

GEOCHEMICAL AND GEOPHYSICAL REPORT

KUTCHO 1 to 6 MINERAL CLAIMS

58°12'N 128°30'W

1041 1W and 2E

LIARD MINING DIVISION

BY

R.G. MacArthur and L. Bradish

February 1978

NORANDA EXPLORATION COMPANY, LIMITED
(NO PERSONAL LIABILITY)

part 1 of 2

MINERAL RESOURCES BRANCH ASSESSMENT REPORT 6686 NO. _____

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LOCATION MAP

Fig. 1

STATEMENT OF QUALIFICATIONS

STATEMENT OF COSTS

ILLUSTRATIONS

Dwg. 2	Claim Map	In Pocket
Dwg. 3	Geochem: Cu, Mo	" "
Dwg. 4	Geochem: Zn	" "
Dwg. 5	Geochem: Pb	" "
Dwg. G.1	CEM Survey	" "
Dwg. G.2	I.P. (F.E.) Survey	" "
Dwg. G.3	I.P. (Res.) Survey	" "

INTRODUCTION

The Kutcho 1 to 6 mineral claims referred to in this report are located approximately 95km southeast of Dease Lake, in northwestern British Columbia.

Access is by helicopter from Dease Lake or via the Kutcho airstrip (3000' gravel) approximately 3km north of the property.

The work described in this report was carried out as a "follow up" to work performed in 1976. (See Geochemical and Geophysical Report, Kutcho 1 to 6 Mineral Claims by R.G. MacArthur and L. Bradish, March 7, 1977).

The linecutting and geochemical survey was carried out under the supervision of R. MacArthur employed by Noranda.

The geophysical survey was carried out under the supervision of L. Bradish employed by Noranda.

The work was performed between June 8, 1977 and July 4, 1977.

CLAIMS AND OWNERSHIP

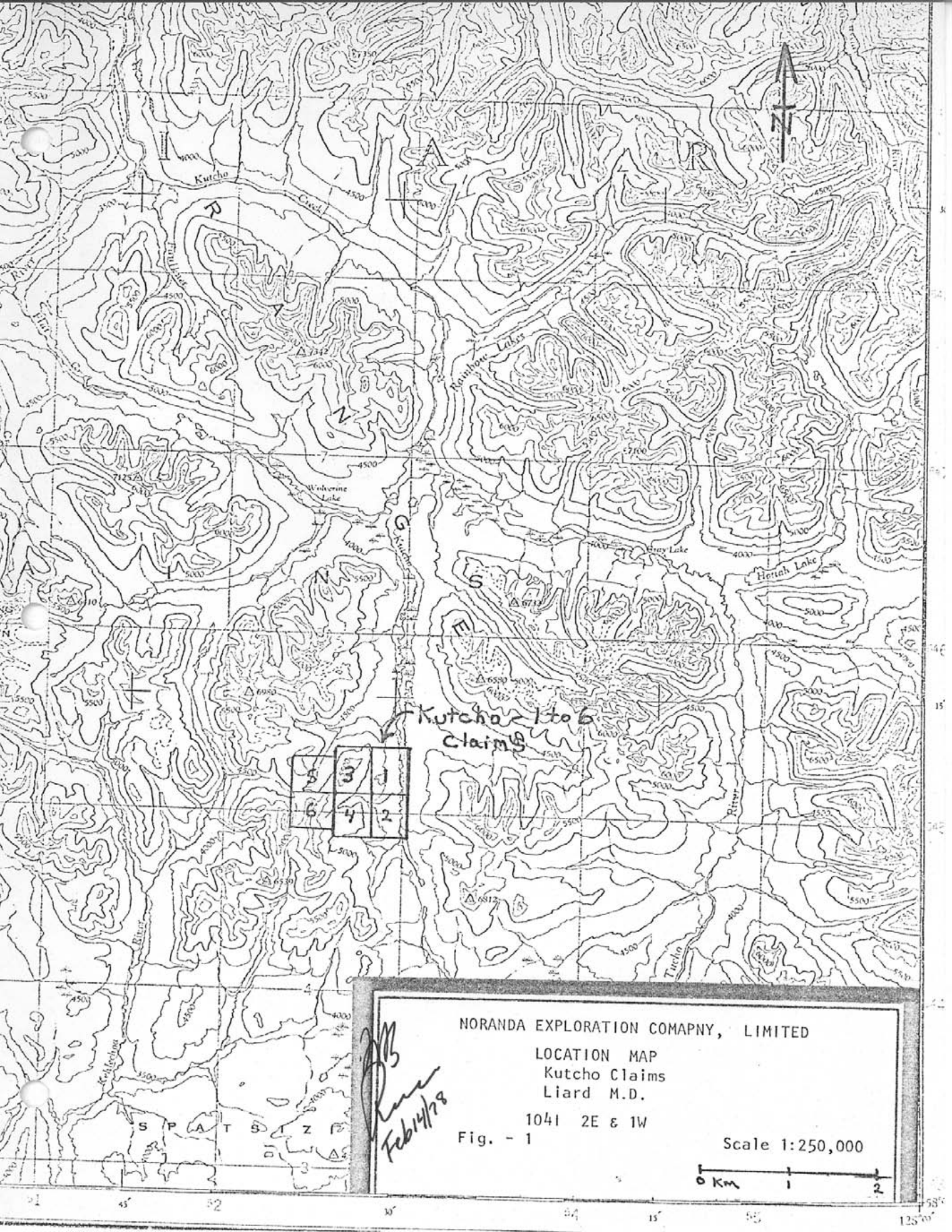
The Kutcho 1 to 6 property consists of the following claims:

<u>Claim</u>	<u>Units</u>	<u>Record Number</u>	<u>Record Date</u>	<u>Owner</u>
1	20	99	March 10, 1976	Noranda Exploration Company, Limited (No Personal Liability)
2	20	100	" "	"
3	20	101	" "	"
4	20	102	" "	"
5	20	103	" "	"
6	20	104	" "	"

GENERAL GEOLOGY

The area has been mapped regionally by the G.S.C. (Map #29 - 1962 1" = 4 miles) and they are in the process of updating their work. In addition, A. Panteleyev of the B.C. Dept. of Mines (see Geological Fieldwork, 1975 B.C. Dept. of Mines) has carried out mapping in the area.

Regional mapping indicates the area is underlain by a sequence of volcanic, volcanoclastic and sedimentary rocks ranging from Upper Triassic to Lower Jurassic in age. The sequence appears to be tightly folded with axes trending west north-west, often plunging to the west. Only one stage of penetrative deformation has been recognized.



Kutcho 1 to 6 Claims

NORANDA EXPLORATION COMPANY, LIMITED
 LOCATION MAP
 Kutcho Claims
 Liard M.D.
 1041 2E & 1W
 Fig. - 1
 Scale 1:250,000
 0 Km 1 2

Rune
 Feb 14/78

GRID PREPARATION

For control purposes 7.4km of line were cut and chained with stations marked at 50 meter intervals. These lines represent extensions of lines cut in 1976.

The linecutting was performed, under contract by T. McCrory and Assoc. of Whitehorse, Yukon Territory.

SOIL GEOCHEMISTRY

Sampling Method

Soil samples were collected at 50m intervals along the grid described above. Two samples were collected at each location where possible. One sample was from the "B" or upper horizon and one from the "C" or lower horizon. Where poor sampling conditions were encountered one sample of the best material available was collected. A total of 125 locations were sampled and 211 samples were collected.

Samples were collected by digging holes with a mattock and shovel. The sample material was placed in "Hi Wet Strength Kraft 3½ x 6 1/8" Open End" envelopes, on which grid locations were marked.

Laboratory Determination Method

The samples are first dried in a drying cabinet for a period of 24 - 48 hours. They are then screened and sifted to obtain a -80 mesh fraction.

To determine the amount of total extractable copper, molybdenum, lead and zinc in each sample, the following procedure is employed:

A small amount of the -80 mesh material, 0.200 grams, is digested in 2ml of HClO_4 and 0.5ml of HNO_3 for approximately four hours. Following digestion, each sample is diluted to 5ml with demineralized H_2O . A Varian Techtron Model AA-5 atomic absorption spectrophotometer is used to ascertain the content, in parts per million, of each element.

Presentation of Results

The results are presented in fig. 3 (Cu, Mo), 4(Zn), 5(Pb). Values are in parts per million. The following values are considered anomalous Cu 100ppm, Zn 200ppm, Mo 20ppm Pb = not applicable. Because of the difficulty in indentifying the actual "B" and "C" horizons in the field, anomalous values in either the "B" or "C" horizons are interpetted together.

SAMPLE AREA

Most of the area sampled is covered with sub-alpine vegetation (alpine spruce, mountain willow etc.).

The area sampled is mainly underlain by schistose volcanic and volcanoclastic rocks including quartz-eye sericite schist, quartz-eye chlorite schist, chlorite schist and rhyolite. Up to 5% pyrite and minor chalcoppyrite are commonly associated with these rocks. Minor zinc mineralization has also been observed in these rocks.

DISCUSSION OF RESULTS

(i) Copper (Fig. #3)

Copper values range from 10 to 900ppm. The survey indicates that the anomalous area to the north outlined in 1976, extends into the present survey area. The rather erratic distribution of the anomalous values may reflect the poor soil development.

(ii) Molybdenum (Fig. #3)

No anomalous values for Molybdenum were recorded.

(iii) Zinc (Fig. #4)

Values for zinc range from 20 to 3400ppm. The distribution of anomalous values correspond well with high copper values.

(iv) Lead (Fig. #5)

No anomalous values for Lead were recorded.

GEOPHYSICAL SURVEYS

Introduction

An Induced Polarization survey and C.E.M. survey were carried out over sections of the Kutcho 2, 3 and 4 Mineral Claims. The surveys were carried out by G. Fenton, Geophysical crew chief, C. Harrison, R. Bryce, operators and two helpers.

C.E.M. - HORIZONTAL SHOOTBACK SURVEY

C.E.M. Transceivers, manufactured by Crone Geophysics Ltd., of Ont. were utilized for this survey. A total of approximately 7.4Km. of line was surveyed with readings taken every 25m. along the survey line. The coil spacing was 75m. with an operating frequency of 1830 Hz.

Method

The two operators, in turn, transmit and receive at each 25 meter set up (coil separation 75M.) To take a reading operator No. 1 transmits with his coil in the horizontal plane while operator No. 2 detects the dip angle of null.

The two operators reverse procedures (operator 2 transmits, operator 1 receives). The two dip angle of null readings are then added together with appropriate sign (\pm). This resultant dip angle constitutes a reading for the set up and this reading is plotted mid point between the two operator locations on the survey lines.

Presentation of Results

The C.E.M. results are plotted in profile form on grid plan Map (Dwg. No. G.1) at a scale of 1:5000. The vertical scale of the profiles is 1 centimeter equals 20 degrees.

The 1977 survey area is indicated on the map. 1976 results are also included.

INDUCED POLARIZATION AND RESISTIVITY SURVEY

Frequency Domain equipment, manufactured by Sabre Electronic Instruments Ltd., was utilized for the survey.

A dipole, dipole array was employed throughout the survey with dipole lengths of 100m and frequencies of 0.3Hz and 5.0 Hz.

A total of 12.4 line kilometers were surveyed.

Method

At each "set up" the grid co-ordinates of each dipole electrode are recorded and the following electrical measurements are made and recorded.

- (1) Transmitter current at 5 Hz.
(milliamperes)
- (2) Induced voltage
(millivolts)
- (3) Frequency of transmitter current changed to 0.3 Hz.
(current maintained constant)
- (4) Receiver measures percent deviation of induced voltage caused solely by change of frequency. (recorded as percent frequency effect).

Since the transmitted current is maintained constant at each frequency, the deviation in induced voltage indicates a change in resistivity with frequency.

This by definition is Frequency Effect. Apparent resistivity is calculated from the recorded current and voltage measurements and the array geometry and dimensions:

$$\text{Apparent Resistivity} = 2 \cdot \rho \frac{V}{I} K$$

where V = millivolts
 I = milliampers
 x = dipole length
 k = array constant

PRESENTATION OF RESULTS

All results of the survey, Percent Frequency Effect (dwg. G.2) and Apparent Resistivity (dwgs. G.3) are presented on a grid plan map at a scale of 1:5,000. The Percent Frequency Effect data is contoured at 3.0, 5.0, 7.5, 10.0 and 15% intervals, and the Apparent Resistivity is contoured at 100, 200...ohm - meter intervals.

The plotting points for all the I.P. data is mid point between the dipoles. The area surveyed in 1977 is east of L. 88E as indicated on the maps. 1976 data is also included.

DISCUSSION OF RESULTS

C.E.M. (Dwg. G.1)

A very pronounced East - West striking response is evident in the 1977 survey area. This occurs over a known graphitic unit which appears to terminate near L. 106E.

I.P. SURVEY

PERCENT FREQUENCY EFFECT (Dwg. G.2)

Although 12.4 line Km. were surveyed, only 9.4 line Km. of data were obtained. Very low resistivities coincident with the graphitic unit are the cause of loss of data.

Two well defined anomalies are evident at Line 94E/98+50N and Line 104E/91+50N. The remaining partially developed anomalies south of these two features lie on the edge of the graphitic unit.

The linear feature (Line 104E/91+50N) was drilled and disseminated sulphides up to 10% were encountered, sufficient to explain the cause of this response.

The circular feature (Line 94E/98+50N) may have a very similar source.

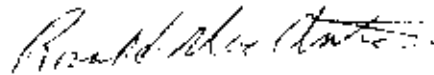
RESISTIVITY (Dwg. G.3)

Extremely low resistivity within the graphitic unit tested the lower limits of the I.P. equipment. Resistivities as low as 2 ohm - meters were observed. An East - West trend is evident with a low resistivity region coincident with the C.E.M. anomaly.

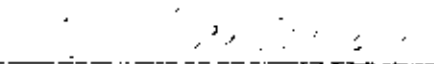
CONCLUSIONS AND RECOMMENDATIONS

The results of the work described above provide some encouragement, although the best I.P. anomaly has been tested by diamond drilling, with negative results (see Report of Diamond Drilling Holes NK-1, NK-2, NK-3 Kutcho Property, by R. MacArthur Feb. 1978). The sources of the anomalous Cu - Zn in soils has not been fully explained and could be due to economic grade mineralization. However neither the geophysical surveys nor prospecting have indicated any obvious targets.

It is recommended that the results of this work be reviewed after the area to the north has been fully assessed, and further work be considered at that time.



R.G. MacArthur
Geologist



L.C. Bradish
Geophysicist

STATEMENT OF QUALIFICATIONS

I, Ronald G. MacArthur 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 1972.
- 2) I am a graduate of Dalhousie University with a Bachelor of Science Degree in Geology.
- 3) I am a member of the Canadian Institute of Mining and Metallurgy.
- 4) I am a member of the Geological Association of Canada.

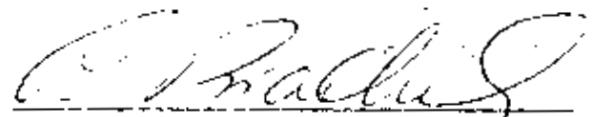


R.G. MacArthur
Geologist
Noranda Exploration Company, Limited
(No Personal Liability)

STATEMENT OF QUALIFICATIONS

I, Lyndon C. Bradish of the City of Vancouver, 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 the University of British Columbia with a Bachelor of Science Degree in Geophysics.
3. I am a member of the Canadian Institute of Mining and Metallurgy.
4. I am a member of the British Columbia Geophysical Society.
5. I have held the position of Geophysicist for Noranda Exploration Company, Limited since May 1973.



L.C. Bradish
Geophysicist
Noranda Exploration Company, Limited
(No Personal Liability)

NORANDA EXPLORATION COMPANY, LIMITED

STATEMENT OF COST

PROJECT Kutcho

DATE February 14, 1978

TYPE OF REPORT Geochemical and Geophysical

a) Wages:

No. of Days 47

Rate per Day \$ 47.89

Dates: from June 8 to July 4, 1977

Total Wages 47 x \$ 47.89 2,250.83

b) Food and Accomodation:

No of days 47

Rate per day \$ 16.78

Dates: from June 8 to July 4, 1977

Total Cost 47 x \$ 16.78 788.66

c) Transportation:

No of days 47

Rate per day \$ 91.19

Dates: from June 8 to July 4, 1977

Total Cost 47 x \$ 91.19 4,285.93

d) Instrument Rental:

Type of Instrument CEM

No of days 3

Rate per day \$ 15.00

Dates: from June 8 to July 4, 1977

Total Cost 3 x \$ 15.00 45.00

Type of Instrument I.P.

No of days 8

Rate per day \$ 80.00

Dates: from June 8 to July 4, 1977

Total Cost 8 x \$ 80.00 640.00

f) Analysis (See attached schedule)		732.76
g) Cost of preparation of Report		
Author	145.78	
Drafting	405.00	
Typing	150.00	700.78
h) Other:		
Line Contract T. McCrory & Assoc. Whitehorse, Y.T.	2,736.00	
Camp equip. & supplies	412.81	
Supervision: R.C. Heim, PhD, P. Eng. G.E. Dirom P. Eng. 5days	900.00	
		4,048.81
 Total Cost		<u>13,492.77</u>

e) Unit costs for CEM Survey		
No of days	6	
No of units	7.4Km	
Unit costs	\$274,9067 / Km	
Total Cost	\$274,9067 x 7.4	2,034.31
Unit Costs for I.P. Survey		
No. of days	31	
No. of Units	12.4Km	
Unit costs	\$656.0854	
Total cost	\$656.0854 x 12.4	8,135.46
Unit Costs for Soil Survey		
No. of days	10	
No. of units	211 samples	
Unit cost	\$15,7488	
Total Cost	\$15,7488 x 211	<u>3,323.00</u>
		<u>13,492.77</u>

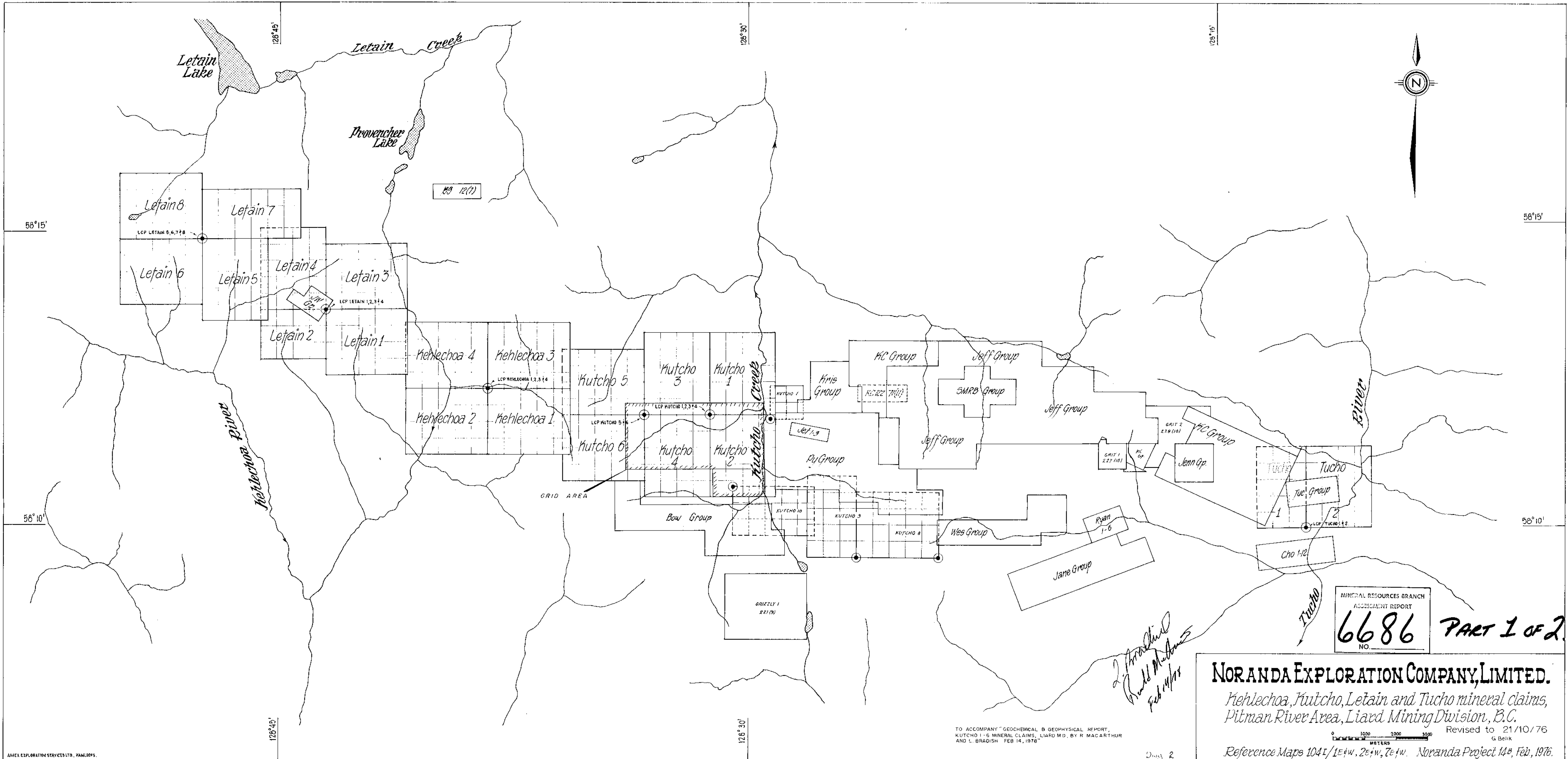
NORANDA EXPLORATION COMPANY, LIMITED
(WESTERN DIVISION)

DETAILS OF ANALYSES COSTS

PROJECT:

<u>ELEMENT</u>	<u>NO. OF DETERMINATIONS</u>	<u>COST PER DETERMINATION</u>	<u>TOTAL</u>
Cu	211	.8682	183.19
Zn	211	.8682	183.19
Pb	211	.8682	183.19
Mo	211	.8682	183.19

732.76



TO ACCOMPANY GEOCHEMICAL & GEOPHYSICAL REPORT,
 KUTCHO 1-5 MINERAL CLAIMS, LIARD M.D., BY R. MACARTHUR
 AND L. BRADISH, FEB. 14, 1976.

*L. Bradish
 R. MacArthur
 Feb. 14/1976*

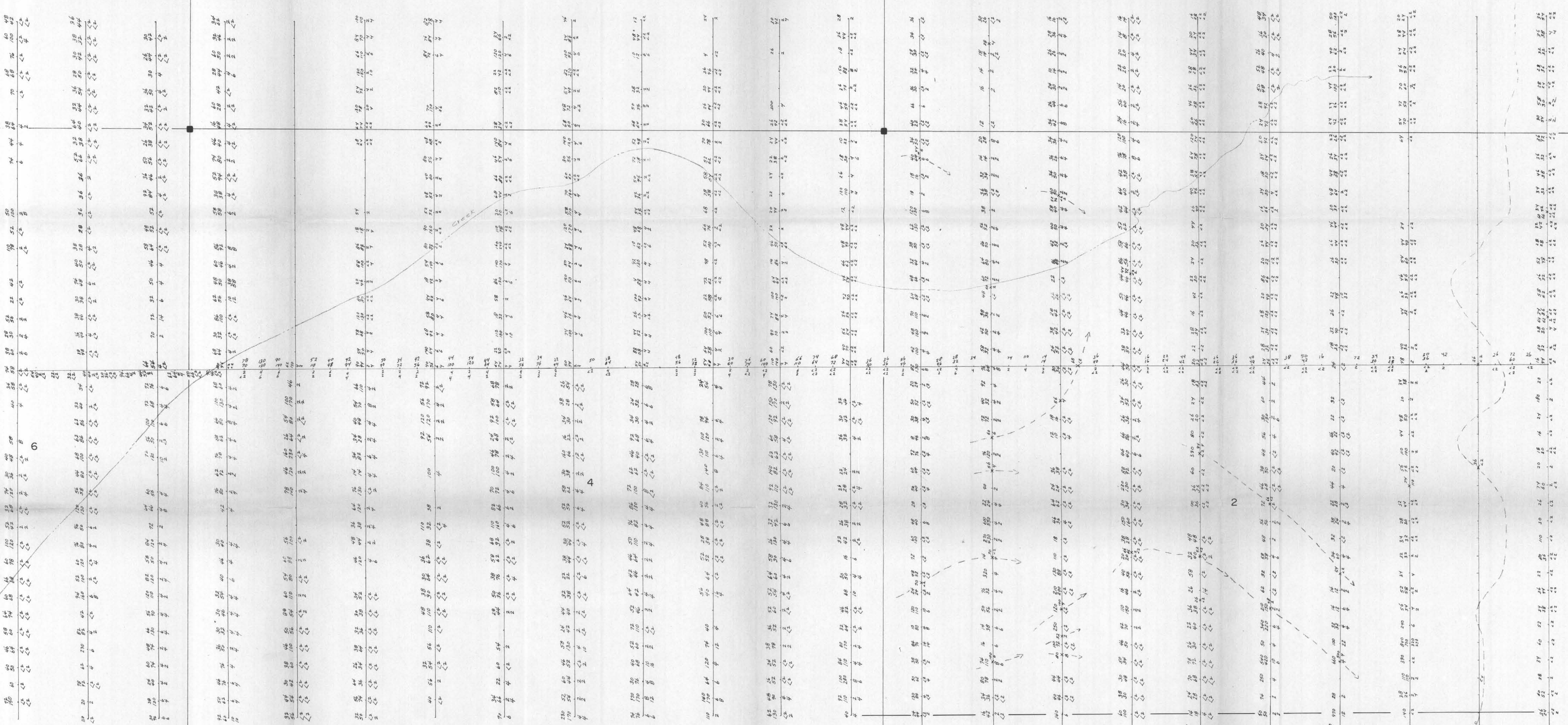
MINERAL RESOURCES BRANCH
 ASSESSMENT REPORT
6686 PART 1 OF 2
 NO.

NORANDA EXPLORATION COMPANY, LIMITED.
 Mehlechoa, Kutcho, Letain and Tucho mineral claims,
 Pitman River Area, Liard Mining Division, B.C.
 Revised to 21/10/76
 G. Belik
 Reference Maps 1041/1E±W, 2E±W, 7E±W. Noranda Project 140, Feb. 1976.



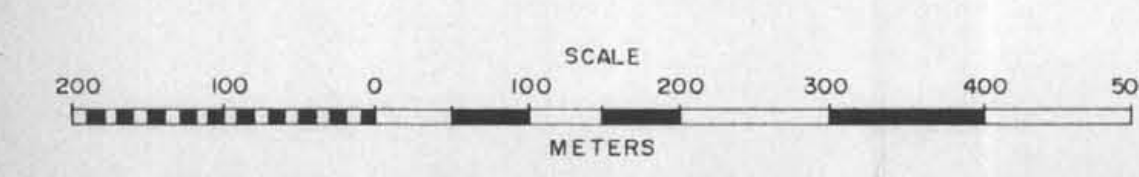
110N
108N
106N
104N
102N
100N
98N
96N
94N
92N
90N

5



1976 Survey area
1977 Survey area

*L. Amadio
Road Map
Feb 14/78*



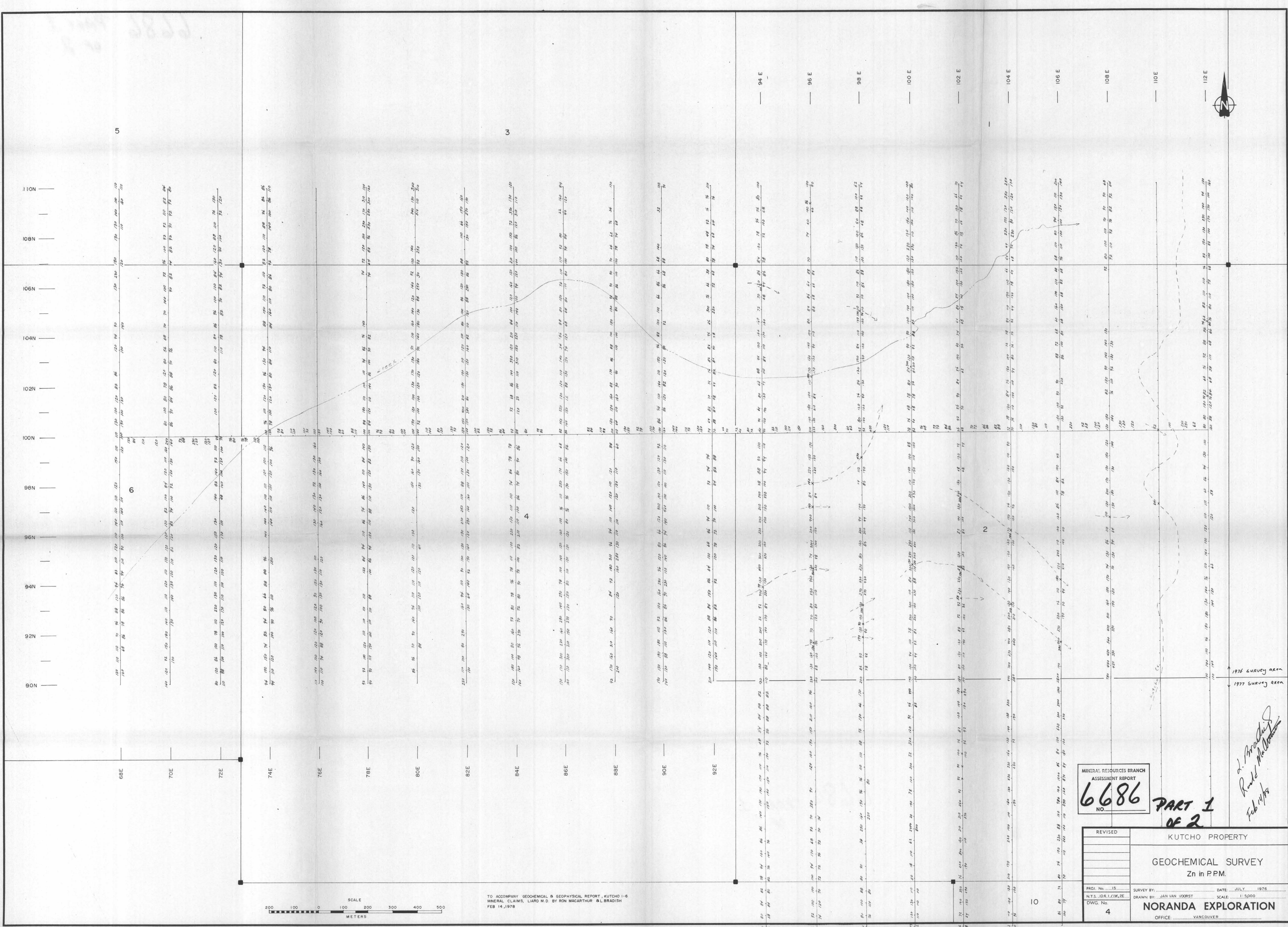
TO ACCOMPANY GEOCHEMICAL & GEOPHYSICAL REPORT, KUTCHO-1
MINERAL CLAIMS, LIARD M.D. BY R. MACARTHUR & L. BRADSHAW
FEB. 14, 1978

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
6686
NO.

**PART 1
OF 2**

REVISED	KUTCHO PROPERTY	
	GEOCHEMICAL SURVEY Cu, Mo in PPM.	
PROJ. No. 15	SURVEY BY: G. BELIK	DATE: JULY, 1976
NTS. 104/L/1W/2E	DRAWN BY: J. V. VOORST	SCALE: 1:5,000
DWG. No. 3	NORANDA EXPLORATION	
	OFFICE: VANCOUVER	

Cu Mo SCLTS



1976 SURVEY AREA
1977 SURVEY AREA

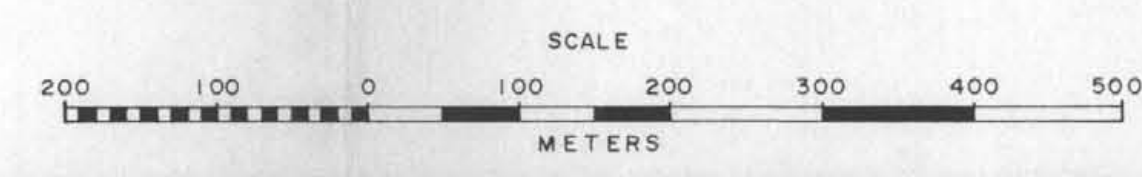
MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
6686
NO.

PART 1
OF 2

R. MacArthur
Feb 14/78

REVISED	KUTCHO PROPERTY	
	GEOCHEMICAL SURVEY	
	Zn in P.P.M.	
PROJ. No. 35	SURVEY BY: JAN VAN VOORST	DATE: JULY, 1976
N.T.S. 104.1/1/72E	DRAWN BY: JAN VAN VOORST	SCALE: 1:5000
DWG. No. 4	NORANDA EXPLORATION	
	OFFICE: YANCOUVER	

TO ACCOMPANY GEOCHEMICAL & GEOPHYSICAL REPORT, KUTCHO I-6
MINERAL CLAIMS, LIARD M.D. BY RON MACARTHUR & L. BRADSHAW
FEB 14, 1978





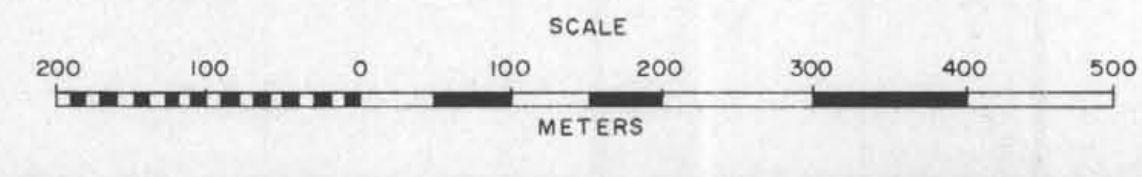
5

3

6

4

*L. Bradish
Rock
MacArthur
Feb 14/78*



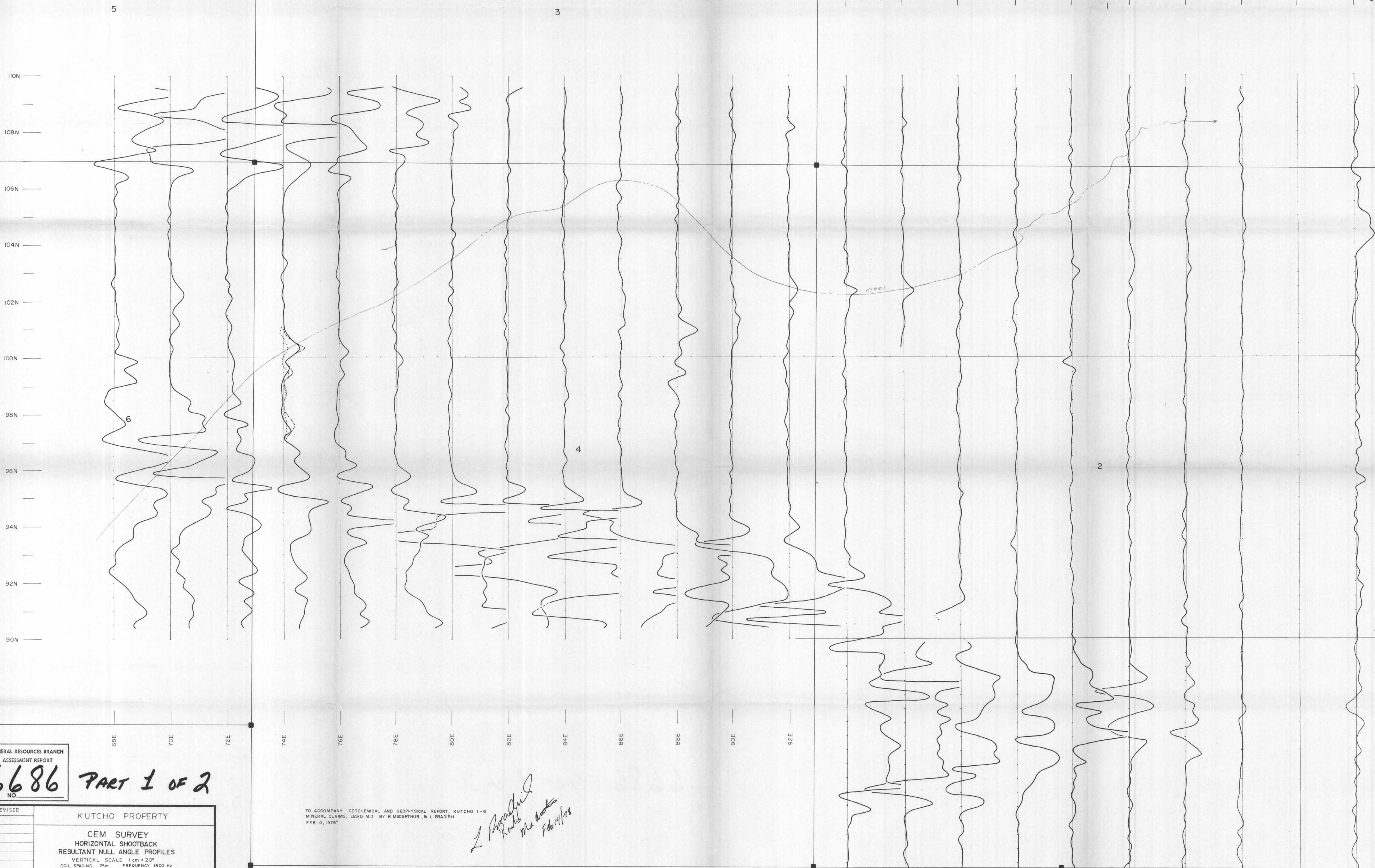
NOTE:
TO ACCOMPANY GEOCHEMICAL & GEOPHYSICAL REPORT,
KUTCHO 1-6 MINERAL CLAIMS, LIARD M.D., BY
RON MACARTHUR & L. BRADISH,
FEB. 14, 1978

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
6686
NO.

PART 1 OF 2

REVISED	KUTCHO PROPERTY	
	GEOCHEMICAL SURVEY Pb in P.P.M.	
PROJ. No. 15	SURVEY BY: G. BELIK	DATE: JULY, 1976
N.T.S. 104.1/1W,2E	DRAWN BY: J. V. VOORST	SCALE: 1:5000
DWG. No. 5	NORANDA EXPLORATION	
	OFFICE: VANCOUVER	

1976 SURVEY AREA
1977 SURVEY AREA



MINERAL RESOURCES BRANCH
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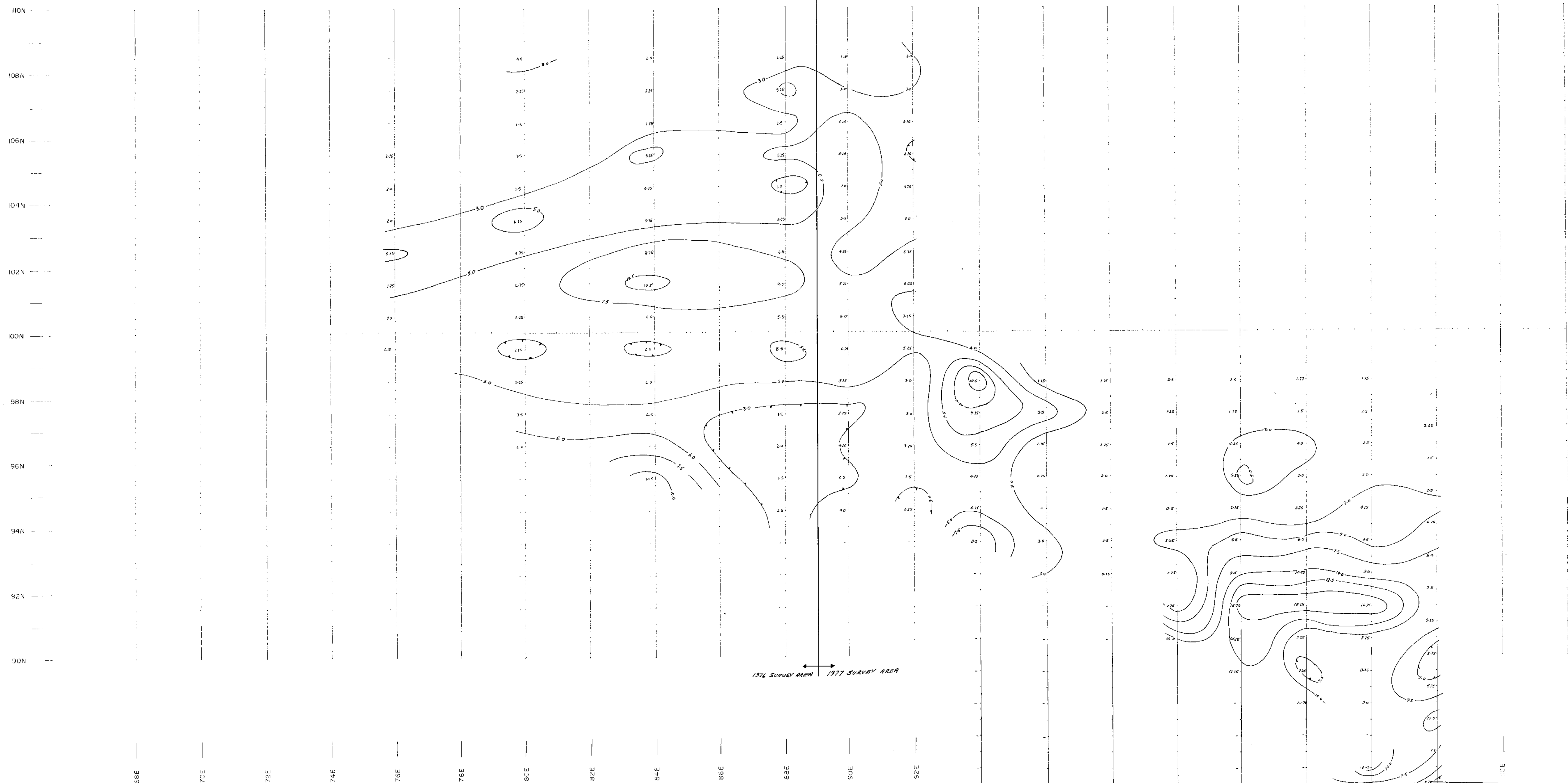
REVISED	KUTCHO PROPERTY	
	CEM SURVEY	
	HORIZONTAL SHOOTBACK	
	RESULTANT NULL ANGLE PROFILES	
	VERTICAL SCALE 1 cm = 20°	
	COIL SPACING 75m FREQUENCY 1800 Hz	
PROJ. No. 15	SURVEY BY G. FENTON	DATE JULY 1976
N.T.S. 104 1/2 W. 2E	DRAWN BY L.C.B.	SCALE 1:5000
DIWG. No. G-1	NORANDA EXPLORATION	
	OFFICE VANCOUVER	

TO ACCOMPANY "GEOCHEMICAL AND GEOPHYSICAL REPORT, KUTCHO 1-6
MINERAL CLAIMS, LARD M.D. BY R. MACARTHUR, & L. BRADISH
FEB. 14, 1978"

*L. Bradish
R. MacArthur
M. L. Bradish
Feb 14/78*

SCALE
200 100 0 100 200 300 400 500
METERS

1976 Survey area
1977 Survey area

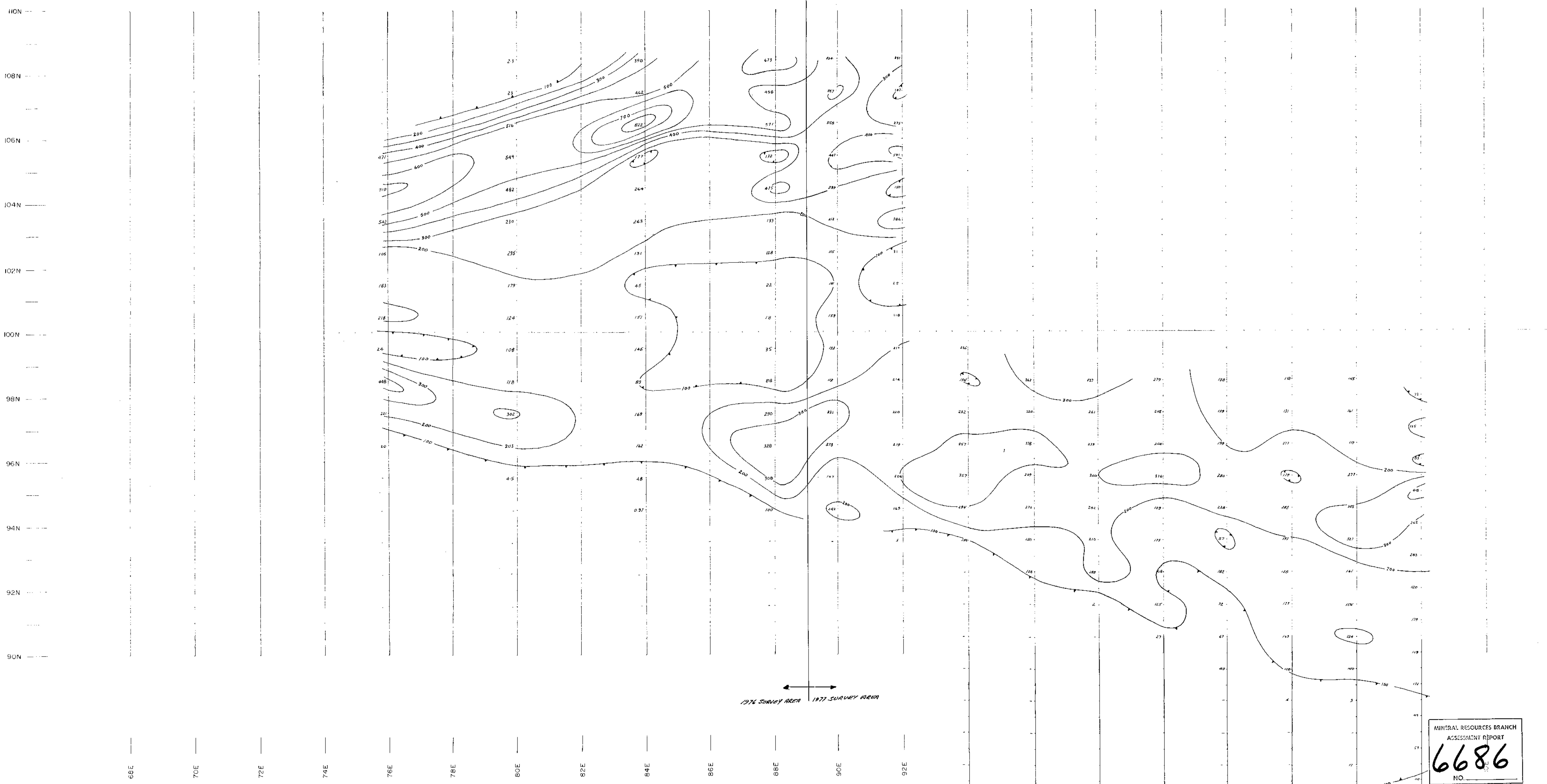


1976 SURVEY AREA 1977 SURVEY AREA

NOTE
TO ACCOMPANY GEOCHEMICAL & GEOPHYSICAL REPORT,
KUTCHO T-6 MINERAL CLAIMS, LEMD MD. BY RON MACARTHUR
& K. BRADISH FEB. 14/1978

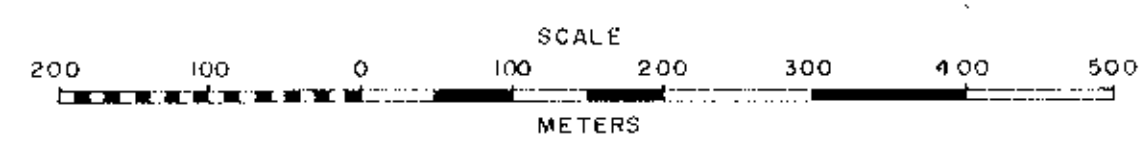
SCALE
200 100 0 100 200 300 400 500
METERS

MINERAL RESOURCES BRANCH ASSESSMENT REPORT 6686 NO.		<i>Bradish</i> <i>Ronald MacArthur</i> <i>Feb 14/78</i>	
KUTCHO PROPERTY		PART 1 OF 2	
I.P. SURVEY PERCENT FREQUENCY EFFECT n=1 FREQ 0.3 B 5.0 Hz n=100m ARRAY DIPOLE-DIPOLE CONTOUR INTERVAL 3.0, 5.0, 7.5, 10.0%			
PROJ. No. 15	SURVEY BY G. FENTON	DATE JULY/AUG 1978	
N.T.S. (0.1/21M, 30)	DRAWN BY L.C.B.	SCALE 1:1000	
DWG. No. G-2	NORANDA EXPLORATION		
	OFFICE VANCOUVER		



1976 SURVEY AREA 1977 SURVEY AREA

L. Bradish
Resistivity Map
Feb 14/78



MINERAL RESOURCES BRANCH
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PART
1 OF 2

TO ACCOMPANY GEOCHEMICAL & GEOPHYSICAL REPORT,
 KUTCHO 1-6 MINERAL CLAIMS, LIARD M.D. BY
 ROY MACARTHUR & L. BRADISH
 FEB 14, 1978

REVISED	KUTCHO PROPERTY	
	I.P. SURVEY	
	RESISTIVITY $\rho_0/2\pi$	
	n=1 FREQ 0.3850 Hz	
	G=100m ARRAY DIPOLE-DIPOLE	
	CONTOUR INTERVAL 100 Ωm	
PROJ. No. 15	SURVEY BY G. FENTON	DATE JULY / AUG. 1974
NETS. 104.1 / 102.2	L.C.B.	SCALE 1:5000
DWG. No. 4-3	NORANDA EXPLORATION	
	OFFICE VANCOUVER	