→ Granduc

Exploration of the Granduc VMS deposit, Stewart Mining Camp, British Columbia

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Granduc is a late-Triassic age Besshi-type (sediment-rich) volcanogenic massive sulfide (VMS) deposit located in the Stewart mining camp, northwestern British Columbia. Historic (pre NI43-101) mineral inventory totaled 39.4 million tonnes grading 1.73% Cu, placing Granduc in the upper decile of Besshi-type deposits. The late-Triassic age Windy Craggy deposit in northwesternmost British Columbia still stands as the world's largest Besshi-type deposit, with nearly 300 million tonnes of massive sulfide grading 1.4% Cu. Unpublished production figures from the Granduc Mine by Newmont and Esso Resources between 1968 and 1984 totaled 15.42 million tonnes at 1.3% Cu and 9 gpt Ag.

Remarkable glacial retreat following mine closure has revealed new outcrops of massive sulfide and magnetite iron formation 2.5 kilometers north of the Granduc Mine. These new exposures, bolstered by data from a modern airborne geophysical survey and results from diamond drilling, are revealing the full magnitude of the Granduc system. Diamond drilling in the past 16 months by Bell Resources Corporation has demonstrated typical massive sulfide intersections of lensoidal to banded chalcopyrite-pyrrhotite-magnetite±pyrite spread across 4 kilometers of strike length both to the north and south of the area of historic production. Unlike the Besshi VMS deposits that are growing on the sea floor today west of Vancouver Island, this late-Triassic seafloor exposure now strikes north-northeasterly and dips 70 degrees to the west. Typical drill intersections have been 3-8 meters true thickness grading 1.8-2.2% Cu, 20 gpt Ag, and 0.2 gpt Au.

All drill intersections have been hosted by thin-bedded chert, graphitic argillite, mafic pyroclastic rocks, greywacke, and magnetite iron formation of the Granduc Mine Series, the same unit that hosted ore in the Granduc Mine. A thin, moderately continuous lime marble unit in the Granduc Mine Series demonstrates a marine setting shallower than the calcium carbonate compensation depth. Tuffaceous argillite and locally pillowed augite andesite flows form the footwall to the Granduc Mine Series rocks.

Hostrock alteration mineralogy includes pervasive light brown, fine-grained biotite (potassic alteration), sericite, quartz, tourmaline, ankeritic carbonate, chlorite, talc, and locally abundant epidote in stockwork zones on the eastern side (footwall) of the sulfide lenses. Extensive epidote stockwork on the footwall side of the northernmost massive sulfide drill intersections (JK Zone) overlain by higher sulfidation state pyrite-chalcopyrite-magnetite suggest that this location was the site of a significant stockwork feeder zone.

Intense postmineral deformation, strongly partitioned into weak sedimentary rocks of the Granduc Mine Series, produced sinistral shearing and pronounced shortening, which is expressed as isoclinal folds and strong foliation in argillaceous and tuffaceous lithologies. Siliceous exhalite and banded magnetite iron formation faithfully record this deformation, whereas massive chalcopyrite-pyrrhotite was apparently remobilized into low stress regions such as fold hinges and consequently protected from foliation. Evidence of such remobilization is seen in the form of angular clasts of folded and foliated wallrocks hosted in a matrix of massive sulfide. In spite of strong deformation, gross stratigraphic continuity of the Granduc Mine Series over a 4 kilometer strike length is maintained, as demonstrated geophysically beneath glacial ice by continuous linear arrays of electrical conductors parallel to stratigraphy. Local overprinting of banded magnetite iron formation and massive chalcopyrite-pyrrhotite by undeformed milky quartz veins carrying scheelite, pyrite, and galena probably records an unrelated mineralization event linked to emplacement of the Coast Range batholith in the Paleocene.

During the upcoming field season an aggressive exploration campaign of surface drilling will transition to underground delineation drilling. Rehabilitation of the 17-kilometer-long Tide Tunnel will facilitate year-round resource drilling and eventual restart of the Granduc mine.