bed approximately 10 metres below the BXLT bed.

The manto type sulphide ore is primarily pyrrhotite with an average of about 10% arsenopyrite, 5% pyrite and 2% chalcopyrite. Galena and sphalerite are rare. The sulphides are laterally zoned from an arsenopyrite rich core grading out to a pyrrhotite dominated fringe. A thin zone of

galena and sphalerite locally rims the gold bearing section and calcite forms the margin of the deposits.

Gold in the sulphide ore occurs as the native metal or, less commonly, as electrum in finely disseminated grains up to 25 microns in size. The gold is very often associated with native bismuth and occurs mainly in fractures in the arsenopyrite and pyrite or along sulphide grain boundaries. Less commonly it is seen as inclusions in pyrrhotite. The gold within the sulphide appears to be erratically distributed showing no preference for the hangingwall or footwall of the deposit.

Alteration

Dolomitization or iron carbonate replacement (FECO) alteration envelopes the mantle mineralization and is especially well developed in the areas lateral to the mantos where the host limestones are brecciated. The carbonate replacement deposition results in the migration and precipitation of calcite in the rocks surrounding the mineralization. Sheeted white calcite veins in limestone is referred to as zebra rock.