

REPORT on  
PROPERTY EXAMINATIONS  
in the SMITHERS AREA, B.C.  
for  
TASEKO MINES LTD.

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by: M.F. Cowan, M.Sc., P.Eng.

Sept. 18, 1970.

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INTRODUCTION

During August 28th to September 1st, 1970, the writer made brief examinations of seven mineral showings and prospects in central British Columbia. Six were within a 50 mile radius of Smithers, one near Fraser Lake. Descriptions and appraisals of their economic potentials are presented herein.

NADINA COPPER SHOWING

On August 28th, a copper showing 5 miles north of Nadina Lake was examined (See Fig. 1 for location). Copper mineralization is exposed in two small trenches 150' apart, on the north side of a small lake that is accessible by fixed-wing aircraft.

Minor chalcopyrite, pyrite, and pyrrhotite occur as isolated grains, blebs, and short stringers in andesitic volcanic rocks of the Jurassic Hazelton Group. The sulfides occur within and adjacent to narrow, rust-stained, white quartz veins (up to 4" in width) in the volcanics. Some minor disseminated chalcopyrite occurs in the adjacent wall rock up to several inches from the quartz veins. Minor local silicification and epidotization of the volcanics has occurred along the quartz stringers and tight seams. The volcanics are tuffaceous in places and locally sheared at N50°W, dip 60°E. Massive andesite with minor, narrow graywacke lenses occurs north of the trenches, uphill from the lake.

Several boulders of pink, porphyritic granite with traces of chalcopyrite were found in the vicinity of the showing. The fragments are sub-rounded, indicating a source some distance away. Glacial striae on bedrock strike E-W and the granitic boulders apparently came from somewhere to the west.

Because the copper mineralization is associated with isolated, narrow quartz veins, the showing does not warrant further interest.

MICROWAVE HILL COPPER PROSPECT

On August 29th, a copper prospect was examined on the east side of Microwave Hill (Mt. Harry Davis on topographic map), just north of Houston, B.C. (Fig. 2). Access to the main road showing is by approximately 2 miles of good gravel road leading from Provincial Highway number 16 about  $\frac{1}{2}$  mile east of Houston. Mr. Gordon Hay of Houston, who holds an interest in the property (along with Mr. Ed Westgarde, also of Houston) informed the writer that 29 claims cover the prospect.

The copper occurs as chalcopyrite and bornite both as seams and disseminations in sheared andesite, dacite, and rhyodacite within a main mass of purple basaltic volcanics. Much of the basalt in the vicinity of the showings comprises a lithic tuff. The main zone of shearing is approximately 150' wide at the road showing, strikes N20°W, dips 30°-70°E, and is apparently at least 2400' in length as indicated by geological mapping. Approximately 400' north along the road from this mineralized shear zone is a 175' section of sheared, rust-stained basalt. Minor copper stain and a trace of bornite was observed in this zone.

At the main road showing the mineralized andesitic volcanics are generally altered and contain abundant carbonate, chlorite, epidote, and some talc. The carbonate has formed, in places, a fine, partly mineralized stockwork. Chalcopyrite and bornite occur

in the strongly sheared chlorite-carbonate zones along with very minor amounts of a mineral thought to be freibergite (argentiferous tetrahedrite). A 15' chip sample taken by the writer from a portion of the road showing was assayed with the following results:

0.16% Cu  
0.27 oz. Ag/ton  
less than 0.003 oz. Au/ton

A grab sample across 3' from a "high grade" pocket in the chlorite-carbonate zone along the main road showing was assayed with the following results:

1.30% Cu  
0.99 oz. Ag/ton  
less than 0.003 oz. Au/ton

Eleven 20' samples taken across the main road showing by B.C. Dept. of Mines geologist B.N. Church were assayed with the following results:

<u>Sample</u>	<u>Oz. Au/ton</u>	<u>Oz. Ag/ton</u>	<u>% Cu</u>
1	trace	Nil	0.003
2	"	"	0.006
3	"	"	0.003
4	"	0.3	0.08
5	"	0.3	0.09
6	"	trace	0.40
7	"	0.1	0.10
8	"	1.7	0.36 )
9	0.01	1.4	0.68 ) avge. 0.43% Cu/80'
10	trace	0.1	0.11 )
11	"	0.8	0.58 )

Core from three drill holes in this area gave very poor assay results, the best being 0.13% Cu over an undisclosed footage, as indicated in a report by J.R. Forsythe. This assay compares with the 15' chip sample taken by the writer.



Trenching some 2400' northwestward up Microwave Hill from the main road showing, near 228N, 194E on the grid, has exposed highly sheared, mineralized rhyo-dacite. The dominant shearing trend is N20°W, dip 30°-50°W. Subsidiary shearing has occurred along N10°E, dip 87°E. The host rock is weathered at the surface with abundant limonite stain, malachite, azurite, and scattered grains of chalcopyrite in the fresher rock. Silica content is high and some may have been locally introduced. Some epidotization and carbonatization has occurred. A grab sample across 20' of this zone gave the following assays:

0.22% Cu  
0.03 oz. Ag/ton  
less than 0.003 oz. Au/ton

A geological map of the property and results of an IP survey have been examined, as well as the brief discussion of results of diamond drilling by J.R. Forsythe. Only one IP anomaly, centered at 224N, 199E, is of sufficient size to be of interest. Drilling results on this anomaly, which is of relatively low intensity, were negative. The other two anomalies on which drilling was recommended, but not carried out, are centered at 220N, 210+50E, and 211+50N, 213E. Each is based on one high reading and their extent is thus suspect.

Although several of the samples taken by B.N. Church along the road showing are of interesting grade (0.43% Cu averaged over 80') the previous geological and geophysical work, if valid, make the property unattractive. Firstly, the geological map indicates that the andesite and rhyo-dacite bands, which are the potential hosts



for economic sulfide mineralization, are of relatively narrow widths and non-continuous extent due to faulting. The main mass of purple-weathering, basaltic volcanics are unmineralized. Secondly, the IP anomalies are weak and the anomaly pattern dispersed across the apparent main shear zone. Thirdly, the drilling results on the most prominent IP anomaly were evidently negative. The conclusion from these facts is that the property is unlikely to have economic merit.

Conversely, there is a remote possibility that sulfide mineralization did not respond to IP probing and that the weak and dispersed IP anomalies are caused by structural conditions such as intense shearing or fracturing of the volcanics. If this is so, a limited program of surface trenching across the main shear zone would be of value in determining whether or not potentially economic mineralization exists on the property.

DOMM MOUNTAIN COPPER SHOWING

On August 29th the writer examined a copper showing on the northwest side of Dome Mountain (Fig. 3). Chalcopyrite and pyrite occur in several, isolated, white quartz veins and lenses 3"-6" wide, in strongly sheared andesite. The veins strike N10°E and dip 85°W, while schistosity is generally at N30°W, dip 35°E, but locally strongly contorted with small scale drag folds. Minor amounts of galena accompany the copper mineralization. No sulfides of significance were seen in the host andesite and the isolated quartz veins and lenses with associated sulfides are undoubtedly of metamorphic rather than hydrothermal origin, having formed in situ during shearing and fracturing of the volcanics.

The prospect has no economic potential.

QUILL CREEK LEAD-ZINC-SILVER SHOWING

On August 30th an examination was made of a lead-zinc-silver showing on Quill Creek, some 2 miles west of the Skeena River near Cedarvale (Fig. 4). The showing is described on p.47-49 in G.S.C. Memoir 212 entitled "Mineral Resources, Usk to Cedarvale, Terrace Area, Coast District British Columbia" by E.D. Kindie, 1937, and briefly on p.93-94 in G.S.C. Memoir 329 "Geology of Terrace Map-Area, British Columbia", by S. Duffell and J.G. Souther, 1964. Access is by about 2 miles of excellent trail from the railroad tracks on the west side of the Skeena River, and thence by approximately 1000' of poor trail which follows the steep walled valley just above Quill Creek.

The lead-zinc-silver mineralization occurs in a quartz-filled, locally brecciated fracture zone in fine-grained, massive graywacke and is associated with a grey feldspar porphyry sill intruding the sediments approximately 100' north of the showing. The porphyry is rust stained in places and carries minor disseminated pyrite. Galena, sphalerite, and minor chalcopyrite occur in the footwall along the fracture zone that strikes N80°E and dips 35°S. A 20' adit has been driven into this zone. The maximum width of the mineralized zone was observed to be about 15' at the level of the adit. The first 5' section into the footwall is well mineralized with sphalerite, galena, and minor chalcopyrite; the next 5' are leaner in sulfides; and the last 5' are poorly mineralized. The better mineralized sections correspond to

the well brecciated portions of the fracture zone. Two 5' samples taken across the first 10' into the footwall at this location assayed as follows:

<u>Footage</u>	<u>% Cu</u>	<u>% Zn</u>	<u>% Pb</u>	<u>Oz. Ag/ton</u>	<u>Oz. Au/ton</u>
0'-5'	0.32	5.2	8.5	7.63	less than 0.003
5'-10'	0.18	1.8	0.5	0.73	less than 0.003

The mineralized zone is cut off up dip by the porphyry sill and down dip, just below the showing, by a north-south striking fault that dips 40°W. A 2' band of graphite occurs in the hangingwall adjacent to the fracture. A narrow band of argillite comprises the footwall of the mineralized zone. The fracturing was localized along the transitional argillite-graywacke boundary.

Above the adit in the porphyry sill are  $\frac{1}{2}$ " to 1" wide, parallel, barren white quartz stringers which strike north-south and dip 40°E. These are spaced several inches to several feet apart and are continuous over 30' to 40'. Just below the porphyry sill, to the west of the adit, is a narrow argillite band that grades rapidly into graywacke within 10' from the contact. The strike and dip of the argillite at this location is N30°W, dip 20°N.

While the grade and width of the showing are interesting, the mineralized zone is terminated abruptly up and down dip by the porphyry sill and the north-south striking fault respectively, and its continuation along strike is unknown. Estimated tonnage from the observed extent of the mineralization is 5000 tons. An access road to the showing would be difficult to build due to the steep rocky walls for at least 1000' along Quill Creek from the end of the good

trail. The termination, by faulting, of the mineralized zone down dip, suggests a similar situation may exist along strike. Considering these factors, the prospect is not attractive.

NITHI MOUNTAIN MOLYBDENUM SHOWINGS

On August 31st, four molybdenum showings on Nithi Mountain, about 6 miles west of Fraser Lake, B.C. (Fig. 6), were examined briefly. Access to the showings is by logging roads.

The first showing had been trenched with a bulldozer for about 150'. Minor molybdenite and chalcopyrite occur in  $\frac{1}{2}$ " wide quartz stringers which strike N60°E and dip 60°S. Their maximum density of occurrence is 3-4 across 20'. The host rock for the quartz stringers is a highly altered, medium grained, quartz monzonite. The alteration is similar to that found at Endako and is characterized by pink potassium feldspar and a pale grey-green mineral which could be a mixture of chlorite and clay minerals. Most of the mafics are gone from the rock. Minor pyrite was observed in the host rock as sparse disseminations and in tight seams. Traces of molybdenite were observed as isolated grains in the host quartz monzonite.

At the second showing, sparse molybdenite occurs in tight, parallel seams 2" to 4" apart. The seams occur in a fine-grained, slightly altered quartz monzonite, and strike N60°E with vertical dips. Small portions of the host rock are rust-stained where minor pyrite occurs. A rusty, barren, white quartz vein, one foot wide, was noted at this showing.

At the third showing, very sparse molybdenite and a trace of chalcopyrite occur in tight, quartz-filled seams that strike

N60°E with vertical dips. The host rock is a highly altered quartz monzonite. The seams are up to several inches apart and are slightly rust-stained.

At the fourth showing very sparse, disseminated blebs of molybdenite occur in altered quartz monzonite. Strong potassium feldspar and argillic alteration have occurred along fractures striking N60°E and dipping 45°N. Narrow veinlets of pink aplite with widths up to 1½" cut the host quartz monzonite. Several 1" wide, barren quartz veins were noted. They are non-continuous over lengths greater than several feet.

In considering the economic potential of the molybdenum mineralization, the pervasive potassium feldspar and argillic alteration, similar to that found at Endako, is encouraging. However, the lack of favourable structural conditions in the immediate vicinity of the showings militates against the probability of finding commercial quantities of molybdenite. The host quartz monzonite, where observed, was poorly fractured and the tight, quartz-filled seams that strike N60°E and carry the molybdenite are too dispersed for development of ore grade material. A viable exploration program for potentially economic mineralization in the area would entail a detailed photo-geologic study of fracturing and fracture patterns to pinpoint any areas of high density fracturing where an orebody might be present.



MUDFLAT CREEK MOLYBDENUM-TUNGSTEN SHOWINGS

On September 1st, molybdenum and tungsten showings were examined at the head of Mudflat Creek, about 6 miles due south of New Hazelton, B.C. (Fig. 5). The area is accessible by a logging road that runs from Provincial Highway number 16 up along the north side of Mudflat Creek to within about a mile of the showings. An old pack trail can be followed for the remaining distance. The showings examined by the writer occur between elevations of approximately 4200' and 4900' in a north-facing cirque at the head of Mudflat Creek. The cirque is just on the north side of the divide with Porphyry Creek (See Fig. 5).

Molybdenite occurs with minor chalcopyrite and some pyrite in shear zones within a granodiorite intrusive. The mineralized shear zones strike N30°W and dip 50° to 70° southwest. They have widths of from 1 to 10 feet and were observed to extend along strike with good continuity for at least several thousand feet. Some mineralization was noted a small distance into the granodiorite away from the shears. Several porphyry dykes with disseminated chalcopyrite and pyrite were noted. They have the same attitudes and widths as the shear zones.

At one location, molybdenite, minor chalcopyrite, and abundant yellow stain from secondary molybdenite minerals occur in three northerly-striking, rusty quartz veins. The veins are less than 2" wide and pinch out over a length of about 50'.

At an elevation of approximately 4200', just above a cirque lake, a tungsten-molybdenite showing was briefly examined. The showing is described on page 47 in G.S.C. Memoir 223, "Mineral Resources, Hazelton and Smithers Areas, Cassiar and Coast Districts, British Columbia" by E.D. Kindle, 1940. Wolframite and molybdenite occur in a 1' to 8' wide shear zone in granodiorite. A number of open cuts have been made along the zone and one of these was examined by the writer. The zone strikes N30°W, dips 65°SW and is rust stained. Molybdenite and minor chalcopyrite were observed but no wolframite was found.

While favourable assays have been reported across narrow widths in the shear zones (G.S.C. Mem. 223), the zones occur infrequently within the granodiorite intrusive and are separated by intervals of hundreds of feet. Thus, structural control of the mineralization is unfavourable and this precludes the possibility of developing mineable tonnages of either the molybdenum or tungsten.

SEVEN SISTERS COPPER-MOLYBDENUM SHOWING

On September 1st, a copper-molybdenum showing in the vicinity of the Seven Sister Peaks (Fig. 4) was examined. Molybdenite, chalcopyrite and associated green copper stain occur over an area of 10' x 15' on a vertical cliff face in quartz monzonite porphyry. Prominent joints in the porphyry occur at N65°W, dip 60°S; N70°E, dip 85°N; and N15°W, dip 90°. The sulfide mineralization is associated with the last of these. The showing is an isolated, minor occurrence of chalcopyrite and molybdenite and of no economic significance.

Respectfully submitted,

BACON & CROWHURST LTD.



M.F. Cowan, M.Sc., P.Eng.



NADINA  
Copper Showing

DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES  
BRITISH COLUMBIA

HONOURABLE R. G. WILLISTON, MINISTER

E. W. BASSETT, DEPUTY MINISTER OF LANDS

G. S. ANDREWS, DIRECTOR OF SURVEYS AND MAPPING

NTS SHEET 93E

WHITESAIL LAKE

SCALE - 1:250,000

SECOND

15'

COAST LAND DISTRICT RANGE 5

127°00'

To Houston—40 miles

45'

LAT 54°00'

To Houston—40 miles

30'



Subject to flooding

Chillamit





NTS SHEET 93L  
SMITHERS, B.C.

SCALE - 1:250,000

MICROWAVE HILL  
COPPER SHOWING



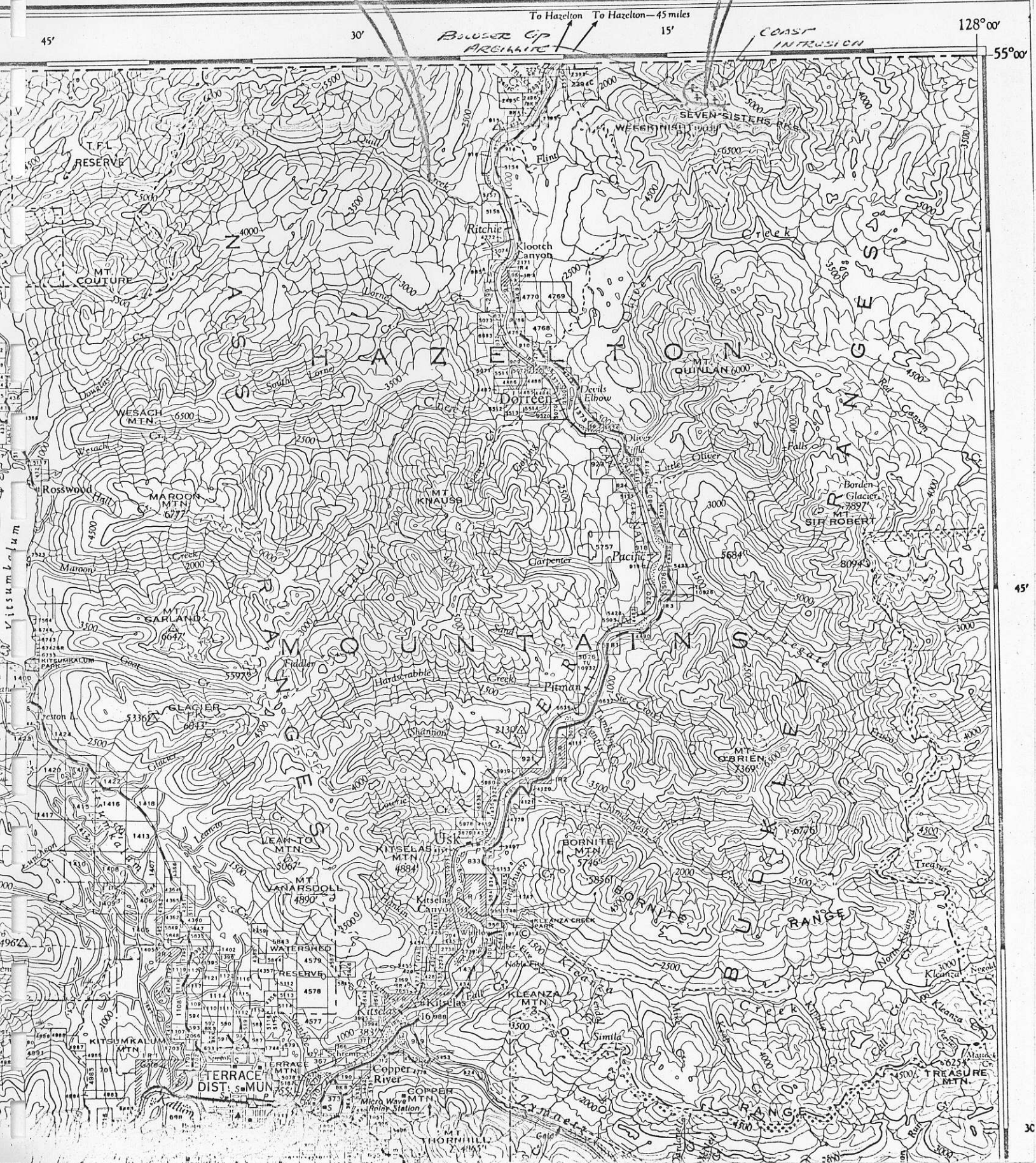


QUILL CREEK  
LEAD-ZINC-SILVER  
SHOWING

PRINCE RUPERT-TERRACE, B.C.  
113J

SHEET 103I AND PART OF 103

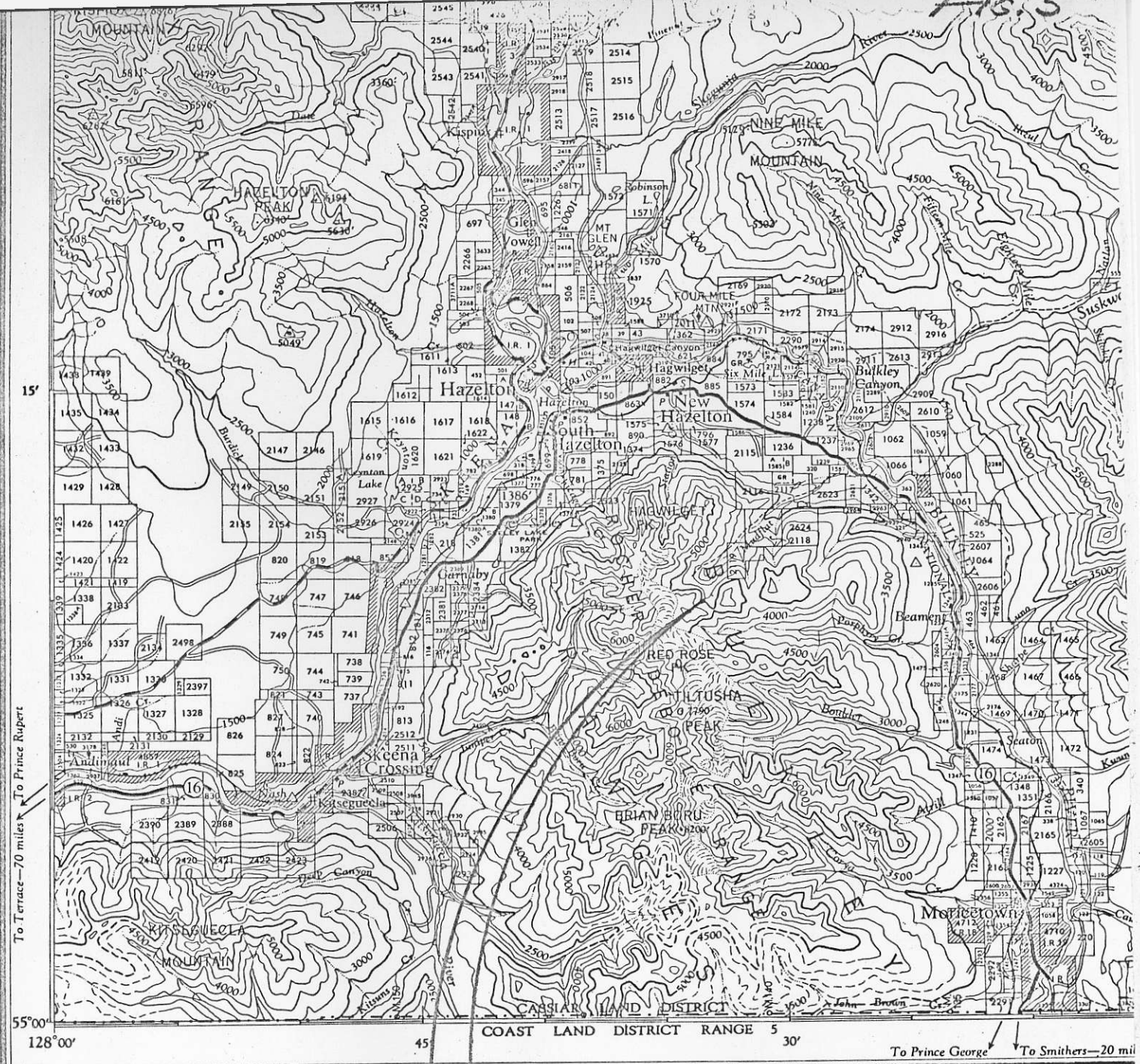
STATUS EDITION—July 2nd, 1964.



45'

30





Surveyed and compiled by the Topographical Survey, Dept. of Mines and Technical Surveys 1935. Revised with the aid of Air Photographs, and drawn by the Army Survey Establishment R.C.E. 1953-54. First Status Edition produced by Geographic Division, Surveys and Mapping Branch, Dept. of Lands, Forests, and Water Resources, 1956. Second Status Edition and roads revised, 1965.

The nearest Government Agent is at Smithers.

Mineral Claims are not shown on this sheet.

Copies of this map may be obtained from Geographic Division, Surveys and Mapping Branch, Department of Lands, Forests, and Water Resources, Victoria, B.C.

*Mudfoot Creek  
Copper Mayedennum  
Tungsten  
Showings*

NTS SHEET 93M  
HAZELTON, B.C.

REFERENCE

Scale - 1:250,000

- Land alienated or covered by application under the Land Act
- Surveyed Timber Lease, Licence, or Berth
- Indian Reserve
- Government Reserve
- Land District Boundary
- Provincial Forest Boundary
- Tree Farm Licence
- Municipality
- Water Supply Area
- Park
- Park less than 30 acres
- Campsite or Picnic Site
- Forest Service Lookout
- Settlement or Locality
- Post Office
- School
- Hospital
- Mine
- Dyke
- Historic Monument
- Mile Post

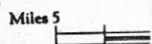
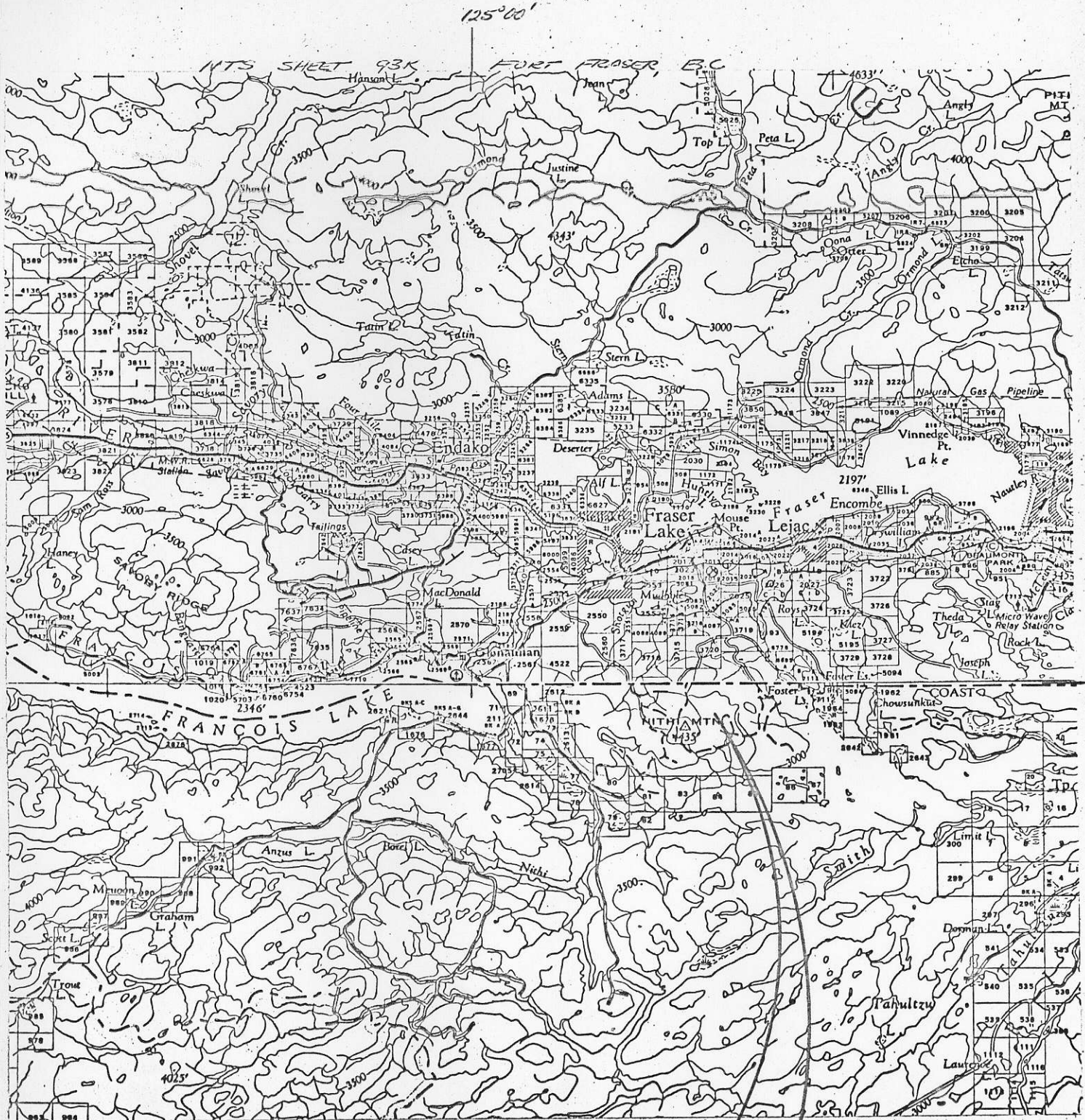


FIG. 5





SCALE - 1:250,000

NITHI MTN  
MOLYBDENUM SHOWINGS