ESKAY CREEK AREA, STRATIGRAPHY UPDATE (104B/9, 10)

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INTRODUCTION

Mapping at 1:5000-scale of an area near the Eskay Creek precious and base metal deposits initiated in 1991 emphasizes documentation of facies variations within the Lower to Middle Jurassic rocks of the Hazelton Group. This work is an integral part of the Mineral Deposit Research Unit's Iskut River Metallogeny project and is the basis of M.Sc. thesis research by the author at The University of British Columbia.

The study area is centred within the northern half of the Unuk map area (Alldrick *et al.*, 1989) and extends south and southwest of the Eskay Creek deposit (Figure 6-4-1). It includes properties held by International Corona Corporation, Granges Inc., American Fibre Corporation/Silver Butte Resources Ltd. (formerly Consolidated Silver Butte Mines Ltd.) and Prime Equities Inc.

Previous work in the Unuk and adjacent Snippaker and Sulphurets map areas was compiled by Britton (1990) who describes the stratigraphic nomenclature for this part of the Intermontane Belt. Current observations from geologists with Granges Inc. and American Fibre Corporation are incorporated in this update.

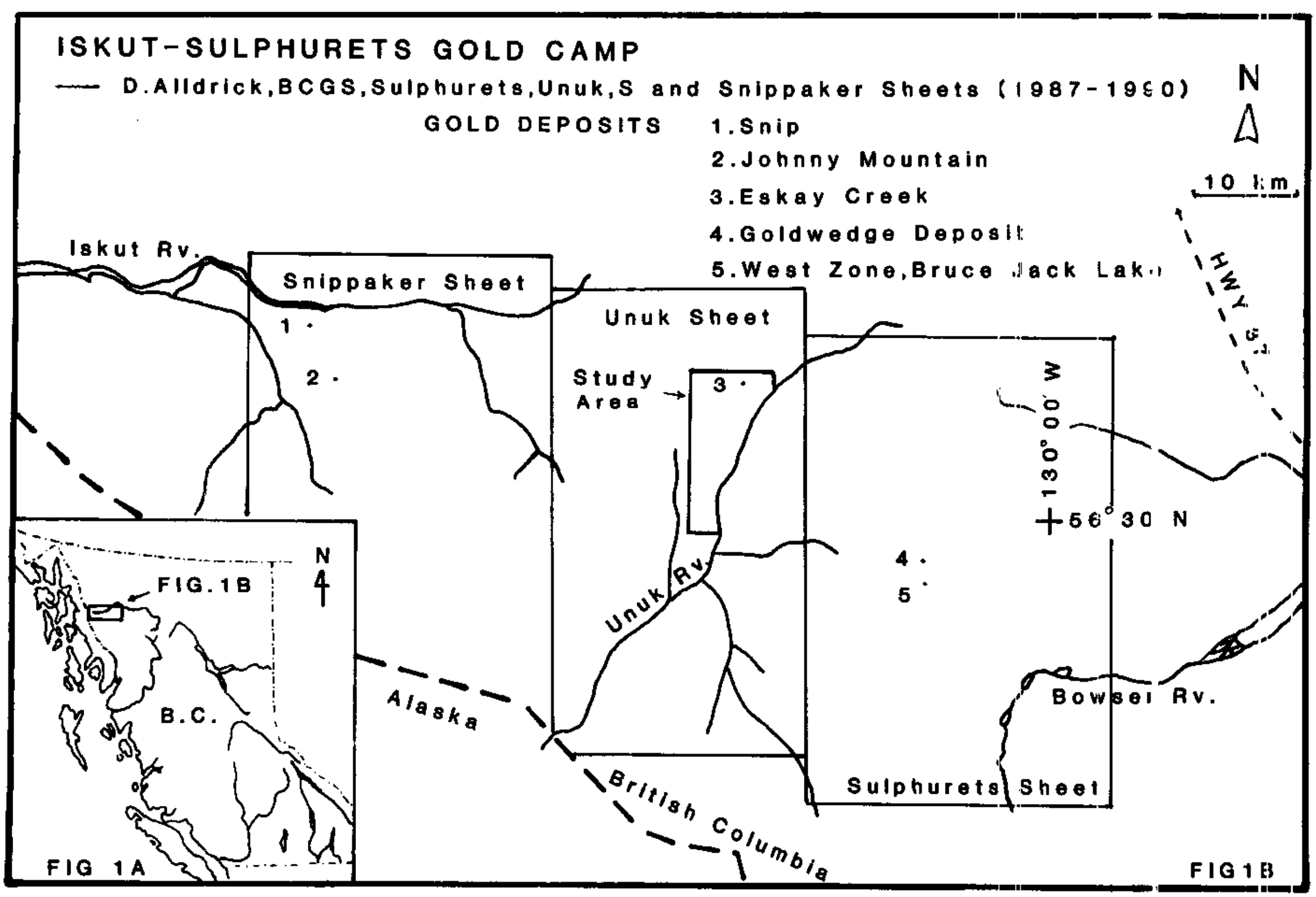

Figure 6-4-1. Iskut-Sulphurets gold camps: study area. (Modified from Alldrick *et al.*, 1989.)

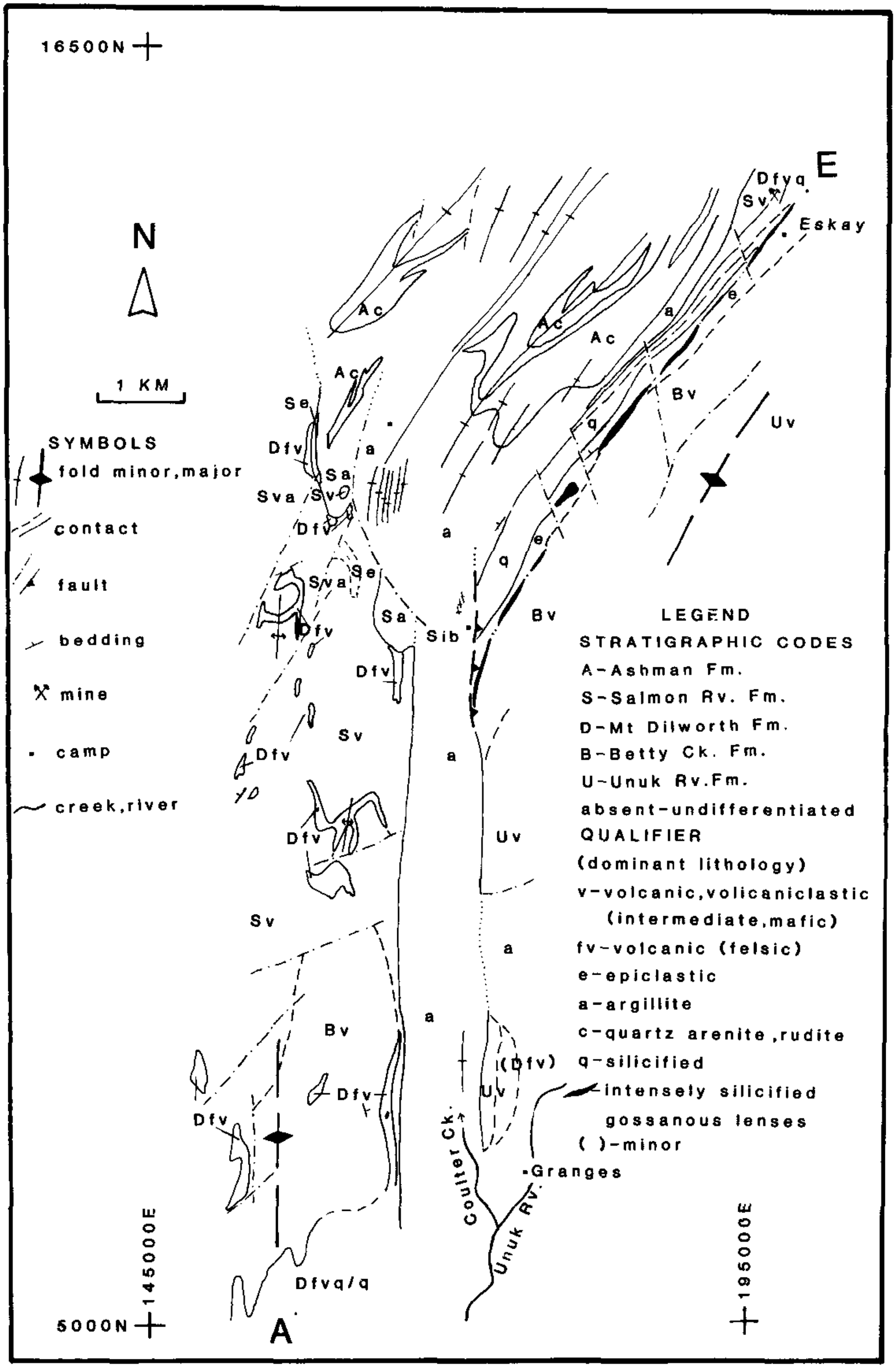

Figure 6-4-2. Simplified geological map of the Eskay Creek area. Structural detail within the northern Bowser Lake Group sediments from Lewis (1992, this volume).

STRATIGRAPHY UPDATE

Six regionally mappable units are defined by Britton *et al.* (1989) in the study area and are tentatively correlated with the Unuk River, Betty Creek, Mount Dilworth, Salmon River and Ashman formations. Significant variations are observed in the distribution of the units defined on the regional 1:50 000-scale mapping (Alldrick *et al.*, 1989) and problems in definition of stratigraphic intervals have arisen.

Stratigraphic intervals are best characterized by the nature of the volcanic rock component. Similar epiclastic rocks occur at different stratigraphic intervals. Regionally extensive fault and stratigraphically controlled alteration dominated by silica replacement often obscures the stratigraphy. Disconformable relationships between formations are common. Individual units display considerable facies variations and contact relationships (depositional and structural) are complex. Experience gained during the 1991 field season suggests that the Hazelton Group rocks can best be mapped in terms of facies.

Within the study area the Unuk River and Betty Creek formations are not easily distinguished. The definitive maroon coloration of the Betty Creek Formation seen in the Stewart area are absent. Both formations comprise green chloritic volcaniclastic rocks, andesitic tuffs, flows and flow breccias and minor shales, sandstones and carbonates. Andesite flows within the Unuk River Formation are characterized by feldspar and/or pyroxene phenocrysts, however this feature is not ubiquitous and the boundary between the formations is indistinct.

The Mount Dilworth Formation disconformably overlies the Unuk River and Betty Creek formations and comprises dacitic to rhyolitic rocks which vary systematically from an imaginary curvilinear baseline extending from Eskay Creek to Alice Lake (E-A; Figure 6-4-2). Close to the baseline the interval is distinguished by flow breccias; clasts within the breccias are flow banded. Farther northwest the stratigraphic interval is marked by discontinuous layers of lapilli breccia (subaerial) and subsequently by heterolithic debris-flow breccias.

Thickness is greatest and continuity is best close to the baseline, maximum thickness is estimated at 25 metres; to the northwest the interval is 1 to 5 metres. Trends comparable to those in the Mount Dilworth Formation are evident in the underlying stratigraphy in the dominance of massive andesite flows near the baseline varying to volcaniclastic, epiclastic and argillite lithologies to the northwest.

Field recognition of the felsic rocks (and lateral variations) is blurred by alteration and relies on identification of poorly preserved primary textures. The imaginary baseline defines the most intense alteration which is characterized by quartz and/or potassium feldspar, sericite and pyrite, imparting a grey-green cherty appearance to the rocks. Within the stratigraphy between SIB and Eskay Creek camps (Figure 6-4-2) the silica alteration zone attains a true thickness of 125 metres and extends between both camps. Textures within the lower 100 metres of the alteration zone are indicative of intermediate and mafic volcanic rocks, including pillow and pahoehoe textures. Unaltered intermediate flows immediately underlie felsic volcanic rocks to the south. Indisputable silicified pahoehoe-textured volcanics are laminated (flow banded). Flow banding has been used to distinguish altered rhyolites throughout the area and highlights the problems associated with recognizing protoliths.

The SIB-Eskay alteration zone is capped by a thin (<10 m thick) black-matrix breccia concordant with the alteration zone and overlying argillite contact and discordant to the stratigraphic contacts. Discrete, narrow (<30 cm) black-matrix breccias and black veinlets cut the underlying silicified volcanic rocks. The breccias comprise cherty, pale grey-green angular fractured clasts; clasts are matrix supported and matrix and fracture infill is gradational from black cherty carbonaceous siltstone to black (carbonaceous?) quartz. Within the stratigraphic interval between the SIB and Eskay camps (Figure 6-4-2), minimally altered, well-bedded feldspathic sandstones, conglomerates, fossiliferous siltstones and minor carbonates mark the transition from green chloritic volcanic and volcaniclastic rocks of the Betty Creek Formation to the east and the silica alteration zone to the west. The sediments are dominated by argillites to the north and pinch out to the south. To the west, similar epiclastic rocks are interbedded with and overlie the Mount Dilworth Formation.

The Salmon River Formation comprises andesite flows and tuffs and volcaniclastic, epiclastic and minor carbonate rocks and argillite. The northwesterly variations within the felsic rocks are mimicked by a transition within the younger rocks from andesite flows which are massive, columnar jointed and brecciated, to pillowed flows; and from a dominance of volcaniclastic to epiclastic rocks and argillite. In the absence of the felsic marker it is difficult to distinguish the upper and lower intermediate and mafic volcanic units. Lateral equivalents of the mineralized, contact argillite at Eskay Creek crop out in the northeast and comprise thin, finely laminated cherty siltstones intercalated with pillowed andesites. Massive argillites in the centre of the map area may include distal equivalents of the Betty Creek and Salmon River formations and, in the absence of volcanic rocks and paleontological control, are indistinguishable from overlying Bowser Lake Group argillites. Qualitatively the argillites in the lower part of the sequence are more carbonaceous and pyritic than argillites in the upper part of the sequence and contain minor carbonate interbeds. Quartz sandstones, grits and conglomerates consisting of white and black cherty clasts are interbedded with the Bowser Lake Group argillites and are good local markers. These sediments onlap the Salmon River and Mount Dilworth formation volcanic rocks to the northwest and northeast where they contain minor feldspathic horizons. Britton *et al.* (1989) correlate this unit with the Ashman Formation of Tipper and Richards (1976), and define it as the base of the Bowser Lake Group. The break between the distal facies of the Salmon River and Bowser Lake formations is a major problem to be resolved.

STRUCTURE AND MINERALIZATION

The distribution of the units is interpreted to represent a triplet of regional folds with fold axes rotated northeasterly to northerly progressively to the south. Argillites, sandstones and conglomerates of the Salmon River Formation and Bowser Lake Group occupy a central synform. Deformation increases to the south in parallel with the gradual rotation of fold axes (Lewis, 1992, this volume). Within the zone of inflection the eastern limb of the synform is truncated by high and low-angle faults with some associated ramping of the volcanic rocks over argillites.

Two periods of faulting are distinguishable. Early faults are associated with varying alteration and mineralization. Small displacements of the contact between the Salmon River and Mount Dilworth formations occur on these faults, however, no significant alteration or epigenetic mineralization is visible in outcrops of the younger rocks, indicating some reactivation of the structures. Within the SIB-Eskay stratigraphy these early structures are prominent as minor faults crosscutting and subparallel to bedding and a major fault zone (Tony's fault named informally after Tom MacKay's horse) also subparallel to stratigraphy.

Recognition of Tony's fault is based on discordance between a linear, subvertical, intense alteration zone and bedding in adjacent epiclastic rocks which varies in orientation, with dips dominantly 45° to 70° northwest. Tony's fault is spatially related to the prominent silica alteration zone and to the imaginary baseline describing variations within the stratigraphy. The core of this fault zone comprises massive lenses of microcrystalline quartz measuring up to 500 by 25 metres which have both diffuse and sharp contacts. The lenses step left-laterally to the north, converging with the silica alteration zone at the Eskay Creek camp, and are enveloped by a continuously mineralized and strongly foliated alteration halo. The strong foliation within the alteration envelope is restricted to sericitic and chloritic alteration zones and is not visible in intensely silicified lenses. The dominant foliation is parallel to axial surfaces of regional folds (post Bowser Lake Group; Lewis, 1992, this volume) and its pronounced development in this zone may simply reflect strain partitioning into the 'slippery' phyllosilicate alteration assemblage. The fault crops out as a line of discontinuous gossanous bluffs from Eskay to SIB camps. Steps within the fault are associated with minor crosscutting mineralized faults which coincidentally control the outcrop distribution of pillowed andesites and cherty siltstones of the Salmon River Formation (contact zone). Mineralization within the faults is dominated by pyrite with or without galena, chalcopyrite and sphalerite.

Late unmineralized faults are related to folding and are best expressed by the truncation of the eastern limb of the regional synform at SIB camp; the stratigraphy and the major gossanous fault zone extending from SIB to Eskay camps are cut off.

FUTURE WORK

There is an intimate relationship between faulting, regionally extensive, stratigraphically controlled alteration and variations within the upper Hazelton Group stratigraphy. Highlighted lithological variations indicate a northerly and northwesterly transition from proximal to distal and subaerial to marine volcanic facies. A focus of future work will be to assimilate field data in terms of facies and determination of protoliths obscured by intense alteration. Further mapping is required to the north and northwest to correlate stratigraphy in the vicinity of the Eskay deposit with regional stratigraphy.

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