

GEOLOGICAL REPORT

COPPER ISLAND CLAIMS - BABINE LAKE, B. C.

OMINECA M. D.

54° - 126° - N.E.

K. C. Fahrni, P.Eng.

June to August 1963.

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT

NO. 529 M.P.

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* * * * *

THE GRANBY MINING COMPANY LIMITED

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1111 WEST GEORGIA STREET

VANGOUVER 5, B. C.

COST STATEMENT

To Whom It May Concern:

During the period from June 1st to August 16th, 1963 a geological survey crew was maintained at our camp at Copper (McDonald) Island in Babine Lake where a survey was being carried out under the direction of K. C. Fahrni, P. Eng. The actual amounts paid out in salaries to geologists for this work are as follows:

John Shaeffe, geologist.

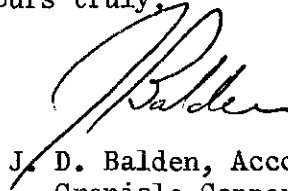
2 $\frac{15}{24}$ month @ \$500 per month	-	1312.50	
Plus 4% Holiday allowance	-	52.50	<u>1365.00</u>

David Wilson, Assistant geologist.

2 $\frac{15}{24}$ month @ \$450 per month	-	1181.25	
Plus 4% Holiday allowance	-	47.25	<u>1228.50</u>

Total direct labor cost. \$ 2593.50

Yours truly,



J. D. Balden, Accountant:
Granisle Copper Co. Ltd.
November 14, 1963

Mineral Claims and How Held

On and adjacent to Copper Island in Babine Lake a total of forty-six mineral claims are held in the name of Granisle Copper Co. Ltd. For assessment work recording, two groups have been established. Of the forty claims included in these groups fifteen are being held by location. This report is to provide evidence of geological work on the groups for which certificates of work are requested for one year each on the located claims. The remaining 25 claims in the two groups together with six additional ungrouped claims are being held by crown grant. The various claims are shown on the accompanying claim map and their details are below.

EAST GROUP

<u>No.</u>	<u>Claim</u>	<u>Lot No.</u>	<u>Rec.No.</u>	<u>Tag No.</u>	<u>Rec.Date</u>	<u>Year Due</u>
1	Nora No 1	7656				
2	Nora No 2	7657				
3	Nora No 3	7658				
4	Nora No 4	7659				
5	Nora No 5	7660				
6	Lake No 1	7682				
7	Deer Fr	7674				
8	Bea No 4	7671				
9	Bea No 5	7672				
10	Coon Fr	7684				
11	Coon No 1	7686				
12	Lynx	7678				
13	Otter No 2	7681				
14	Coon No 2	--	9983	B-84160	Dec 6/55	1963
15	Coon No 3	--	9984	B-84158	"	"
16	Mink	--	9977	B-84161	Nov 28/55	"
17	Mink No 1 Fr	--	9978	B-84162	"	"
18	Mink No 2 Fr	--	9974	B-84164	"	"
19	Otter Fr	--	9975	B-84140	"	"
20	Fish	--	10330	B-75778	May 31/56	1964

WEST GROUP

<u>No.</u>	<u>Claim</u>	<u>Lot No.</u>	<u>Rec.No.</u>	<u>Tag No.</u>	<u>Rec.Date</u>	<u>Year Due</u>
1	Arlen No 1	7673				
2	Arlen No 2	7674				
3	Arlen No 3	7663				
4	Arlen No 4	7668				
5	Black Bear No 2 Fr	7661				
6	Black Bear No 3 Fr	7667				
7	Bea No 1	7665				
8	Bea No 2	7666				
9	Bea No 3	7670				
10	Elk	7675				

SCHEDULE OF CLAIMS

WEST GROUP

<u>No.</u>	<u>Claim</u>	<u>Lot No.</u>	<u>Rec.No.</u>	<u>Tag No.</u>	<u>Rec.Date</u>	<u>Year Due</u>
11	Fox	7676				
12	Wolf	7677				
13	Hare No 1 Fr		10327	B-75780	May 31/56	1964
14	Hare No 2 Fr		10255	B-84146	May 29/56	"
15	Hare No 3 Fr		10256	B-84147	"	"
16	Hare No 1		10326	B-75779	May 31/56	"
17	Hare No 2		10328	B-84141	"	"
18	Hare No 3		10329	B-84142	"	"
19	Hare No 4		10257	B-84143	May 29/56	"
20	Hare No 5		10258	B-84144	"	"

CLAIMS NOT INCLUDED IN EAST AND WEST GROUPS

<u>No.</u>	<u>Claim</u>	<u>Lot No.</u>
1	Bea No 6	L 7678
2	Black Bear No 1 Fr	L 7662
3	Lake No 2	L 7683
4	Mouse Fr	L 7680
5	Nora No 6 Fr	L 7669
6	Otter No 1	L 7685

While the writer outlined and directed the geological work and maintained contact with the work by making four separate visits to the property during progress of the job, the actual field traversing and mapping was carried out by Mr. John Shaefle assisted by Mr. David Wilson. Due to the detailed nature of the work and simple access, these men worked separately a good part of the time in the field.

The background of geological training for Shaefle and Wilson is tabulated below.

John Shaefle, geologist

- 1956 Princeton University Geology Field Course.
- 1956 Summer job Rogers Geophysical - Yellowstone region,
Montana
- 1957 B. Sc. degree in Geology, Wayne State University,
Detroit, Michigan.
- 1957 Summer job Manitoba Mines Branch - geologist -
photo mapping.
- 1958 U.S. Army Engineers - Construction engineering.
- 1960 Independent prospecting - Northern Ontario
- 1961 Construction job Marysville, Michigan - Concrete
inspector.
- 1961-2 Post degree geology at U.B.C., Vancouver
- 1962 Redstone Mines - Geological exploration N.W.T.

David Wilson, Assistant geologist

- 1957 B.A. degree Geology Major at U.B.C., Vancouver
- 1957 Mine Geologist United Keno Hill N.W.T.
- 1958 Post Graduate geology courses at U.B.C.
- 1958 Geologist Cowichan Copper Co., Vancouver Island.

1. INTRODUCTION

Copper Island has been more or less continuously under development by Granisle Copper Company, a subsidiary of Granby Mining Company of 507 - 1111 West Georgia Street, since 1955. An outcrop of low grade copper mineralization has been tested by over eighty diamond drill holes. Geological detail in the drilled area has been defined but the large part of the island is covered by thick forest growth, and logging slash with very little outcrop apparent.

The objective of this summers work was to traverse the island at sufficiently close intervals to locate and map all significant rock exposures. From the completed map it was hoped that extensions to the known mineralization or new areas of mineralization might be indicated for development by further drilling or stripping. At the same time it was desired to know whether certain areas could be expected to be barren of mineral and be suitable for mill or plant sites without the possible future need for relocation due to ore extensions.

At the beginning of June a two-man field party was organized in Vancouver and transported to Babine Lake where camp was established in an old cabin previously used by company personnel, and the field work was begun.

2. LOCATION AND ACCESS

The Copper Island property lies at about latitude $54^{\circ} 57'$ N and longitude $126^{\circ} 10'$ West. The island lies in Hagan Arm, an indentation of the east shore of Babine Lake. The nearest settlement to the island is at Topley Landing, about 10 miles distant by boat on the west side of the lake. Topley Landing is about 27 miles northerly by road from Topley, the nearest Post Office, located on the No. 16 trans provincial highway and on the C. N. Railway line. Supplies were obtained at Topley Landing. A 22 foot river boat with outboard motor was used for transportation across the lake.

The survey area was relatively close to the camp location. Transportation to the traverse starting points was usually by boat.

3. REGIONAL GEOLOGY

Physiographically Copper Island lies at the northwest corner of the Nechako Plateau region of central British Columbia. Islands and shore lines show the effects of glacial action, with tops being well rounded.

3. REGIONAL GEOLOGY (Continued)

Work by the Geological Survey of Canada suggests that rocks of Copper Island are part of the Takla group. This is a series of rocks mainly being volcanic flows but carrying interbedded tuffs, argillites, greywackes and limestones. The Takla group is Triassic in age and is cut by at least two major intrusives, Topley granite and Coast Range diorites.

While the older rocks on Copper Island are mainly volcanics, some sedimentary rocks are found on Sterrett Island along the north and west sides. These rocks follow description of the Takla group quite well. A porphery mass on Copper Island cuts the older rocks. Some similar porpheries are found on nearby islands and the mainland. They are syenitic in character and are correlated with the Topley Intrusives. Regional grand-diorite masses correlated with the Coast Range Intrusives are exposed within a few miles to the east and south of Copper Island.

4. HISTORY

The Copper Island prospect has been known for many years and has been investigated to some extent by many examining engineers and mining companies. The property has been variously known as Newmen Island and McDonald Island properties. Several tunnels were driven prior to 1913 when first mention of the property is made in B. C. Minister of Mines Reports.

In 1929 Consolidated Mining and Smelting Co. took an option on the property and carried out a program of diamond drilling. Indications of a large tonnage of low grade copper ore were obtained but the option was permitted to lapse.

In 1946 American Metals held the property and put in a few drill holes without much encouragement.

In 1955 the principal claims were purchased by Granby Mining Co. and their subsidiary Granisle Copper Co. Ltd. was organized a short time later. Additional claims were located to effectively cover the entire island. Drilling programs were carried out in 1955, 1956, 1958 and 1962. A reserve of at least 8,000,000 tons of ore at a grade of 0.68% copper with a surrounding zone of lower grade material has been proven. Topographic surveys have been made and feasibility studies are now in progress to determine whether a mining plant can be put into operation on the property.

5. GEOLOGICAL MAPPING METHOD

The mineral claim survey for Crown Grant applications has provided a controlled grid of claim corners over the entire island. The recently completed topographic survey has given some additional traverse lines and has located the island's principal topographic features. The topographic map was used as the base for the geological study reported here. Pace and compass traverses or chain and compass traverses were run between established points on the ground and outcrop encountered was studied carefully and its location noted for plotting upon the geological map.

Diamond drill hole collars are shown on the geological map. Cores are stored in a core shed at Copper Island so geologists were able to refer to the drill core or the core logs in the drilled areas.

Where outcrop is encountered, the weathering of the high pyrite content gives a thick zone of rusty non-descript rock. Considerable effort is required to pick through this zone to get into the relatively fresh rock. Specimens from most of the outcrops were obtained and are on hand for reference and possible use in microscopic rock identification.

6. DETAILED GEOLOGY

The accompanying geological map shows the outcrop areas and the general grouping of the rock types on Copper Island. This is based upon details from the earlier drill data, extended to fit in with the recent mapping. Much of the information recorded by Shaefle and Wilson in their original field notes has been omitted from this map, general rock types only being indicated. Some of the more significant of this data is summarized in descriptive form below under particular sub headings.

(a) Rock Types

All of the outcrops mapped on Copper Island can be classified as either volcanic flow material or intrusive. Some sedimentary rocks are known on adjoining islands to the south and west but none were identified on Copper Island. The volcanic sequence varies through several of the common types on the island. At the north point flows of basic composition are very anygdular in texture with cavities now filled by calcite, chalcedony and opal up to several inches across. Massive and fragmental flows of andesitic composition are interbedded with the anygdaloids there and occur elsewhere in thicker series of that texture.

(a) Rock Types (Continued)

The felsitic rocks are light colored when fresh but usually rusty due to weathering of pyrite where exposed along the south shore of the island. No appreciable variation can be distinguished in texture or grain size throughout this unit.

The syenite porphery dyke is the most outstanding rock on the island both physically and figuratively. It forms the face of the mineralized talus knoll which marks the copper ore outcrop and it is sufficiently distinctive to permit differentiation from the volcanic types. Some other outcrops such as that occurring on the mainland to the north-east and on the head of Sterrett Island to the south are similar in texture but vary in composition and are doubtfully of the same dyke but possibly are smaller dykes of the same family. In the ore zone a number of dykes of several feet in width and less have been mapped which are indistinguishable from the main porphery dyke. At least one basic dyke is indicated as an amphibolite due to its composition of black hornblende needles.

(b) Structure

Two north-west trending faults are shown where indicated by actual shearing and alteration and by the discontinuity of the older formations. The actual displacement on these faults are not determined and may be considerable since no good correlation of strata across them can be made within the limits of the map area. Fractures without much displacement indicated follow north-south and north-east-south-west directions with steep dips. These may be auxiliary to the large faults and would suggest that the large faults are also steep dipping.

Structure in the older rocks can be noted in some cases as anygdule allignment, flow banding and contacts. While the strike direction is uniformly north-easterly, the slope indicated is sometimes north-westerly and sometimes south-easterly so must be taken as inconclusive until further evidence is obtained.

Dykes, where contacts are observed are steep dipping with strike being indicated by fracture cleavage.

(c) Alteration and Metamorphism

A zone of hydrothermal bleaching extends along the principal faults and fractures of the region, depending upon the size of the structure, up to 100 feet or more in width. In this zone ferromagnesian minerals are reduced to sericite and koalin with losses of iron by solution. Small amounts of quartz as watery looking stringers occur. Sulphide grains are common usually being pyrite.

(c) Alteration and Metamorphism (Continued)

A zone of gray earthy alteration, possibly due to formation of kaolin occurs around the outer border of the ore zone. This has not been noted elsewhere on the property so far.

Metamorphism due to the syenite porphery dyke is a marked feature of the ore zone. Felspars are developed and the entire rock type adjoining the dyke has taken on a coarse texture. This rock was originally mapped as diorite. From consideration of the geological map it will be noted that re-location across the southern fault of similar rock groups would bring the fragmental flow which has been so subject to metamorphism in the ore zone into line with a belt of grey-wacke mapped on the north shore of Sterrett Island. Further work will be necessary before this correlation can be accepted, but there are some resemblances between the two rock types.

(d) Mineralization

Extensive mineralization by copper appears to be limited to the zone of fragmental flows at their contact with the syenite porphery dyke. In detail the chalcopyrite occurs there in a system of narrow quartz stringers which cut both rock types. This type of mineralization was not noted elsewhere on the island except in large blocks believed to be float to the south and east of the ore zone and the north-east corner of Sterrett Island.

A low intensity copper mineralization with pyrite occurs in several outcrops along and near the large faults and on the auxiliary fractures. This amounts to about 0.04% copper and is sufficient to give occasional copper stain in weathered outcrops but is too low for any commercial consideration.

Traces of chalcopyrite can be found at several points in the felsitic and andesitic volcanics not obviously related to fracturing but possibly related to narrow syenite porphery and amphibolite dykes.

Zinc and lead mineralization has been known for many years at workings on the south west shore of the island, related to a north-east trending fracture. No extensions have been found on Copper Island but on the north-east corner of Sterrett Island a few grains of galena were found in the reddish agglomeratic volcanic exposed there.

Magnetite was reported in drill logs at several points. No appreciable exposures were found, but some tests with a prospecting magnetometer has indicated some irregular variations in the earths magnetic field in the vicinity of the copper mineralization zone and a uniform increase in magnetic values toward the north point of the island which may be related to particularly magnetite rich members of the volcanic flow sequence there.

(d) Mineralization (Continued)

Pyrite occurs extensively in the felsitic flow members. Its occurrence may be localized in the zones adjacent to the two main faults where traces of chalcopyrite occur with it. In the northern and eastern part of the ore zone near the felsitic rock contacts and in the felsitic rocks themselves considerable fine pyrite is found. This may be in the form of a halo outside the copper mineralization.

7. CONCLUSIONS

Outcrop is not plentiful but such exposures as were observed and mapped fit into a logical geological pattern.

There appears to be no sign of a repetition of the copper mineralization or the geological conditions controlling the copper mineralization on the island. The possible extension of the favorable fragmental horizon west of the syenite porphery dyke has not been found so far. No other major exposures of the syenite porphery were found which might indicate presence of other large dykes. No areas of quartz filled fractures like the ore zone were located.

Geological conditions are not important considerations for the selection of a mill site except in so far as they might affect foundations of mill and crushing plant machinery.

Variation in magnetitic values of the earths field suggest that a detailed magnetic survey of the island might yield valuable geological indications.

E. MAPS

Three maps accompany this report they are titled as follows:

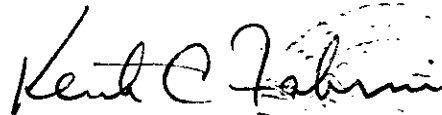
1. Part of Babine Lake showing Copper Island
Scale 1" = 1/2 mile.
2. Mineral Claims on Copper Island
Scale 1" = 600 feet.
3. Copper Island Geological Map
Scale 1" = 200 feet.

These maps are enclosed in an envelope attached in the back of this report.

F. CERTIFICATION

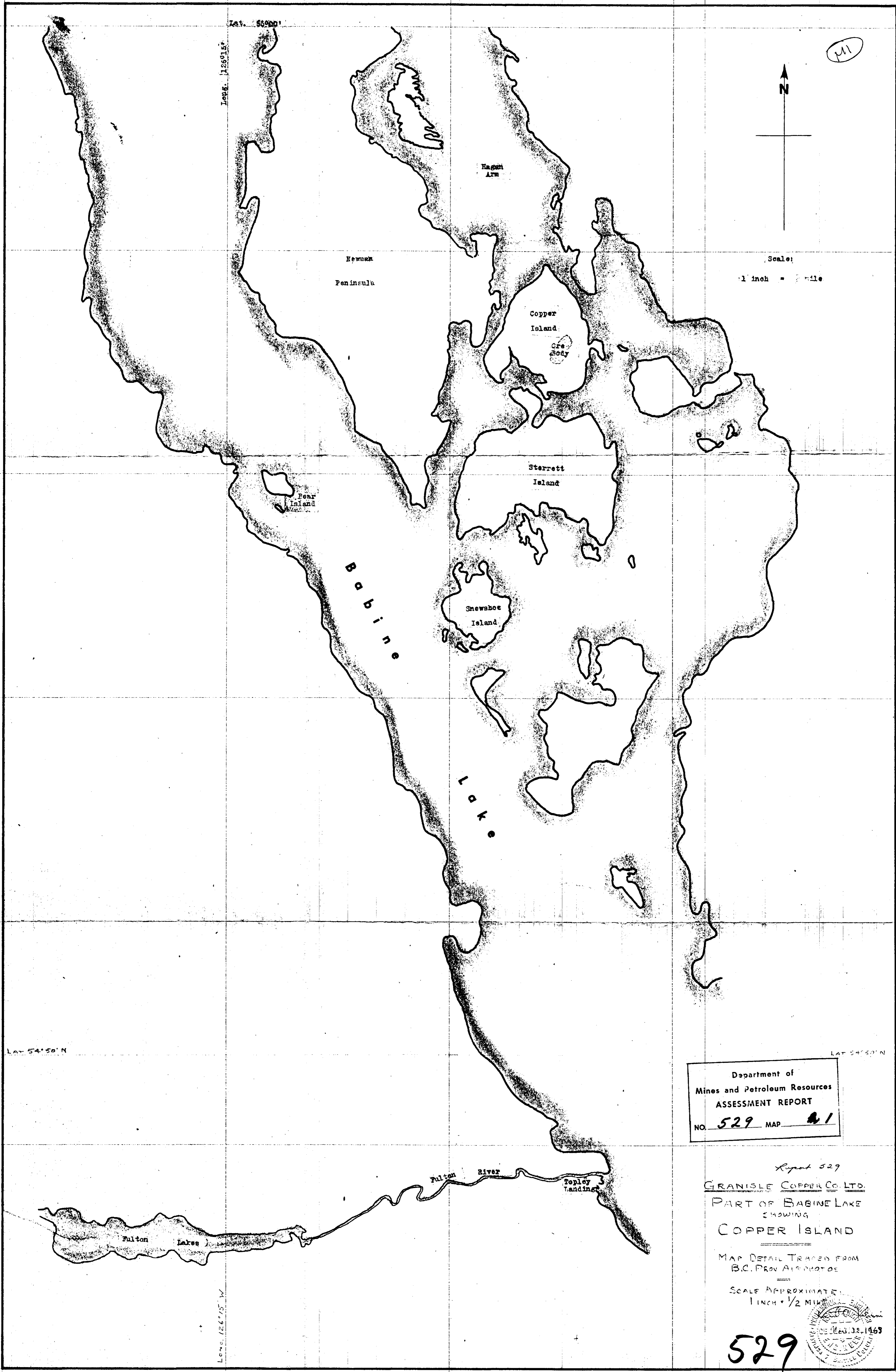
The information presented in the preceding report has been derived from my own observation and by interpretation of original field notes taken at my direction by qualified surveyors and geologists. The financial data and the field notes are on file at the office of the company.

Report respectfully submitted,

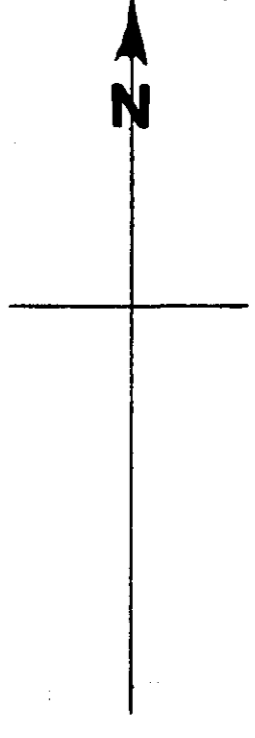


Keith C. Fahrni,
Professional Engineer in B. C.
Chief Geologist,
The Granby Mining Company Limited
507 - 1111 West Georgia Street,
Vancouver 5, B. C.

November 19th, 1963.



M1



Scale:
1 inch = 1/2 mile

Lat. 55°00'

Long. 126°15'

Newnack
Peninsula

Hagart
Arm

Copper
Island
Cre. Body

Sterrett
Island

Pear
Island

Babine
Lake

Shewshoe
Island

Lat. 54°50' N

Lat. 54°50' N

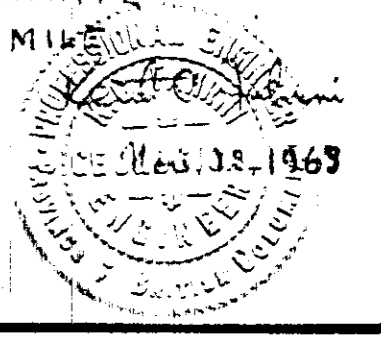
Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 529 MAP 41

Report 529
GRANISLE COPPER CO. LTD.
PART OF BABINE LAKE
SHOWING
COPPER ISLAND

MAP DETAIL TRACED FROM
B.C. PROV. AIRPHOTOS

SCALE APPROXIMATE
1 INCH = 1/2 MILE

529



Long. 126°15' W

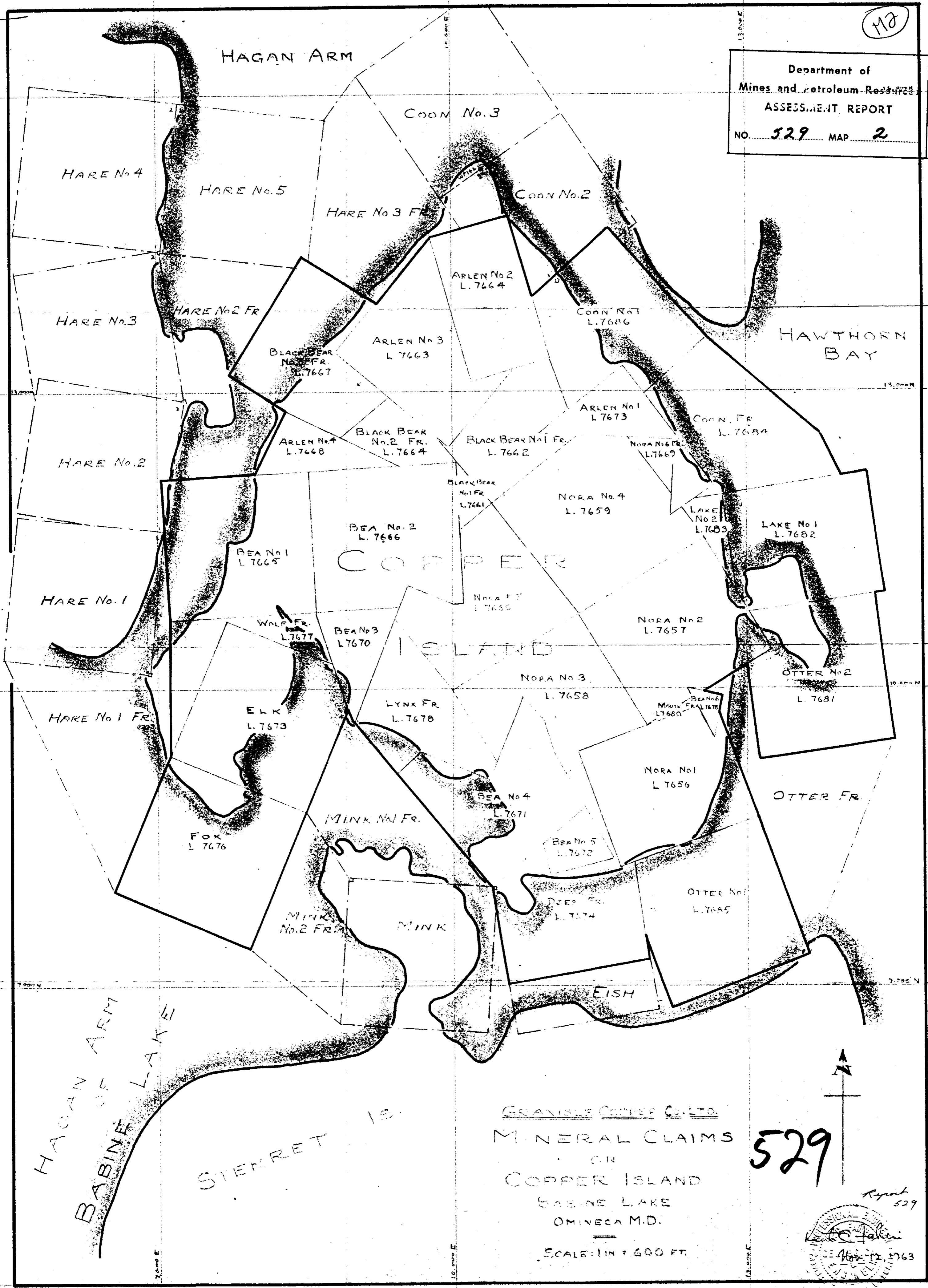
Fulton
Lake

Fulton
River

Topley
Landing

118

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 529 MAP 2



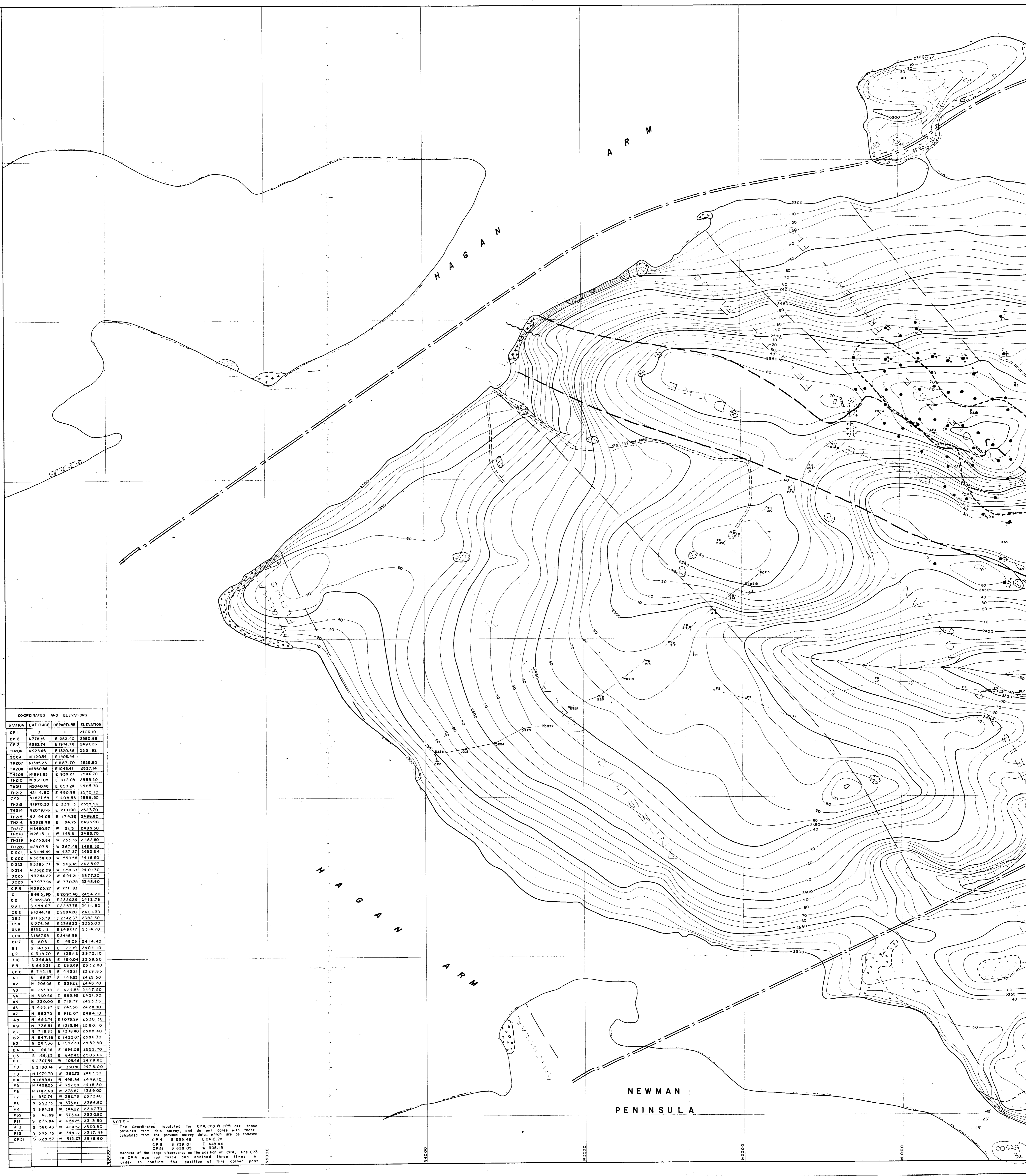
HAGAN ARM
BABINE LAKE

STENRET

GRANVILLE COPPER CO. LTD.
MINERAL CLAIMS
ON
COPPER ISLAND
BABINE LAKE
OMINECA M.D.
SCALE: 1 IN = 600 FT.

529

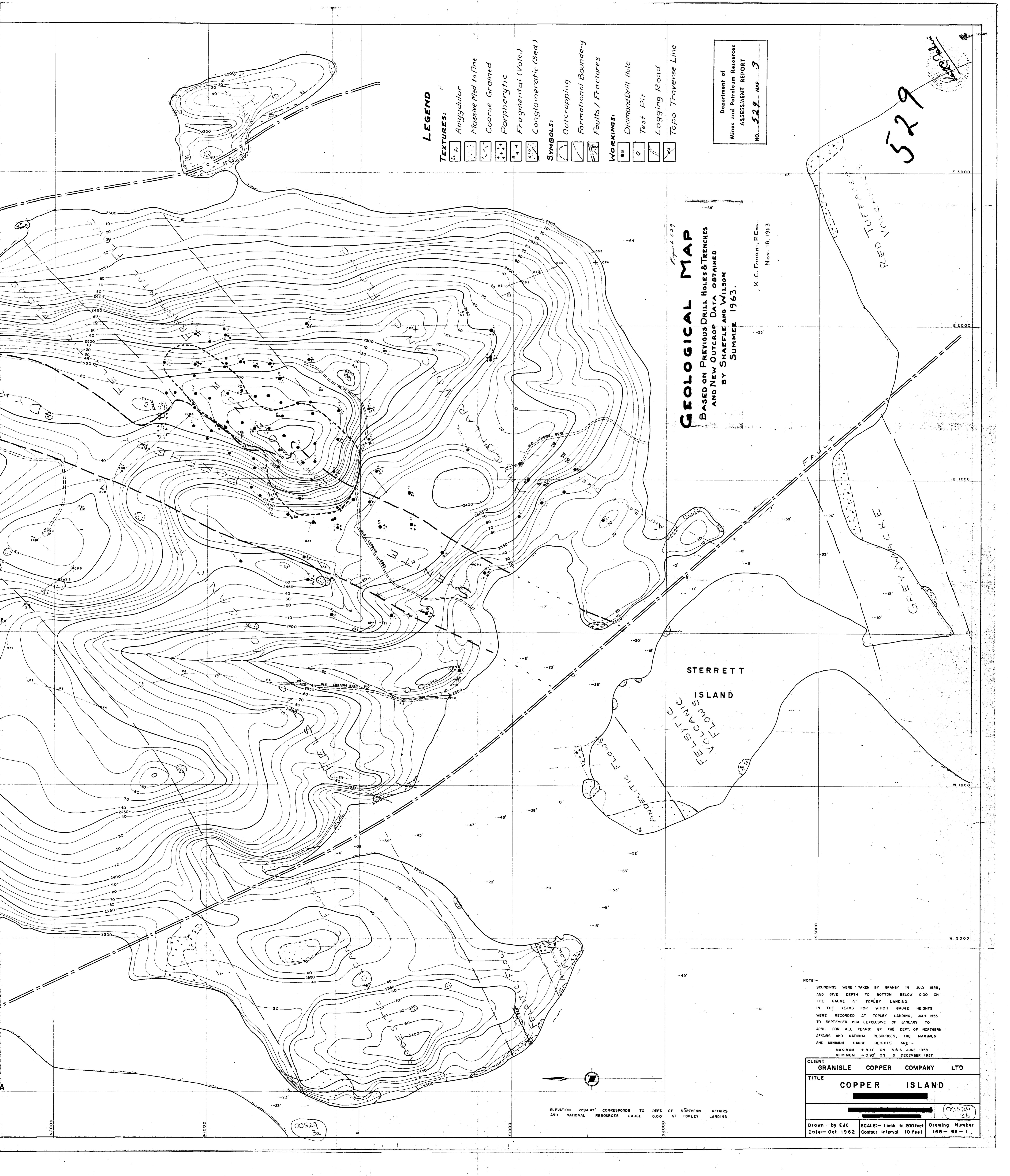
Report 529
Professional Engineer
Kurt C. Fisher
June 12, 1963



COORDINATES AND ELEVATIONS			
STATION	LATITUDE	DEPARTURE	ELEVATION
CP 1	0	0	2406.10
CP 2	N 778.16	E 1282.40	2582.88
CP 3	S 562.74	E 1974.76	2497.26
TH206	N 923.66	E 1320.88	2551.82
Z06A	N 1120.54	E 1406.46	
TH207	N 1585.25	E 1187.70	2525.90
TH208	N 1560.86	E 1045.41	2527.14
TH209	N 1691.93	E 939.27	2546.70
TH210	N 1839.08	E 817.08	2553.20
TH211	N 2040.98	E 653.24	2565.30
TH212	N 2114.80	E 590.95	2570.10
CP 5	N 1877.58	E 408.98	2559.50
TH213	N 1970.30	E 339.13	2555.90
TH214	N 2079.66	E 260.98	2527.70
TH215	N 2194.08	E 174.35	2488.60
TH216	N 2328.96	E 64.75	2466.90
TH217	N 2460.97	W 31.31	2489.50
TH218	N 2615.11	W 145.61	2486.70
TH219	N 2755.84	W 253.33	2482.80
TH220	N 2907.51	W 367.48	2466.32
D 221	N 3094.49	W 437.27	2452.04
D 222	N 3258.80	W 500.98	2416.50
D 223	N 3385.71	W 566.45	2425.97
D 224	N 3562.29	W 638.63	2401.30
D 225	N 3744.22	W 694.21	2377.30
D 226	N 3937.96	W 730.36	2348.80
CP 6	S 925.27	W 771.83	
C 1	S 969.90	E 2207.40	2464.20
C 2	S 969.80	E 2220.39	2412.78
OS 1	S 954.67	E 2257.75	2411.80
OS 2	S 1044.78	E 2294.20	2401.30
OS 3	S 1163.78	E 2342.37	2382.30
OS 4	S 1274.95	E 2388.23	2355.00
OS 5	S 1521.12	E 2487.17	2314.70
CP 4	S 1557.95	E 2448.99	
CP 7	S 808.1	E 49.03	2414.40
E 1	S 147.51	E 72.19	2404.10
E 2	S 315.70	E 133.42	2370.10
F 18	S 389.85	E 150.04	2358.90
CP 8	S 665.31	E 283.69	2332.80
A 1	N 88.37	E 149.63	2429.50
A 2	N 206.08	E 339.22	2446.70
A 3	N 457.88	E 624.58	2447.50
A 4	N 360.66	E 593.95	2421.60
A 5	N 330.00	E 716.77	2423.35
A 6	N 453.87	E 747.56	2428.80
A 7	N 553.70	E 912.07	2484.10
A 8	N 652.74	E 1075.29	2530.30
A 9	N 735.51	E 1213.34	2560.10
B 1	N 718.93	E 1318.40	2588.40
B 2	N 547.98	E 1422.07	2586.30
B 3	N 267.30	E 1592.39	2552.40
B 4	N 96.46	E 1695.06	2552.70
B 5	S 158.23	E 1849.40	2503.60
F 1	N 2307.54	W 109.46	2479.60
F 2	N 2180.14	W 330.86	2475.00
F 3	N 1979.70	W 382.73	2467.50
F 4	N 1699.81	W 495.86	2449.70
F 5	N 1429.25	W 575.29	2418.90
F 6	N 1147.68	W 678.87	2389.00
F 7	N 930.74	W 782.78	2370.40
F 8	N 593.73	W 858.91	2358.50
F 9	N 394.38	W 944.22	2347.70
F 10	S 42.69	W 973.44	2330.00
F 11	S 276.84	W 424.25	2313.50
F 12	S 580.43	W 424.57	2300.50
F 13	S 595.75	W 348.27	2317.43
CP 51	S 629.57	W 312.03	2316.60

NOTE: The Coordinates tabulated for CP4, CP8 & CP51 are those obtained from this survey, and do not agree with those calculated from the previous survey dots, which are as follows:
 CP 4 S 1555.48 E 2412.28
 CP 8 S 739.01 E 448.44
 CP 51 S 628.05 W 308.19
 Because of the large discrepancy on the position of CP4, line CP3 to CP4 was run twice and chained three times in order to confirm the position of this corner post.

00529
3a



- LEGEND**
- TEXTURES:**
- Amygdule
 - Massive Med. to Fine
 - Coarse Grained
 - Porphyritic
 - Fragmental (Volc.)
 - Conglomeratic (Sed.)
- SYMBOLS:**
- Outcropping
 - Formational Boundary
 - Faults / Fractures
- WORKINGS:**
- Diamond Drill Hole
 - Test Pit
 - Logging Road
 - Topo. Traverse Line

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 529 MAP 3

GEOLOGICAL MAP
BASED ON PREVIOUS DRILL HOLES & TRENCHES
AND NEW OUTCROP DATA OBTAINED
BY SHAEFFLE AND WILSON
SUMMER 1963.

K. C. FURBER, P. Eng.
Nov. 18, 1963

STERRETT
ISLAND

NOTE:-
SOUNDINGS WERE TAKEN BY GRANBY IN JULY 1959,
AND GIVE DEPTH TO BOTTOM BELOW 0.00 ON
THE GAUGE AT TOPLEY LANDING.
IN THE YEARS FOR WHICH GAUGE HEIGHTS
WERE RECORDED AT TOPLEY LANDING, JULY 1959
TO SEPTEMBER 1961 (EXCLUSIVE OF JANUARY TO
APRIL FOR ALL YEARS) BY THE DEPT. OF NORTHERN
AFFAIRS AND NATIONAL RESOURCES, THE MAXIMUM
AND MINIMUM GAUGE HEIGHTS ARE:-
MAXIMUM +8.11' ON 5.6 JUNE 1958
MINIMUM +0.90' ON 5 DECEMBER 1957

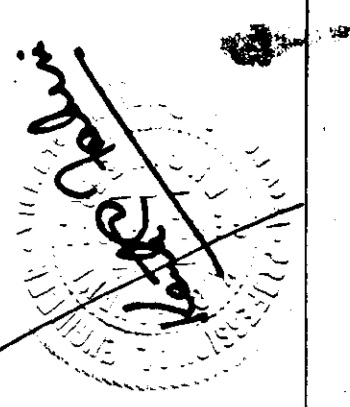
CLIENT
GRANISLE COPPER COMPANY LTD

TITLE
COPPER ISLAND

Drawn by EJC SCALE: 1 inch to 200 feet Drawing Number
Date: Oct. 1962 Contour Interval 10 feet 168-62-1

ELEVATION 2294.47' CORRESPONDS TO DEPT. OF NORTHERN AFFAIRS
AND NATIONAL RESOURCES GAUGE 0.00' AT TOPLEY LANDING.

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