GEOLOGY OF THE SPIDER CLAIM GROUP ON LONG LAKE (104A/4)

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INTRODUCTION

This study describes geology and mineralization in the vicinity of the 'Glacier Creek augite diorite intrusive' and the Spider claim group (Mineral Inventory 104A-010). The work included detailed mapping (1:10 000) of a 1.5-square-kilometre area surrounding the Spider workings. The main adit was blocked by snow but sulphide-bearing samples from dumps near the upper and lower adits were collected for study. Augite porphyry from the lower adit was collected for radiometric dating and whole rock analysis. Grab samples of pyritic strata were submitted for assay.

HISTORY

The Spider claim group, Lots 4172 to 4174, was first staked in 1918 by Bill Hamilton and Charlie Larsen of Stewart. Trites & Wood, part owners of the Premier mine, optioned the property in early 1919 but did little work on it. Later that year the option was acquired by the Algunican Development Company of Brussels, Belgium. In 1920, under the local management of W. A. Meloche and the supervision of John Hoveland, a camp was constructed on the Spider property to carry out exploration including: diamond drilling, two open cuts on an exposed vein, and a 215-metre adit on another vein. These excavations are still intact. Algunican Development dropped the option at the end of 1920.

In 1924, the claims were Crown-granted to Hamilton and Larsen. B.C. Bonanza Mines Limited optioned the ground in 1925 and mined and shipped 6.35 tonnes (7 tons) of ore with grades averaging 15.4 grams gold per tonne (0.45 troy ounce per ton) and 12 700 grams silver per tonne (371 troy ounces per ton), with some lead and zinc values. Exploratory work was done on two new veins.

In 1933, the property was allowed to lapse for taxes and was purchased from the government by Theo Collart and associates of Prince Rupert. The property was then leased to O. McFadden and another Stewart miner, who mined a total of 15.9 tonnes (17.5 tons) over the next three years with grades averaging 13.7 grams gold per tonne (0.40 troy ounce per ton) and 6 400 grams silver per tonne (188 troy ounces per ton).

As of May, 1984, Marie Burnett of Stewart owned Lot 4172, Spider No. 1 claim, and Carl E. Wickstrom of Vancouver owned Lots 4173 and 4174, Spider Nos. 2 and 3 claims.

REGIONAL GEOLOGY

The region lies near the western edge of the Intermontane Belt close to the contact with the Coast Plutonic Complex. The Spider claim group is at the contact of the Betty Creek and the Salmon River Formations (Grove, 1983) or of map units 2, 3, and 4 of Alldrick (this volume). Fossils indicate that the strata are of Middle Jurassic age (Grove, 1973). The older Betty Creek Formation consists of red, purple, green, and black volcanic breccia, conglomerate, sandstone, and siltstone, described following as unit 2. The Salmon River Formation (Grove, 1983) includes a basal felsic volcanic sequence overlain by siltstones, greywackes, sandstones, some calcarenite, and minor amounts of limestone, argillite, and conglomerate, described following as units 3, 4, 5, and 6. The augite porphyry rock within the map-area has been interpreted as an intrusive stock by previous workers (Schofield and Hanson, 1922; Hanson, 1929, 1935; Grove, 1971, 1973, 1983), and is described following as unit 1.

All the previously mentioned rocks are intruded by the Tertiary Portland Canal dyke swarm; the dykes range in composition from granite to quartz diorite. Structurally, the map region lies on the eastern limb of the canoe-shaped, doubly plunging, north-trending Dillworth syncline.

STRATIGRAPHY

The stratigraphic sequence in the map-area consists of a massive augite porphyry unit overlain by an epiclastic sedimentary unit. These are overlain by a sequence of felsic volcanic rocks capped by dark grey and black siltstones (Fig. 113). The succession has been deformed and intruded by Tertiary Portland Canal dykes. Surficial deposits in the map-area include alluvium, lacustrine deposits, and moraines.

The epiclastic sedimentary rocks and all the felsic volcanic units contain fragments of augite porphyry, indicating that the augite porphyry is older and was eroding when the Middle Jurassic succession was deposited.

The contact between the massive augite porphyry and the overlying epiclastic sediments resembles an *in situ* weathered bedrock profile. At this contact the massive augite porphyry grades upward into a fractured porphyry and then into a rock with angular fragments of porphyry in a gritty matrix. There is a sharp contact at the top of this gradational zone with overlying conglomerate which consists of rounded augite porphyry cobbles in a gritty matrix. The sharp contact and the rounded fragments suggest that water-reworked strata were deposited above an *in situ* weathered sequence. With the possible exception of the pyritic rhyolite lapilli tuff-sandstone contact, which was not observed in the map-area, the remaining contacts are all conformable.

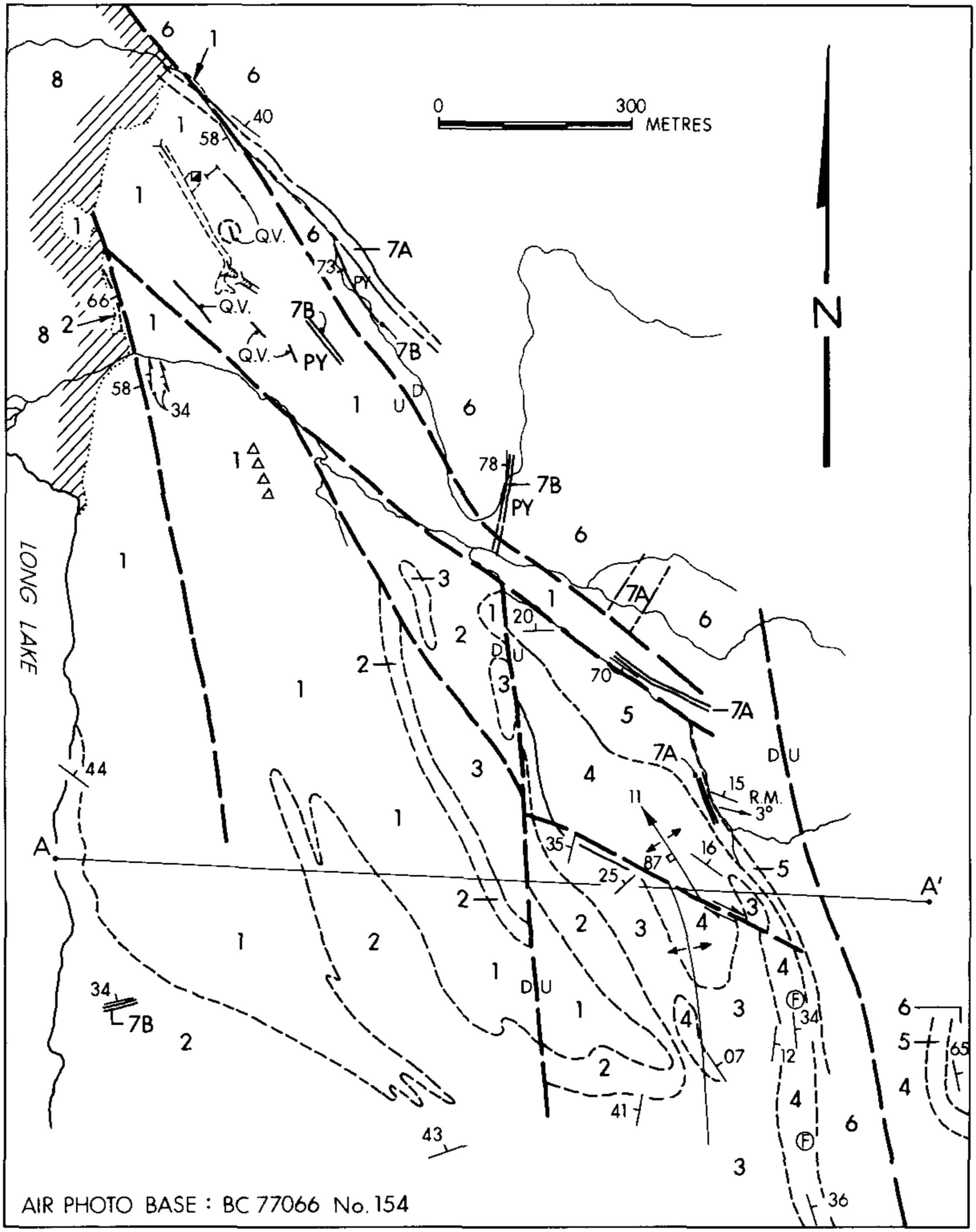

Figure 113. Geology of the Spider claim group on Long Lake, Stewart, British Columbia.

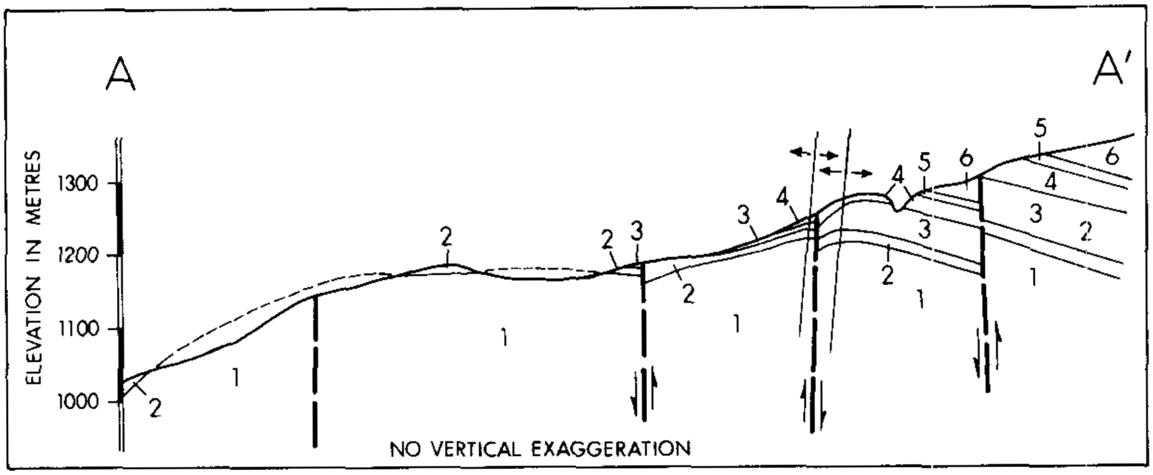

Figure 114. Geological cross-section A-A', Spider claim group (see Fig. 113 for location).

LEGEND

8	ALLUVIUM, LACUSTRINE SANDS AND SILTS, AND GLACIAL MORAINES
7	DYKES
	A HORNBLENDE–FELDSPAR PORPHYRY (GRANODIORITIC)
	B FINE–GRAINED MASSIVE GRANODIORITE
6	SILTSTONES
5	PYRITIC RHYOLITE LAPILLI TUFFS
4	RHYOLITE LAPILLI TUFFS
3	DUST TUFFS WITH OCCASIONAL FRAGMENTS OF AUGITE PORPHYRY
2	EPICLASTICS
1	MASSIVE AUGITE (± FELDSPAR) PORPHYRY, (Δ BRECCIATED)

SYMBOLS

ADIT WITH PLAN OF UNDERGROUND WORKINGS . . . .

OPEN CUT, WITH ADIT PORTAL . . . .

INCLINED SHAFT . . . .

STRIKE AND DIP OF EITHER CONTACT OR BEDDING . . . .

FAULT; U = UP FAULTED SIDE; D = DOWN FAULTED SIDE . . . . U D

INFERRED CONTACT . . . .

MAPPED CONTACT . . . .

QUARTZ VEIN . . . . Q.V.

PLUNGE AND TREND OF A RIPPLE MARK . . . . 3 R.M.

STRIKE AND DIP OF A FOLIATION . . . .

STRIKE AND DIP OF A FAULT 66

FOSSIL LOCATION . . . . F

ANTICLINE, SHOWING TRACE OF AXIAL PLANE, PLUNGE OF AXIS, AND DIP OF AXIAL PLANE 87 11

DAM LOCATION . . . .

UNIT 1 - MASSIVE AUGITE PORPHYRY

This rock consists of euhedral green-black phenocrysts of augite in an aphanitic, medium grey to olive green matrix. Augite phenocrysts range in size from 2 to 8 millimetres, often showing an eight-sided cross-section on fresh rock surfaces (*see* Grove, 1971, Plate XIVA). In a few areas small crystals of feldspar, less than 1 millimetre, are present in the matrix. Some of the large greenish black phenocrysts appear to be pseudomorphs of chlorite after augite. The augite porphyry may be a flow as indicated by an overall dense, massive texture. A narrow brecciated zone, possibly a flow breccia or feeder pipe, occurs in the central area of the augite porphyry.

The mineralized quartz veins, for which Spider claims were staked, are hosted in intensely sheared zones of the massive augite porphyry.

UNIT 2 - EPICLASTIC ROCKS

Rocks in the epiclastic unit range from siltstones to cobble conglomerate. In general, clasts in the epiclastic unit are mainly felsic volcanic rocks but toward the lower contact with the augite porphyry, clasts are predominantly augite porphyry. Rock fragment sizes range from bed to bed within the unit; they vary from grit size to cobbles 15 centimetres in diameter. The rock is typically a purplish, hematitic colour but may also be bright medium green.

UNIT 3 - DUST TUFF

The dust tuff is a massive aphanitic siliceous rock. Rare, rounded fragments of augite porphyry occur in the upper part of the unit near the contact with overlying felsic lapilli tuff. The colour ranges from purple to light green or light grey. The rock fractures into angular pieces with sharp corners and smooth planar faces which have a greasy to waxy lustre. This unit appears to thicken to the east, changing from 8 metres in the central part of the map-area to more than 40 metres in the east (Fig. 114).

UNIT 4 - RHYOLITE LAPILLI TUFF

The rhyolite lapilli tuff unit is approximately 20 to 30 metres thick. The tuffs lie conformably between unit 5, pyritic rhyolite lapilli tuffs, and unit 3, dust tuffs. Lapilli in unit 4 range from 2 to 15 centimetres in diameter and are hosted in a fine-grained, light grey matrix. The clasts consist of an assemblage of rhyolitic fragments as well as some clasts of augite porphyry. Both rhyolite and augite porphyry fragments are angular, suggesting minimal reworking after deposition. A thin bed of fossiliferous impure limestone, located a metre below the upper contact of this unit, hosts fragments of belemnites and pelecypods as well as silty mud balls or rip-up clasts.

UNIT 5 - PYRITIC RHYOLITE LAPILLI TUFF

Except for the presence of disseminated pyrite, this 2-metre-thick unit is identical to the rhyolite lapilli tuff described previously as unit 4. Pyrite occurs in both the clasts and the matrix. Heterolithic fragments include silty limestone blocks that are up to 1 metre in diameter. The pyrite produces a characteristic heavily iron-stained weathered surface.

UNIT 6 - SILTSTONES

Unit 6 consists of interbedded siltstones and fine-grained sandstones in layers 5 to 10 centimetres thick. The rocks are pyritic in many places producing the characteristic banded, iron-stained weathered surfaces that allow easy identification. The thickness of this unit could not be determined in the map-area. Ripple marks, recorded in the northeast corner of the mapped area at the base of the siltstone unit, display an amplitude of 2 centimetres and a wavelength of 8 centimetres. Stratigraphic tops are upright; the siltstone strikes 115 degrees and dips 15 degrees north-northeast; the ripple marks plunge 03 degrees toward 105 degrees.

UNIT 7 - DYKES

Hornblende-feldspar Porphyry

This dyke-rock type is characterized by phenocrysts of white euhedral plagioclase approximately 5 to 10 millimetres in length, and slender, dark green euhedral hornblende approximately 3 to 8 millimetres long in a fine-grained light grey groundmass. Some dykes also have small phenocrysts of euhedral potassic feldspar, usually less than 2 millimetres long.

Aphanitic Diorite

A lack of phenocrysts and a medium green to light grey colour distinguish this dyke-rock type. Some of these dykes carry up to 2 per cent fine, disseminated pyrite.

STRUCTURE

Beds in the eastern part of the map-area are folded forming an anticline plunging 7 to 11 degrees northerly at 005 degrees azimuth. The axial surface of this fold dips 87 degrees easterly; limbs are sharply flexed containing an interlimb angle of about 74 degrees. The size and attitude of this fold indicates that it may be a second-order flexure parasitic to the main Dillworth syncline to the west.

The fold axial trace is offset by a right lateral fault that strikes west-northwest (Fig. 113). Other faults in the area strike northerly and northwesterly. Movements shown by offset contacts are right lateral on northwesterly and vertical on northerly faults; at least two periods of faulting occurred. An example of vertical offset is the small fault block immediately northwest of the fold axis. This block has dropped relative to the strata to the east and to the south, so unit 3 the dust tuff just caps the hills on the block.

A tongue of epiclastic conglomerate overlies the massive augite porphyry in the fault block in the southwest part of the map-area. Two possible structural interpretations are: a syncline with an erosional remnant of epiclastic strata preserved along the fold axis, or a paleotopographic low on the augite porphyry paleosurface with epiclastic rocks filling this depression.

Dykes in the mapped area generally trend either north or northwest. The dykes are found along axial surfaces in the folded siltstones, along faults in the massive augite porphyry, and filling contact faults. This suggests dyke intrusion postdated much tectonic activity, including the major period of folding.

MINERALIZATION

Study of sulphide mineralization in the map-area was limited to surface examination of the quartz veins and dump material from the Spider adits. Quartz veins on the Spider claim group are numerous and range in size from narrow stringers to veins up to 2 metres wide with a strike length of several tens of metres. For vein locations, *see* Figure 113 or, for a more detailed map, refer to the 1936 British Columbia Ministry of Mines Annual Report, page B29. Sulphides noted in samples from the upper adit include argentite, sphalerite, galena, chalcopyrite, and pyrite.

CONCLUSION

The augite porphyry body at the north end of Long Lake, formerly identified as a Tertiary age stock, is now thought to be a Middle Jurassic or older augite porphyry lava flow. Intrusion of the dykes in the map-area evidently postdated folding because they cut a parasitic anticline revealed by this mapping project.

ACKNOWLEDGMENTS

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