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SILBAK PREMIER MINE
CAPSULE GEOLOGY

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HISTORY

The Silbak Premier mine is located 22 km north of Stewart, British Columbia, and is accessible via gravel road. The original Premier claim group (Cascade Fall No. 4 and 8, Pictou, Simpson, Essington, Rupert and Hazelton claims) was staked by the Bunting brothers and W. Dillworth in 1910, and tunnelling on 1- and 2-levels was conducted by the Salmon Bear River Mining Company Ltd. in 1912 and 1913 (Grove, 1971). Bonanza high grade ore was discovered between 1916 and 1919 at which time ASARCO acquired 52% controlling interest in the Premier Gold Mining Company Ltd. The initial discovery was a gossan above 2-level portal. At the same time B.C. Silver Mines Ltd. was formed by O.B. Bush to develop the easterly extension of the Premier ore zone.

Construction of a 200 tons per day (tpd) mill was completed by 1921; prior to this, all ore was shipped directly to the Tacoma, Washington smelter. In 1926 mill capacity was increased to 400 tpd. Sebakwe and District Mines Ltd., which gained control of the adjacent Bush property in 1926, tunnelled 300 m from Cooper Creek to intersect mineralization in 1926 (Grove, 1971).

From 1924 to 1931 45% of the mine production was direct shipping ore, indicative of the ore's spectacular quality. The mill expanded to 500 tpd in 1933 after which all ore was milled. B.C. Silver and the Northern Light deposit came on stream after 1935.

On January 1, 1936 Silbak Premier Mines Ltd. was formed by the amalgamation of Premier Gold Mining Company with B.C. Silver Company (owners of B.C. Silver Ltd. and Sebakwe and District Mines Ltd.); prior to this, the operations were independent. Life was added to the mine in 1940 when the Northern Light orebody was discovered. Labour shortages and disputes plagued the mine from 1943 to 1946. ASARCO withdrew from the management position at Silbak Premier in 1947. In the same year the aerial tramway (at that time the world's longest) which carried ore from Silbak Premier to the Portland Canal dock was abandoned due to the cost of repairs and was replaced by truck haulage.

Indian Mines Ltd. reached a milling agreement with Silbak Premier in 1950 and ore production began in 1951. Low base metal prices in 1953 forced closure of the mine. In 1955, an exploration program aimed at increasing reserves was conducted, and the mine re-opened in 1956 but only one month later fire destroyed the mill. In 1959 a one year lease was granted for ground above 2-level, including the Glory Hole wall which Silbak Premier Mines Ltd. believed contained no significant ore. A Bonanza high grade ore lens was discovered by the lessees, containing electrum and ruby silver and was mined from 1959 to 1960.

A new 75 tpd mill and cyanide plant was constructed at 6-level portal in 1964 but was never brought to full capacity and ceased operation in 1967. In 1968 the mine closed and has remained inoperative. Currently, Westmin Resources Ltd., Pioneer Metals Corporation and Canacord Resources Inc.are constructing a

2,000 tonnes per day mill to extract the low grade, bulk tonnage ore.

REGIONAL GEOLOGY

Regional geological studies of the Silbak Premier area were initiated by Schofield and Hanson (1922), fifty years later Grove (1971) provided more detailed descriptions. More recently Alldrick and Alldrick and others (1983 to 1988) have published several papers on the area. Anderson (GSC, Current Research, 1988) has reviewed the regional stratigraphy, plutonism and structural framework based on his remapping of the Iskut map sheet.

PROPERTY GEOLOGY

The deposit is hosted in Late Triassic to Early Jurassic andesitic to dacitic volcanic rocks, correlated with the Hazelton Group, Telkwa Formation (Brown, 1987). The ore is hosted by monotonous, massive aphyric andesite, monolithic andesite breccia and lapilli tuff, and dacite porphyries. The andesite, at least 750 metres thick, is intruded by Early Jurassic Texas Creek plutonic suite porphyries and is unconformably overlain by volcaniclastic and epiclastic rocks. The mixed green and maroon, heterolithic volcaniclastic rocks form the bulk of the Bear River ridge directly east of Silbak Premier.

The green weathering andesites are propylitically altered with ubiquitous disseminated pyrite and foliated chlorite and sericite. The least altered samples contain small (< 1 millimetre

long) plagioclase and hornblende phenocrysts in an aphanitic groundmass. Rare amydules are evident in drill core (P. Wodjak, personal communication, 1986). The most characteristic feature of the andesite package is the pervasive carbonate, chlorite, and clay alteration around the Silbak Premier deposit.

There are three varieties of porphyritic dacite: (1) Potassium feldspar porphyry, (2) Hornblende-plagioclase porphyry, and (3) Maroon porphyry. They are hypabyssal members of the Texas Creek plutonic suite. Porphyry characteristically is blocky weathering and less foliated than the andesite or tuff. The potassium feldspar porphyry historically know as "Premier Porphyry", for varieties of green weathering potassium feldspar-quartz-hornblende-plagioclase porphyry spatially associated with ore at Silbak Premier. Hornblende-plagioclase porphyry is texturally similar to potassium feldspar porphyry but contains few or no quartz or potassium feldpsar phenocrysts. Maroon porphyry is distinct with a maroon to purple groundmass. It is higher structurally and all known mineralization lies stratigraphically and structurally below it.

Structure:

The dominant structures at Silbak are pencil lineations, extensional white barren quartz veins and joints. Bedding attitudes are limited, an overall moderate northwest-dipping section has been established based on drill results and sparse and controversial surface data. A pervasive northwest-dipping phyllitic chlorite-sericite foliation is best developed in andesites. Ore is predominantly discordant but locally concordant

with the moderately northwest-dipping andesite flows, breccias and dacite sills/flows (?). Narrow zones, less than 2 metres wide, of easterly-striking, steeply-dipping planar fabrics are exposed locally. Heterolithic epiclasts in a few outcrops are elongated and are colinear with the pencil lineations.

ORE, GANGUE AND ALTERATION

There are at least four styles of mineralization. Sulphide content varies, generally less than 5% but can be as high as 75%. Textures range from stockwork and siliceous breccia to local layered to massive sulphide-rich mineralization. Such ore diversity is an indication of the complex and episodic nature to ore deposition at Silbak Premier.

Ore minerals:

Ore minerals include pyrite, sphalerite, galena, with minor tetrahedrite, chalcopyrite and local pyrrhotite. Bonanza ore contains native gold, electrum, silver sulphosalts and native silver.

Gangue:

Gangue minerals are quartz, potassium feldspar, chlorite, carbonate and others.

Alteration minerals:

Hydrothermal alteration zones related to the mineralizing system are represented by a proximal silicification/quartz stockwork and potassium feldspar and/or sericite facies potassic alteration. Peripheral to mineralization is a propylitic alteration assemblage of carbonate, chlorite and pyrite. The

variable intensity and type of alteration is partially controlled by fracture intensity and host lithology, and presumably, elevation in the hydrothermal system.

ORE CONTROLS

Mineralization at Silbak Premier occurs along two trends; (1) a steeply northwest-dipping, at surface but moderate dipping at depth (6-level), "northeast-zone", and (2) a steep to vertical "northwest zone". Most production came from within about 500 m of the intersection of these two zones. These trends are believed to represent structural controls to mineralization and emplacement of dacite porphyry intrusions.

MODEL

A hybrid ore genesis model combining epigenetic vein and porphyry copper characteristics compare well with features observed at Silbak Premier.