# COMINCO-REDFERN TULSEQUAH CHIEF MASSIVE SULPHIDE DEPOSIT, NORTHWEST BRITISH COLUMBIA

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The Tulsequah Chief property is located near the confluence of the Tulsequah and Taku Rivers in the Coast Range Mountains of B.C., 100 km south of Atlin B.C. and 65 km northeast of Juneau, Alaska. The property was first staked in 1923 following the discovery of a high grade lens of pyrite, barite, sphalerite, galena and chalcopyrite. Cominco Ltd. acquired the deposit in 1946 and placed it and the adjacent Big Bull deposit into production in 1951 at a rate of 530 tons/day. The mine was closed in 1957 due to low metal prices.

Production from 1951-1957 was 625,781 tons from the Chief and 403,308 tons from the Bull at a combined average grade of 0.11 oz/t Au, 3.69 oz/t Ag, 1.59% Cu, 1.54% Pb and 7.0% Zn. At shutdown, ore reserves in the Chief to the 5100 level were estimated at 780,000 tons at 0.07 oz/t Au, 2.9 oz/t Ag, 1.3% Cu, 1.6% Pb and 8.0% Zn. Recent drilling has discovered two new sulphide lenses and extended others. Average spacing of drill hole penetrations is too widespread to infer hole to hole correlation with a high degree of confidence.

The Tulsequah Chief deposit occurs in a northeasterly striking, west dipping sequence of Pre-Permian, submarine, volcanic-sedimentary rocks located on the west limb of a north plunging anticline. The anticline is delineated by a mixed limestone, chert, clastic sequence containing Pennsylvanian-Permian fossils. This sequence occurs stratigraphically above the Chief deposit. Pre-Permian pyroclastics, clastics, limestone and chert. All rocks are intruded by Paleozoic diorite and dacite, and Tertiary rhyolite plugs, sills and dykes. A major regional fault cuts off the west extension of the Tulsequah Chief stratigraphy.

The Tulsequah Chief deposit is located along the base of a thick lenticular mass of dacite-rhyolite pyroclastics near the contact with an underlying thick sequence of basalt-andesite pyroclastics and flows. The deposit is broken into four blocks by north-south striking, steeply dipping faults, all of which were initially synvolcanic growth faults which created a seafloor graben that was active during deposition of the sulphide lenses.

Mineralization occurs in conformable lenses consisting of pyrite (15-80%) with varying amounts of sphalerite, galena, chalcopyrite, gold, silver, barite and gypsum. These lenses occur along a 700 m strike length in a lithologic package known as the mineral horizon. The mineral horizon consists of altered, intercalated dacite-rhyolite tuffs, muds, cherty tuffites, and cherts intermixed with altered dacite-rhyolite lapilli tuffs.

Alteration in the mineral horizon consists of primarily of sericite and pyrite (10-80%). Weak sericite-pyrite (<5%) alteration and patchy anastomosing zones of silica veins and pervasive silicification extend for distances up to 30 metres above the mineral horizon into the overlying dacite-rhyolite pyroclastic package, indicating hydrothermal activity continued after the main phase of sulphide deposition. The mineral horizon is underlain by a

discordant alteration pipe which is centered on the graben, crosscuts stratigraphy, can be traced on surface for 1 km and occurs primarily in andesite volcanics. Alteration in the pipe is concentrically zoned outward from a sericite-pyrite (15-25%) core through a transition zone of biotite (phlogopite)-pyrite (15-20%) to an outer zone of chlorite-pyrite (5-10%).

The intimate spatial relationship of the mineralized lenses with the same package of volcanic rocks indicates that sulphide formation was an integral part of, and related to volcanism. The Tulsequah Chief is typical of the rhyolite associated massive sulphide class of deposits with its closest analogue, Westmin's HW deposit on Vancouver Island.