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GEOLOGY AND MINERALIZATION IN THE TULSEQUAH-TAKU RIVER AREA

Northwestern British Columbia

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The Tulsequah-Taku River area in northwestern British Columbia has been the scene of prospecting and mining periodically since the discovery of gold along the Taku River as early as 1875 and during the Klondike Rush of 1897-1898. Despite mining operations at the Polaris-Taku, Tulsequah Chief, and Big Bull mines between 1937 and 1957, road access into the area has not been established. When mining ceased, due primarily to low metal prices, reserves remained which have recently become the attraction for a 'modern' search for both precious and base metals. Also, rapidly receding glaciers have left new exposures leading the discovery of new showings eg. Maple Leaf.

The area is underlain by rocks of the **Stikine Terrane** where it abuts against gneisses of the **Tracy Arm Terrane** to the south and the **Nisling Terrane** to the northwest, and plutonic rocks of the Coast Plutonic complex. Stikine Terrane rocks include proximal facies andesitic island arc volcanics that are believed to be age equivalent to the late Paleozoic tuffaceous and argillaceous sedimentary rocks near Tatsamenie Lake. The Paleozoic volcanic-sedimentary packages near the Tulsequah-Taku River confluence are exposed in four distinct fault-bounded blocks, each of which contains a discrete lithological suite. The Mount Eaton-Mount Ericksen blocks comprise the **Tulsequah sequence**, which hosts the volcanogenic massive sulphide deposits, and is dominated by **massive and pyroclastic andesitic** with minor interbedded rhyolitic rocks in a section **at least 5 km thick**. About ten per cent of the sequence consists of interbedded, characteristically discontinuous, sedimentary units. **Fusulinids** of **Middle Pennsylvanian age** occur in limestone units **intercalated with** massive andesite in the Tulsequah sequence and are interpreted to stratigraphically overlie the massive sulphide deposits. Galena lead isotope interpretation of data from the Tulsequah Chief deposits gives a ~~Devonian~~ (?) age for the volcanogenic massive sulphide deposits in the area. An analogy is made to the Myra Falls deposits

needs refining (tos)

(Yes! Jan. 8/92 Cominco zircon date from rhyolite = 352 Ma (L. Miss.) i.e. deposit(s) in core of anticline.

on Vancouver Island. During periods of quiescence in andesitic volcanism, several sedimentary basins, reefs, and rhyolite eruptive centres developed in several stratigraphic levels, in part controlled by synvolcanic growth faults, for example at Tulsequah Chief. Volcanogenic massive sulphide deposits of the Kuroko-type formed on the sea floor near the transition from andesitic to rhyolitic volcanism.

Upper Triassic, including the regional Sinwa Formation limestone marker horizon, and younger strata in the Taku embayment to the east reflect folding and thrusting tectonically related over a moderately long time interval. During the latter stages of deformation of rocks in the Taku embayment, the Sloko Group of Late Cretaceous to Early Tertiary age formed, in part related to intrusion of medium to high level plutons and stocks, eg. Mt. Ogden. Plutonic rocks of Early Triassic to Early Tertiary age intrude the Tulsequah sequence.

Rocks in the Tulsequah sequence have been affected by lower greenschist metamorphism with cleavage and bedding trending predominantly northerly with dips to the west. Tight folding occurs with north-northwest trending axes. The Tulsequah Chief deposits lie on the westerly limb of a north-plunging anticline. Late stage faulting has produced moderate right-lateral displacements. The regional Chief Fault is postulated to have offset what was once a composite felsic centre which hosted the Big Bull and Tulsequah Chief massive sulphide deposits.

Previous mining in the area, from the Polaris-Taku, Tulsequah Chief and Big Bull mines, is valued at approximately $240 million; current mineral inventories add an additional $1,160 million (in 1990 dollars). Typical regional alteration and mineralization zoning patterns are associated with the many known deposits.

The Tulsequah Chief (and Big Bull) deposits produced, between 1951 and 1957, approximately 1 million tons of ore yielding 44,254 ounces gold, 3.4 million ounces silver, 13,603 tons copper, 13,463 tons lead, 62,346 tons zinc, and 227 tons cadmium. At least eight separate, conformable lenses of massive, py-cp-sp-gn-tet with significant gold and silver values in a q-sc-ba-ah gangue occur over a strike length of 500 metres in the 'Mineral Horizon', a transition zone consisting of dacitic strongly altered and rhyolitic pyroclastics with fine cherty tuff and mud interbeds between footwall andesitic and hangingwall acidic pyroclastic rocks. This sequence has been intruded by post mineral diorites and

dacites of unknown age interpreted to be subvolcanic and by Tertiary rhyolitic dykes. Historically, ore shoots average 40 feet in thickness. DDH-90-22 intersected a possible new 'H' lens which assayed 2.98% Cu, 1.6% Pb, 9.1% Zn, 0.11 opt Au, and 5 opt Ag over 164 feet. Geological reserves for the deposit were estimated by Redfern Resources in 1989 at 5.8 million tons grading 1.6% Cu, 1.31% Pb, 7.03% Zn, 0.08 opt Au and 2.93 opt Ag.

The Polaris-Taku gold mine produced, between 1937 and 1951, 753,255 tons of ore yielding 231,604 ounces of gold at grades between 0.25 and 0.6 opt gold, ore shoots, occurring in shear zones in veins, associated with Sloko Group (Tertiary) dykes, range from 1 to 15 feet in width. Gold occurs in arsenopyrite $\pm$ associated stibnite in andesite and silicified tuffs. Gangue minerals include fuchsite and iron carbonate. Current reserves are estimated at 1.18 million tons grading 0.44 ounces gold per ton.

A belt of several small intrusions (Lester Jones Intrusions) cut rocks of the Taku embayment. Associated with these are broad zones of alteration, dominated by pyrite and carbonate with veins containing quartz, carbonate, and a wide variety of sulphides, suggestive of a porphyry to mesothermal vein 'transitional' setting. The Red Cap prospect is an example of a potential large polymetallic porphyry system.

The Mt. Ogden porphyry molybdenum-tungsten deposit is hosted by a Cretaceous to Tertiary age, high-level, Na-rich alaskite which intrudes schists and gneisses. Between 1978 and 1981, some 2.2 million dollars were spent exploring this deposit which yielded surface grades of 0.2 to 0.3% MoS_2. One high grade vein is estimated to contain 30,000 tons of 1.85% MoS_2.

TS:JB

NWBC.DOC

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ESKAY CK.

J. Blackwell

Conf. Juneau '91

Apr. 17/91

Pathfinder Zone of 21 B

ZnS-tetra-cpy

(no bournonite or boullangerite)

= good VMS + barite

→ To north along Pathfinder fault zone = greater displacements of rk. units.

– Incredible chlorite alt'n right below MS

i.e. syndc. structure (proximal VMS)

Contact Lens = clastic-turbidite facies along struc. corridor.

Tok frac. ~ 3% of total contained Au (Adrian res.)

Tul. Chief (Randal Aulis)

(Chris Marriott) $0 C ABIS TAKU

Projection

84K Au/yr @ 600tpd

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