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EPITHERMAL GOLD VEINS OF THE MAIN ZONE AT MT. SKUKUM

SOUTHWESTERN YUKON TERRITORY

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Mt. Skukum epigenetic gold veins, 65 km southwest of Whitehorse, Yukon Territory, occur in Main Cirque which forms the headwaters of Butte Creek in the southwestern part of the Mt. Skukum volcanic complex. The deposit is low in sulphide content and enclosed in andesitic volcanic rocks. K-Ar dating indicates an Early Eocene, Tertiary age of 51.6 ± 1.8 Ma for the andesitic volcanics. Agip Canada Ltd. of Calgary discovered the property in 1980 during follow-up of geochemical anomalies found in stream sediment samples during regional exploration.

Drill testing and trenching were conducted in 1982, 1983, and 1984. Erickson Gold Mines Ltd., who currently operate the property, commenced driving an adit in July 1984 to begin production. Proven reserves (R. Summerville, 1985, pers. comm.) are 148,980 tonnes (164,222 tons) of ore with an average grade of 24.98 grams gold/tonne (0.80 oz gold/ton) and 20.5 grams silver/tonne (0.66 oz silver/ton).

The deposit occurs in andesitic volcanic rocks which dip gently to the southwest. Dominant rock types are porphyritic

andesite flows with vesiculated and brecciated flow tops and andesitic lapilli tuffs with minor bedded tuff layers. In the vicinity of the deposit these rocks have undergone magnetite and plagioclase destructive propyllitic alteration and characteristically display abundant chlorite, calcite and epidote.

A major fault zone bisects the main cirque and may have acted as a conduit for hydrothermal fluids during formation of the economic vein system. This fault zone, known as the Main Fault Zone, ranges from 20 to 30 m across and consists of two or three major faults and associated heavy fracturing. The Main Fault Zone, can be divided into two parts according to its orientation. The Main Zone Fault (South) trends 030 degrees and dips 80 degrees east. The Main Zone Fault (North) trends 050 degrees and dips 80 degrees east. Faults are poorly expressed on the surface but are expressed in core as gouge varying from 10 cm to 3 m or more in width. Massive or stockwork veins occur along most of the length of this fault zone which has been traced for 1.5 km along strike. The Main Zone Fault is one of three subparallel vein fault systems which are current exploration targets on the property. The other two lie immediately to the west of the map area. The operator (R. Summerville, 1985, pers. comm.) has indicated that mineable ore exists in the easternmost of these zones, and that the other zone has potential yet to be defined.

Numerous felsic to intermediate dykes parallel the Main Zone Fault and are most abundant in its immediate vicinity. A prominant felsic dyke up to 30 m thick occurs immediately adjacent to mineralized vein material in the southern end of the Main Zone

structure. This dyke is one of three which are cross-cut by narrower but equally extensive andesitic and dacitic dykes. All of these dykes are cross-cut by the veins.

Several extensive tabular breccia bodies cross-cut the volcanic strata at high angles throughout the Main Cirque with trends which parallel those of dominant local fractures. The largest, located just east of the Main Zone structure, consists of a highly siliceous matrix enclosing angular rhyolitic and/or andesitic fragments that range from millimeter size to 10 cm in diameter. At its thickest, this body is about 10 m thick and closely parallels the eastern rhyolitic dyke along most of its length. In places, the dyke bisects the breccia body and runs down its center.

Two separate vein - forming events are apparent in rocks of the Main Zone. The first is marked by blue-grey chalcedonic veinlets rarely more than 2 mm thick. These veinlets usually display pyritic selvages and envelopes, and are associated with extensive wallrock alteration ranging from intense silicification to phyllic alteration characterized by abundant muscovite, quartz and pyrite. Locally, these first stage veinlets form dense stockworks associated with intense alteration and pyritization. These stockworks, throughout the main cirque area,are marked by heavily iron stained gossans, which do not seem to bear any relation to the economic veining. First stage veinlets have not been found with significant gold or silver mineralization.

The second and final stage of veins, in contrast, hosts all

known gold mineralization and contains no sulphides. These second stage veins are found throughout the Main Cirque area but are concentrated in the Main Zone structure itself. Megascopically, second stage veins are white and consist exclusively of a quartz - calcite assemblage. Characteristic textures range from a sugary massive appearance to a vuggy texture with abundant wallrock breccia fragments and well developed cockade structures. Calcite commonly appears as coarse, bladed crystals up to 1.5 cm long intergrown with quartz.

The ore zone occurs over a section of the second stage veins south of the flexure in the Main Zone Fault. The ore zone has been defined by drill holes as being 200 m long with an average width of 5 m and a vertical extent of about 80 m. Ore zone veins, which are up to 10 m thick, tend to bifurcate at shallow depths into smaller, closely spaced, discontinuous veins that parallel the Main Zone Fault. A petrographic study (Bacon, Donaldson and Associates Ltd., 1983) of a limited number of specimens of vein material showed that gold [more correctly electrum] occurs in its native form as fine flakes between 15 and 20 microns across. Within the vein electrum is contained only in quartz although assay values are highest in veins with at least equal amounts of quartz and calcite. The 1.2:1 ratio between gold and silver assay values shows no systematic variation with vertical position in the deposit. Values for gold and silver drop abruptly in wallrock adjacent to the veins. Precious metal content also appears to be low in veins away from the rhyolite dyke.

Alteration associated with second stage veins is poorly

developed. Veins 1 to 2 m across may show phyllic alteration halos which extend no more than 1 to 2 cm from the vein or, more commonly, show no alteration halos at all.

Gold-silver veins at the Mt. Skukum deposit apparently were emplaced at low temperature in a circulating hydrothermal system driven by a heat source at depth associated with dykes present in the area. We propose that circulating hydrothermal fluids leached gold from the surrounding andesitic volcanics during propylitization. Permeability probably was controlled by faulting, brecciated flow tops and bottoms, and lapilli tuff horizons. Gold was precipitated in intensely permeable zones, such as the Main Fault Zone and breccia bodies, when the metamorphic fluids were escaping from the system.