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THE TULSEQUAH MINING CAMP

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by

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SLIDE 1

HISTORY, LOCATION AND ACCESS

The Tulsequah mining camp is located in northwestern British Columbia approximately 80 km (50 miles) northeast of Juneau, Alaska, near the junction of the Taku and Tulsequah Rivers. The lower 32 km (20 miles) of the Taku River is in Alaska. The mining town of Tulsequah grew up in the late 1920's. Prior to its inception, gold had been discovered along the Taku (Tacoo) River as early as 1875, and during the Klondike Rush of 1897-98, the Taku River was used by prospectors as a route to the Interior. The town of Tulsequah had a former customs station, an airport, and acted as a supply depot between the coast and the interior. During mining, a regular river-boat service operated on the Taku River between Juneau and Tulsequah and a motor road connected the landing with the camp and mines. An airstrip located by the Polaris-Taku mine maintained twice-weekly flights to Atlin. When mining in the Tulsequah camp ceased in 1957, all services ceased and 300 people moved out.

PREVIOUS GEOLOGICAL WORK

Previous geological work in the area was carried out by Cockfield (1926), Kerr (1932), Aitken (1955) and Souther (1958-60).

SLIDE 2 + 3,4,5

PHYSIOGRAPHY

The predominent northwesterly trend of the Boundary Ranges is interrupted by the broad Taku River valley which is apparently relatively free of fog making access a little easier. Peaks are steep and rugged and total relief is 1520 metres (5000 ft.) to 2130 metres (7000 ft.).

SLIDE 6 + 7,8,9,

Of great economic significance during the operation of the mines was the yearly action of Tulsequah Lake, a self-dumping glacier-dammed lake, located 20 km (12 miles) above the mouth of the Tulsequah River. The

lake is normally 4.8 km (3 miles) long by 0.9 km (.5 mile) wide and is dammed at one end by a short tributary to the Tulsequah Glacier. The lake fills to 60 metres (200 ft.) to 106 metres (350 ft.) when water suddenly drains out violently underneath the ice and discharges at the toe of the Tulsequah Glacier. Over a period of three days or less 8,000 to 13,000 million cu. ft. of water runs in the Tulsequah River creating a catastrophic flood with chaotic piles of broken ice. The townsite at Polaris-Taku, the roads from the town to the mill and from the mines to the mill, as well as all the bridges would be destroyed. This cycle apparently has occurred annually since 1942 and periodically over 65 years.

GLACIATION

During glaciation, ice converged on the Taku Valley from the northeast and the southeast and flowed southwesterly. Today glaciers are receeding at a rapid rate leaving new exposures.

SLIDE 11 + 12

GENERAL GEOLOGY

Very briefly the layered rocks in the Tulsequah area can be divided into two main subdivisions which are separated by a major unconformity below the Upper Triassic. The "lower" division, which hosts most of the known mineral prospects, consists of intensely folded and regionally metamorphosed volcanic and volcaniclastic rocks of Permian and Middle Triassic age as well as older strata of unknown age. The "upper" division is composed of much more sedimentary rocks which have undergone minor folding and have not been regionally metamorphosed. Sedimentary rocks show marked facies changes from off-shore types in the northeast to near-shore types in the southwest.

Granitic rocks ranging in age from Mesozoic to Tertiary have intruded the sequence.

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DETAILED GEOLOGY

Orebodies in the Tulsequah camp occur mainly with Upper Triassic Stuhini Group volcanic rocks which lie unconformably on Paleozoic volcanic and sedimentary rocks. The Upper Triassic opened with intense and widespread volcanism and closed with abundant sedimentation. Deformation and erosion continued throughout. The Stuhini Group consists of a basal conglomerate overlain by at least 3650 metres (12,000 ft.) of thick andesitic flows and pyroclastic rocks interlayered with coarse breccias, volcanic conglomerate, and lesser amounts of greywacke and siltstone. The Sinwa Formation limestone, a most useful marker horizon, lies unconformably on Stuhini Group rocks. A great variety of granitic rocks occur within the area.

STRUCTURE AND TECTONIC HISTORY

The structures observed in the Tulsequah area are related to 3 main episodes of tectonic activity which culminated in 1) Mid to Upper Triassic, 2) Upper Jurassic, and 3) Early Tertiary time. Each episode was marked by a major unconformity. During Mid-to Upper Triassic time, uplift, metamorphism, and granitic intrusion were prominent.

As mentioned earlier, Triassic time was a period of active and widespread volcanism, deformation, and granitic intrusion, which produced several mineral prospects in the area.

Two major fault directions exist - 1) Northwest (Tulsequah) Faults, and 2) Northeast (Taku) Faults. Some faults have been traced over 25 km (15 miles) and may consist of a series of parallel breaks.

MINERALIZATION AND GEOLOGICAL ASSOCIATIONS

1) Base metal replacement bodies with significant amounts of gold and silver occur in sheared Stuhini volcanic rocks (eg. Tulsequah Chief

and Bull), in sheared Permian limestone (eg. Erickson-Ashby), and in quartz feldspar porphyry bodies cutting Stuhini volcanic rocks. The zones parallel the local structure and usually lie in or close to the axes of minor folds. The country rock is highly silicified, carbonatized, and albitized and contains abundant disseminated pyrite. Principal ore minerals are chalcopyrite, sphalerite, galena, and tetrahedrite. Auriferous arsenopyrite is the main ore mineral at the Polaris-Taku mine. Gangue minerals include quartz, calcite and barite.

2) "Porphyry"-type copper and/or molybdenum prospects (eg. Moly-Taku, Bing).

ALTERATION ZONING?

In the Tulsequah area molybdenum prospects are found near the "tops" of intrusions and copper ± molybdenum prospects are also found in small stocks. Copper-lead-zinc prospects are found in altered wallrock adjacent to felsite cupolas. In the outer part of altered zones (i.e. above the actual intrusion) veins of stibnite and barite are abundant.

SLIDE 14 + 15, 16, 17, 18, 19, 20, 21, 22, 23, 24

POLARIS-TAKU MINE (WHITEWATER)

The Polaris-Taku gold mine, located approximately 12 km from the mouth of the Tulsequah River on its west side, was discovered in 1929, actively explored in 1931, and produced 753,255 tons of ore (including 231,604 oz. Au) @ 0.25 to 0.6 oz./ton Au between 1937 and 1951 with the exception of the war years from 1942-46. Ore deposits are located in shear zones containing numerous (more than a dozen)replacement veins with gold values occurring over widths from 1 ft. to 15 ft. (av. 8 ft.). Gold occurs in fine needles of arsenopyrite disseminated in green massive andesite and

and silicified tuffs alternating with phyllite and schist. Ore minerals include arsenopyrite, pyrite, stibnite, and free gold. Gangue minerals include ankerite, silica, and fuchsite. Mineralization in contained in a 600 sq. metres (2000 sq. ft.) area. Oreshoots pinch and swell from 50 to 800 ft. in length with widths up to 35 ft. Vertical continuity extends for at least 400 ft. Estimated reserves (1950) were 145,636 tons @ 0.4 oz./ton Au.

SLIDE 25 + 26 → 47 incl.

TULSEQUAH-CHIEF

The Tulsequah-Chief mine is located approximately 15 km (8 miles) above the mouth of the Tulsequah River on its east side. Prospectors were attracted to the area by a prominent brown-yellow bluff and discovered the property in 1923. Two altered shear zones occur over 900 metres (3000 ft.) apart, both on anticlinal structures within Stuhini volcanic rocks which have been intruded by a wedge of quartz feldspar porphyry. Alteration is associated with large felsite dykes and northeasterly trending faults. Mineralization consists of massive, fine-grained pyrite plus chalcopyrite in lenses and sphalerite, pyrite and galena in dense quartz-carbonate-barite gangue. Oreshoots pinch and swell with an average width of 40 ft. This copper-zinc prospect returned assays ranging from: Cu: <1% to 14%; Zn: 2 to 10%; Pb: minor; Au: 0.1 to 0.3 oz/ton; and Ag: 1.6 to 15 oz,/ton.

Between 1951 and 1957 Cominco produced 1,029,089 tons or ore, yielding 44,254 oz. Au; 3,400,773 oz. Ag; 13,603 tons Cu; 13,463 tons Pb; 62,346 tons Zn; and 227 tons Cd from both the Tulsequah-Chief and Big Bull mines.

SLIDE 48 + 49 → 57 incl.

BIG BULL (MANVILLE)

The Big Bull mine, located 5 km (2 miles) north of the old town of Tulsequah, was discovered in 1929 and worked on during 1930. It is

nearly identical to the Tulsequah-Chief mine with mineralization occurring in altered shear zones within Stuhini volcanic rocks, slightly higher in the section than at Tulsequah-Chief. On the surface, the prospect was exposed over a length of 900 ft. with a maximum width of 27 ft. Oreshoots pinch and swell. Ore fluids were controlled mainly by faulting, but may also have been dammed by a tuff overlying the host massive fragmental mine volcanic rock. Grades ranged from 0.1 to 0.2 oz./ton Au; 6 to 7.5 oz./ton Ag; 1.6 to 2.8% Cu; and 12 to 20% Zn.

The mine was operated by Cominco during 1951-57 and closed due to low metal prices.

The ores from the Tulsequah-Chief and Big Bull mines were milled at the Polaris-Taku site.

SLIDE 58 + 59, 60, 61, 62

ERICKSON-ASHBY

The Erickson-Ashby prospect, located approximately 4 miles northeast of the old town of Tulsequah on the east side of Taku River, was first staked in 1929 and had a good deal of work done on it up until 1932. Work was intermittent until 1964 when an extensive diamond drill program was carried out.

Pyrite, sphalerite, galena, minor chalcopyrite, and minor freibergite occur as massive sulphide replacement "patches" in discontinuous limestone sheets (produced by folding) lying immediately below Stuhini volcanic rocks, which are cut by a large tabular body of fine grained quartz monzonite. At least three such "patches" occur on a steep wall - the largest one being 400 ft. by 100 ft.

SLIDE 63 - Geol. map + 64 →

MOLY-TAKU (NAN)

The Moly-Taku molybdenum prospect, located approximately 25 km southeast

of Tulsequah near Mt. Ogden, has been explored intermittently since the 1960's. Difficult access and rugged terrain have precluded any major previous exploration development; however, during the past two years the prospect has been mapped and sampled with the aid of mountain climbing equipment. An irregular body of light coloured Cretaceous-Tertiary quartz monzonite porphyry intrudes a sequence of Permo-Triassic metasedimentary and metavolcanic rocks, which include tactite, a diabase sill, and a thin-to-thick-bedded sequence of shales and carbonates. Molybdenite occurs in quartz veinlets and as fine desseminations within the porphyry and locally within the tactite

Impressive float observed on active glaciers and also in outcrop in near-inaccessible rock bluffs are suggestive of a major molybdenum-bearing body in the area which will necessitate much more work.

SUMMARY

The presence of base metal replacement type massive sulphide deposits, carrying significant amounts of gold and silver, and copper and/or molybdenum deposits attest to the economic potential of the once famous Tulsequah mining camp. However, access to and from the area, both during exploration and mining stages, would have to be a major consideration in any exploration plan.

The Tulsequah camp has produced over 1.75 million tons of ore from the Polaris-Taku, Tulsequah-Chief, and Big Bull Mines, including 236,000 ounces of gold.

Today the camp is idle and there are no permanent residents of Tulsequah. Salvage operations have been underway at the Polaris-Taku mine for the past few years now, however, equipment lies idle at the Tulsequah-Chief and Big Bull Mines.

I believe that under favourable political, economic, and access conditions the Tulsequah camp should be thoroughly re-investigated for potential precious and base metal massive sulphide replacement type orebodies, particularly with a more fundamental understanding of detailed lithology and ore controls for mineralization of this type.

It is tempting to correlate the massive sulphide bearing Triassic section of the Stuhini Group with the Nikolai greenstone and Amphitheater Group of south central Alaska, and others in southeastern Alaska and the Karmutsen Group of B.C.

The Alaska Juneau and Treadwell gold deposits located in the Juneau gold belt to the southwest of Tulsequah produced more than 120 million tons of relatively low-grade gold ores (eg. 0.04 oz./ton) between 1885 and 1944, yielding close to $150 million.

The total production of ores from the Tulsequah camp equalled greater than $150 million at todays metal prices.

Update (Apr. '91): - Previous mining ~ $240 million
- 'Reserves' ~ $1,160 million (1990 dollars)