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Utah Report

GEOLOGY, GEOCHEMISTRY & GEOPHYSICS

SULTANA GROUP

55° 127° S.W.

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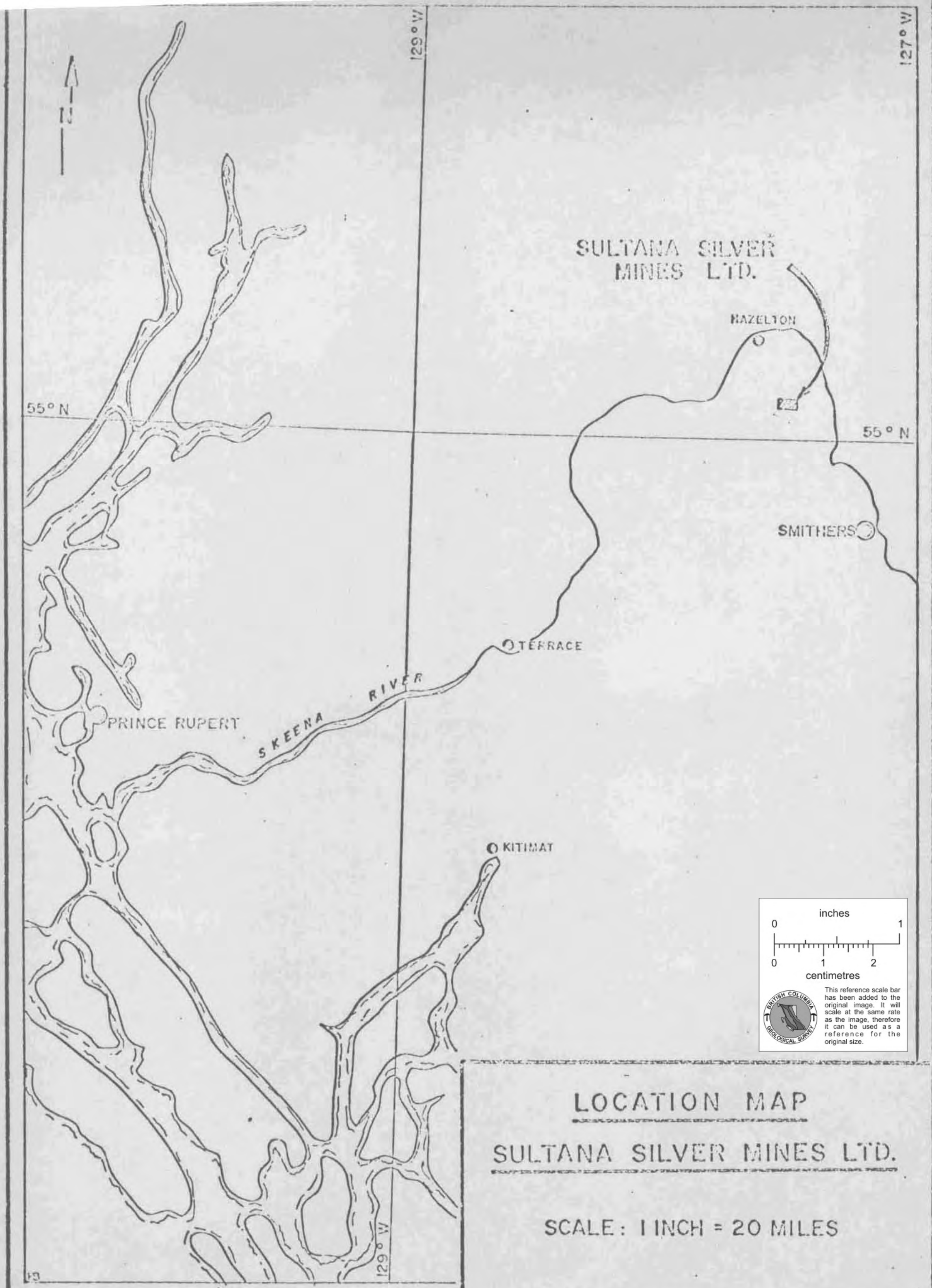
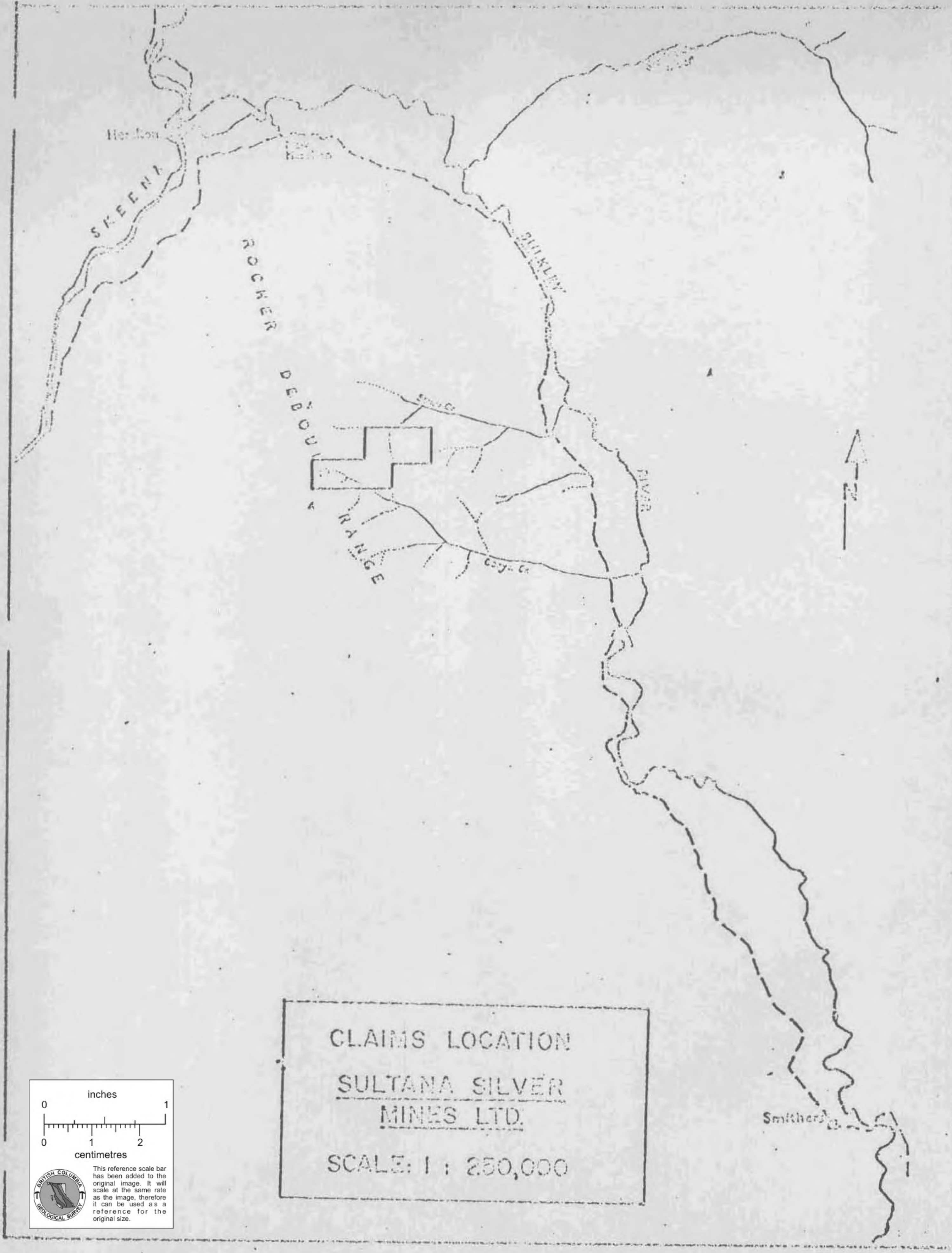


LOCATION MAP

SULTANA SILVER MINES LTD.

SCALE : 1 INCH = 20 MILES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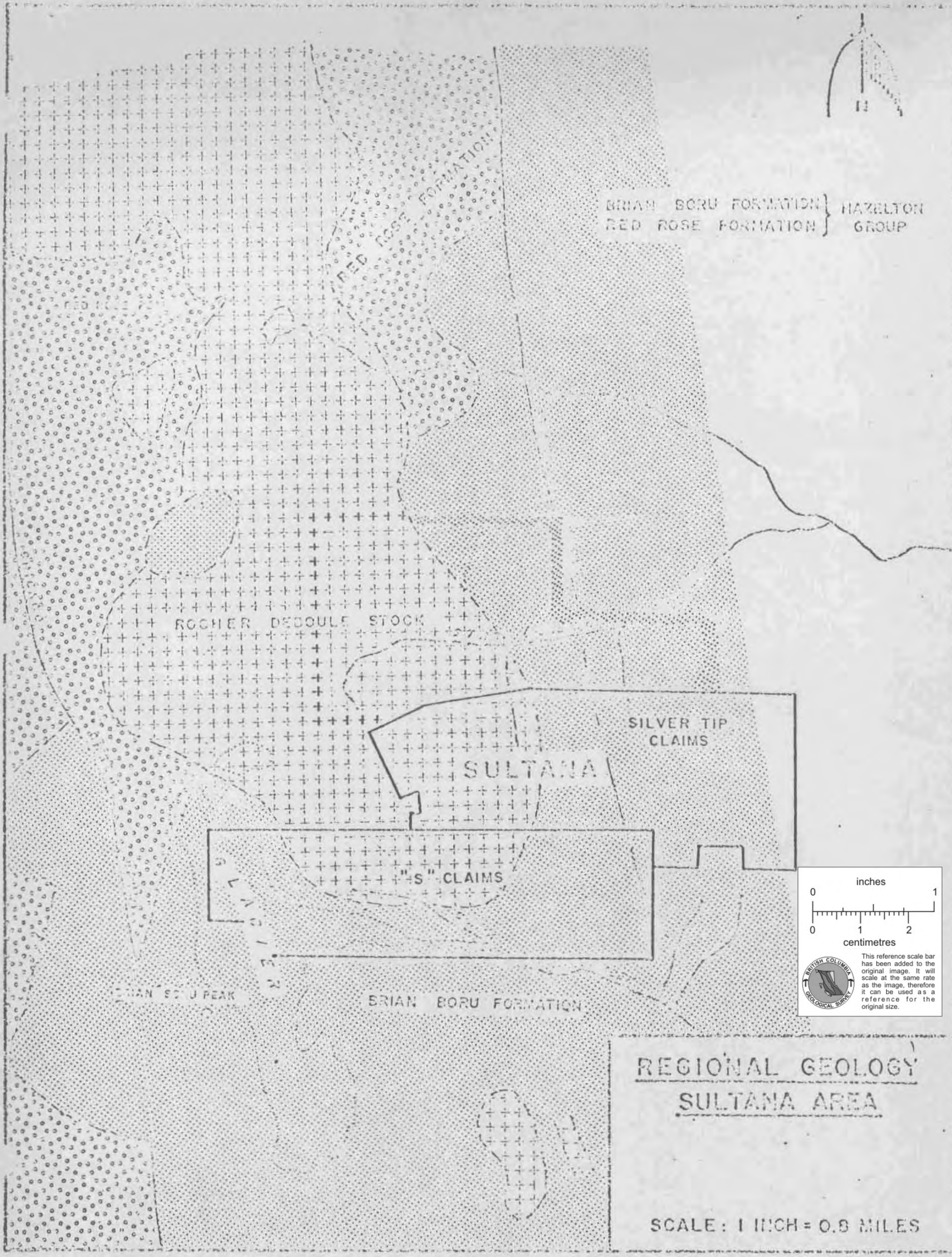
BRITISH COLUMBIA GEOLOGICAL SURVEY


BRIAN BORU FORMATION } HAZELTON GROUP
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RED ROSE FORMATION
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BRITISH COLUMBIA GEOLOGICAL SURVEY
REGIONAL GEOLOGY
SULTANA AREA
SCALE : 1 INCH = 0.8 MILES

SUMMARY

The Sultana prospect, located at the headwaters of Boulder Creek 10 miles northwest of Moricetown, B.C. previously held and studied by Sultana Silver Mines Ltd. was optioned by Utah Construction & Mining Co. in July 1970 involving 63 contiguous claims. Optioning was based on results reported by owners in their Prospectus dated May 31, 1969 and report dated January 20, 1970.

Types of Studies carried out by Utah Construction & Mining Co.

(1) Geological mapping on a scale of 1" = 200'

(2) Rock Geochemical Survey on a scale of 1" = 200'

(3) Induced Polarization Geophysical survey on a scale of 1" = 200'.

The area studied is underlain by light grey, fine to medium grained granodiorite cut by silicified andesite and granite porphyry dikes, both of which exhibit parallel north-west trends. This same trend is that of the dominant fracture system which appears to be more intense in the area of the silver vein "stockwork". Hydrothermal argillic and sericitic alteration effects are localized within the granodiorite on the area containing this vein stockwork. Chalcopyrite and pyrite are found on fracture surfaces and molybdenite was found in drill core from this area. Both copper and molybdenum rock geochemistry assays define large anomalous zones which extend outward to the northwest and southeast of this area. The Induced Polarization survey describes an elongate anomaly coincident with and superimposed upon the copper and geochemical anomalies in this mineralized area of the granodiorite.

Location & Access (55° 06' N, 127° 32' W)

The Sultana property is located at the headwaters of Straw (Boulder) and Corya Creeks and across the intervening mountain ridge. Except in the creek valleys, most of the property lies above timberline to elevations of 7000 ft. It is two miles southsoutheast of Tiltusha Peak and three miles southeast of the old Red Rose mine.

A campsite is located near the head of Straw Creek at an elevation of about 5,000 ft. It is reached by approximately thirteen miles of dirt road built by Sultana Silver Mines Ltd. up the valley of Straw Creek from Highway No. 16, six miles north of Moricetown Station on the Canadian National Railway. The Corya Creek area has no access and can be reached only by helicopter since the north edge of the intervening ridge is nearly vertical.

Topography and Vegetation

Topography in the area is precipitous at higher elevations and only somewhat less rugged on lower slopes. Above timberline (3,000-4,000 ft.) outcrop is plentiful especially on steep ridges. Heather blankets the shallow lower slopes and alpine fir is common in depressions on these slopes.

Property:

Sultana Silver Mines Ltd. owns a total of 63 contiguous recorded mineral claims in two groups: the Silver Tip claims and those designated as the "S" claims. The Silver Tip claims which are numbered 1 to 34 have been surveyed by the firm of McWilliam Whyte, Cable and Associates in 1967 and include as fractions, numbers 24, 25, 26, 30 and 34. The "S" claims consist of 29 mineral claims recorded January 14, 1970. The enclosed claim map shows the property configuration.

Assessment work is being applied to those claims now grouped as the Silver Tip group and consisting of mineral claims:

Claim Name	Record Numbers
"S" 13 to 20	84129 to 84163 inclusive
Silver Tip #1 to # 6	41038 to 41043 inclusive
Silver Tip # 7 to # 16	47227 to 47236 inclusive
Silver Tip # 18 to # 25	47843 to 47850 inclusive
Silver Tip # 26	47858
Silver Tip # 27 to # 34	47851 to 47857 inclusive

History:

The property was first described briefly in the Summary Report of the Geological Survey of Canada in 1910 as the Last Chance and Little Wonder. No further mention was made of it until 1921 when it was referred to as the Sultana property by the British Columbia Minister of Mines Annual Reports. In 1923 the Granby Consolidated Mining Smelting & Power Company held an option and diamond drilled one short hole. In 1956 the property was relocated by J.W. Bryant and Bert Spisak for Canusa Mining Company and named the Snowshoe No. 1 to 8 claims. During that year Canusa drilled several short holes. The existing Silver Tip claims were located in 1966 and 1967 by C.E. Carlson and Victor Bartell while the "S" claims were later staked in January 1970 by T.D. Wilkinson for Sultana Silver Mines Ltd. which became a public company the 3rd of May 1968. In 1967 Sultana Silver Mines Ltd. built a ten mile access road into the property and carried out exploratory stripping and trenching. From November to December 1968 Sultana completed five short drill holes and partially completed another before adverse conditions closed operations. Three deeper diamond drill holes were completed from June to August 1969. No further work has been attempted by the Company.

Geology:

Regional Geology

The geology of the Rocher Deboule Range has been mapped by Dr. A. Sutherland-Brown of the B.C. Dept. of Mines and Petroleum Resources and the results appear in Bulletin 43 (1960) "Geology of the Rocher Deboule Range." Essentially this range is a north-south trending stock of granodiorite-monzonite which outcrops from Hagwiget Peak at the north end of the range to Brian Boru Peak at the south, a distance of some 10 miles and outcrops over a width of 3 to 6 miles.

The intruded formations that underlie most of the Rocher Deboule Range around the stock belong to the Hazelton Group of sedimentary and volcanic rocks of Jura-Cretaceous age. These formations strike northward and dip gently to the east, but they have been considerably dislocated by north-trending regional block faults; the Cap Fault to the west and Pangea Fault to the east, with the block between being upthrust. The third major fault, the Chicago Fault, forms the west flank of all the peaks in the range. Pendants of the Hazelton Group appear in the Rocher Deboule Stock and form the highest peaks.

PROPERTY GEOLOGY:

General

The Sultana property is situated almost exclusively within the granodiorite of the Rocher Deboule Stock, but does extend to the granodiorite-volcanic contact in the south. This contact is assumed to be covered by recent morainal material in the Corya Creek Valley. Outcrops of strongly fractured andesite porphyry containing minor disseminated pyrite were found on the south side of this moraine whereas outcrops of contaminated granodiorite occur on the north side of the valley.

A copper-silver vein "stockwork" (after Dr. D.D. Campbell) situated in the cirque floor, at the head of Boulder Creek, was formally the focus of interest. Trenching and diamond drilling was carried out by Sultana Silver Mines Ltd. in an effort to investigate its extent and mineable potential. A report of these investigations can be found in the Prospectus for Sultana Silver Mines Ltd. dated May 31, 1969 and in a later report by C.R. Saunders of Dolmage, Campbell and Associates dated January 20, 1970.

All phases of the field work were completed under the supervision of M.J. Young, District Geologist, Vancouver office of Utah Construction & Mining Co.

Systematic geological mapping, on a scale of 1" = 200 feet, was done by R.B. Anderson and K.B. McHale for the Utah Construction & Mining Co. over a grid surveyed with Brunton compass and chain. This grid consisted of lines spaced every 200' trending N 60° E and marked with stations every 100 feet.

The purpose of this mapping was to investigate the area of disseminated chalcopyrite-molybdenite mineralization which occurs peripheral to the copper-silver vein stockwork at the head of Boulder Creek. This area is almost entirely underlain by light grey, fine to medium grained granodiorite which exhibits varying degrees of argillic alteration (as seen in diamond drill core). A prominant North-west fracture system with steep dips both east and west was found to predominate in the area. This particular fracture system varies in intensity from closely spaced (1 to 3 per foot) immediately adjacent to the vein stockwork to a blocky wider spaced pattern in the cirque walls on the south and south-east margins. Chalcopyrite appears to be concentrated along these fractures. Pyrite mineralization was found both as disseminations and as fine fracture fillings scattered throughout the granodiorite.

A small diorite body containing both pyrite and chalcopyrite outcrops a few hundred feet north of the vein stockwork and may represent a separate intrusive phase, but is more likely a pod of contaminated intrusive made more basic by assimilation of the intruded volcanics.

Two sub-parallel silicified andesite dikes or pendants (?) can be seen along strike of the major fracture close to the vein stockwork. These andesite outcrops are peculiar in that they show drag-folding likely generated by igneous intrusion. Minor disseminated pyrite was noted in the outcrop nearest the vein but no sulfide mineralization was found elsewhere.

Small outcrops of fine to medium grained aplite containing only minor disseminated pyrite were found south of the vein area. The granodiorite-aplite contact was only seen in talus but it appears to be gradational.

A zone of irregular pegmatite and hornblende dikes, intruding the granodiorite, was found on the face of the south-east cirque wall and extends along the wall for about 100 feet. Coarse pyrite and chalcopyrite blebs were found to be restricted to this zone. Adjoining these dikes is a thirty-foot wide, granite porphyry dike which strikes north-west in accord with the dominant fracture direction. Pyrite and minor chalcopyrite were found in wall rock near the contact but not within the granite porphyry itself.

Another granite porphyry dike with a similar strike and width and containing minor amounts of disseminated pyrite intrudes the granodiorite about 800 feet to the south on the cirque wall. Forty feet to the east of this second dike lies a strongly leached, poddy, quartz vein with a maximum width of 4 feet averaging about 1/2 foot, also striking north-west. Mineralization within this quartz vein is restricted to minor pyrite and chalcopyrite.

Talus blocks near the cirque wall, 1800 feet to the south of the vein area, contained molybdenite rosettes in thin quartz veinlets (1/8 to 1/4"). Drilling has revealed molybdenite mineralization in the granodiorite in the vein area but it was not noticed in surface exposures. Peculiar also to this talus were magnetite filled fractures up to 1/4" in width.

GEOCHEMISTRY:

Eighty-one rock geochemical samples were gathered with a 200 foot spacing of sample points on lines 200 feet apart where it was possible. Samples were collected outside the area of interest in order that background values could be determined.

Each rock geochemical sample consisted of up to twelve chips taken within a ten foot diameter circle. The chips averaged 3/4" in diameter. The chips were placed in Kraft paper sample bags. Care was taken to ensure that the chips were of fresh rock with little alteration, no quartz veining and no visible sulfide mineralization. The samples were analyzed for Cu, Mo, & Zn by atomic absorption spectroscopy.

A hand specimen was taken at each sample point. These were later examined under a microscope to determine composition, alteration effects and the character of sulfife mineralization.

A statistical analysis was made of the results.

The average metal content for igneous rocks is as follows:

Cu	Mo	Zn
30 ppm	1.9 ppm	60 ppm

Hawkes & Webb "Geochemistry in Mineral Exploration"

The mean values for the Sultana property are as follows:

	Cu	Mo	Zn
A.	129 ppm	1.46 ppm	25 ppm
B.	38 ppm	0.6 ppm	22 ppm

The values in "A" category are the mean values for all the samples. Copper is 2 to 4 times the average value. The molybdenum value is just slightly less than the average metal content value. Zinc is less than one half the average metal content value.

The values in category "B" are the approximated means for the background populations except for the molybdenum value. This value was determined from a graph where all zero values were ignored. The zero values are not really zero but less than 1 ppm and therefore they would lower the mean value by being treated as zero values. The copper value falls within the accepted range and the zinc value is less than one-half the standard value. The zinc "low" probably reflects both removal of zinc during hypogene mineralization and by leaching processes.

The following table summarizes the results of the analysis:-

METAL	RANGE ppm	MEDIAN ppm	BACKGROUND POP. ppm	ZONE OF MIXING ppm	ANOMALOUS POP. ppm
Copper	13-4200	129	0-100	100-150	150
Molybdenum	0-30	1.46	0-3	3-3.5	3.5
Zinc	13-183	24	0-30	30-40	40

RESULTS

The sampling has outlined an area that is anomalous in copper and molybdenum. The anomalies trend approximately N 40 W subparalled to the major fracturing in the area. The zone is approximately 500 to 1000 feet wide and is at least 1500 feet long an is still open to the north west. The copper and molybdenum anomalies overlap for a major part of the area. The geochemical anomalies coincide with the induced polarization anomaly.

COPPER

INTERVAL ppm	NUMBER OF SAMPLES	% FREQUENCY	CUM. % FREQUENCY
0-49	16	19.68	19.68
50-99	15	18.45	38.13
100-149	16	19.68	57.81
150-199	5	6.15	63.96
200-249	3	3.69	67.65
250-299	6	7.38	75.03
300-349	3	3.69	78.72
350-399	3	3.69	82.41
400-449	6	7.38	89.79
450-499	-	-	89.79
500-549	2	2.46	92.25
550-599	-	-	92.25
600-649	3	3.69	95.94
>649	3	3.69	99.63

MOLYBDENUM

VALUE ppm	NO. OF SAMPLES	% FREQ.	CUM. % FREQ.
1	32	39.36	39.36
1	15	18.45	57.81
2	9	11.07	68.88
3	7	8.61	77.49
4	3	3.69	81.18
5	3	3.69	84.87
6	2	2.46	87.33
7	4	4.92	92.25
8	3	3.69	95.94
>8	3	3.69	99.63

ZINC

INTERVAL ppm	NO. OF SAMPLES	% FREQ.	CUM % FREQ.
10-14	2	2.46	2.46
15-19	10	12.30	14.76
20-24	32	39.36	54.13
25-29	16	19.68	73.81
30-34	5	6.15	79.96
35-39	4	4.92	84.88
40-44	5	6.15	91.03
45-49	3	3.69	94.72
50-54	1	1.23	95.95
55-59	1	1.23	97.18
60-64	1	1.23	98.41
>65	1	1.23	99.64

GEOPHYSICS

An Induced Polarization survey was conducted over the property from August 27 to September 4, 1970 under the direction of J. Sirola . Every second line (400 ft. Line separation) of the geology and geochemical grid was used for control with station intervals being used every 200 feet.

EQUIPMENT:

Transmitter - Elliott Model, Manufactured by Elliott Geophysical Co., 4653 East Pima St., Tucson, Arizona, U.S.A.

Receiver - Scintrex IPR-7, Manufactured by -Scintrex Limited, 2222 Snidercroft St., Concord, Ontario.

CREW:

T. Molloy
Tom Harris
M. Rugg
G. McDowall
J. Sirola

METHOD:

The direct current pulse or time domain induced polarization method was employed for this survey. The moving electrode array consisted of pole-dipole configuration with a "spread" between potential electrodes P_1 to P_2 of 300 feet separation, current to potential electrode (C_1 to P_1) of 300 feet and 900 feet. Two readings were taken at each station, the first with $N = 1$, the second with $N = 3$ "a" is used to denote the distance between the potential electrodes (P_1 to P_2) while "na" denotes the distance between C_1 and P_1. Thus $N = 1a$ or simply $N = 1$ where $a = 300$ feet and $na = 300$ feet or $n = 3$ where $a = 300$ feet and $na = 900$ feet. The receiver was located at P_1 in all cases. The infinite current electrode C2, was placed at a sufficient distance from the moving array to prevent any effect on C_2 on the readings.

OBSERVATIONS:

Contouring, the geophysical data has revealed a range of N= 1 chargeability from less than 30 milliseconds to slightly over 120 milliseconds which represents an anomalous zone 4 times over background. Corresponding resistivity for N = 1 exhibits a range of values from less than 700 ohm feet to greater than

20,000 ohm feet. The anomalously low resistivity contour of 800 ohm feet closely aligns the elongate high chargeability.

A similar situation exists for chargeability and resistivity at N = 3, with a chargeability range of less than 50 milliseconds to greater than 100 milliseconds, and a resistivity range of less than 1000 ohm feet to better than 7000 ohm-feet. This represents an anomalous chargeability of 2 times over background. The resistivity low does not as closely approximate the chargeability "high" as it did in the case of N = 1, but does maintain the same general northwest trend. The N = 3 chargeability "high" contour is open to the north and suggests a continuation that can only be speculative.

In overall plan the N = 1 chargeability high appears as an elongate arcuate zone extending over 1200 feet in length and averaging 50 feet in width. The same is true for N = 3 anomalous chargeability except that overall length is unknown and width averages about 200 feet. Spacially, the N = 3 anomaly is offset about 300 feet from the N = 1 anomaly suggesting a structure that strikes generally north-west and dips at approximately 45° East. The greater width of the N = 3 chargeability anomaly in turn suggests a gradual swelling of the structure with depth.

The I.P. anomaly is also significant in that it nearly confines itself to the anomalous geochemical zones for copper and molybdenum. In a rough sense zinc anomalies appear peripheral to the I.P. anomaly and to a lesser degree peripheral to the copper and molybdenum zones.

It is interesting to note that the trend of the I.P. anomaly coincides with the dominant fracturing in the area as well as lying within the area of more fractures in this area with copper estimated visually at 0.1%.

CONCLUSIONS:

The I.P. results, described above, probably represent a mineralized fracture zone over a length of approximately 1200 feet in the granodiorite. This is supported by the rock geochemical survey which indicates a copper anomaly overlapping the I.P. anomaly. The geochemical anomaly is approximately 500 feet to 1000 feet wide and at least 1500 feet long and open to the northwest. Outcrop and drill core from within this same area shows some quartz veining with associated pyrite, chalcopyrite and molybdenite.

R.B. Anderson

R.B. Anderson,
Geologist

VANCOUVER, B.C.
JANUARY 26, 1971.