



GEOLOGY OF THE SUSTUT AREA

(94D/9, 10)

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A programme of reconnaissance and detailed mapping has been completed in the Sustut area. The reconnaissance work was directed toward expanding the area of geological control from a cross-section established during the 1973 field season; the detailed investigation focused on Wesfrob Mines Limited's DAY prospect and the ASITKA prospect of Nomad Mines Ltd.

The extent of the reconnaissance area is shown on Figure 12. This covers the main block of Wesfrob's claims, centred on the company's Sustut Copper prospect, tracing the important Triassic volcanoclastic beds for a total distance of about 14 miles.

Except in a few areas where folding and faulting are especially pronounced, the main belt of Triassic Takla strata is tilted to the southwest exposing the underlying Paleozoic beds along the west side of Moose Valley. At the west boundary of the map-area near Two Lake Creek, rocks of the Takla Formation are downfaulted against the Paleozoic succession.

In the type area (Church, 1973), the Mesozoic section includes three main stratigraphic divisions. The lowest division, about 7,000 feet thick, consists primarily of augite-rich basalt with intercalations of aphyric basalt and coarse feldspar-bearing basaltic andesites. Massive volcanic breccia deposits predominate although lava flows, bedded breccias, and pillow lavas are locally conspicuous. A unit consisting of dark, thinly bedded sandstone and siltstone, locally ranging to several hundred feet thick, is lowermost in the exposed section. The middle division consists of about 3,500 feet of mixed andesite and basalt volcanoclastic rocks — lahar, tuff breccia, volcanic sandstone, and conglomeratic beds — which rest on relatively thin, fossiliferous, tuffaceous argillite, chert, and carbonate beds. The upper division, about 4,000 feet thick, comprises locally well-layered maroon and grey, welded and nonwelded ash flow tuffs and volcanic breccias ranging from basalt to rhyolite in composition.

The stratigraphic position of a polymictic conglomerate formation has now been established in the section as occurring above the volcanoclastic beds in the middle division. This formation, displaying numerous boulders and pebbles of Permian limestone, jasper, chert, etc., was evidently derived from Paleozoic units once elevated and exposed by faulting in the Two Lake Creek area.

Wesfrob's Sustut Copper prospect is the main mineral occurrence in the region. This is an unusual stratiform chalcocite-rich deposit of a few tens of millions of tons grading slightly more than 1 per cent copper. The deposit appears to be related in some way to a sandstone and conglomerate-rich layer in the volcanoclastic formation of the middle division. It is interesting to note, however, that south of the Sustut Copper prospect near Willow Creek, although the sandstone and conglomerate beds increase in volume, especially in the lower half of the formation, no additional significant mineralization has been located.

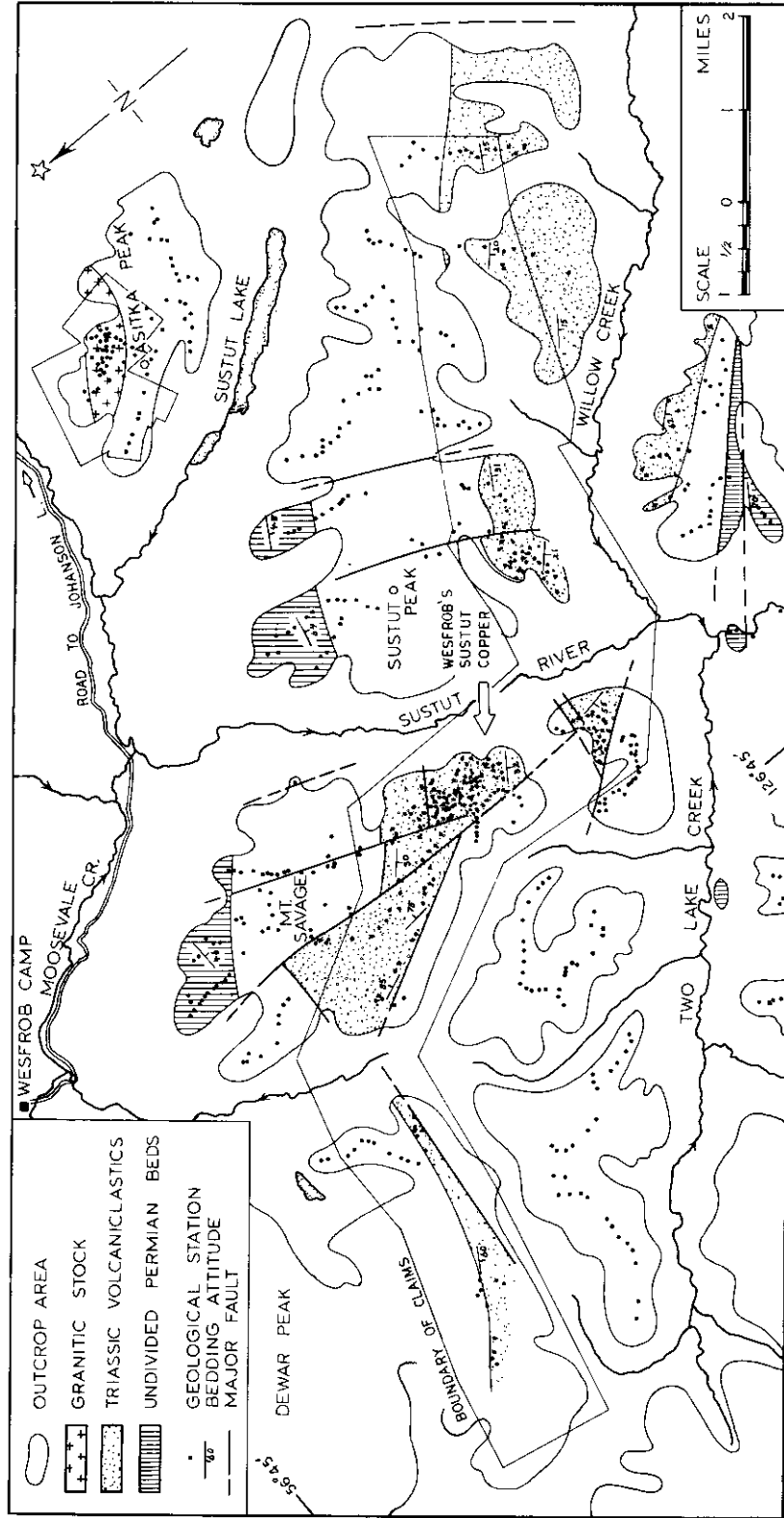


Figure 12. Generalized geology, Sustut area.

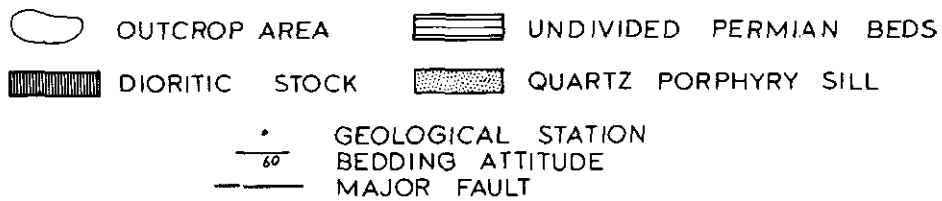
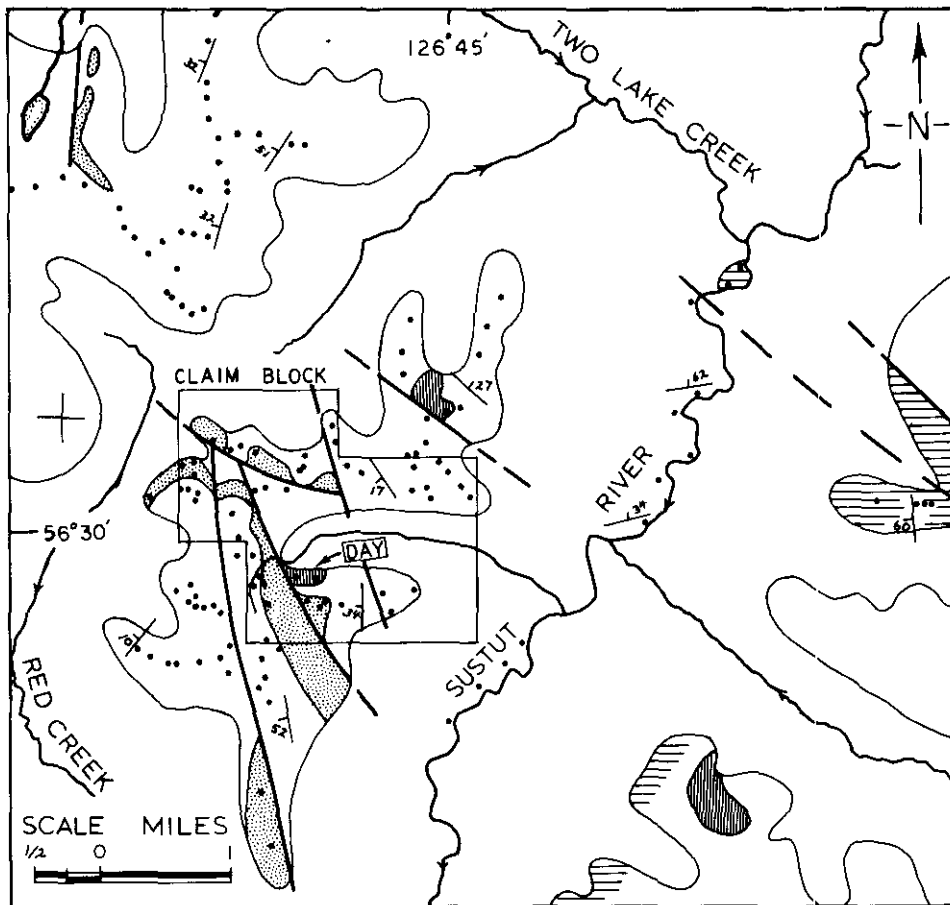


Figure 13. Generalized geology, DAY claims and vicinity.

Other small stratiform-type deposits have been discovered by Wesfrob on the WILLOW and SIT claims located approximately 2.5 and 6 miles respectively, southeast of the Sustut Copper prospect. The WILLOW mineralization consists of thin, discontinuous chalcopyrite and chalcocite disseminations in shales at the base of the volcanoclastic formation. The SIT occurrence is a small deposit of chalcopyrite, bornite, and chalcocite in fractures and gas cavities in aphyric basalt near the top of the lower division. Also, a few stratiform copper deposits of apparent minor significance have been found in association with the ash flow tuffs and breccias of the upper division. Such is the occurrence on the 'A' claims of Rio Tinto Canadian Exploration Limited (latitude 56° 38'; longitude 126° 45') and Wesfrob's PLUTO prospect a few miles to the north. The 'Topper showings' optioned to Brascan Resources Limited (latitude 56° 38'; longitude 126° 45') may be similar.

Intense prospecting was also in progress in the diorite and granodiorite intrusions northeast and southwest of the main belt of Takla rocks. In August, Nomad Mines Ltd. moved drill equipment onto a gossan area of a biotite hornblende granodiorite stock on the northeast flank of Asitka Mountain (see Fig. 12). Silt samples taken from this area show some exceptionally high copper values.

TABLE OF SILT ANALYSES

	1	2	3	4	5
	<i>ppm</i>	<i>ppm</i>	<i>ppm</i>	<i>ppm</i>	<i>ppm</i>
Cu	270	1000	340	170	250
Pb	22	22	22	17	23
Zn	60	75	90	50	100
Ag	0.7	0.8	1.0	0.9	1.1
Mo	7	4	4	6	8
Mn	590	430	480	350	810
	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>
Fe	0.27	0.20	0.22	0.23	0.27

Further west, more drilling was completed on Wesfrob's DAY prospect near the Sustut River (see Fig. 13). The target area is a small but locally well-mineralized dioritic stock. This appears to be the oldest of a series of intrusions which cut the volcanic rocks of the upper division. A fresh sample of hornblende from the DAY diorite yields a K-Ar age of 184±11 m.y.

Potassium (per cent)	$\bar{X} = 0.367$
Ar ^{40*} ppm	0.005066
Ar ^{40*} / total Ar ⁴⁰	0.493
Ar ^{40*} / K ⁴⁰	0.01130
Apparent age	184±11 m.y.
K ⁴⁰ / K constant	1.22 x 10 ⁻⁴ g/g

REFERENCES

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