B.C.11

RECONNAISSANCE WORK, 1979
Stewart Area, N.T.S. 103P, 104A, 104B/9
P.N. 019

Vancouver, B. C. B. W. Downing
March , 1980

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B. W. Downing

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P.N. 019

STEWART AREA

1. Introduction

Regional work consisted mainly of prospecting, mapping, and silting of various areas from Meziadin Lake west to Bitter Creek, an area of ice fields, glaciers and rugged topography. Two fly camps were established approximately 40 miles east of Surprise Creek to investigate some gossans and intrusives. Most of the work was carried out from the base camp. The areas involved have not been mapped in any detail by the government surveys, Figure 019-79-0.

A Bell G47-B model, piloted by G. Kettleson, was contracted from Northern Mtn. Helicopters, Prince George, from July 4 to Sept. 19. A breakdown of the hours is as follows:

PN 003 (Gataga trip)	15.4 hours
PN 003 (Moose Valley trip)	∿5 (?)
PN 019	66.5
PN 029	78.0
PN 078	21.6 "
TOTAL	186.5

Earlier in the summer, a June 21, regional stream sediment and water accelerated geochemical survey was released by the provincial government covering the areas 103 I and part of 103J, 103P and part of 103O. A Bell 206 from Shirley Helicopters, Whitehorse, was contracted through Yukon Air and operated from Stewart. Personnel involved were B. Downing, P. Burns, C. Leitch, G. Thomassen and P. Walker. Two days prior to the release were spent in checking out anomalous areas that resulted from last year's work (PN 119, Project Rpt., J. Wilson, 1979). After investigation, these areas required no further work and were subsequently dropped from this summer's program. On the day of the release, upwards to 20 helicopters from Terrace and 2 from Stewart were involved in the staking rush. From information received from the Vancouver office (JJM, ILE, SZ) via telephone, an area approximately eight miles east of Alice Arm was to be staked; however, upon arrival, Amax had already commenced staking as had an independent group, thus no ground was open. The results of the

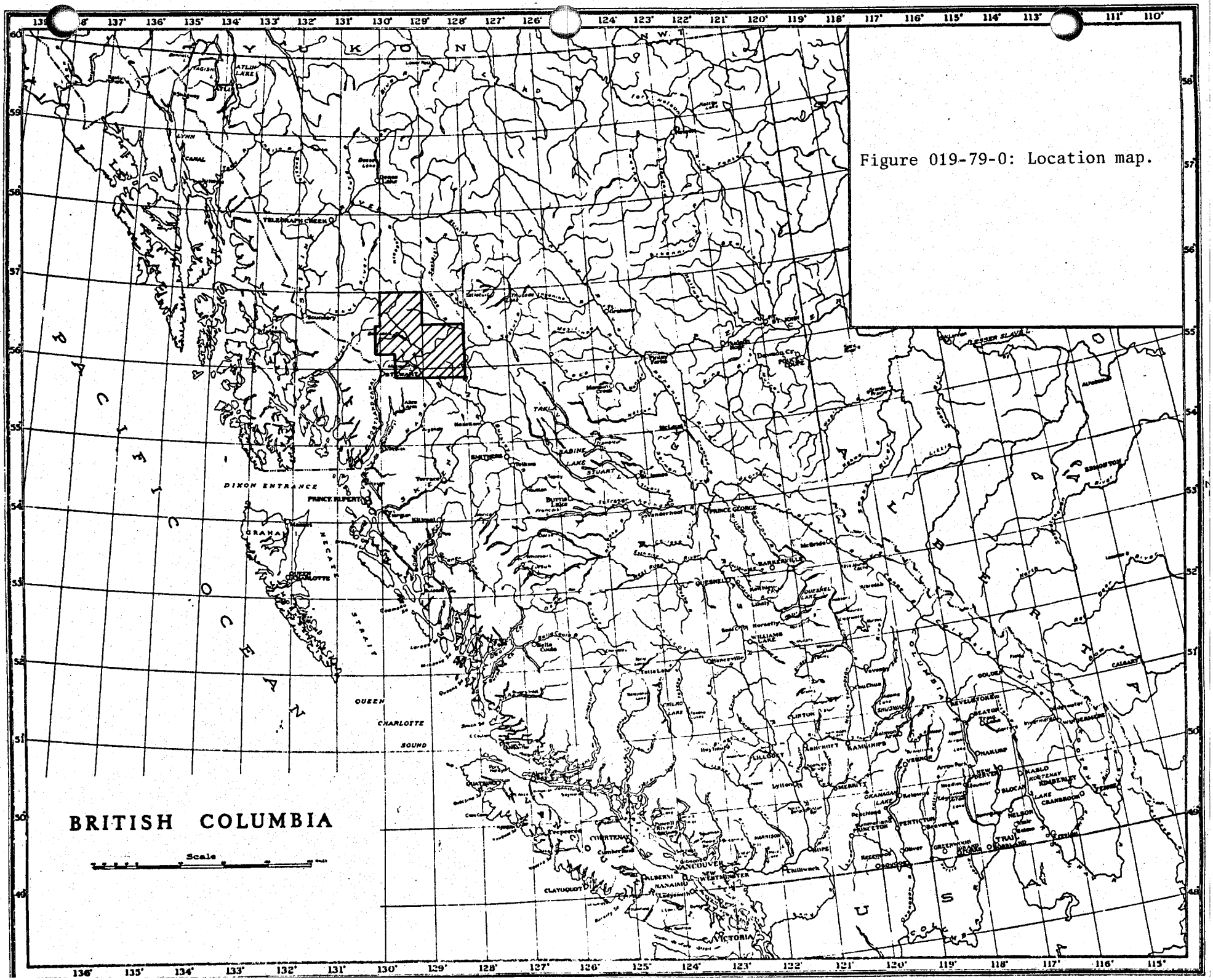


Figure 019-79-0: Location map.

geochem survey did not appear to indicate any new area(s) for exploration and reconfirmed what was known about the numerous projects already mapped. No claims were staked by FNM in the areas covered by the survey.

2. Areas Examined

2.1 Sallysout Creek Area - 104A/1 (Figure 019-79-1)--

Numerous gossans had been noted in the early 70's by J.J. McDougall and recently (1978) silt sampled by J. Wilson. Further work was required and a two-man fly camp (KHC, EL) was established to investigate them. The gossans were in fact, numerous carbonate (siderite)-minor pyrite quartz veins intruding greywackes and argillites. Several non-mineralized diorite dykes also intrude the sediments. No anomalous values resulted from the stream sediment samples, and no further work is recommended.

2.2 O'Dwyer Creek Area - 104A/1 (Figure 019-79-2)--

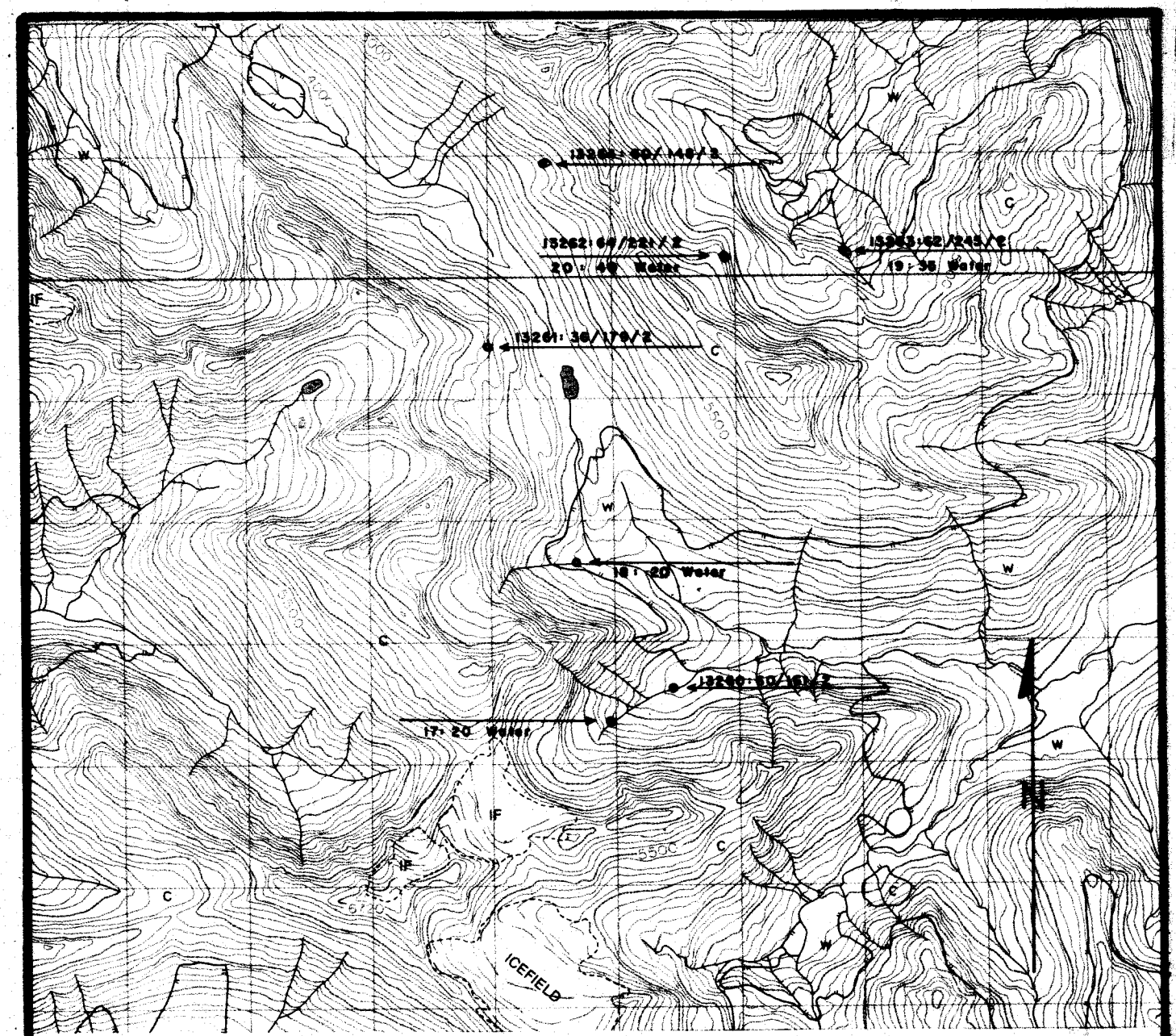
A large diorite stack intruding Bowser Group sediments was prospected and silt sampled (KHC, EL). The intrusive is quite massive, ranging in composition from fine to coarse-grained gabbro and diorite with virtually no hydrothermal alteration within or around the intrusive. Quartz veins are sporadic as is pyrite. No anomalous values were recorded from the stream sediments and no further work is recommended.

2.3 Rochester Creek Area - 104A/1

A series of aeromagnetic highs along Rochester Creek near the upper reaches of Bell Irving River were investigated, and which turned out to be isolated Tertiary (?) lavas. No further work is recommended.

2.4 Entrance Peak Area - 104A/4 (Figure 019-79-3) --

The source of the 1977 Mo anomaly was located on the north side of Entrance Peak -- a massive medium to coarse-grained K-Fels porphyritic granodiorite with scattered py-mo-qz veins and the odd Mo rosette along fractures. A narrow zone of hornfelsed volcanic rock up to ten meters wide occurs along the intrusive. No noticeable alteration occurs within the intrusive.



LEGEND

Sample No: Cu/Zn/Mo in ppm.
No: F in ppb. Water

1000 0 1000 2000 Meter

SCALE: 1:50 000

FALCONBRIDGE NICKEL MINES LTD.

PROPERTY:

LOCATION: Sallyscout Creek Area B.C.

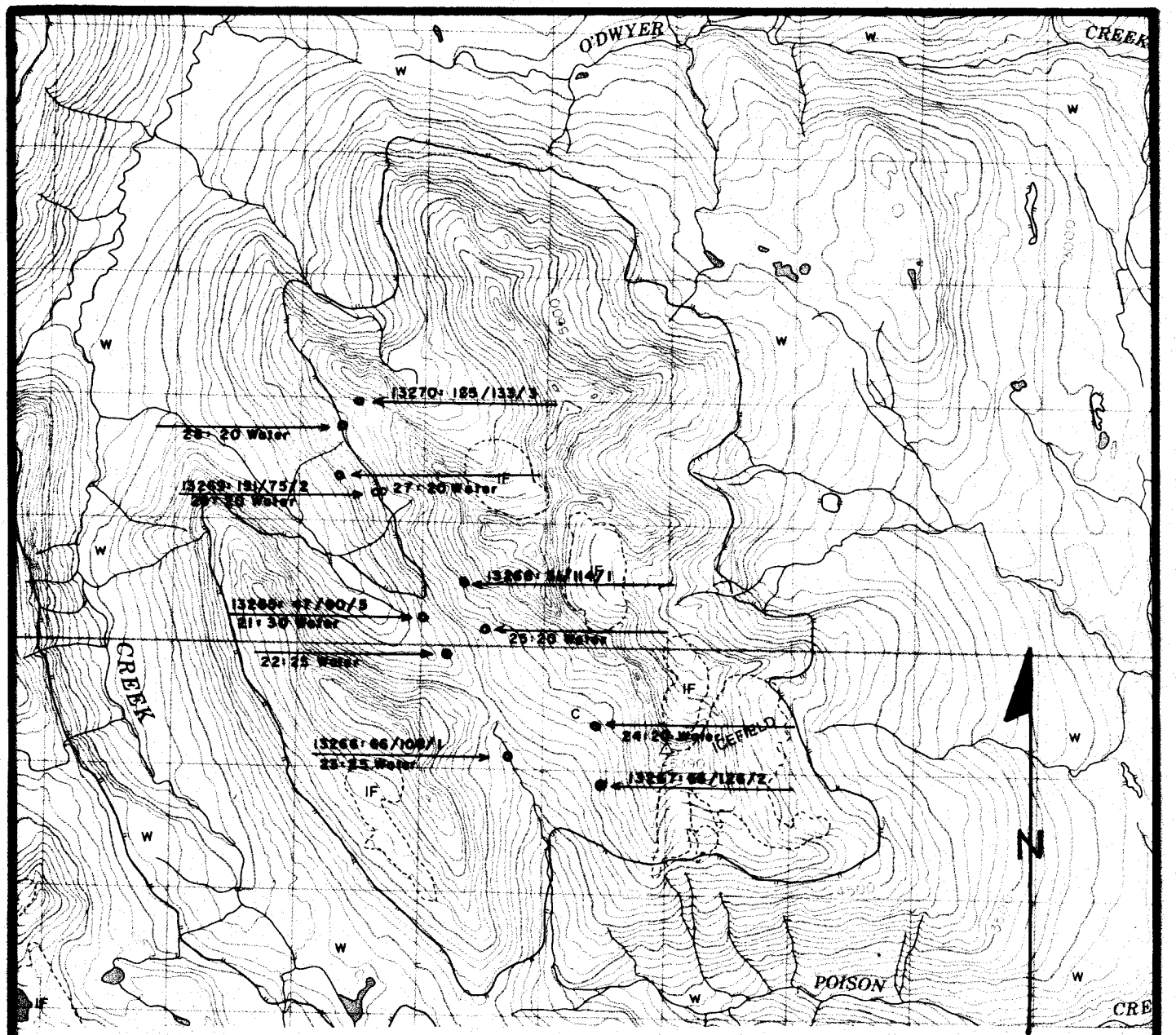
TYPE OF MAP: Geochem. (Silt + Water)

BASED ON: Fieldwork by K.H.C. E.L.

DATE OF WORK: Summer 1979

DRAWN BY: G.T. Nov. 1979

N.T.S. NO.: 104-A-1 FIG. NO.: 019-79-1



LEGEND

Sample No: Cu/Zn/Mo in ppm.
No: F. in ppb. Water

1000 0 1000 2000 Meter

SCALE: 1:50·000

FALCONBRIDGE NICKEL MINES LTD.

PROPERTY:

LOCATION: Canyon Creek Area B.C.

TYPE OF MAP: Geochem (Silt + Water)

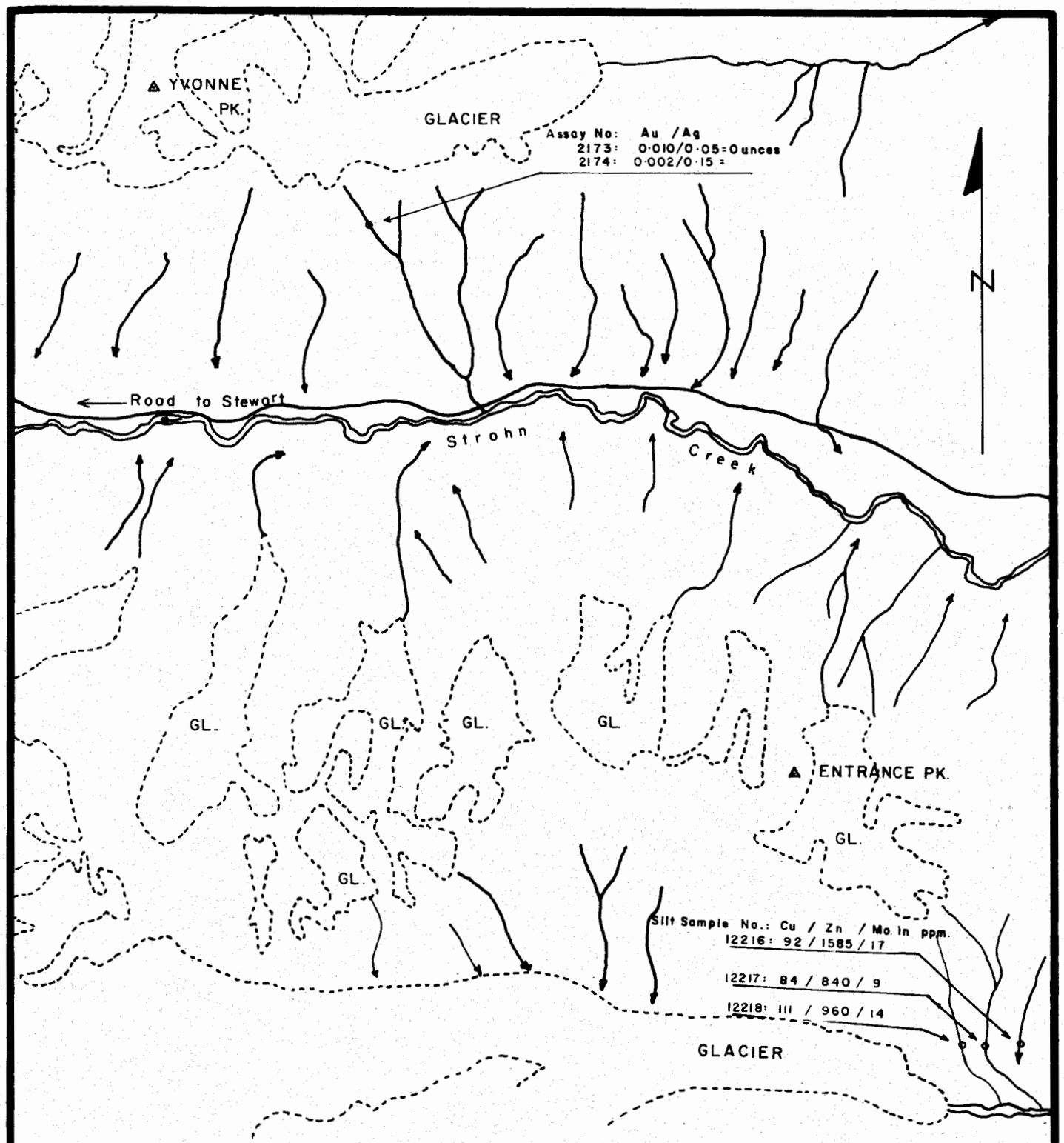
BASED ON: Fieldwork by K.H.C. E.L.

DATE OF WORK: Summer 1979

DRAWN BY: G.T.

DATE: Nov. 1979

N.T.S. NO: 104-A-1 **FIG. NO:** 019-79-8



FALCONBRIDGE NICKEL MINES LTD.

LOCATION: Entrance Peak Area B.C.

TYPE OF MAP.: Geochem & Assays Value

BASED ON: Fieldwork by B.D. G.T. E.L. Summer 1979

DRAWN BY: . G.T. Nov. 1979

N.T.S. NO.: 104-A-4 FIG. NO.: 019-79- 3

Another small granodiorite porphyry occurs on the east end of Entrance Peak. Two mineralized (py) samples of volcaniclastics were assayed, none of which are encouraging. The B & B claims on Nelson Creek were examined and silt sampled. One of the streams (#12218) apparently drains the granodiorite.

No further work is recommended.

2.5 Todd Creek Area- 104A/5E (Figure 119-79-4)

A small hornfels zone with a stockwork of meneghinite ± boulangerite pyrite - quartz veins was located towards the end of the season near the junction of Todd Creek and Bowser River. The hornfels occurs at the contact of the Bowser sediments and Hazelton volcanics. Assays of vein material are shown in Figure 119-79-4.

A large discontinuous gossan (disseminated pyrite) occurs predominantly along the western side of Todd Creek for approximately two miles from the headwaters. One day was spent during August 1978, and August 1979, prospecting a few of the showings.

Further work is recommended with the emphasis on mapping of a porphyry-type environment.

2.6 Treaty Creek (104B/9E)

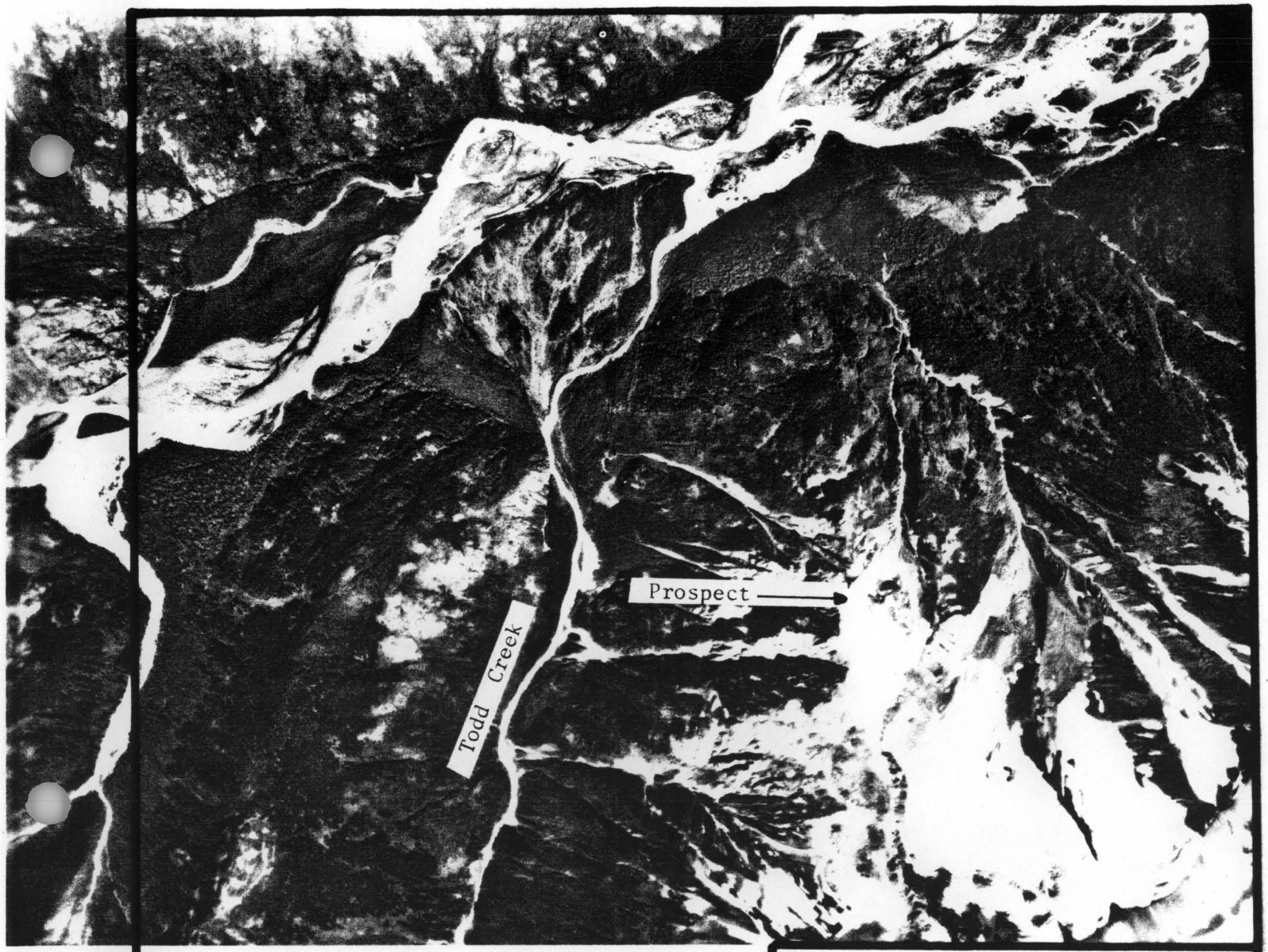
Two days were spent briefly examining the gossans at the headwaters to Treaty Creek. Two soil samples were anomalous in Mo (12 & 33 ppm). This area warrants further investigation.

2.7 RHS - Red Mt. Properties (C. Leitch , B. Downing)

Location: 104P/13W
Lat. 55°56' Long. 129°44'
15 km. east of Stewart
Skeena M.D.
Airphoto B. C. 2183-114

Claims: RHS (4) F.N.M.
Jack (20) Zenore Exploration (Van.) - Red Mtn.

Metals: Mo, Au, Ag



NO.	Au oz/t	Ag oz/t	Pb %	Zn %
15204	0.005	0.27		
15205	0.002	0.20		
15206	0.005	5.99	6.50	2.80
15207	0.020	11.70	1.95	2.90

N

FALCONBRIDGE NICKEL MINES LTD.

PROPERTY: Todd Creek

LOCATION: Stewart Area B.C.

TYPE OF MAP: Assays Location

BASED ON: Fieldwork by B.D. C.L. K.H.C.

DATE OF WORK: Summer 1979

DRAWN BY: G.T. B.D. March 1980

600 0 600 1200 meter

SCALE: 1:30·000

N.T.S.: 104-A-5 FIG. NO.: 019-79-4

General: (C. Leitch)

Two days were spent in the company of B. Downing in examining outcrops around the Red Mountain - R.H.S. areas (Figure 019-79-5&6). The "Erin" molybdenite showings, on the northeast side of Bromley Glacier at McAdam Point, were not visited but are presumed to be similar to the R.H.S. showings. Results of samples taken for geochem analysis are shown in Table 1. The R.H.S. property has been tested by a few packsack drill holes and subsequently mapped by D. Hattie (1973). The Red Mtn property was partially mapped by K.L.Daughtry(Jack Claims-1967) with further prospecting by A. Burton, a co sultant to Zenore. Reconnaissance mapping by Leitch and Downing over the properties revealed several new (and unreported) areas of geological interest.

In summary, the style of mineralization and intrusion at the R.H.S. is not encouraging for the development of a stockwork molybdenum deposit. The intrusive, porphyritic in both quartz eyes and K-feldspar, is of the right composition but is batholithic in character, i.e. intruded at too low a level to develop the requisite fracture system around it. The hypalyssal hornblende porphyry intrusive on Red Mountain is of the correct level and indeed contains a magnificent quartz stockwork, but is barren of molybdenite.

The country rocks intruded by the R.H.S. stock were limy sediments which have been extensively and thoroughly skarnified and hornfelsed. Pyrite and pyrrhotite are abundantly disseminated through these rocks (3 - 5%, locally to 10%). Some zones parallel to bedding of intense silica and sulphide resemble quartz veins; these, along with specimens containing disseminated sulphides, were checked with a U.V. lamp for possible scheelite, but none was detected.

The molybdenite-bearing quartz veins extend for only a very limited distance into the skarn and hornfels (less than 30 m), implying that although the intrusive was very hot, the intruded rocks were so well healed that insufficient fracturing was available to form a deposit.

Besides the main intrusive mass, numberous sets of dykes cut the country rocks. Earliest amount these (inter-mineral) is a quartz-K-feldspar porphyry with an aphanitic groundmass but otherwise



Figure 019-79-5 Red Mountain - R.H.S. Property, August 1978

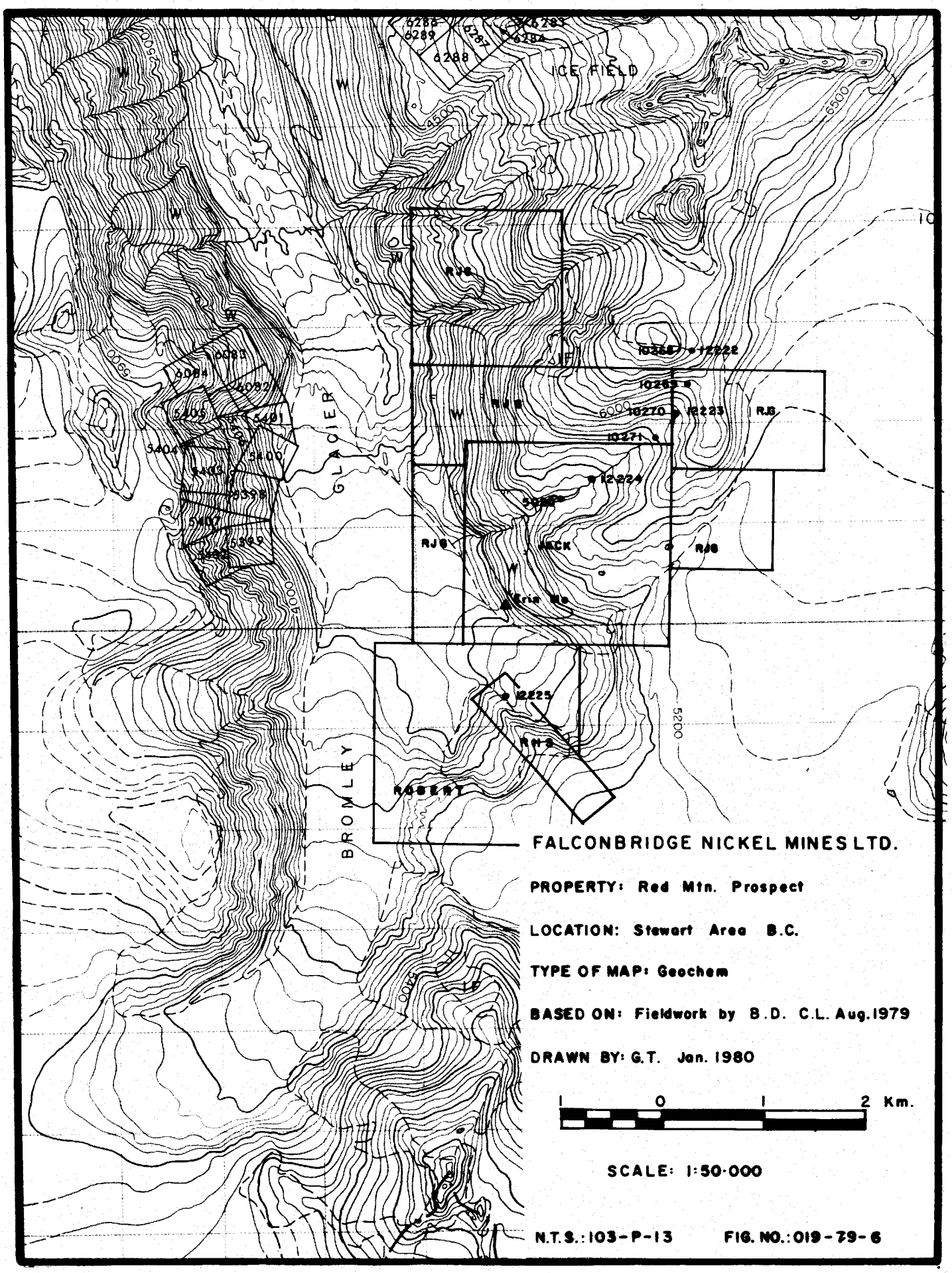

ICE FIELD
GLACIER
BROMLEY
RJB
JACK
Eric No
ROBERT
FALCONBRIDGE NICKEL MINES LTD.
PROPERTY: Red Mtn. Prospect
LOCATION: Stewart Area B.C.
TYPE OF MAP: Geochem
BASED ON: Fieldwork by B.D. C.L. Aug.1979
DRAWN BY: G.T. Jan. 1980
1 0 1 2 Km.
SCALE: 1:50·000
N.T.S.: 103-P-13
FIG. NO.: 019-79-6

Table 1: Soil, silt and rock analyses from Red Mountain area.
(See Figure 019-79-6 for locations of samples.)

Number	Type	Mo	W	Cu ppm	Zn ppm	Pb ppm	Au ppb	Ag ppm
12222	soil	7	<2	292	237			1.4
12223	soil	46	5	101	108			4.1
12224	silt	330	4	545	379			1.1
5020	silt (GSC, 1978)	16	8	210	295	30		1.2
12227	silt (RHS)	73	4	194	271			1.5
10268	rock, py-po acidic vol. chl-qz - ser alt.	3		42	30	27	25	0.5
10269	rock, chip over $5m^2$, hblde. porph., chl-qz-ser alt.	65		216	40	11	1255	0.4
10270	rock, chips of, qz-py veins, chl-ep alt.	89		99	18	9	20	0.5
10271	rock (assay), mag -tourm actinolite - chl breccia						0.002	0.02

very similar to the main stock. It contains 1 - 2% disseminated pyrrhotite, and where observed was 1 - 2 m thick, subvertical, and trended northeast along the axis of intrusion from Lost Mtn. to Red Mtn. This felsic dyke is cut at right angles by northwest-trending, light green andesitic dykes containing fine, felted plagioclase grains, and both of these dykes are cut by dark "trap" or "lamprophyre" dykes.

The main intrusive mass is a medium to coarse-grained biotite granite, containing distinctive quartz eyes and large K-feldspar phenocrysts (up to 10 cm long). It is essentially fresh and untouched by an alteration except along narrow, scattered quartz vein selvages. These are of three types. The most common and obvious is dark grey - green and up to 10 cm wide; it is best described as "greisen", or quartz-muscovite - pyrite. It is found on the edges of veins bearing coarse chalcopyrite and sphalerite. The second most common selvage type is a very pale green, which again is quartz-sericite (but a different variety of muscovite, or sericite, than is in the dark selvages), and accompanies molybdenite mineralization. The third, relatively uncommon selvage type is pink K-feldpar and quartz; it is barren of mineralization.

The density of quartz veining within the intrusive (1 - 2 veins, 2 cm thick, per meter) is insufficient to give minable MoS_2 grades. In fact, the intrusive probably grades around 250 ppm Mo (0.03 - 0.04% MoS_2) over representative widths. The molybdenite is present as very fine flakes in the margins of quartz veins, and as minor disseminations into the selvages.

The homogeneous trend of quartz veining (northeast), and the lack of pervasive alteration in the intrusive, make it unlikely that there is another intrusive below it which has supplied the

molybdenum. Thus there appears to be no radial or concentric pattern indicating a buried target, and the sparseness and weak mineralization in the exposed veining would seem to rule out the possibility of an Endako-type deposit (except underneath the glacier, where it is impossible to test).

It seems most likely that the observed molybdenum mineralization represents weak veining in and around the contact zone of the presently exposed stock. Thus the center of this stock, under the Bromley Glacier between the R.H.S. and Erin prospects is liable to be quite barren, with what little molybdenite there was being concentrated around the stock margins.

A different structural setting is represented by the hornblende - plagioclase porphyry exposed in Goldslide Gulch on Red Mountain. This grades from a hypabyssal porphyry with barely phaneritic groundmass at its deepest exposed level, to a sub-volcanic neck with apanitic groundmass. These rocks are much more susceptible to intensive fracturing and indeed a well-developed quartz vein stockwork is present in this intrusive (generally 1 - 2% quartz veins, but with substantial areas 100m X 50m with 10 - 50% vein quartz). However, no minerals of economic interest except traces of copper can be discerned in this stockwork.

Molybdenite is notable by its absence. Several zones of a black tourmaline - magnetite - actinolite minor rhodonite breccia occur within this quartz stockwork.

Alteration grades in the stockworked area range from weak propylitic (chlorite-epidote)through intense propylitic (chlorite - carbonate - pyrite) to weak phyllic (carbonate - sericite). This alteration, unlike that at the R.H.S. - Erin stock, is pervasive and well developed. There is some suggestion that the best alteration and veining is related to a fault system which runs up Goldslide Creek.

The hornblende porphyry intrudes a gently northeast-dipping sequence of dacitic (?) volcanics which may well be coeval with the hornblende porphyry. The textures of the volcanics and their composition resemble the hornblende porphyry, suggesting a coeval, comagmatic history.

An intense, widespread zone of pyritization (minor phrrhotite) 3 - 4 km in diameter is centered on the hornblende porphyry.

Conclusions

It is possible that economic concentrations of molybdenite may exist at depth below the hornblende porphyry plug, where the proper high-level setting could be combined with molybdenum supplied by an intrusvie of the R.H.S. - Erin type. The combination of a strongly fractured, high-level porphyry intruding a pile of its own volcanics, with a concomitant strongly developed concentric zone of pyritization and alteration, close to intrusives carrying known molydenite, is too promising to be ignored.

Recommendations

The hornblende porphyry stock, surrounding volcanics, and the R.H.S. - Erin molybdenite - bearing stock, need to be carefully mapped (stadia- transit survey) with the whole area considered as a single complex system. Special attention should be directed towards mapping alteration patterns and radial / concentric patterns, in and around the hornblende porphyry stock, in order to decide whether or not another deeper intrusive center could be present below Goldslide Creek basin. Any pattern of veins in this basin carrying MoS_2 should be carefully mapped. A magnetometer survey of the basin might determine if the tourmaline/magnetite breccias seen are expressions of an underlying magnetite "shell" which could overlie molybdenite ore. A rock geochem survey should also be conducted.

An option on this property should be taken.

2.8 Porter/Willoughby Creeks Area - 103P/13 (Figure 019-79-7)

Five days were spent in examining outcrops in the Porter (Del Norte), Willoughby, and Nelson Creek valleys by foot from helicopter drop-off points. Examination was confined to the heads of the valleys, west of the Bowser-Hazelton contact.

There appear to be two main zones of interest within the Hazelton rocks, one close to the contact with the overlying Bowser group, and one further to the west by some 4 km. Both these zones trend northerly (about 350°) and are marked along their length by noticeable red-brown staining, or gossans. The rocks in between are light to dark brown and relatively unstained.

The lowermost Bowser rocks, along the contact, are also strongly stained due to weathering of pyrite. This staining exists regionally right up the margin of the basin and is presumed to owe its origin more to a regolith effect than to economic mineralization. For instance, the same pyritic rocks occur at the margin of the basin west of the Surprise Creek showings and are unrelated to the mineralization.

The prime object of the work in Porter/Willoughby Creeks was to trace the origin of massive pyrite/sphalerite/galena - bearing boulders located last season on the glacier ice. These have been traced to one source, beneath a small glacier between the heads of Porter and Willoughby Creeks. However, other sources may exisit and are unlocated. The source of material such as samples BD-17 and BD-8 in Porter Creek, both massive pyrite/sphalerite boulders, is unexplained. The accessible outcrops that are possible sources for this material have yielded only weak pyrite mineralization. The only remaining sources are outcrops on the south side of Porter Creek headwaters, accessible only to mountaineers or mountain goats, or concealed areas beneath the glacier. Visual examination of the available outcrop is not encouraging, so it is likely that the source

is below the glacier in the head cirque of Porter Creek. This would be on strike from the known source in the northern cirque at the head of Willoughby Creek.

Prospecting of the next gossan northward along the strike of the mineralized structure, in the south fork of Nelson Creek, disclosed only strong pyrite with no base-metal sulphides.

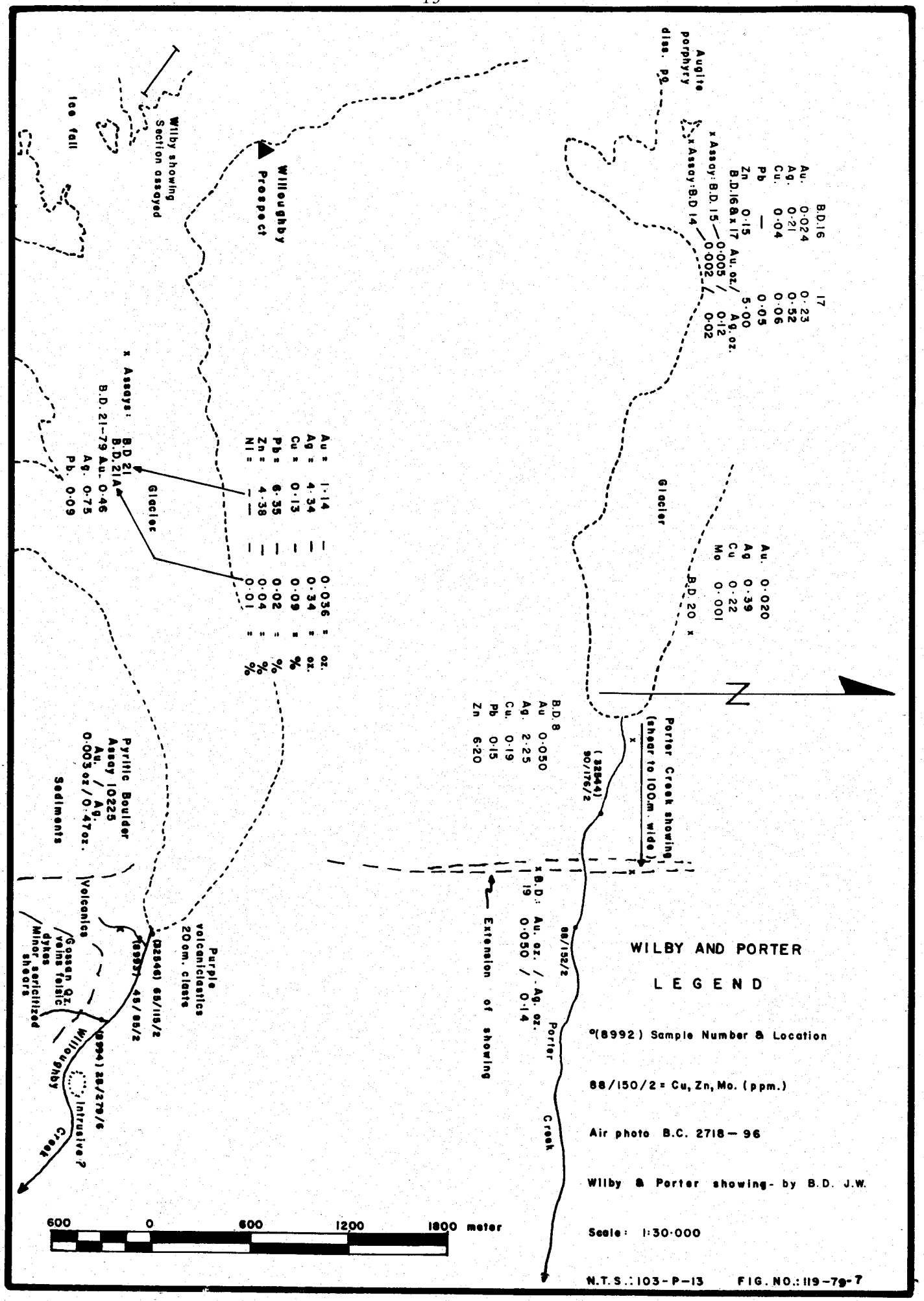
The structure of the Hazelton rocks observed is highly complex, due to intense local folding of sedimentary marker horizons and suspected closely-spaced faulting. It is only possible to guess at the overall structure of the area examined, without doing a good deal more detailed work. Strikes appear to be generally northeast to northerly, with westerly dips.

The main rock types seen include a schistose, orangey-brown weathering biotite crystal tuff (the westernmost rock seen), a coarse andesite tuff-breccia which may underly the former, and variable green andesitic tuffs which may be equivalent to the tuff-breccia. Intercalated within the green adesitic unit are rare pods and one thin (5m) continuous bed of grey highly fossiliferous limestone. To the east, another similar grey limestone is overlain by a distinctive brown-weathering carbonate member (2 m. thick) and a 10 - 20 m. thick black argillite. This sequence has been noted in both Willoughby and Porter Creeks, but has not been traced between them.

There are several varieties of dykes and small intrusive bodies in the area, with intrusive activity becoming more prevalent to the north in Nelson Creek. Dykes of hornblende porphyry (andesite to diorite) are most common, usually trending northwesterly. A few trend northeast to easterly, and near the intrusive bodies all directions are possible. A biotite porphyritic dyke was seen at the large gossan in the south fork of Nelson Creek, trending northeasterly. The larger intrusive mass in Porter Creek is a hornblende-plagioclase porphyry, of andesitic composition. It intrudes and deforms the argillite on its eastern side, but seems almost to grade into the andesites on the west.

Mineralization in the form of pyrite is widespread in the Hazelton rocks, casuing weak gossanous staining in many locations throughout the area examined. However upon detailed examination the pyrite is found to be restricted to widely spaced fissures or shears, and rusty float from these tends to spread out and give the appearance of a larger gossan. In a few places, there is minor base-metal mineralization in quartz veins at the center of these rusty fissures, i.e. where mineralizing activity was strongest. Chalcopyrite, sphalerite, and rare galena were noted, but nothing approaching economic grade over minable widths was seen. Such veins were noted just above the toe of the glacier in Porter Creek, on the north side of the valley; and near the located source of massive sulphide boulders, headwaters of Willoughby Creek.

In summary, there still appears to be a chance of finding a small, high-grade lens of massive sulphide, either wholly or partly buried beneath the ice. Gold and silver credits may make the prospects of developing any such find more attractive, but remoteness and access would severely restrict any development.


WILBY AND PORTER
LEGEND
°(8992) Sample Number & Location
88/150/2 = Cu, Zn, Mo. (ppm.)
Air photo B.C. 2718 — 96
Wilby & Porter showing- by B.D. J.W.
Scale: 1:30·000
N.T.S.: 103-P-13
FIG. NO.: 119-79-7
600 0 600 1200 1800 meter
Wilby showing
Section assayed
Ice fall
Willoughby Prospect
Augite porphyry dike. pg.
Glacier
Porter Creek showing (shear to 100m. wide)
Extension of showing
Porter Creek
Pyritic Boulder Assay 10225 Au. / Ag. 0·003 oz / 0·47oz.
Sediments
Volcanics
Gossan Qz. veins felsic dykes Minor sericitized shears
Purple volcaniclastics 20 cm. clasts
Willoughby Creek
Intrusive?
B.D. 16 Au. 0·024 Ag. 0·21 Cu. 0·04 Pb — Zn 0·15
B.D. 17 0·23 0·52 0·06 0·05 5·00 Ag. oz. 0·12 0·02
x Assay: B.D. 15 — 0·005 / 0·002
x Assay: B.D 14
B.D. 16 & x 17 Au. oz. / Ag. oz.
x Assays: B.D. 21 B.D. 21A
B.D. 21-79 Au. 0·46 Ag. 0·75 Pb. 0·09
Au = 1·14 — — 0·036 = oz.
Ag = 4·34 — — 0·34 = oz.
Cu = 0·13 — — 0·09 = %
Pb = 6·35 — — 0·02 = %
Zn = 4·38 — — 0·04 = %
Ni = — — — 0·01 = %
B.D. 20 x
Au. 0·020
Ag 0·39
Cu 0·22
Mo 0·001
B.D. 8
Au 0·050
Ag. 2·25
Cu. 0·19
Pb 0·15
Zn 6·20
(32844) 90/176/2
x B.D.: 19 Au. oz. / Ag. oz. 0·050 / 0·14
88/152/2
(32846) 68/118/2
(32847) 48/85/2
(8994) 88/279/6

2.9 Willoughby Creek Prospect (C. Leitch)

Location: 103P/13E
Lat. 55°59' Long. 129°35'
25 km ENE of Stewart
Skeena M.D.
Airphoto B. C. 5505-265

Claims: none

Metals: Au, Ag

General:

An area of massive sulphide float found near the headwaters of Willoughby Creek (north side) was revisited August 15, 1979 and the massive sulphide was found in outcrop (Fig 019-79-8). The area outcropping at the junction of the Willoughby Creek glacier and Cambria Icefield, Fig. 019-79-9 , was mapped using stadia and transit, Figure 019-79-16. A reconnaissance EM-16 (VLF) and magnetometer survey was conducted by S. Presunka. The two silt samples taken are slightly anomalous in Zn and Ag.

The massive sulphides are seen to strike northerly and are exposed over 8.5 m. of width. The exposed strike length is only about 15 m. Thus the lens of massive sulphide is covered both to the east and north. To the west, a linear north-trending boundary is observed between massive sulphides and pyritic-fissured, green coarse volcanic tuff-breccia (the "Diorite Breccia" of Gordon Brown seen at the "Wilby Prospect" across the glacier 500 - 1000 m. to the south). To the south, the massive sulphide lens is cut off by a fault striking 080° (070° - 090°) with right laterial displacement and steep dip. The massive sulphides can be seen in sheared pods (1m X 2m) strung out along this fault to the south-west for 30 m before disappearing again under the ice of the main glacier.



Figure 019-79-8 Willoughby Creek Prospect

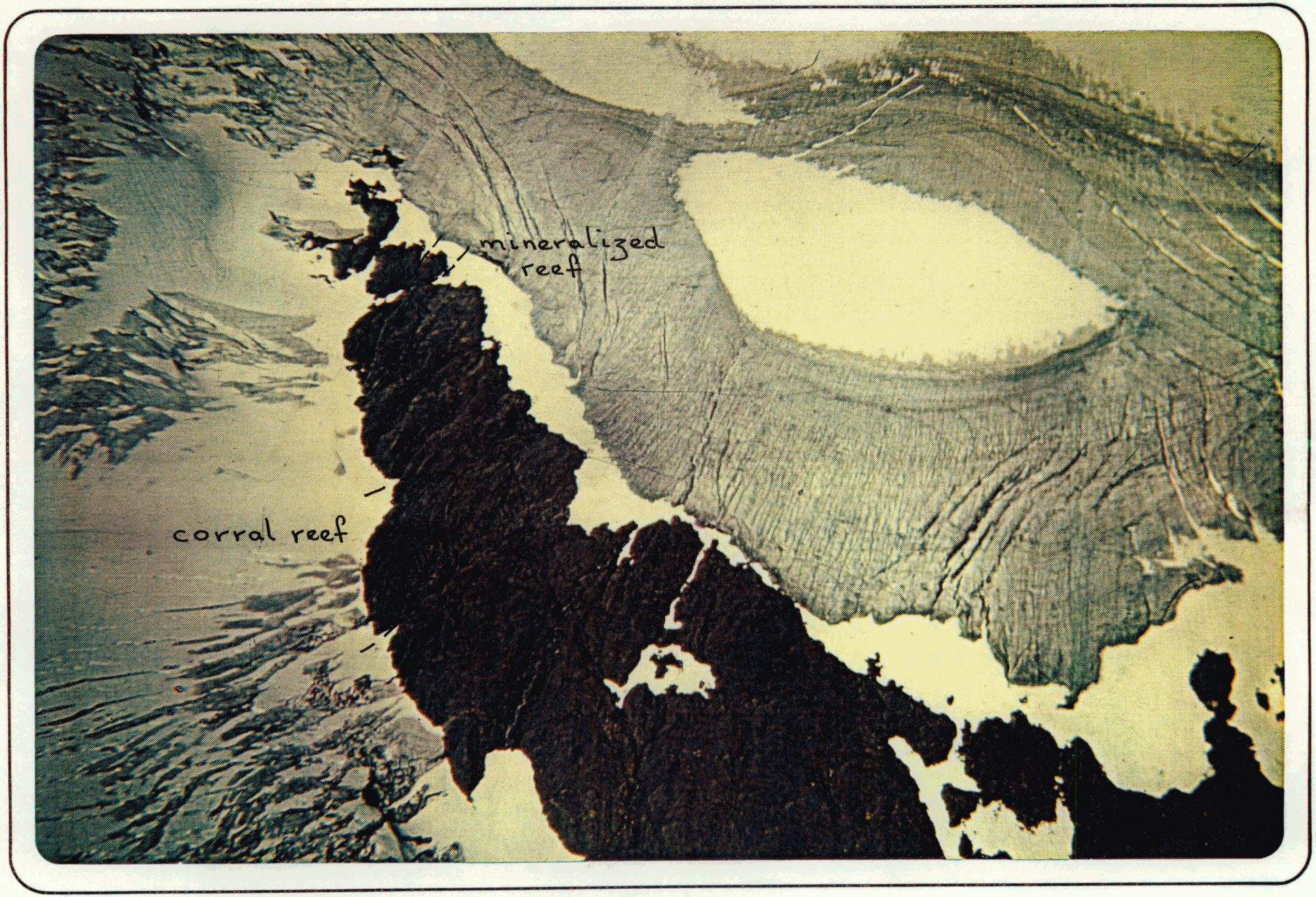


Figure 019-79-9 Willoughby Creek Prospect

The massive sulphide lens is composed of pyrite and sphalerite, with textures identical in places to that of a coralline limestone bed observed 100 m to the south - east Figures 019-79 . It seems likely that the sulphides have replaced the corals of the limestone preferentially, leaving a black (argillaceous) matrix which was not so easily replaced. Where the mineralization is less intense within the lens, sulphides are separated by pale greenish, highly silicified interstices (strong quartz-sericite-pyrite alteration).

Pyrrhotite is notably absent in the massive sulphides, as is magnetite. No galena has been observed to date at the showing, but at the Wilby Prospect to the south (approximately on strike) boulders of massive pyrite shalerite and galena were reported. There is considerably more gold and silver associated with the galena than with the sphalerite, according to all the assays taken by Gordon Brown, Alex Smith, Premier geologist, and more recently Bruce Downing. The pyrite-sphalerite material appears to run 0.05 - 0.2 oz/ton Au and 0.2 - 0.6 oz/ton Ag, while the galena-sphalerite material runs 0.80 - 1.30 oz/ton Au and 4 - 7 oz/ton Ag (all assays from the "Wilby Prospect" area).

The only assays to hand from recent sampling show that the massive pyrite-sphalerite (float) is low in gold (0.057 oz/ton) and silver (0.36 oz/ton), but contains 6.80% Zn. Results of a chip sample across the massive sulphide lens indicates 0.005 Au, 0.19 Ag and 0.83 Zn. The pyritic-fissured material around the margins contains about 0.005 oz/ton Au and 0.1 - 0.3 oz/ton Ag, plus 0.1 - 0.2% Zn.

There is a possibility that, while only sphalerite-pyrite material is exposed at surface in the massive sulphide lens, sphalerite-pyrite-galena, with accompanying better gold and silver values, may be present below the surface.

It whould be noted that a brief survey with the Ronka EM 16 was made over the glacier covering the northward extension of the massive sulphide lens; this showed that, while the exposed lens had



Figure 019-79-10 Volcanic breccia



Figure 019-79-11 Fragment rimmed with pyrite, pyrite fractures and pyrite blebs in matrix

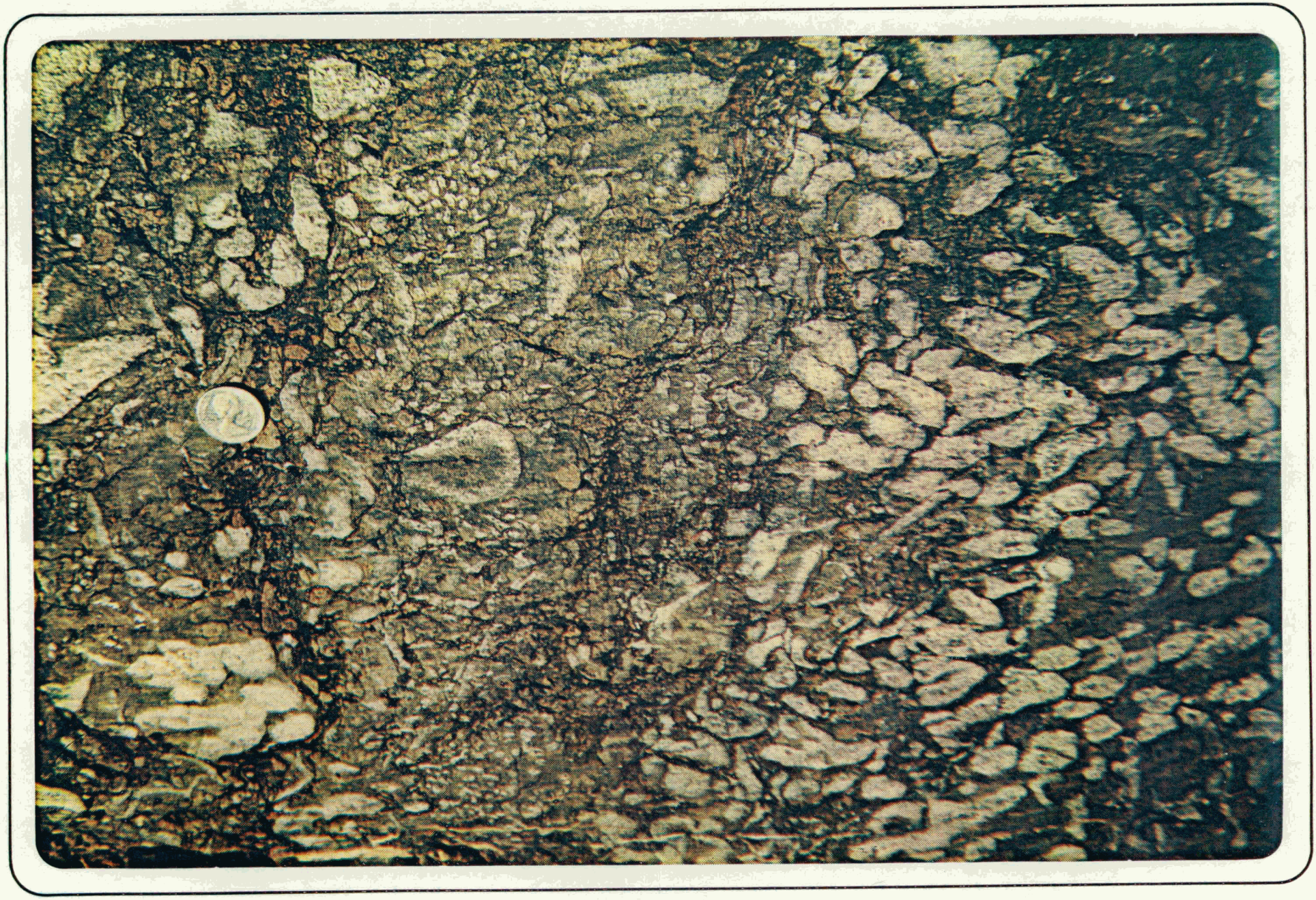


Figure 019-79-12 Corral



Figure 019-79-13 Corral



Figure 019-79-14 Corral cut by quartz veins



Figure 019-79-15 Corral

only a short strike length to the north under the ice, a much larger conductor was indicated to the north-east under the ice. It thus appears possible the the massive sulphide lens seen is truncated to the north of a fault parallel to the one exposed, and dislocated to the east under the ice. An anomaly was also picked up by the E.M. 16 some 400 m to the north (although the character of the anomaly was indistinct - it could have been due to a fault). Magnetic readings are of background values.

There is also a possibility that the massive sulphide horizon extends to south and west in a series of faulted extensions, under the ice-fall of the north arm of Willoughby Glacier. This would connect the newly discovered mineralization with the similar, known mineralization of the old "Wilby Prospect". Significantly, the newly discovered zone was not known to earlier prospectors, having only just been uncovered by melting of a small "patchy" glacier, and therefore has never been tested.

Numerous irregular pyritic shears occur around this sulphide zone. pyrite also occurs as rims around fragments and as blebs up to ½ cm. across in the matrix, Figures 019-79-10 and 11.

The other coralline reef, Figures 019-79-12 to 15 outcropping 100 m. to the southeast of this sulphide zone, is non-mineralized and approximately 200 m. in exposed outcrop. An andesite dyke intrudes the reef along its western contact with the volcanic breccia.

The massive sulphides lie in a sequence of altered andesitic tuffs and breccias which strike north-northwesterly and dip gently (10^{o} - 40^{o}) westward. The sequence is underlain to the east by a section of highly crumpled black argillite containing a few beds of rusty brown carbonate (1 - 2 m. thick) associated with grey, fossiliferous limestone beds up to 15 m. thick.

The volcanic sequence passes upward from a coarse tuff (fragments 1 - 2 cm size) through the coarse breccia (fragments 10-20 cm. size) into a rock described as a biotite crystal tuff. This latter rock is always strongly schistose, weathers orangey - brown, and characterized by large (0.5 cm) pale green biotite phenocrysts derived from hornblendes.

There are also numerous intrusive rocks exposed around the Willoughby Prospect. A prominent set of north-westward trending felsic dykes is exposed along a cliff face approximately 1000 m. to the northeast. A several meters thick dyke of chloritized and pyritized hornblende - plagioclase porphyry is exposed north and east of the glacier, 500 m. from the sulphide zone. Within the map area, non-mineralized northwest trending hornblende -plagioclase porphyry and northeast trending amygdaloidal andesite dykes are present. A hornblende - plagioclase dyke outcropping 50 m. west of the sulphide zone is strongly altered (quartz - sericite - carbonate - pyrite).

This area is more of geological interest than economic owing to its location. The only viable recommendation would be to trench and/or put down a packsack drill hole to test the depth of mineralization.

3. Recommendations and Logistics

3.1 P.N. 019

a) The Todd Creek area should be thoroughly prospected with regional geological mapping and emphasis on prophyry - type (Mo) and vein (Au-Ag) mineralization.

b) The horfels-quartz vein stockwork zone on Todd Creek should be staked and mapped with emphasis on a rock geochem survey.

c) The mineralized coral reef at Willoughby Creek Prospect should either be trenched or drilled (packsack $\sim$ 25 m.). Further regional mapping and prospectin around this prospect should be conducted.

d) The Hazelton-Bowser contact area should be prospected together with regional mapping, and geochem (silt, rock) in N.T.S. 104A and 104B. This area is a favourable zone for porphyry-type mineralization.

e) A geological compilation map, 1:50,000, should be made of the prospecting areas.

Time: July, August (approximately 4 weeks)
Personnel: 1 geologist, 1 prospector, 2 assistants
Transportation: helicopter (turbine type) (Approximately 25 hrs)

Costs:

Salaries:	35,000
Transporation ($350/hr)	8,750
Camp Operation:	5,000
Analyses:	2,250
Miscellaneous:	9,000
Total	60,000

3.2 RHS-Red Mountain Area (Mo-Au Porphyry prospect)

The property at Red Mountain, owned by Zenore, Vancouver (Alex Burton - consulting geologist) should be optioned.

I have discussed an exploration program covering two years with Messers Jack Howard and Alex Burton with respect to the following:

Year 1

a) EM-16 (VLF, magnetometer survey to delineate faults, contacts, mineralized zones and extent of the magnetite-tourmaline breccia.

b) Rock geochem survey.

c) Detailed geological mapping, 1:5,000, using stadia and transit.

Costs:

Geophysical Survey	5,000
Geochem Survey	2,000
Geological Survey	10,000
Miscellaneous	8,000
Total	25,000

(This program can be operated from the Surprise Creek camp, P.N. 029, to help reduce costs.)

Year 2

a) Drill favourable areas, approximately 500 m.

Costs:

Drilling @ $150/m.	75,000

N.B. Zenore has subsequently staked another 6 claims after my discussion as I had outlined that the more favourable area was outside their present claims.