GEOLOGY OF THE BEARSKIN (MUDDY) LAKE, TATSAMENIE LAKE DISTRICT, NORTHWESTERN B.C.;

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SHEET A: NORTHEASTERN QUADRANT

The map sheet extends across the extreme northeastern portions of the project area. Much of the rock underlying this portion of the map area is an upper Triassic granodiorite which has been U-Pb dated at 218±3.6 Ma (Oliver and Gabites, 1993). Isolated volcanic roof pendants are also present. Additional geological highlights include:

1. A porphyry copper-molybdenum occurrence has been mapped across the eastern portions of the map area. Preliminary unpublished zircon age data for this intrusion indicates that it is upper Triassic in age and about 2.0 Ma years younger than the surrounding granodiorite batholith. Copper-molybdenum mineralization in this zone occurs as classical porphyry style fracture controlled veinlets and disseminations. This mineralized intrusion is tentatively named the Icy Pass Porphyry.

2. The upper Triassic hornblende diorite which hosts porphyry copper-molybdenum mineralization is cut by a younger quartz-feldspar and biotite porphyry intrusion. Semi-massive stibnite and gold mineralization is associated with this younger intrusive phase. These younger porphyritic intrusions may be correlated with the upper Cretaceous to Tertiary Sloko intrusions.

3. Contact relationships between the large dioritic to gabbroic intrusive body, located in the extreme northeastern portions of the map area, and the enclosing granodiorite are poorly constrained. This rock may be simply a more mafic phase of the larger granodiorite body.

SHEET B: NORTHWESTERN QUADRANT

This map sheet covers the northwestern portions of the map area. The following points are relevant to the interpretation of the lithologic and structural relationships shown on this map:

• 1. In the extreme southwestern corner of the map Pennsylvania to Permian age rocks are exposed in the core of a large regional antiform, the Tatsamenie antiform. Felsic volcanics rocks, exposed at the south end of Tatsamenie Lake, have been dated at 307±2Ma (Oliver and Gabites, 1993). The older felsic rock package structurally overlies younger Permian age carbonates. The contact is a south verging thrust.

• 2. Felsic rocks in this area have an unusual map pattern. Rapid changes in the orientation of early linear rock fabrics and the development of an unusual north trending lobe, a weak Type 2 interference pattern, clearly indicates that these rocks have been deformed by a second fold structure. These younger folds typically trend north-northeast, have moderate northeast directed plunges and are upright.

• 3. An unconformable contact relation is shown in the west central portions of the map area. Highly foliated and strongly actinolite porphyroblastic pre-middle Triassic rocks are overlain by non-foliated, weakly deformed volcanic and sedimentary rocks. These rocks are likely correlates of the upper Triassic Stuhuni group.

• 4. A large zone of hydrothermal alteration, approximately 14 square kilometres in extent outcrops from the central to the northeastern portions of the map area. The rock modifier “ak” (ankerite) defines in part the distribution of iron carbonate. This mineral is the principle alteration product and forms a bright orange-buff weathering zone. Green micas, secondary silica, secondary potassic feldspars and pyrite are also important mineral assemblages. The alteration zone does not appear to track the contact of the main granodiorite body exposed on the northern portions of the map area. Rock alteration is likely related to the emplacement of several smaller diorite to granodiorite stocks and the presence of several large extensional faults which are located in this area. One of these large faults, which strikes east-west and dips subverticaily, is enveloped by an alteration zone up to 50 metres in width. For up to 100 metres on either side of this fault drag folds deform the rock and rotate supracrustal rocks into this fault zone. Fracture controlled copper mineralization may be identified at several locations within this alteration zone and limited data also suggests that a few of the smaller stocks may host porphyry style mineralization.

SHEET C: CENTRAL QUADRANT

Most of the volcanic rocks shown on this map are strongly porphyroblastic. Actinolite, biotite, albite and sometimes hornblende are formed from a mafic volcanic protolith. This metamorphic assemblage is not related to contact effects along the western margin of the granodiorite batholith. Most of these rocks have two cleavages. The younger of these is best identified petrographically and is present as a weak crenulation cleavage. Some rotational fabrics, and pressure shadows are associated with larger porphyroblasts. These are not interpreted as S/C fabrics.

Other features of interest on this map sheet include:

• 1. Ultramafic bodies are exposed in four areas on this map. Although no isotopic age constraints may be imposed on these rocks, they are likely younger than the upper-Triassic. These rocks, are olivine-pyroxene - magnetite Alaskan style intrusions. Near major fault zones they are extensively serenitizined and carbonitized. These rocks were initially interpreted by Oliver and Hodgson (1990) as part of a poorly preserved and dismembered ophiolite. This interpretation has been revised based on updated petrographic data, on the development of a broader geological map base and a revision in the interpretation of field relationships.

• 2. The large north trending fault zone which traverse
the central portions of the map area is a continuation of the Bear Fault system which hosts gold mineralization at the Golden Bear deposit, 10 kilometres to the south. This structure is not well exposed on the north side of Tatsamenie Lake. Based on offset stratigraphy, the last movement across this fault is dextral and rotational.

- 3. Contact relations for the intravolcanic limestone unit shown on the west central portions of this map are weakly constrained and have been identified at only three geological stations. This unit does not appear to cross the north trending Bear Fault defined in the central portions of the map area.

- 4. The extreme western contact of the isolated granodiorite body in the north-central portions of the map area is weakly constrained by available field relations. Offsets of this rock mass across the northern extension of the Bear fault have not been determined.

- 5. A northeast trending synform-antiform couple is shown on the extreme southern edge of this map area. The antiform is the northern extension of the Sam Creek antiform. Its position is well constrained by both lithology and rock fabric orientations. The position of the synform is defined by the rapid rotation of early linear rock fabrics across the axial surface of the younger synform.

**SHEET D: SOUTHERN QUADRANT.**

Several complex geological relations are shown on this map. The present contact patterns have been strongly influenced by a minimum of two folding events and by both contractional and wrench faults. Significant geological and structural features on this map include:

- 1. The large mass of Permian carbonate rocks shown in the central portions of the map have been deformed into a large north trending antiform, the Tatsamenie antiform. This fold has a south directed plunge in the southern portions of the map area. To the north, plunges reverse. This reversal is caused by the interaction of a younger northeast trending antiform, the Sam Creek antiform with the older Tatsamenie antiform. The tear drop shaped map pattern of the Permian carbonate rocks is interpreted as a map scale Type 1 to 2 interference pattern.

- 2. The northern contact of the Permian succession with the overlying supracrustal rocks occurs across a south verging thrust. This contraction fault places an older felsic volcanic rock package dated at 301.8 ±2/4 Ma (Oliver and Gabites, 1993) on top of Permian carbonate rocks. These felsic rocks are correlated with the felsic volcanic rock package dated at 205±7 Ma to 179±6 Ma (Schroeter, 1987). The formation of the antiform predates the activation of this fault.

- 3. The Sam Creek antiform deforms early rock fabrics and lithology into a northeast plunging antiform. It does not deform the north trending Bear Fault system. K-Ar dates on sericite, formed in association with this fault, suggest that rocks are hydrothermally altered between 205±7 Ma to 179±6 Ma (Schroeter, 1987). The formation of the antiform predates the activation of this fault.

- 4. The Golden Bear deposit, located just north of Bearskin (Muddy) Lake, is bounded to the east by a non-mineralized gabbro and to the west by Permian carbonates. Mineralization forms in dilatant fault zones localized to carbonate-chert-and sulphidized mafic volcanic contacts. Prior to the initiation of mining, the deposit was estimated to contain 625 000 tonnes of 18.63 grams per tonne gold (Oliver and Hodgson, 1989).

- 5. Immediately west of the Golden Bear deposit, map scale second phase folds and interference structures are developed. These structures are believed to have formed at the same time as the larger Sam Creek antiform.

- 6. Several splays or strands of the Bear Fault are shown on this map. Many of these are associated with zones of strong iron carbonate development, sericite, pyrite and green micas or clays. Some of these structural zones, notably the Fleece Zone located 2.0 km's north of the Golden Bear mine, are also mineralized. The orientation of second order fault splays and the morphology of mineralized zones suggests that at the time of mineralization movement along the Bear Fault system was sinistral and reverse.

**REFERENCES**


