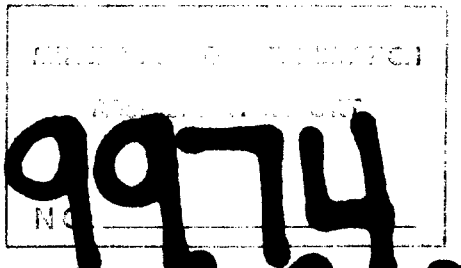
1981 ASSESSMENT REPORT

LINECUTTING, GEOLOGY, GEOCHEMISTRY AND GEOPHYSICS ON THE LAKE MINERAL CLAIMS (BABINE GROUP I & BABINE GROUP II)

OMINECA MINING DIVISION

93M/1E

55°03'N-55°10'N 126°12'W-126°18'W



9974
part 1 of 2

Noranda Exploration Company, Limited
(No Personal Liability)

Michael W. Leahey
Paul McCarter

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SUMMARY AND RECOMMENDATIONS

The 1981 field program on the Lake Mineral Claims consisted of linecutting, geology, soil geochemistry, ground magnetometer, and reconnaissance induced polarization surveys. This was the first systematic property work to be carried on between the Bell mine and the Morrison deposit. Although the most favorable areas east of the Babine lakeshore are swamp covered and lack outcrop, a number of IP anomalies and magnetic features are worthy of fill-in lines and additional follow-up. An attempt to determine the depth to bedrock by hammer seismic in the anomalous areas should also be part of the follow-up program.

1. INTRODUCTION

The Lake group of claims is located along the eastern shore of Hatchery Arm of Babine Lake (Fig. 1). The property extends from the southern tip of Morrison Lake for 13 km southward to the southern part of Hatchery Arm, and for 2 to 3 km eastward from the shoreline. The property is bounded by 55°03'N to 55°10'N latitude, and by 126°12'W to 126°18'W longitude. Access to the area is by boat from Smithers Landing (27 km) or from Granisle (30 km).

The Lake claim group consists of 136 units contained in 12 claims (Fig. 2) and is contiguous with Noranda Exploration's Morrison property and the Trap Mineral claims.

Most of the property is situated within a low-lying area between a north-northeasterly trending ridge and the eastern shore of Hatchery Arm. The area is heavily forested, and swamps are numerous.

During June and July 1981, linecutting, geological, geochemical, and geophysical surveys were carried out on the Lake claim group. All surveys were conducted at a scale of 1:5000.

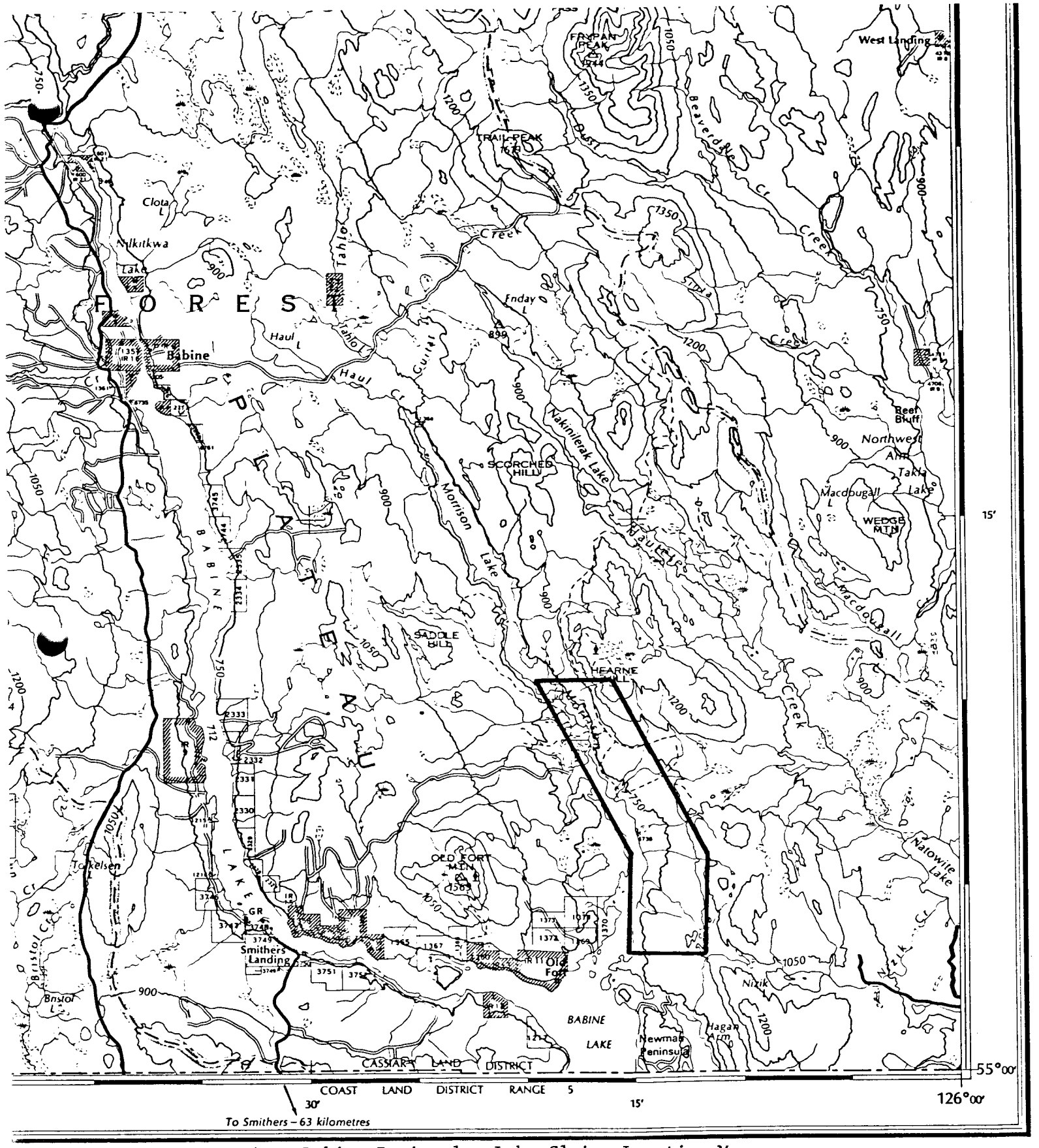

Figure 1. Babine Regional: Lake Claims Location Map
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N

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

Miles 5 0 5 10 15 20 Miles

Scale of Kilometres

5 0 5 10 15 20 25 30

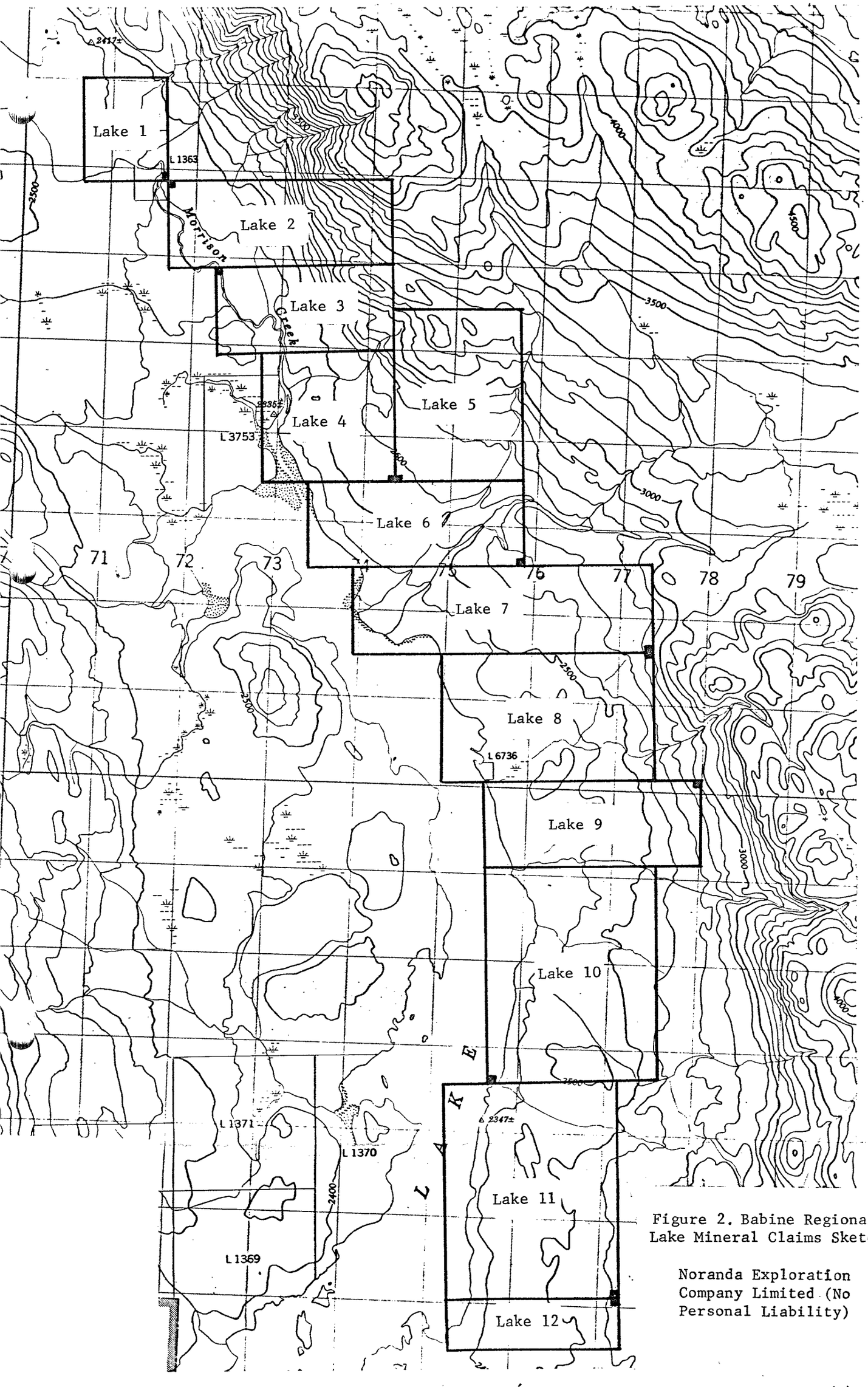

Figure 2. Babine Regional: Lake Mineral Claims Sketch

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Previous work on parts of the Lake claim group includes an induced polarization survey (Nielsen and Gutrath, 1973), a gravity survey (Scott, 1973), and a geochemical and geological survey (Wolfhard, 1973). These studies were of a regional scope, however, and coverage of the Lake claim group is minimal. More recently, Walker (1981) conducted a combined Magnetometer and VLF-EM airborne survey over the claim group at the scale of 1:25 000.

2. CLAIM DATA

For assessment purposes the twelve mineral claims (136 units) of the Lake property were joined with the contiguous Trap mineral claims (30 units). Data on the two new groups, Babine I and II, follow:

Group	Claim	Units	Record No.	Recorded	Expiry
Babine I	Lake 1	4	3377	Nov. 1980	Nov. 19, 1986
	Lake 2	10	3378	Nov. 1980	Nov. 19, 1986
	Lake 3	8	3379	Nov. 1980	Nov. 20, 1986
	Lake 4	9	3380	Nov. 1980	Nov. 20, 1986
	Lake 5	12	3381	Nov. 1980	Nov. 21, 1986
	Lake 6	10	3382	Nov. 1980	Nov. 21, 1986
	Trap 1	20	1660	March 1979	March 26, 1986
	Trap 2	10	1661	March 1979	March 26, 1987
Babine II	Lake 7	14	3383	Nov. 1980	Nov. 21, 1986
	Lake 8	15	3384	Nov. 1980	Nov. 22, 1986
	Lake 9	10	3385	Nov. 1980	Nov. 22, 1986
	Lake 10	20	3386	Nov. 1980	Nov. 22, 1986
	Lake 11	20	3387	Nov. 1980	Nov. 23, 1986
	Lake 12	4	3388	Nov. 1980	Nov. 23, 1986

The preceding information was filed with the Gold Commissioner's office in Smithers, Suspense Account 889590G, on November 19, 1981.

3. LINECUTTING

A total length of 63.58 km of grid line was cut on the Lake claim group during May and June, 1981 by Bema Industries Limited of Langley, B.C. Stations were picketed at intervals of 50 m on lines spaced 500 m apart.

4. REGIONAL GEOLOGY

The Hatchery Arm area has been included in various reports and regional geologic maps (Carter, 1973; Carter, 1977; Richards, 1974). Jurassic volcanic rocks of the Hazelton Group are the oldest rocks in the area. They are overlain, and are partly in faulted contact with sedimentary and minor volcanic rocks of the Skeena and Sustut Groups of Lower and Upper Cretaceous ages, respectively. The Jurassic and Cretaceous strata are intruded by stocks, dikes, and sills of feldspar-biotite±hornblende porphyry of Eocene age. The Eocene intrusions are the host rocks for the porphyry-type copper mineralization present at the Bell and Granisle mines to the south, and at the Morrison deposit to the north. The intrusive rocks have been localized by a dominant system of north-northwest-trending faults and a subsidiary set of northeast-trending faults.

5. PROPERTY GEOLOGY

The Lake claim group is located, for the most part, in an area of flat terrain with numerous swamps. As a result, outcrops are rare over most of the property, except in an area of high relief in the northeastern part of the claim group (Fig. 3). Here there is a conformable succession of at least seven units of volcanic rocks which belong to the Hazelton Group of Jurassic age. Andesite and basalt are the most abundant lithologies, although a discontinuous lens of rhyolitic to dacitic tuffs and breccias is present in the middle of the succession. The proportion of fragmental rocks decreases as the rocks become more mafic. Flows and porphyritic flows are the dominant lithologies in the basaltic units.

Structural data suggest that the volcanic strata strike northwesterly, and dip at an average angle of 60° northeasterly. Thus, the southeastern basaltic unit is the lowest exposed member of the succession in this area (Fig. 3). The rapid topographic change at the base of this unit may suggest that a major north-northwest-trending fault may transect the property in this area; however, there is no direct evidence for the existence of this fault on the claim group.

Volcanic rocks of the Hazelton Group are exposed at two other locations on the Lake claim group (Fig. 4). A rhyolitic flow is in faulted contact with a basaltic flow along a stream canyon near the intersection of TL70 + 00E and L65 + 00N, and a massive basaltic flow is exposed near the intersection of TL70 + 00E and L40 + 00N.

Sedimentary rocks which belong to the Skeena and Sustut Groups of cretaceous age are not exposed on the claim group, although one boulder of conglomerate was found in the northern part of the property on L85 + 00N.

Feldspar-biotite porphyry dikes were observed in several locations on the claim group (Fig. 3, 4, and 5). They trend north to north-northwesterly, and are on the order of one hundred to two hundred meters wide. The dikes are comprised of phenocrysts of plagioclase feldspar (40%-50%) and biotite (3%-5%) set in a very fine-grained, greenish grey groundmass of quartz, feldspar, and chlorite.

6. MINERALIZATION AND ALTERATION

Trace amounts of pyrite and chalcopyrite are disseminated in the volcanic rocks near the intersection of TL70 + 00E and L65 + 00N (Fig. 4), and near the intersection of TL70 + 00E and L85 + 00N (Fig. 5). In addition,

magnetite is a ubiquitous constituent of the mafic and intermediate volcanic rocks, and comprises up to 3% of the rock. These occurrences appear to be syngenetic with respect to the Hazelton Group.

Sulphide mineralization is not associated with the feldspar-biotite porphyry dikes; however, a stockwork system of specular hematite veins occurs adjacent to the dike in the northeast corner of the property (Fig. 3). In general, the porphyritic dikes are partly chloritized, but other types of alteration were not observed in the field.

7. GEOCHEMICAL SURVEY

A total of 869 soil samples and 31 silt samples was collected from the Lake claim group (Fig. 6, 7, and 8). Soil samples were collected at intervals of 50 m along the cut lines, and silt samples were obtained where streams intersected the grid.

7.1 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.

7.2 Discussion of Results

Results of the geochemical survey are not encouraging, and overall values for trace elements are rather low. Ranges for the analysed elements in the soils are as follows:

Cu	6-660	ppm
Mo	2-34	ppm
Zn	8-580	ppm
Pb	2-26	ppm
Ag	0.2-2.0	ppm
Mn	60-31 000	ppm
Fe	0.2-14.0	%

There are no well-defined anomalies on the property, although localized unsupported high concentrations of elements are not uncommon. The area underlain by Hazelton Group volcanic rocks tends to contain better than average values of all analysed trace elements. Soil samples obtained within a few hundred meters of the eastern shore of Hatchery Arm, particularly south of L30 + 00N, tend to contain higher concentrations of trace elements than samples farther from the shore. The cause of this is unknown, however, as there are no outcrops or float in this area. Zonation of metals is not evident on the property.

8. GEOPHYSICAL SURVEYS

Ground magnetic and induced polarization surveys were completed on the Lake mineral claims to aid in geological interpretation in the areas of scarce outcrop.

8.1 Magnetometer Survey

A ground magnetic survey over 51 kilometers of grid lines was completed using a hand-held Unimag G-836 proton precision magnetometer. Total field readings were regularly taken at 50 m intervals and at 25 m

spacings when a magnetic change of 250 gammas occurred. Base stations were established at the intersection points of the tie lines and picket lines. Maximum time between re-reading of the base stations was two hours. A main base station was set up at camp and readings were taken before and after a day's work. All readings were corrected for diurnal variation.

8.2 Discussion of Results

The results of the surveys are plotted on Fig. 9; the picket lines represent the 58 000 gamma datum. The profile represents a moving average of four consecutive readings.

Between L80 + 00N and L100 + 00N a major step of some 1000 gammas occurs at 68 + 00E; east of this break there are at least two additional parallel highs centered on L71 + 00 and L73 + 00E. The original break could represent a northwest to north-northwest fault zone. The other highs are within the volcanic units and are at acute angles to the geology strike. It is also known that the volcanics contain abundant magnetite.

The favourable area on intrusives from the lakeshore to TL70 + 00E could be masked by alluvium cover. Centered on L5 + 00N at 17 + 00E, a gentle but wide magnetic feature is evident.

8.3 Induced Polarization Survey

An induced polarization and resistivity survey was completed by Noranda personnel on the property, covering 51 kilometers of grid lines. The survey was undertaken using "frequency domain" IP equipment manufactured by Sabre Electronics of Vancouver, and designed to Noranda specifications.

The dipole-dipole array was used for the survey. With this array the current electrodes, C_1 and C_2, and the two potential electrodes, P_1

and P_2, were moved in unison along the survey lines. At each "set-up" the grid location of each electrode (C_1, C_2, P_1, P_2) was recorded and the following electrical measurements were read and recorded:

1. Transmitter current on frequency 5 Hz (current recorded in milliamperes);
2. Receiver measures the developed voltage (voltage recorded in millivolts);
3. Transmitter current maintained constant, frequency changed to 0.3 Hz; and
4. Receiver measures voltage change as a per cent deviation caused solely by the change in frequency (per cent deviation of voltage recorded as Percent Frequency Effect).

By definition, Percent Frequency Effect is the per cent change of resistivity caused by a change in the frequency of the current. Since resistivity is directly proportioned to voltage, if the current is constant at each frequency, the per cent change of resistivity equals per cent change of voltage.

The resistivity value for each "set-up" was calculated from the recorded current and voltage measurements and the array dimension in meters. The equation is:

$$\underset{\text{(ohm-meters)}}{\text{Apparent Resistivity}} = \frac{V}{L} 2\pi XK$$

where V = millivolts
L = milliamperes
X = dipole length (meters)
K = array constant

The separation between the electrodes was 100 meters and measurements of per cent effects and apparent resistivity were made for the first electrode configuration (n = 1).

8.4 Discussion of Results

The results of the surveys are plotted on Fig. 10. The apparent resistivity value is profiled using a three cycle log scale; the per cent frequency effect values are plotted on the picket lines and profiled using a normal scale.

There are no sore thumb anomalies, however there are some twice background features that could be representative of porphyry systems. The following summarizes the IP anomalies:

	PFE/Background	Resistivity	Remarks
L5+00N, 33+50E	4/2	minor drop	On strike with BFP
L10+00N, 40+50E	4/1	major drop	On strike with BFP
L75+00N, 60+50E	4.25/1.25	no change	No outcrop
L80+00N, 68+50E, 69+50E	4/1.25	high	Fault zone
L85+00N, 59+50E, 60+50E	4.25/1.75	low	Intrusive/Sed. zone
L85+00N, 68+50E, 69+50E	4/1.75	high	Fault zone
L85+00N, 70+50E	8.25/1.75	high	Volcanics with cpy
L105+00N, 71+50E	3.5/1.0	low	Fault zone

9. REFERENCES

Carter, N.C. (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.

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Nielsen, P.P., Gutrath, G.C. (1973): Geophysical Report of the Induced Polarization Survey on the Hatchery Arm and Hawthorn Bay Properties, Babine Lake Area, B.C., B.C. Dept. of Mines and Petroleum Resources, Assess. Rept. No. 4426, 18 p.

Richards, T.A. (1974): Hazelton East Half, p. 35-37 in Report of Activities, Part A, Geological Survey of Canada Paper 74-1A, 396 p.

Scott, A. (1973): Geophysical Report on a Gravity Survey of Some R, RR, NED, BAB, NDl, and TONJA Claims Situated on the East Shore of Babine Lake at Hawthorn Bay and Hatchery Arm, Omineca Mining Division, B.C., B.C. Dept. of Mines and Petroleum Resources Assess. Rept. No. 4249, 10 p.

Wolfhard, M.R. (1973): Geological and Geochemical Report on Some R, RR, SNO, NED, BAB, TONJA, IDC, and N Claims Situated on Babine Lake at Hawthorn Bay, and Hatchery Arm, B.C. Dept. of Mines and Petroleum Resources Assess. Rept. No. 4250, 9 p.

Walker, J.T. (1973): Instruction Manual Induced Polarization Equipment, Noranda Exploration Company, Limited (No Personal Liability).

(1981): Report on the Airborne Geophysical Survey in the Bell-Morrison Area, Babine Lake, B.C., B.C. Dept. of Mines and Petroleum Resources Assess. Rept. No. 9298, 4 p.

APPENDIX I

STATEMENT OF COST

NORANDA EXPLORATION COMPANY, LIMITED

STATEMENT OF COST

PROJECT Babine DATE January 20, 1982

TYPE OF REPORT - Geology, Geophysics, Geochem & Line-Cutting

a) Wages:

No. of Days	592			
Rate per Day	$ 71.192			
Dates From:	January 1, 1981 - December 31, 1981			
Total Wages	592	x	$ 71.192	42,145.75

b) Food and Accomodation:

No of days	592			
Rate per day	$ 26.4916			
Dates From:	January 1, 1981 - December 31, 1981			
Total Cost	592	x	$ 26.4916	15,683.05

c) Transportation:

No of days	592			
Rate per day	$ 37.5992			
Dates From:	January 1, 1981 - December 31, 1981			
Total Cost	592	X	$ 37.5992	22,258.70

d) Instrument Rental:

Type of Instrument	Proton Magnetometer			
No of days				
Rate per day	$			
Dates From:				
Total Cost		X	$	212.00

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

f)	Analysis (See attached schedule)		4,590.00
g)	Cost of preparation of Report		
	Author		996.69
	Drafting		8,066.05
	Typing		996.69
h)	Other:		
		Contractors	15,067.20
		Camp & Field Supplies	22,389.14

Total Cost $132,405.27

e) Unit costs for Geology

No of days 592

No of units

Unit costs 75.7708 / day

Total Cost 592 x $75.7708 = 44,856.29

Unit Costs for Geophysics
No. of Units 102 Line Km
Unit Costs 426.888/L Km
Total Cost 102 X $426.888 = 43,542.60

Unit Cost for Geochem
No. of Units 900 Samples
Unit Costs 27.3856 / Sample
Total Cost 900 X $27.3856 = 24,647.00

Unit Cost for Line-Cutting
No. of Units 63.5 L Km
Unit Costs 304.8721 / L Km
Total Cost 63.5 X $304.8721 = 19,359.38

TOTAL COST $132,405.27

NORANDA EXPLORATION COMPANY, LIMITED
(WESTERN DIVISION)

DETAILS OF ANALYSIS COSTS

PROJECT: BABINE

ELEMENT	NUMBER OF DETERMINATIONS	COST PER DETERMINATIONS	TOTAL
Cu	900	1.50	1,350.00
Mo	900	.60	540.00
Zn	900	.60	540.00
Pb	900	.60	540.00
Ag	900	.60	540.00
Mn	900	.60	540.00
Fe	900	.60	540.00

$ 4,590.00

APPENDIX II

STATEMENTS OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

I, Michael W. Leahey, of the town of Smithers, Province of British Columbia, do certify that:

1. I have been an employee of Noranda Exploration Company, Limited since May 1973.

2. I am a graduate of St. Francis Xavier University in Antigonish, N.S. with a Bachelor of Science Major in Geology (1973).

Dated at Smithers

this 7th day of November, 1980

Michael W. Leahey

Michael W. Leahey

District Geologist

Noranda Exploration Company, Limited

(No Personal Liability)

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)