

4

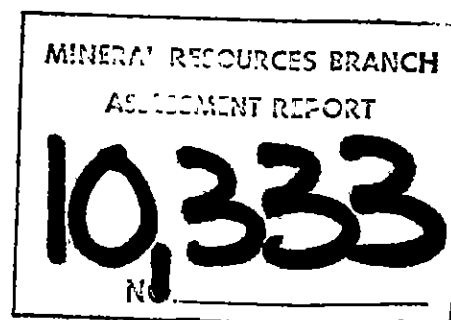
ASSESSMENT REPORT

GEOLOGY AND GEOCHEMISTRY OF THE MAC AND PEN MINERAL CLAIMS

SOUTH NEWMAN PENINSULA

Omineca Mining Division N.T.S. 93L/16

54°56' N, 126°12' W



Submitted by: P. McCarter, December 1981

Owner/Operator: Noranda Exploration Company, Limited
(No Personal Liability)

TABLE OF CONTENTS

	Page
1. SUMMARY AND CONCLUSIONS	1
2. INTRODUCTION	2
3. LINECUTTING	5
4. REGIONAL GEOLOGY	5
5. PROPERTY GEOLOGY	6
5.1 Jurassic Rocks	6
5.2 Eocene Rocks	6
5.3 Mineralization	7
5.4 Alteration	8
6. GEOCHEMISTRY	9
6.1 Sampling and Analytical Procedure	9
6.2 Discussion of Results	9
7. RECOMMENDATIONS	11
8. REFERENCES	11

LIST OF FIGURES

	Page
FIGURE 1 SOUTH NEWMAN PENINSULA:	
Location Map (1:250 000)	page 3
FIGURE 2 SOUTH NEWMAN PENINSULA:	
Claim Sketch (1:50 000)	page 4
FIGURE 3 SOUTH NEWMAN PENINSULA:	
Geological Map (1:5000)	back pocket
FIGURE 4 SOUTH NEWMAN PENINSULA:	
Alteration and Sample Location Map (1:5000) . .	back pocket
FIGURE 5 SOUTH NEWMAN PENINSULA: Geochemistry:	
Soils: Copper, Molybdenum (1:5000)	back pocket
FIGURE 6 SOUTH NEWMAN PENINSULA: Geochemistry:	
Soils: Zinc, Lead, Silver (1:5000)	back pocket
FIGURE 7 SOUTH NEWMAN PENINSULA: Geochemistry:	
Soils: Manganese, Iron (1:5000)	back pocket

APPENDICES

APPENDIX I STATEMENT OF QUALIFICATIONS
APPENDIX II STATEMENT OF COST

1. SUMMARY AND CONCLUSIONS

The Pen and Mac claims are located on the southern part of Newman Peninsula approximately six kilometres north of the town of Granisle. During May and June 1981 geological and geochemical surveys were carried out on the claims to assess the possibilities of locating porphyry-type mineralization similar to that at the Bell and Granisle Mines.

The southern part of Newman Peninsula is underlain by acid to intermediate volcanic fragmental rocks of the Hazelton Group of Jurassic age, which are in fault contact with breccias and feldspar-hornblende⁺ biotite porphyry of Eocene age. Structural data suggest that the porphyritic rocks may represent volcanic necks and associated flows; thus, they may be sites of former volcanic vents. The breccias overlie the porphyritic rocks, and may be partly intruded by them. All fragments within the breccias were derived from the porphyritic rocks. The size and sorting of the fragments is indicative of a near-vent source.

Sulphide mineralization was not observed in the Eocene rocks, and only trace amounts of pyrite were found in the Hazelton Group. However, alteration zones are present within the porphyritic rocks, and appear to be centered on a large exposure of unaltered porphyry, possibly an Eocene volcanic vent, in the south central part of the peninsula.

Results of the geochemical survey indicate that there are areas of weakly anomalous values of copper, zinc, lead, and silver in the northern and eastern parts of the property. Local unsupported anomalous values of these elements are not uncommon. The source of these element concentrations is not known for certain; however, the anomalous values found in the Hazelton Group may be representative of syngenetic mineralization inherent

within the Jurassic rocks. Higher values of copper, zinc, and silver in the northeast part of the property may be related to the Granisle porphyry copper deposit.

2. INTRODUCTION

The Pen and Mac claims are located on the southern part of Newman Peninsula approximately six kilometres north of the town of Granisle (Fig. 1). The property is centered on $54^{\circ}56'$ N latitude and $126^{\circ}12'$ W longitude. Access to the area is by boat on Babine Lake from Granisle. Claim data for the Pen and Mac claims (Fig. 2) are as follows:

<u>Claim</u>	<u>Units</u>	<u>Record Number</u>	<u>Expiry Date</u>
Pen	8	3753	May 17, 1983
Mac	12	3751	May 17, 1983

The property lies between 720 and 900 metres elevation, and consists of moderately rolling topography with a northwest-trending ridge along the central axis of the peninsula. Most of the southern part of the property has undergone extensive logging except for a narrow strip of trees around the perimeter of the peninsula. The northern part of the property is tree-covered.

Previous work on the southern part of the peninsula includes: an induced polarization survey (Baird, 1970); EM, magnetometer, and self-potential surveys (Cochrane, 1966, 1967; Montgomery and Cochrane, 1965); and geochemical surveys (Cochrane, 1966; Montgomery and Cochrane, 1965). These surveys covered part of the property only, or were of a reconnaissance rather than a detailed nature. The present geological and geochemical surveys were carried out at the scale of 1:5000 on lines spaced at one

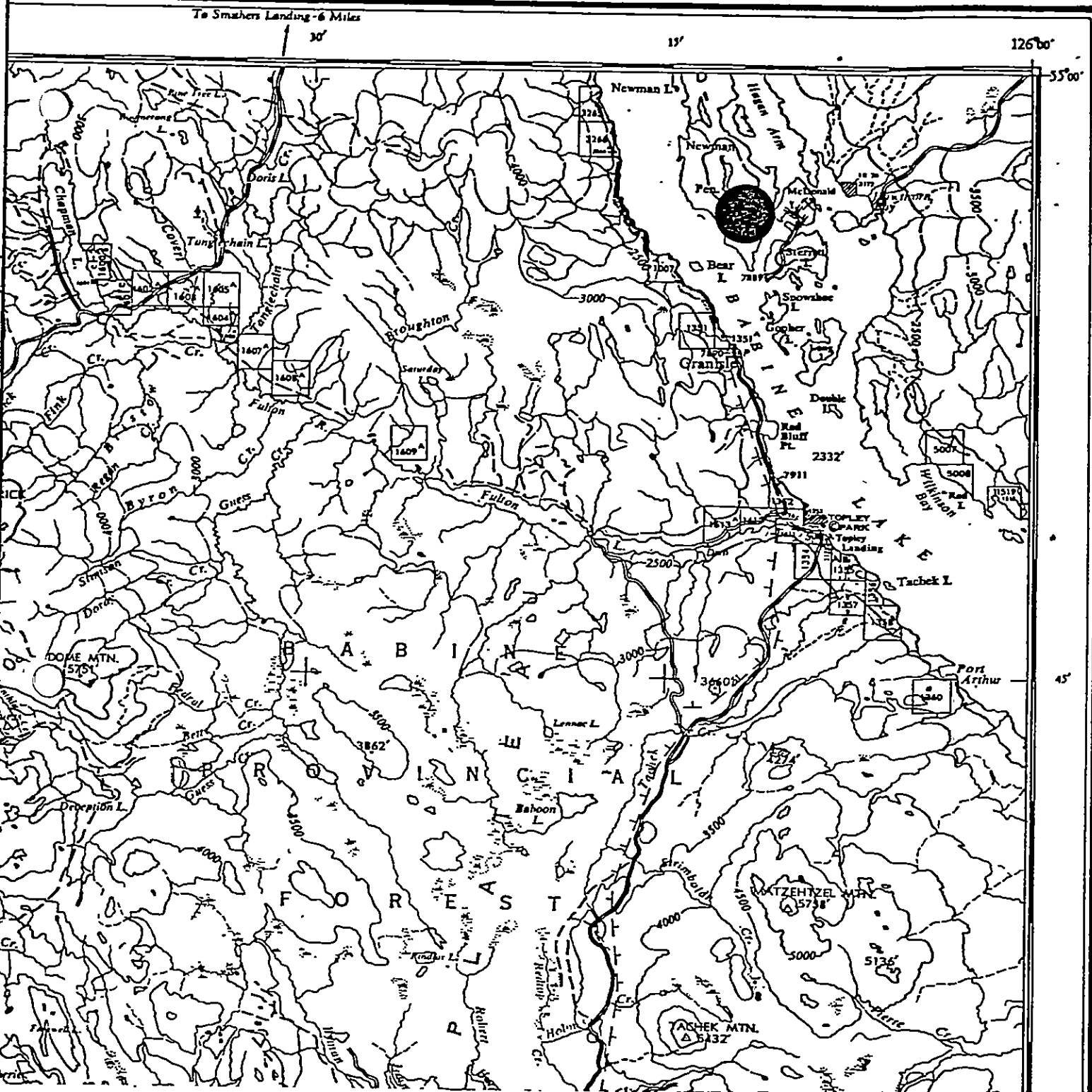
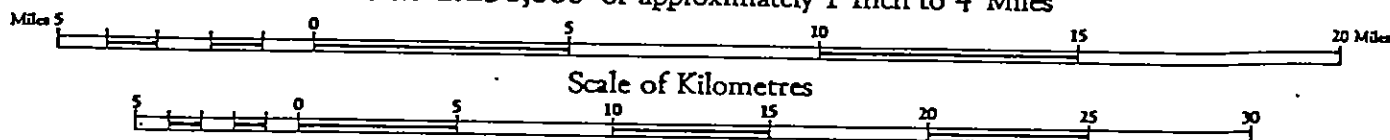


Figure 1. South Newman Peninsula: Location Map
Noranda Exploration Company Limited
(No Personal Liability)

Scale 1:250,000 or approximately 1 Inch to 4 Miles





Scale 1:50,000 Échelle

Meters 0 1000 2000 3000 4000 Meters

Yards 0 1000 2000 3000 4000 Yards

hundred-metre intervals. The lines were run by pace and compass from 8.075 kilometres of cut base lines. The present survey covers the area south and east of Ketz Lake and includes parts of Noranda's Arch and Hare claim groups.

3. LINECUTTING

A total of 8.075 kilometres of control lines were cut on the southern part of Newman Peninsula by Talisman Resources of Richmond, B.C. Stations were picketed every 50 metres along each line.

4. REGIONAL GEOLOGY

The southern part of Newman Peninsula has been included in various regional geological surveys (Hanson et al., 1972; Tipper et al., 1976; and Carter, 1977). Because of the close proximity of the Pen and Mac claims to the Bell and Granisle Mines, geologic maps of a somewhat more detailed nature (1 inch to 1 mile) have also covered the southern part of the peninsula (Carter, 1966; and Carter, 1977).

Jurassic volcanic rocks of the Hazelton Group are the oldest rocks in the vicinity of Newman Peninsula. They are intruded by stocks, dikes, and sills of feldspar-biotite⁺hornblende porphyry of Eocene age. The intrusive rocks have been localized by a dominant system of north-northwest-trending faults and a subsidiary set of northeast-trending faults. According to Carter (1966, 1977a) the southern part of the Newman Peninsula lies immediately west of a major north-northwest-trending fault that transects both the Bell and Granisle porphyry copper deposits.

5. PROPERTY GEOLOGY

The southern part of Newman Peninsula is underlain by intermediate to felsic volcanic rocks of the Hazelton Group of Jurassic age, and by porphyritic flows and associated breccias of Eocene age. The two units are in faulted contact.

5.1 Jurassic Rocks

Rocks of the Hazelton Group are exposed along the eastern side of the southern part of Newman Peninsula, and in a small area on the southwestern shore of Hagan Arm opposite the Granisle pit (Fig. 3). Both areas are bounded on the west by north-northwest-trending faults which separate the Jurassic rocks from the younger Eocene strata. Attitudes of foliation within the Hazelton Group, although not abundant, indicate that the sequence dips 70° to 80° southeasterly.

The volcanic rocks of the eastern part of the peninsula are divisible into a lower unit of interbedded rhyolitic to dacitic flows, porphyritic flows, tuffs, lapilli tuffs, and breccias which are in gradational contact with an upper unit of similar rocks of andesitic to dacitic composition. Andesitic rocks are also exposed along the southeastern shore of Ketza Lake. Basaltic flows, in part amygdaloidal, crop out in a small area along the southwestern shore of Hagan Arm (Fig. 3).

5.2 Eocene Rocks

Rocks of Eocene age are exposed along the western side of the southern part of Newman Peninsula, and along the southwestern side of the southern part of Newman Peninsula, and along the southwestern shore of Hagan Arm (Fig. 3). In both areas, the Eocene strata are in faulted contact with the Hazelton Group on the east. However, the nature of this contact between Ketza Lake and Hagan Arm is unknown.

Eocene rocks consist of feldspar-hornblende[†]biotite porphyritic flows overlain by breccias, which were partly derived from the flows. The porphyritic rocks are exposed along the central ridge of the peninsula, and in a small area near Hagan Arm (Fig. 3). Feldspar-hornblende[†]biotite porphyry has been affected by hydrothermal alteration in the north central part of the peninsula. Elsewhere on the property, however, the rock is fresh, and tends to form areas of higher relief due to its resistance to surface weathering. Unaltered feldspar-hornblende[†]biotite porphyry consists of subhedral to euhedral phenocrysts of plagioclase feldspar (25%-45%), hornblende (10%-15%), and biotite ($\leq 1\%$) in a very fine-grained, grey to dark grey, quartzo-feldspathic groundmass. Preferred orientation of the mafic minerals imparts a vague sub-horizontal foliation to the rock.

Columnar jointing is common in the fresh porphyry. Structural relationships with the overlying strata suggest that the porphyries may represent the necks of volcanic centres.

Pyroclastic breccia, flow breccia, and lahar overlie feldspar-hornblende[†]biotite porphyry. The contact is not exposed, however, and may be partly intrusive. The rocks are monolithic, and consist of subrounded to subangular fragments of variously altered feldspar-hornblende[†]biotite porphyry in a very fine grained, greenish-grey matrix. The fragments are generally unsorted, and range from ≤ 1 cm to 1 m in size, suggesting a close proximity to a source vent.

5.3 Mineralization

Trace amounts of pyrite are disseminated locally in the Hazelton volcanic rocks, particularly south of Ketz Lake. Pyrite has also been observed in glassy quartz veins in the Jurassic strata.

Sulphide mineralization was not observed in the feldspar-hornblende[±] biotite porphyry or the associated breccias. Trace amounts of very fine-grained magnetite and hematite are present in the unaltered and altered porphyry, respectively.

5.4 Alteration

Feldspar-hornblende[±]biotite porphyry can be divided into four zones on the basis of hydrothermal alteration (Fig. 4). Zone I corresponds to the unaltered porphyry in the south-central part of the peninsula and in the Hagan Arm area. The other three zones appear to be variations of the phyllic-type of alteration.

Zone II is located in the southeastern part of the peninsula. Zone II is gradational with Zone I, and is represented by weak sericitization of plagioclase accompanied by the presence of minor amounts of limonite. The groundmass is dark grey, and may contain very fine-grained biotite.

Zones III and IV are most prevalent in the north-central part of the property. Hornblende and biotite phenocrysts are partly to completely altered to reddish hematite, which imparts a reddish-brown colour to the rock. Fine-grained disseminated specularite is a common constituent. Veinlets of sericite and clay occur in the most intensely altered rocks.

Zone IV is similar to Zone III, but contains variable amounts of very fine-grained fuchsite which imparts a blue-green colour to the rock. Zone IV is not extensive, and is locally superimposed on Zone III.

Exposures of the alteration zones are not adequate to completely delineate them; however they appear to be peripheral to the major exposure of unaltered porphyry in the south-central part of the peninsula.

6. GEOCHEMISTRY

A total of 1495 soil samples and 27 stream sediment samples were collected on the Pen, Mac, Arch, and Hare claims. Samples were obtained from stations 50 metres apart on lines spaced at intervals of 100 metres (Fig. 5 and 6). The lines were run by pace and compass from previously cut control lines.

6.1 Sampling and Analytical Procedure

Soil samples were obtained from the B horizon, where possible, with the aid of an iron mattock. The samples were placed in "High Wet Strength Kraft 4" x 6" Envelopes", and air-dried in the field. In the laboratory the -80 mesh size fraction is separated, and 0.2 grams of this fraction is digested in 2 millilitres of HClO_4 and 0.5 millilitres of HNO_3 for approximately four hours. Subsequently, each sample is diluted to five millilitres with demineralized water. The content (in parts per million) of various elements in the soil is determined with the aid of a Varian Techtron Model AA-5 atomic absorption spectrophotometer. All soil samples were analysed for copper, molybdenum, zinc, lead, silver, manganese, and iron at the analytical laboratory of Noranda Exploration Company, Limited in Vancouver, B.C. under the direction of E. van Leeuwen.

6.2 Discussion of Results

Results of the geochemical survey are not encouraging, and for the most part, well-defined trends are not evident (Fig. 5 and 6). High concentrations of copper (>50 ppm) and molybdenum (>3 ppm) tend to parallel each other, and localized anomalous values are common (Fig. 5). Trends of high copper values are present, however, in the following areas:

1. in the northwest part of the property near the shore of Babine Lake;

2. in the northeast part of the property near the shore of Hagan Arm; and
3. in the east central part of the peninsula.

The latter area occurs within felsic to intermediate volcanic rocks where trace amounts of pyrite have been observed. The other areas are underlain by Eocene breccia and altered feldspar-hornblende-biotite porphyry. All of the copper anomalies trend in a northerly direction.

High concentrations of zinc (>200 ppm) and silver (>1.0 ppm) are roughly coincident with the anomalous copper values, although there is more scatter of data. High values for lead accompany zinc and silver in the east central part of the peninsula, but are absent elsewhere. The zinc-silver-lead anomalies correlate well with induced polarization anomalies determined by Baird (1970).

The high concentrations of copper, zinc, silver, and lead in the eastern part of the property may be related to the mineralization at the Granisle mine. A westward displacement of the zinc-silver-lead anomalies with respect to the copper anomalies in the east central part of the peninsula, suggest a zonal relationship of the elements that is consistent with this relationship. However, correlation of the geochemical results with the Granisle deposit may not be valid as a major fault separates the mine from the southern part of Newman Peninsula. Also, high concentrations of trace elements within the Hazelton Group may actually be an inherent characteristic of the Jurassic strata.

7. RECOMMENDATIONS

Results of the geochemical survey are not encouraging. Geologic mapping has not outlined any areas of significant sulphide mineralization, although distinct zones of hydrothermal alteration have been delineated. Further geophysical surveys, particularly induced polarization surveys, may be of value if carried out in the northern and northeastern parts of the area. However, work to date does not warrant further exploration of the property at this time. Nevertheless, Noranda should retain possession of the claims due to their close proximity to both the Bell and Granisle mines.

8. REFERENCES

Baird, J.G., (1970): Report on Induced Polarization Surveys Newman Peninsula and Rum Island Properties, Babine Lake Area, British Columbia; B.C. Department of Mines and Petroleum Resources, Assess. Rept. no. 2646, 7 p.

Carter, N.C. (1966): Northern Babine Lake Area, p. 90-93 in B.C. Minister of Mines and Petroleum Resources Annual Rept. 1965, 442 p.

(1973): Geology of the Northern Babine Lake Area, Omineca Mining Division, B.C. Dept. of Mines and Petroleum Resources, Preliminary Map no. 12, 1:63,360.

(1977): Porphyry Copper Deposits of the Babine Lake Area, Figure 26 to accompany B.C. Dept. of Mines and Petroleum Resources, Bull. 64, 1:250,000.

(1977a): General Geology, West Central British Columbia, Figure 8 to accompany B.C. Dept. of Mines and Petroleum Resources, Bull. 64, 1:500,000.

Cochrane, D.R. (1966): Geophysical and Geochemical Report of the Jen Group of Twenty-eight Full Sized Claims, B.C. Dept. of Mines and Petroleum Resources Assess. Rept. no. 810, 6 p.

(1967): Geophysical Report on Electromagnetic and Magnetic Surveys on the Jen, Ketza, and Rum Claims, B.C. Dept. of Mines and Petroleum Resources Assess. Rept. no. 1072, 11p.

Fader, H.A. (1966): Geochemical and Geological Report of Work Done Between July 4 and December 21, 1966 on the Penn Group of 68 Claims on Newman Peninsula, Babine Lake, B.C. Dept. of Mines and Petroleum Resources Assess. Rept. no. 1115, 15 p.

Hanson, G., Phernister, T.C., Lang, A.H. (1942): Houston, Coast District, British Columbia, Map 671-A, Canada Dept. of Mines and Resources, 1:253,440.

Montgomery, J.H., Cochrane, D.R. (1965): Geochemical and Geophysical Report on the Ketza Group of Eighteen Claims, B.C. Dept. of Mines and Petroleum Resources Assess. Rept. no. 844, 14 p.

Tipper, H.W., Richards, T.A. (1976): Geology of the Smithers Map Area, British Columbia, Geological Survey of Canada, Open File 351, 1:126,720.

APPENDIX I

STATEMENT OF QUALIFICATIONS

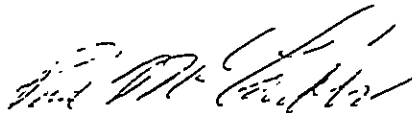
STATEMENT OF QUALIFICATIONS

I, Paul McCarter, of the city of Corvallis, State of Oregon,
do certify that:

1. I have been an employee of Noranda Exploration Company, Limited
since April, 1981;
2. I am a Canadian citizen;
3. I am a graduate of the University of Western Ontario in London,
Ontario with an Honours Bachelor of Science Degree in
Geology (1974); and
4. I am a graduate of Oregon State University in Corvallis, Oregon
with a Master of Science Degree in Geology (1980).

Dated at Smithers

this 12th day of June, 1981



Paul McCarter

Field Geologist

Noranda Exploration Company, Limited

(No Personal Liability)

APPENDIX II
STATEMENT OF COST

NORANDA EXPLORATION COMPANY, LIMITED

STATEMENT OF COST

PROJECT South Newman
TYPE OF REPORT Geology & Geochem

DATE December 17, 1981

a) Wages:

No. of Days	29	
Rate per Day \$	170.014	
Dates From:	Jan/81 to Dec/81	
Total Wages	29 x \$ 170.014	4,930.40

b) Food and Accomodation:

No of days	29	
Rate per day \$	84.7759	
Dates From:	jan/81 to Dec/81	
Total Cost	29 x \$ 84.7759	2,458.50

c) Transportation:

No of days		
Rate per day \$		
Dates From:		
Total Cost	X \$	

d) Instrument Rental:

Type of Instrument		
No of days		
Rate per day \$		
Dates From:		
Total Cost	X \$	

Type of Instrument

No of days

Rate per day \$

Dates From:

Total Cost	X \$	
------------	------	--

f) Analysis
(See attached schedule) 7,762.20

g) Cost of preparation of Report

Author	170.00
Drafting	440.64
Typing	<u>170.00</u>

h) Other:

Total Cost

\$15,931.74

e) Unit costs for Geology

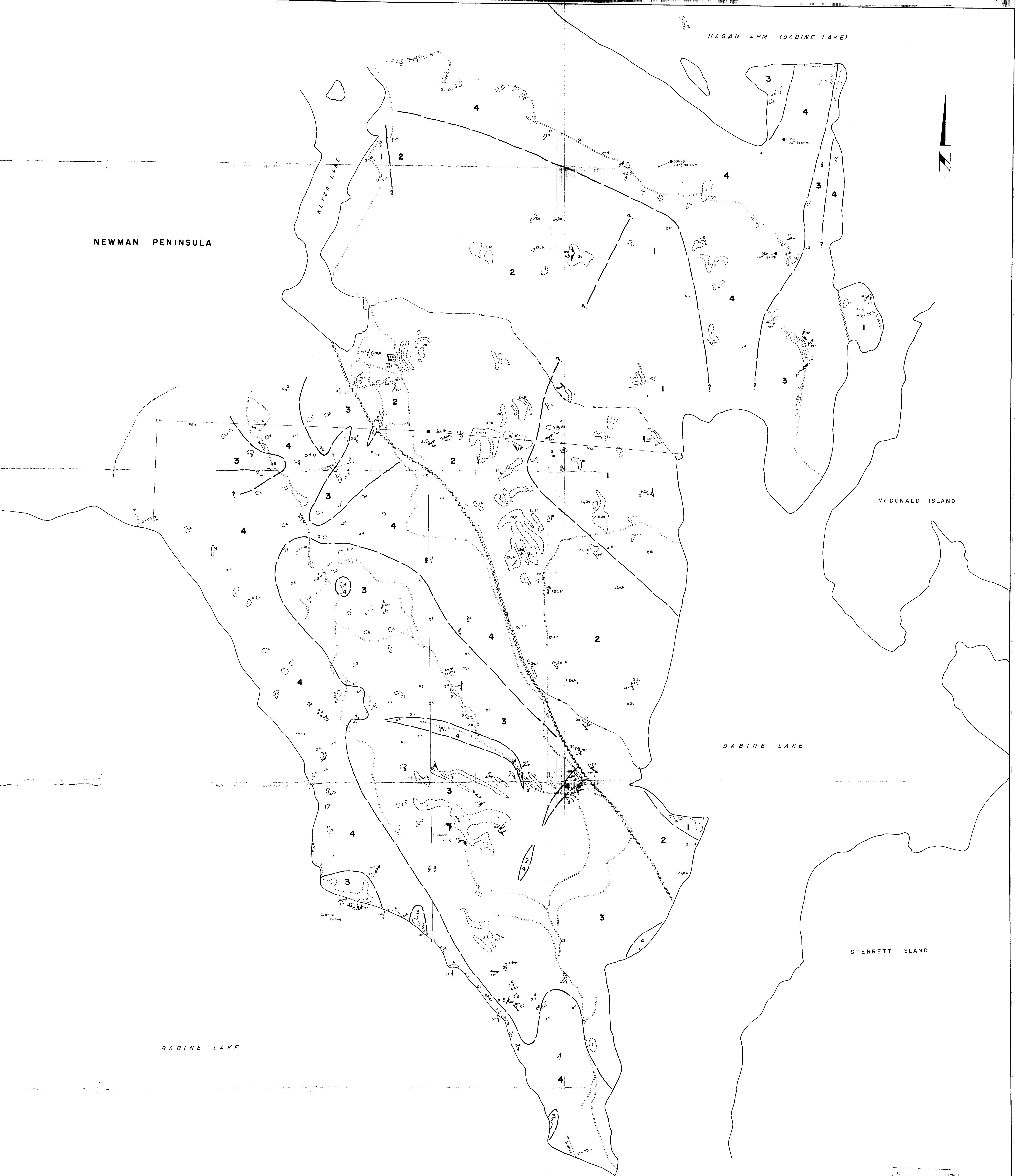
No of days	29	
No of units		
Unit costs	107.6814 /Day	
Total Cost	29 x \$107.6814	3,122.76

Unit Costs for Geochem

No. of Units	1522 Samples	
Unit Costs	8.4158/Sample	
Unit Costs	8.4158/Sample	
Total Cost	1522 X \$8.4158	<u>12,808.98</u>

\$15,931.74

DETAILS OF ANALYSIS COSTS



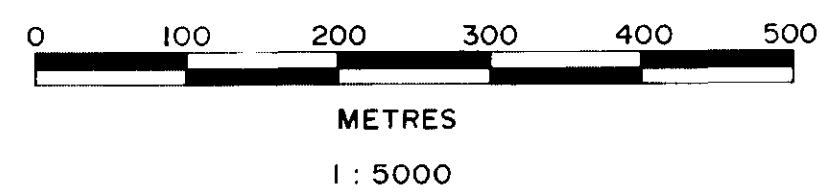
LEGEND

ROCK UNITS

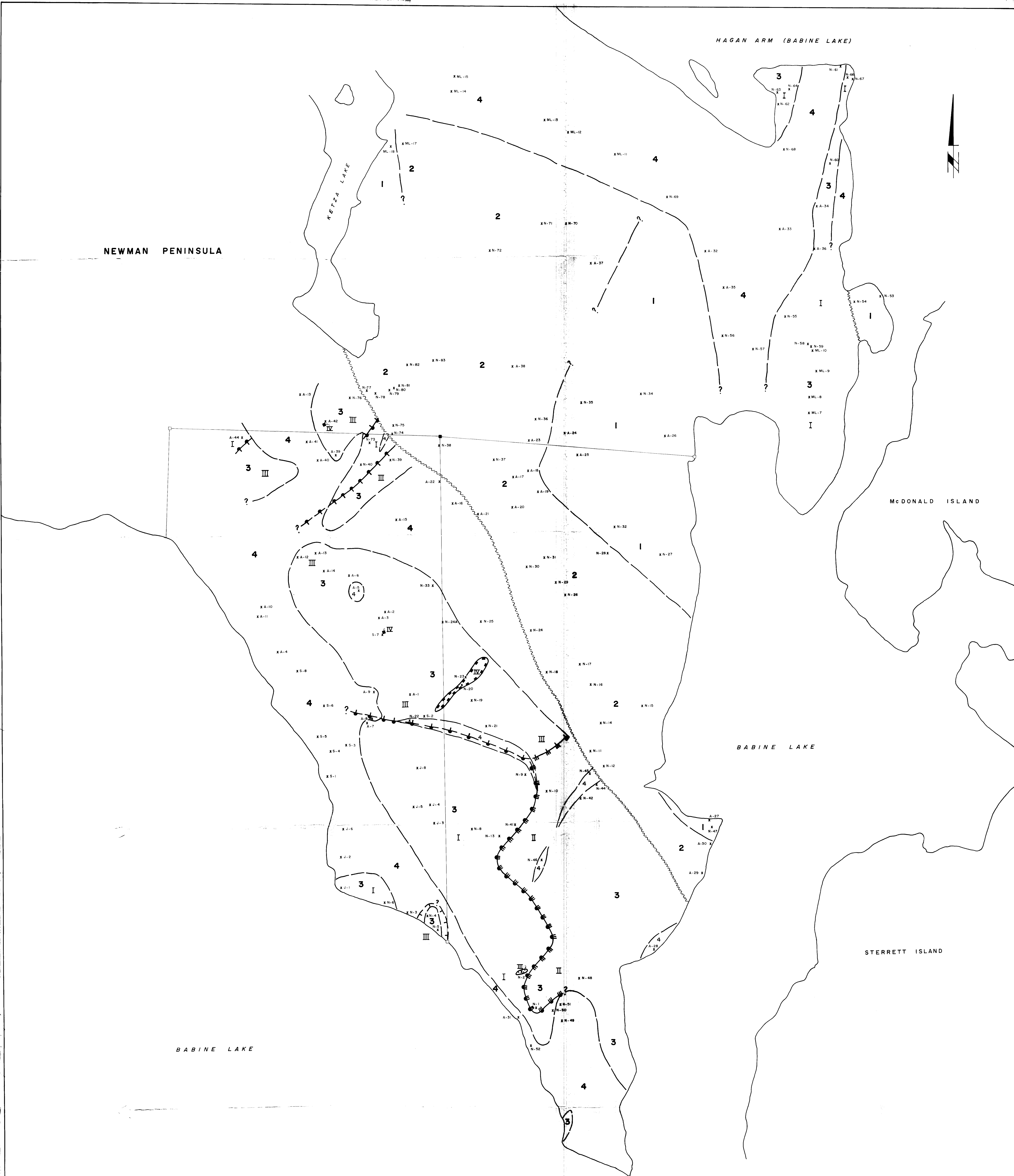
- 4 Pyroclastic Breccia, Flow Breccia, Lahar fragments of variously altered Hornblende - Feldspar + Biotite Porphyry.
- 3 Hornblende - Feldspar + Biotite Porphyry in part, flows.
- 2 a. Rhyolite to Diatite Tuffs and Flows.
b. Rhyolite to Diatite Breccia.
- 1 a. Basalt.
b. Andesite to Diatite Tuffs and Flows.
c. Andesite to Diatite Breccia.

SYMBOLS

- Outcrop Boundary
- Small Outcrop
- Road
- Claim Post (Corner Post, Legal Corner Post)
- Claim Line with Claim Name
- Fault
- Geological Contact
- Foliation (inclined, vertical)
- Joints (inclined, vertical)
- Bedding (inclined, vertical)
- Quartz Vents
- Diamond Drill Hole, Giant Explorations Ltd., 1966, inclination, depth (position approximate).
- Stream, with flow direction.
- Cut Lines, with station numbers.



REVISED		SOUTH NEWMAN PENINSULA	
		GEOLOGICAL MAP	
PROJ. No. 1033	SURVEY BY: P. McCarter, J. Graham	DATE: JUNE 1981	
N.T.S. 32 L/7/6	DRAWN BY: E. C.	SCALE: 1:5000	
DWG. No.	NORANDA EXPLORATION		
FIG. 3	OFFICE: SMITHERS, B.C.		



LEGEND

ROCK UNITS

- 4 Pyroclastic Breccia, Flow Breccia, Lahar fragments of variously altered Hornblende - Feldspar ± Biotite Porphyry
- 3 Hornblende - Feldspar ± Biotite Porphyry in part, flows
- 2 a. Rhyolite to Dacite Tuffs and Flows
b. Rhyolite to Dacite Breccia
- 1 a. Basalt
b. Andesite to Dacite Tuffs and Flows
c. Andesite to Dacite Breccia

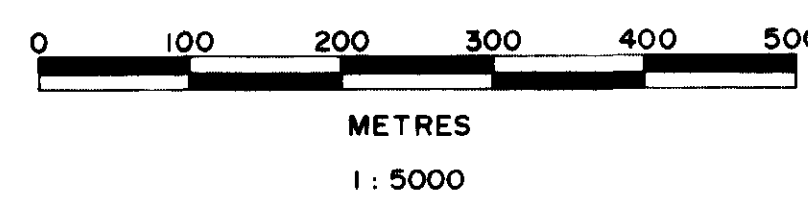
SYMBOLS

- Geological Contact
- X N-43 Rock Sample Location, with Sample Number.
- ~~~~~ Fault
- , ■ Claim Post (Corner Post, Legal Corner Post)

ALTERATION ZONES

(IN HORNBLende-FELDSPAR ± BIOTITE PORPHYRY)

- I Unaltered
- II Phyllic (Sericite-Limonite)
- III Phyllic (Sericite-Hematite)
- IV Phyllic (Fuchsite-Hematite)



REVISED		SOUTH NEWMAN PENINSULA	
		ALTERATION AND SAMPLE LOCATION MAP	
PROJ. No. 1033	SURVEY BY: P. McGowan	DATE: JUNE 1981	
N.T.S. 93 L/Z 16	DRAWN BY: E.C.	SCALE: 1:5000	
DWG. No. FIG. 4	NORANDA EXPLORATION		
	OFFICE: SMITHERS, B.C.		

NEWMAN PENINSULA

HAGAN ARM (BABINE LAKE)

McDONALD ISLAND

STERRETT ISLAND

BABINE LAKE

BABINE LAKE

LEGEND

- Cu (ppm) $\frac{1}{2}$ 40
Mo (ppm) $\frac{1}{2}$ 2
NS $\frac{1}{2}$ No sample
1.2 $\frac{1}{2}$ 100-1500 (Lower limit, equal to 1000)
50 $\frac{1}{2}$ Cu anomaly contour (ppm)
3 $\frac{1}{2}$ Mo anomaly contour (ppm)
- 100 samples
50 samples
No sample
100-1500 (Lower limit, equal to 1000)
Cu anomaly contour (ppm)
Mo anomaly contour (ppm)

10333

0 100 200 300 400 500
METRES
1:5000

REVISED	SOUTH NEWMAN PENINSULA	
	GEOCHEMISTRY : SOILS	
	COPPER, MOLYBDENUM	
PROJ. No. 10333	SURVEY BY: P. McCarter	DATE: June 1981
NTS: 93 L/16	DRAWN BY: E. C.	SCALE: 1:5000
DWG. No.	NORANDA EXPLORATION	
FIG. 5	OFFICE: SMITHERS, B.C.	

NEWMAN PENINSULA

HAGAN ARM (BABINE LAKE)

KETZA LAKE

McDONALD ISLAND

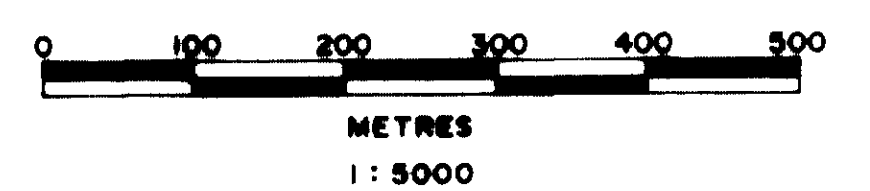
STERRETT ISLAND

BABINE LAKE

BABINE LAKE

LEGEND

- , ■ Claim Post (Corner Post, Legal Corner Post)
— 200 — Zn anomaly contour (ppm)
- - - 20 - - - Pb anomaly contour (ppm)
— 5 — Ag anomaly contour (ppm)



10333

REVISED	SOUTH NEWMAN PENINSULA		
	GEOCHEMISTRY : SOILS		
	ZINC, LEAD, SILVER		
PROJ. No. 1033	SURVEY BY: P. McCarter	DATE: June 1981	
N.T.S. 93 L / 16	DRAWN BY: E. C.	SCALE: 1:5000	
DWG. No. FIG. 6	NORANDA EXPLORATION		
	OFFICE: SMITHERS, B.C.		

NEWMAN PENINSULA

HAGAN ARM (BABINE LAKE)

McDONALD ISLAND

STERRETT ISLAND

BABINE LAKE

BABINE LAKE

LEGEND

- Mn (ppm) — 700
Fe (ppm) — 2.4
▲ Silt Samples
— N.S. — No Sample
□, ■ Claim Post (Corner Post, Legal Corner Post)
— 1000 — Mn anomaly contour (ppm)

0 100 200 300 400 500
METRES
1:5000

MINERAL EXPLORATION
10333

REVISED	SOUTH NEWMAN PENINSULA	
	GEOCHEMISTRY : SOILS	
	MANGANESE, IRON	
PROJ. No. 1033	SURVEY BY: P. McCarter	DATE: June 1981
N.T.S. 93 L/16	DRAWN BY: E.C.	SCALE: 1:5000
DWG. No.	NORANDA EXPLORATION	
FIG. 7	OFFICE: SMITHERS, B.C.	