

6486

GEOLOGICAL REPORT
ON
DETAILED MAPPING
OF PART OF
BETTY CLAIM
at MERRITT, B.C.
NICOLA MINING DIVISION
92I/2W
owner: C.C.RENNIE

OCTOBER 1977

by C.C.RENNIE, P.ENG.

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT

NO. _____

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 STATEMENT OF EXPENDITURES

The following are the expenses of the survey covered in the following report. These expenses are to be applied as assessment work on the mineral claim.

Professional fees (C.C.Rennie, P.Eng., geologist)

4 field days - Sept.24 to Sept.27 inclusive
 at \$250.00/day = \$1000.00

1 day report preparation
 at \$250.00/day = \$250.00

Travel time 8 hours \$100.00

Field assistant (M.R.Rennie,
 chainman)

4 days at \$50.00/day = \$200.00

Vehicle rental and gasoline \$181.14

Motel and meals \$101.98

\$1833.12

INTRODUCTION

The Betty claim covers the western extension of the contact of the Guichon Batholith with limey rocks of the Nicola Series - a geologic setting considered highly prospective for contact-type skarn and copper mineralization such as occurs at Craigmont Mine, 4500 meters to the east of the center of the Betty claim.

The Craigmont Mine will ultimately produce 800,000,000 lbs. of copper from a zone less than 1000 meters long, 150 meters wide at its widest structural spread, and 500 meters high. The relatively high grade of the undiluted ore, ranging from 1.8% Cu to 2.4% Cu, is^a very attractive exploration target as it will bear considerable development and mining expense if found in quantity. Furthermore, the existence of the Craigmont underground development and concentrator, an experienced mining crew in the area, and existing power, gas and transportation facilities will all be a credit to any new mineralization found in the area.

Work done in the past has not fully explored the potential of the Betty claim but has indicated that there are no near-surface orebodies on the claim. Previous work has also indicated that the western portion of the claim has the best potential for shallower, more easily explored and more easily developed mineralization. This western portion of the claim has received little attention in the past because it was furthest from the existing Craigmont workings and concentrator.

The purpose of the detailed mapping covered by this report was to trace the limestone and limey rocks in this western portion of the claim, as well as possible, through existing outcrops in order to illustrate that this limey section has sufficient strike continuity to contain a Craigmont size orebody. This survey was successful not only in tracing the limey rocks but also in mapping areas of epidote actinolite skarn coincident with magnetic trends. This continuity of host rock in proximity to the batholith, together with evidence of alteration should be sufficient encouragement to attract a detailed and continuing drill program.

PROPERTY AND OWNERSHIP

The Betty Lou group of 17 claims and fractions that had covered the west slope of Promontory Hill since November 1957 were formally abandoned by C.C.Rennie in order to relocate the ground under the Modified Grid System.

The Betty claim of 12 units, record no.181(10) was staked on October 2 and 3, 1976 and recorded in Vancouver, B.C. on October 5, 1976. The legal post of the claim is exactly at the northeast corner of Mameet Indian Reserve No 9, and the claim extends three units south and four units east from this point.

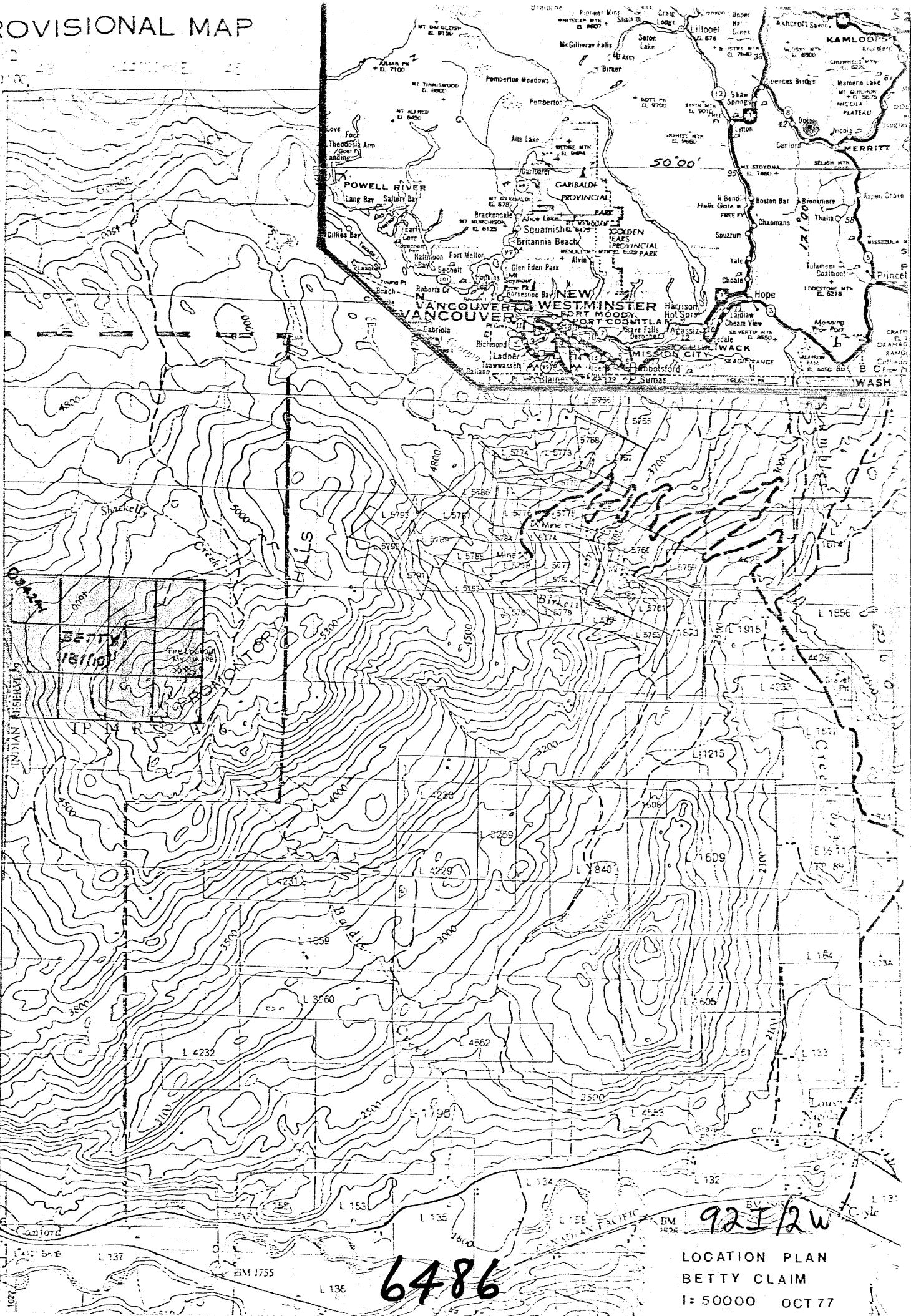
Name and address of the present sole owner of the Betty claim:

Clifford C. Rennie
1943 Boulevard Crescent
North Vancouver, B.C.
V7L 3Y9

PROVISIONAL MAP

92-112

50°15'
50°10'
50°05'
50°00'
50°55'
50°50'
50°45'
50°40'
50°35'
50°30'
50°25'
50°20'
50°15'
50°10'
50°05'
50°00'



BETTY CLAIM
181101
Fire Look Out
56855

6486

92 I 12 W
LOCATION PLAN
BETTY CLAIM
I: 50000 OCT 77

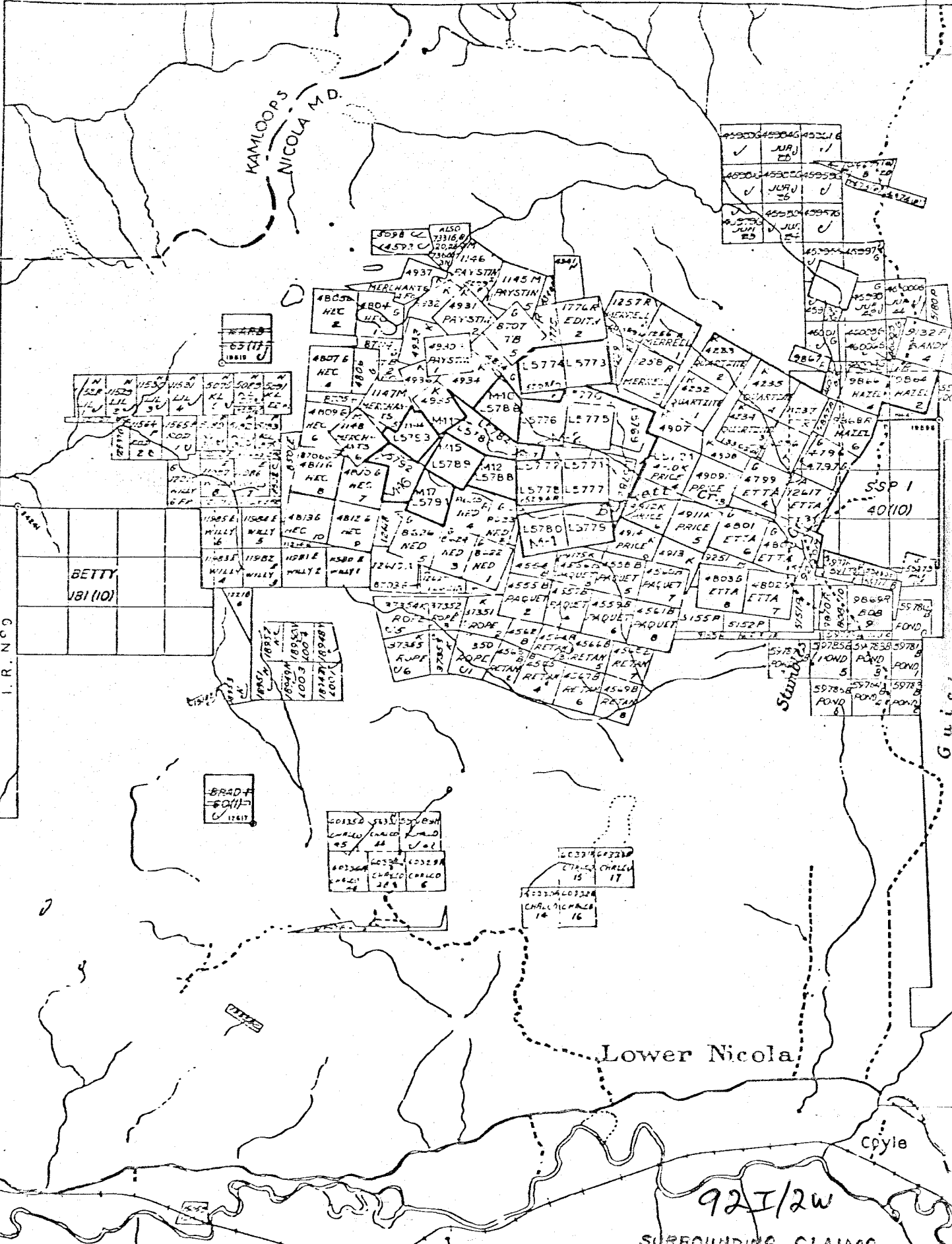
50'15" 127'00"

TO NORTH SFE MAP 22

M 92 I/2 W

KAMLOOPS
NICOLA M.D.

45300	45304	45318
✓	JUN 25	✓
45304	45308	45312
✓	JUN 25	✓
45312	45316	45320
✓	JUN 25	✓



BETTY
JBI (10)

BRAD
C 17617

40150	40151	40152
CHARL	CHARL	CHARL
14	14	14
40153	40154	40155
CHARL	CHARL	CHARL
14	14	14

40156	40157
CHARL	CHARL
15	17

40158	40159
CHARL	CHARL
14	16

Lower Nicola

Coyle

92 I/2 W

SURROUNDING CLAIMS

6486

1:50000 OCT 77

1/3 E

LOCATION, ACCESS AND PHYSIOGRAPHY

The property is on the northwest slope of Promontory Hill, 17 km west of Merritt, B.C. in the Nicola Mining Division. Promontory Hill is the site of a forestry lookout and microwave repeater station.

The access road to Promontory Hill leaves the Merritt-Spences Bridge road approximately 13 km west of Merritt and 3 km west of Lower Nicola. This road is steep in part, climbing 1220 m in 12.9 km, but is negotiable with two wheel drive vehicles in good weather. A rather obscure access road leaving the Promontory Hill road 7.9 km from the highway leads westward around the mountain to 1510 m elevation on the Betty claim. This road can be driven with 2 wheel drive in good weather.

A well graded logging road also leads to the claim from the vicinity of Dot, halfway between Merritt and Spences Bridge and joins with the above mentioned access road at 1800N 2250W, so there is two way access to the claim. The logging road would be a preferable route for any equipment coming to work on the property.

Elevations range from 1734 m at the top of Promontory Hill to 1280 m at the Indian Reserve NO.9 boundary to the west. The claims are covered by varying stands of scattered large fir trees, closely spaced lodgepole pine, open poplar stands and occasional alpine clearings. Overburden ranges from almost none along the spine of the ridge to probably 15m depths of glacial till on the north slopes. Water is not abundant on the claim but there are small streams both north and south of the claim and a small spring at 1500N 2400W.

Annual precipitation is 37cm(15") with more than half of it as snow in the winter. Snow does not usually stay on the ground until December and is mostly gone from the claim by June. Temperatures range from a maximum 35°C in summer to -20°C minimum in winter.

HISTORY AND PRESENT SURVEY

A chronological history of work on the area from 1957 to 1975 was presented in the 1975 assessment work report on the property and will not be repeated here. The work comprised geological, geophysical, and geochemical mapping and the drilling of five diamond drill holes, during the period 1957 to 1967. The property was dormant from 1968 to 1975.

In July 1975 C.C.Rennie purchased the Betty Lou group of claims from Canex Placer and carried out additional geological and magnetometer mapping for assessment work. The Betty Lou group was formally abandoned and restaked in October 1976 as the Betty claim (12 units) under the modified grid system.

In September 1977 the geological mapping which is the subject of this report was carried out to define the continuity of the limey rocks in the western portion of the property. The survey was controlled by tape and compass surveying using the legal corner of the Betty claim as a base station, measuring to a point 1425 meters south of the legal post then carrying a baseline eastward up to a point 240 meters east of the west boundary of the claim, then extending a base line at 1380 meters south of the legal post from 240 meters to 425 meters east of the west boundary. From this point open-ended tape and compass traverses were extended along roads and tracks to tie in outcrops. The stations on the baselines and traverses were marked by stakes with orange flagging tape attached bearing the station number.

GENERAL GEOLOGY

The general Promontory Hill area is underlain by the Nicola Series rocks of Upper Triassic age, cut off to the north by the Guichon Batholith, and intruded in the southeast corner by the Coyle stock. A portion of the central area is overlain by a volcanic series shown as Kingsvale volcanics on the G.S.C. maps, but potassium-argon age dated at 47 million years and therefore correlatable with the Coldwater beds of Tertiary age. The western extension of the Nicola rocks is overlain by the Spences Bridge volcanics of Lower Cretaceous age. Recent glacial till covers parts of the area.

The Nicola rocks on the area are predominantly andesitic fragmentals and flows with intercalated feldspathic greywackes, minor argillites and relatively narrow but persistent bands of limestone. Structurally the Promontory Hill area may be anticlinal, somewhat overturned to the south, with eastward plunging drag folds on the north side of the anticlinal axis. The limestone in the Nicola Series, although less than 5% of the rock volume in the Promontory Hill area is economically important because it is the host rock for the Craigmont copper ore body to the east. The limestone has been thickened and attenuated by drag folding so that true thicknesses of the limestone bands are difficult to establish.

The Guichon Batholith to the north is a fresh hornblende granodiorite but generally has a dioritic marginal phase in the Promontory Hill area. At some points the diorite contact with the Nicola rocks is sharp but at others, and particularly where the Nicola rocks are feldspathic greywackes, the contact is gradational, resulting in the field-named rock "dioritized greywacke". Hydrothermal alteration of the batholithic rocks is slight, with fresh diorite in contact with Nicola rocks in some areas.

GENERAL GEOLOGY continued

The "Kingsvale" volcanics do not outcrop on the Betty claims but cover a section between the Betty claim and the Craigmont mine to the east. They are a thick pile of volcanic agglomerates with poorly stratified bentonitic conglomerates, sediments and clays containing plant remains (coal and petrified wood) toward the base. Thin basalt dykes in the western part of the Betty claim may be related either to the Kingsvale or the Spences Bridge volcanics.

The Spences Bridge volcanics underly the Indian Reserve No.9 to the west and effectively mask any extension of the Nicola rocks westward.

Glacial overburden, in the form of tillite and hard clay has been derived from the batholith to the north and transported south southeast to cover most of the bedrock in the northern part of the claims; and was probably dumped from beneath the glacier as it rode up over the resistant ridge of Promontory Hill. Boulders in the tillite are up to 1 metre diameter, but mostly are 10-15cm diameter and are all granodiorite from the batholith.

LOCAL GEOLOGY

The local geology of the whole claim block was described in considerable detail in the 1975 report on the Betty Lou group, and will not be repeated here except to relate the geology of the area mapped in greater detail in the present survey to the geology of the whole claim block.

The intent of the present survey was to show the continuity of the limey zone by mapping all the outcrops in the western section, some of which had been missed during the broader scale 1975 mapping.

Rock Types

The rocks in the 1977 map area have been divided into four general categories: "limestone", greywacke, andesitic fragmental, and porphyry; plus some altered equivalents of the limey rock.

The limestone in detail is a horizon approximately 50 to 60 meters in true thickness, which ranges in composition from pure white, crystalline bands up to 2 meters thick, exhibiting good bedding, to a volcanic fragmental with limestone cement where the limestone comprises only approximately 10% of the rock and the other 90% is a fairly well sized andesitic fragmental with fragments from 0.2 to 1cm in diameter. The pure limestone is estimated to be less than 20% of the zone so the whole "limestone" zone would be better described as an impure to very impure limestone. Within the limestone zone there are outcrops of non-limey andesitic fragmental and greywacke that suggest discontinuous lenses or bands of these rock types. This "limestone" horizon suggests a shallow marine chemical deposition of limestone over a sufficient period to build up a 50 meter thickness of limestone interspersed with showers of poorly sorted volcanic material that was only sufficiently water transported to give it a poorly bedded fabric.

This "limestone" or limey horizon is sufficiently reactive to readily form epidote actinolite skarn and at probably higher temperatures will form garnet epidote skarn. On weathered surfaces

LOCAL GEOLOGY continued

the limey fragmentals have a very porous appearance, suggesting a good degree of permeability for mineralization.

The greywacke is a brown, poorly sorted, water lain sediment, exhibiting poor bedding, except where silty in composition. It is generally closely fractured and occasionally mineralized with pyrite along the fractures so that it weathers yellow to rusty.

The andesitic fragmental is a dark green to black, dense hard and brittle rock that is more blocky fractured than the greywacke. The fragmental nature is best seen on weathered surfaces as the fragments are not too apparent in the freshly broken rock. There is no obvious bedding in this andesitic fragmental. Good contacts with the greywacke were not seen but it is suspected that these two rock types may grade into one another over short distances along strike, down dip, or up and down the section. Again these rock types would suggest some variation through marine deposition to shallow water reworking to submarine volcanic activity dumping unsorted fragments in relatively clear water.

The porphyry is a quartz feldspar porphyry with rounded quartz eyes. This rock is dense, hard and blocky fracturing. Good contacts with the andesitic fragmental and greywacke were not seen. The western-most sub outcrop of porphyry contains a few siliceous inclusions that suggest proximity to a contact with a silty or fine grained greywacke. There is no evidence of mineralization or alteration in the porphyry and the feldspars appear quite fresh in hand specimen.

Structure, Faulting and Continuity

The limey zone, where the only rock attitudes are available, appears to maintain a strike of N60°E and a dip to the north of 55° to 75°. East of the detailed area the limestone outcrops have a gentler dip to the north lending support to the hypothesis that in the area near holes #2 and #3 the limestone can be expected to steepen at depth, probably going to depth between holes #2 and #3. In the western section the limey zone would be expected to maintain its steep northern dip until it contacted the batholith.

LOCAL GEOLOGY continued

Displacement of limestone outcrops at 1500N, 2160W indicates a lefthand displacement fault with a horizontal throw of approximately 50 meters. Unfortunately there is insufficient outcrop in the whole area to permit concluding that there are no other faults in the area. There may be either further faulting or pinching of the limey zone at 1600N 2040W where a large outcrop of andesitic fragmental occurs where the limey zone should project.

The limey zone has been mapped as likely continuous throughout the 800 meter strike length of the map area, providing sufficient strike length of favourable rocks to host a Cragmont size orebody. Unfortunately the shortage of outcrop between 1650N 2000W and the next easterly outcrop of limestone 1960N 1730W does not permit verification of continuity of limestone through to the Can#2 - Can #3 drill hole area but it is reasonable to assume that the limestone should continue throughout this section, albeit with some possible disruption.

Alteration and Mineralization

The most obvious alteration, besides recrystallization of the limestone and hornfelsing of the greywacke is the development of epidote in the limey rocks, particularly along a NW-SE trend through 1400N, 2300W that corresponds roughly with a weak magnetic high that appears to extend from the batholith projection at 1560N, 2460W to the diorite apophysis that runs along 1200N from 2100W east to 1500W. This suggests the possibility of a diorite cross dyke beneath the surface producing some alteration. Minor amounts of actinolite were found with the epidote skarn at 1425N, 2320W. Since actinolite is found in abundance in close association with chalcopyrite in the Cragmont mine the presence of actinolite is considered a good sign.

Some garnet occurs with epidote and fine disseminated pyrrhotite in a siliceous skarn at 1540N 2360W. A 1cm patch of chalcopyrite was also found at this outcrop.

LOCAL GEOLOGY continued

No magnetite, hematite or chalcopyrite were seen in outcrops, but had these occurred at surface the property would have been more dilligently explored in the past. Moderately abundant pyrite in greywacke at 1800N 2200W gives the rock a rusty weathering appearance. This pyrite would appear to be occurring within the batholith aureole.

If copper mineralization is present, with or without attendant magnetite or hematite it is expected to occur below 300 meters below surface as there is no geophysical encouragement in the area, unless the small magnetic high at 1750N 2200W represents a small upward projection of magnetic material that gives no other response. Projections of the limey zone down dip northward at 60° toward the batholith contact that may dip 70° southward, as it does elsewhere, suggest that the top of any possible alteration aureole in the limestone with attendant mineralization could be 300 to 500 meters below surface. (Fig 3)

RECOMMENDED FURTHER WORK

A progressive and continuing program of exploratory drilling is required to explore for mineralization at depth in the limey horizon where it dips within the contact aureole of the Guichon batholith. Very likely a fence of drill holes in one section will be required to provide a cross section that will allow projection of the zone down dip and along strike so that the zone can be effectively explored with a minimum of holes.

An initial vertical hole is proposed at 1750N 2200W to a minimum depth of 500 meters (Fig.3). Depending on the results of this hole further intersection of the zone could be obtained by wedging this hole or by drilling additional new holes on the same section. Obviously the program would have to proceed one hole at a time but ultimately the area deserves a minimum of 3000 meters of drilling to fully search for a Craigmont-type ore deposit.

C. C. Rennie

C.C.Rennie, P.Eng.

DECLARATION OF QUALIFICATIONS

I, CLIFFORD C. RENNIE, certify that:

1. I am a geologist, resident at 1943 Boulevard Crescent, North Vancouver, B.C.
2. I am a graduate in Geological Engineering from the University of British Columbia with the degree of B.A.Sc. and have been continuously employed as a geologist since 1950.
3. I have been a member of The Association of Professional Engineers of British Columbia since 1955.
4. I am very familiar with the geology of the mineral claims as I was senior geologist at the Craigmont mine from 1957 to 1966, and have since reviewed the geology and geophysics of these claims during my employment by Placer Development Ltd. on exploration geology.
5. I am the sole owner of the Betty claim.

C. C. Rennie

C.C.Rennie P.Eng.

REFERENCES

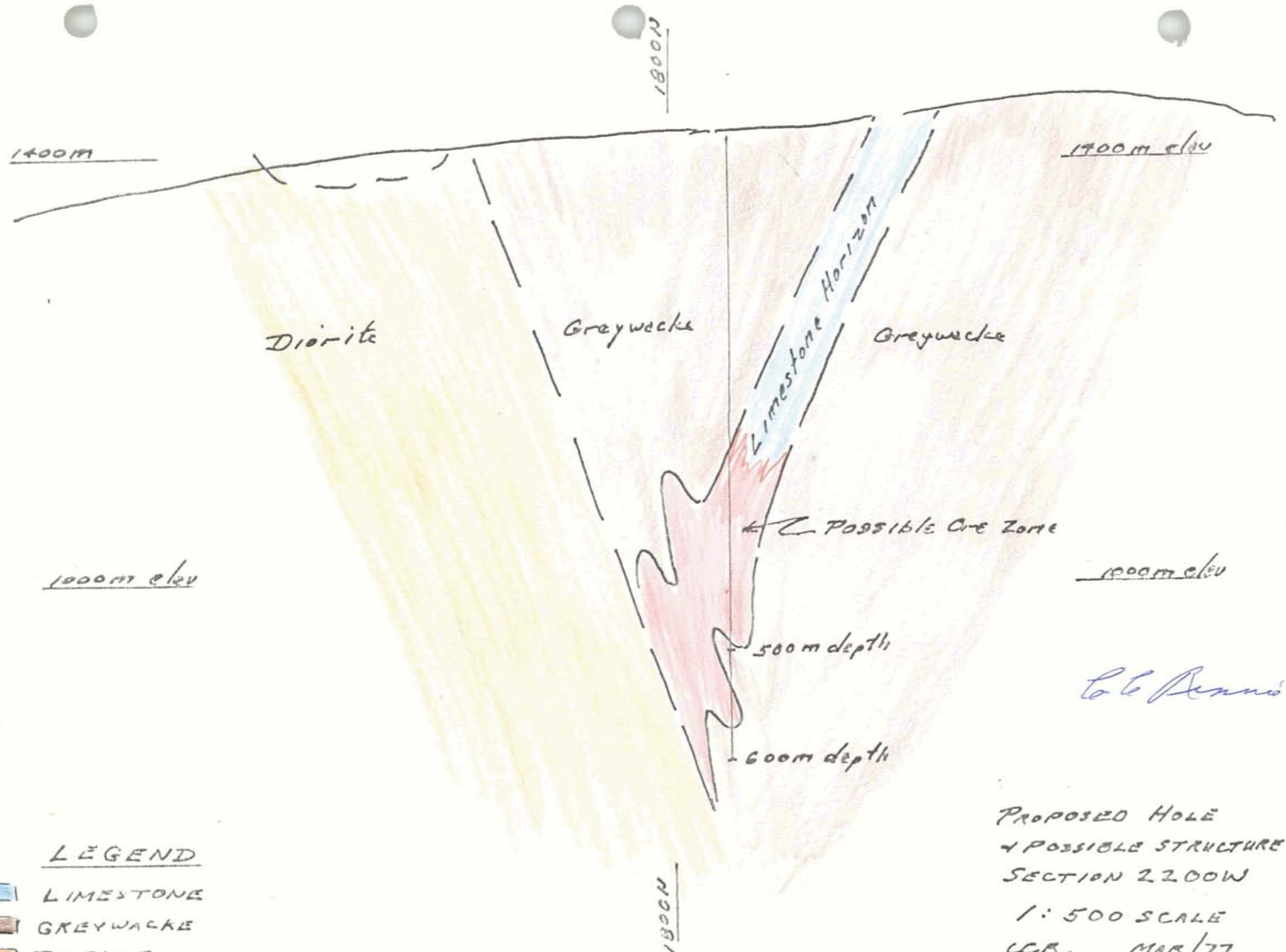
The following is a semi-chronological list of references of published and unpublished reports.

- Cockfield, W.E. - G.S.C. Memoir 249, Geology and Mineral Deposits of Nicola Map Area, B.C. 1948
- Carr, J.M. - B.C. Minister of Mines Reports
1959 pp 31-34
1960 pp 26-40
1961 pp 31-37
- Ball, C.W. - Report on Geological Survey of the Betty Lou and Lou Groups of Mineral Claims, Promontory Hill, Merritt, B.C. Sept.16 to Oct.20, 1959. 3 Nov. 1959.
- Allan, A. - Report on a Vertical Magnetic Survey over the Betty Lou and Lou Mineral Claims, Promontory Hill, Merritt, B.C. Nov.1960 to April 1961. May 23, 1961
- M^CPhar Geophysics Ltd. - Report on the Induced Polarization and Resistivity Survey on the Betty Lou Claim Group, Nicola Mining Division, B.C. Oct. 27, 1961
- Hunting Survey Corp. - Report on an Induced Polarization Survey on the Betty Lou Claims. May-June 1961
- Ball, C.W. - Geological Report - Betty Lou Mineral Claims. April, 1963
- Hunting Survey Corp. - Report on Induced Polarization Survey on the Betty Lou Property, Highland Valley, B.C. Aug. 1963.
- Pentland, W.S. - A Proposed Exploration Program for the Betty Lou Mineral Claims, Merritt, B.C., Feb. 26, 1965.
- A Summary of Results of the 1965 Exploration Program and a Proposed Work Program for 1966. May 19, 1966

REFERENCES continued

- Canex Aerial Exploration Ltd. - Results of an Induced Polarization Survey, Betty Lou Claims, Craigmont Area, Feb. 9, 1968.
- Kowalczyk, P. - Memo to file Re: Geophysics, Betty Lou. Feb. 22, 1972.
- Young, R.J.; Bristow, J.F. et. al - Numerous memos from Craigmont Mines Personnel.
- Cannon, R.W. - Summary of the Betty Lou Claim Group, Merritt, B.C. May 21, 1975.
- Rennie, C.C. - Geological and Geophysical Report on Betty Lou Claims at Merritt, B.C. September 1975

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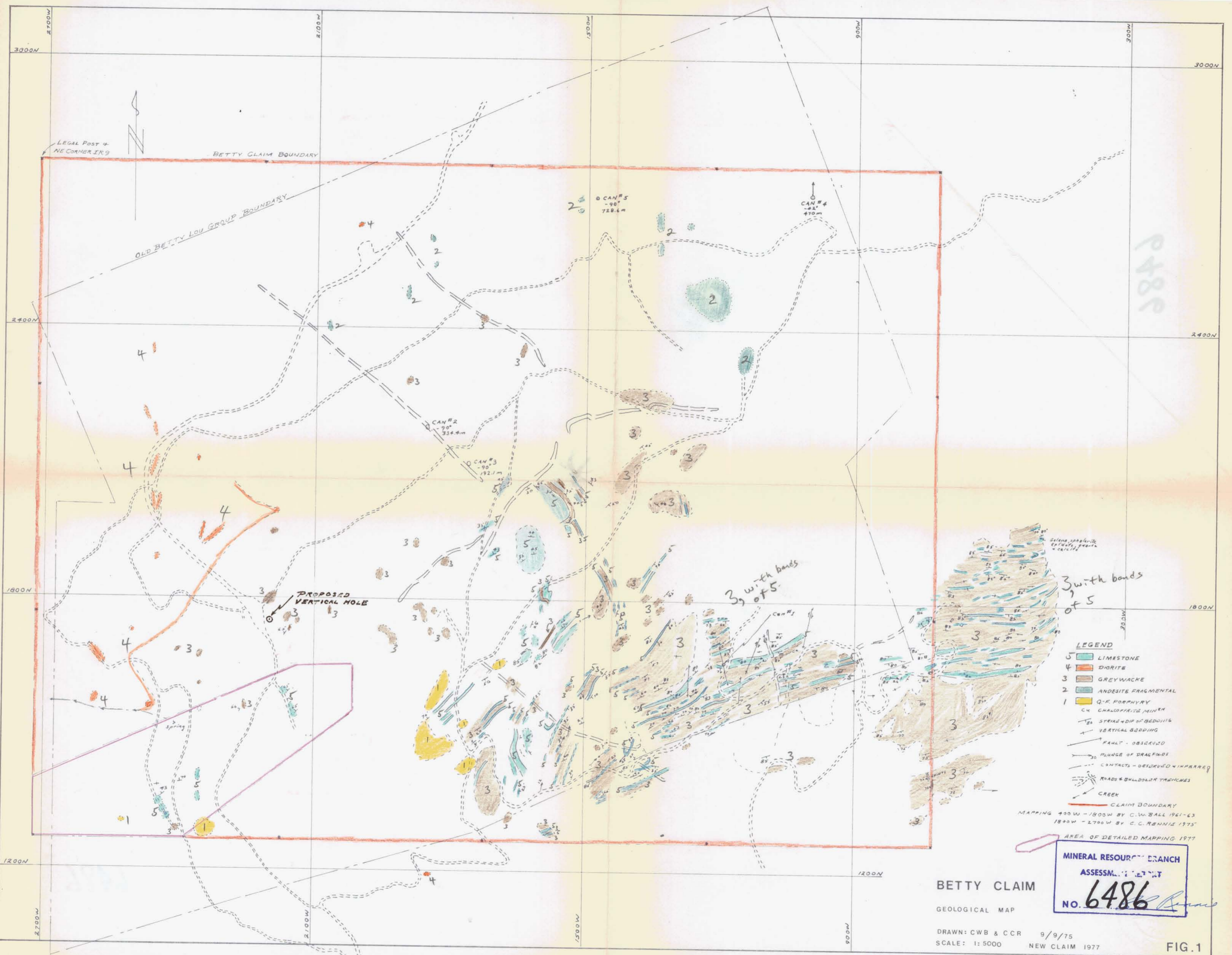


LEGEND

- LIMESTONE
- GREYWACKE
- DIORITE
- POSSIBLE ORE ZONE

PROPOSED HOLE
 + POSSIBLE STRUCTURE
 SECTION 2200W
 1:500 SCALE
 UCR. MAR/77

La C. Pennino



9486

- LEGEND**
- 5 Limestone
 - 4 Diorite
 - 3 Greywacke
 - 2 Andesite Fragmental
 - 1 Q.E. Porphyry
 - CH ChalcoPrite Miner
 - SS STRIKE & DIP OF BEDDING
 - VERTICAL BEDDING
 - FAULT - OBSERVED
 - PLUNGE OF DRAGFOLD
 - CONTACTS - OBSERVED & INFERRED
 - ROADS & SHOULDER TRENCHES
 - CREEK
 - CLAIM BOUNDARY

MAPPING 1900W - 1800W BY C.W. BALL 1961-63
 1800W - 2700W BY C.C. BENNIE 1975
 AREA OF DETAILED MAPPING 1977

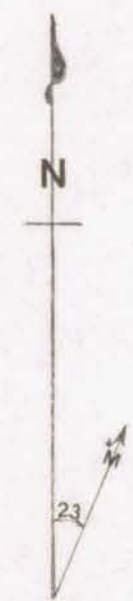
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BETTY CLAIM

GEOLOGICAL MAP

DRAWN: CWB & CCR 9/9/75
 SCALE: 1:5000 NEW CLAIM 1977

FIG. 1



J.R. #9
BETTY CLAIM WEST BOUNDARY

BETTY CLAIM SOUTH BOUNDARY

- LEGEND**
- LIMESTONE
 - GREYWACKE
 - ANDESITIC FRAGMENTAL
 - PORPHYRY
 - ROAD
 - BULLDOZER TRACK
 - OUTCROP

BULLDOZER TRENCH

OUTCROP & SUBOUTCROP OF PORPHYRY WITH MINOR SILICONS INCLUSIONS

TRENCH IN HIGHLY FRACTURED EPIDOTE ALKALINE SHAPE DERIVED FROM LIMESTONE FRAGMENTAL NO ATTITUDE

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NO. **6486**

DRAWN C RENNIE SCALE 1:1000
TRACED DATE OCT. 1977
APPROVED

BETTY CLAIM

WESTERN LIMESTONE ZONE
DETAILED GEOLOGY
FILE No.

FIG. 2