

2438

MAGNETOMETER AND ELECTROMAGNETIC

SURVEYS

ON THE

LOLJUH PROPERTY

54° 25' N, 127° 10' W

GAVIN E. DIROM, P. ENG.

NORANDA MINES LIMITED

OMINECA MINING DIVISION, BRITISH COLUMBIA

JULY 30th, 1969 to AUGUST 8th, 1969

Department of  
Mines and Petroleum Resources  
**ASSESSMENT REPORT**

NO. 2438 MAP.....

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REPORT ON THE  
MAGNETOMETER AND ELECTROMAGNETIC  
SURVEYS  
ON THE  
LOLJUH PROPERTY  
NORANDA MINES LIMITED

INTRODUCTION:

The Loljuh Property referred to in this report is located approximately 28 air miles south of Smithers, British Columbia at the headwaters of Loljuh Creek (See Figure 1). Access to the property is by helicopter from the Smithers heliport to a landing site within the claim group.

Elevations range from 3,500 feet to 5,000 feet on the property.

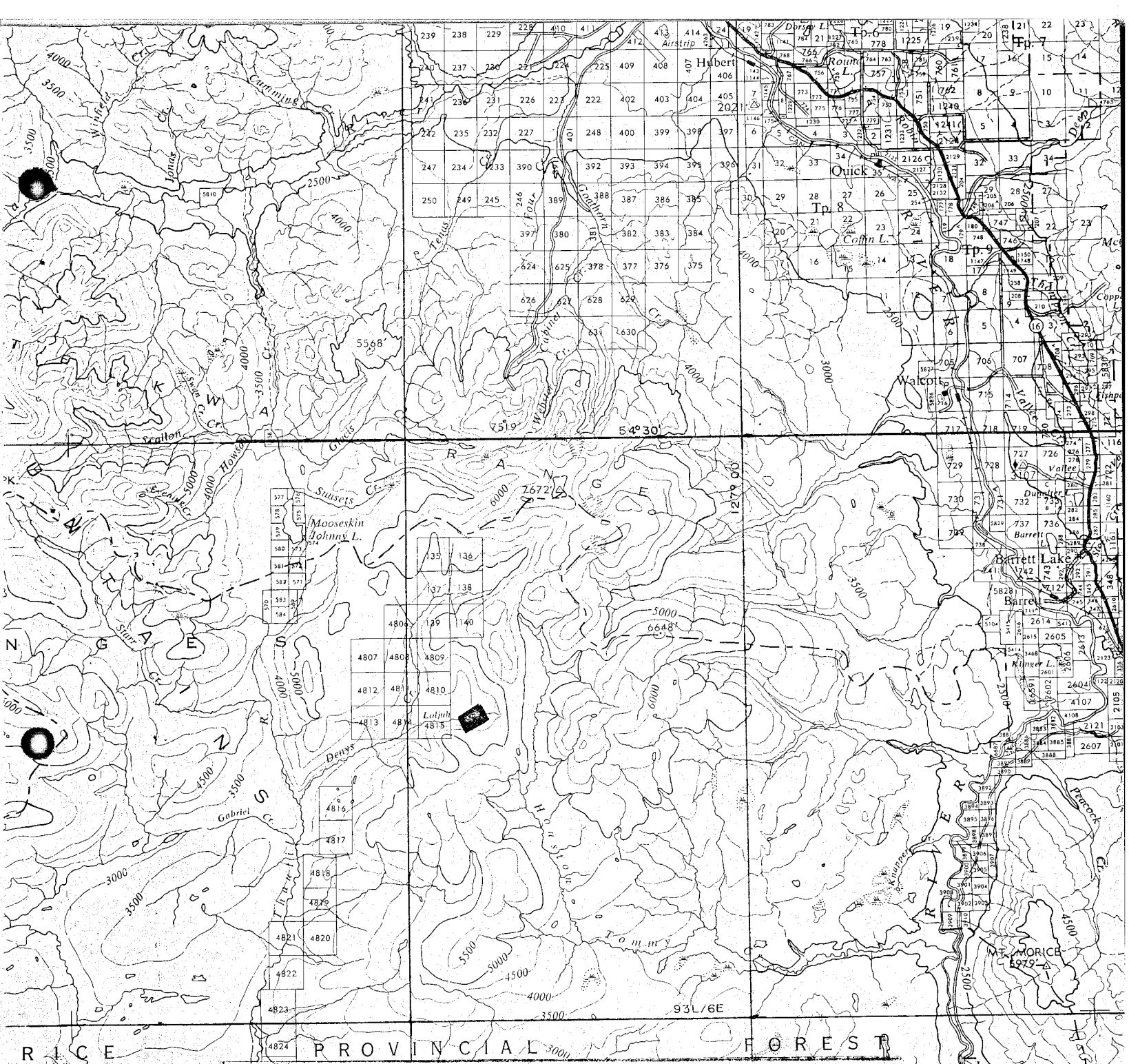
The property consists of 17 contiguous mineral claims in the Omineca Mining Division of British Columbia (See Figure 2).

The claims are as follows:

<u>Claim</u>	<u>Recording Date</u>	<u>Record Number</u>	<u>Owner</u>
Rock #107 - 114	June 29th, 1970	50414 - 50421	Noranda Mines Ltd.
Rock #132 - 135	August 1st, 1970	51997 - 52000	" " "
Rock #136 - 140	August 22nd, 1970	53124 - 53128	" " "

These mineral claims were staked following a geochemical silting programme.

The geophysical surveys described in this report were carried out in an attempt to locate conductive zones possibly associated with mineralization and to provide a magnetic map to assist in geologic interpretations. The surveys were carried out by a two man Noranda Exploration



NORANDA MINES LIMITED

LOCATION MAP

LOLJUH PROPERTY

OMINECA M.D., B.C.

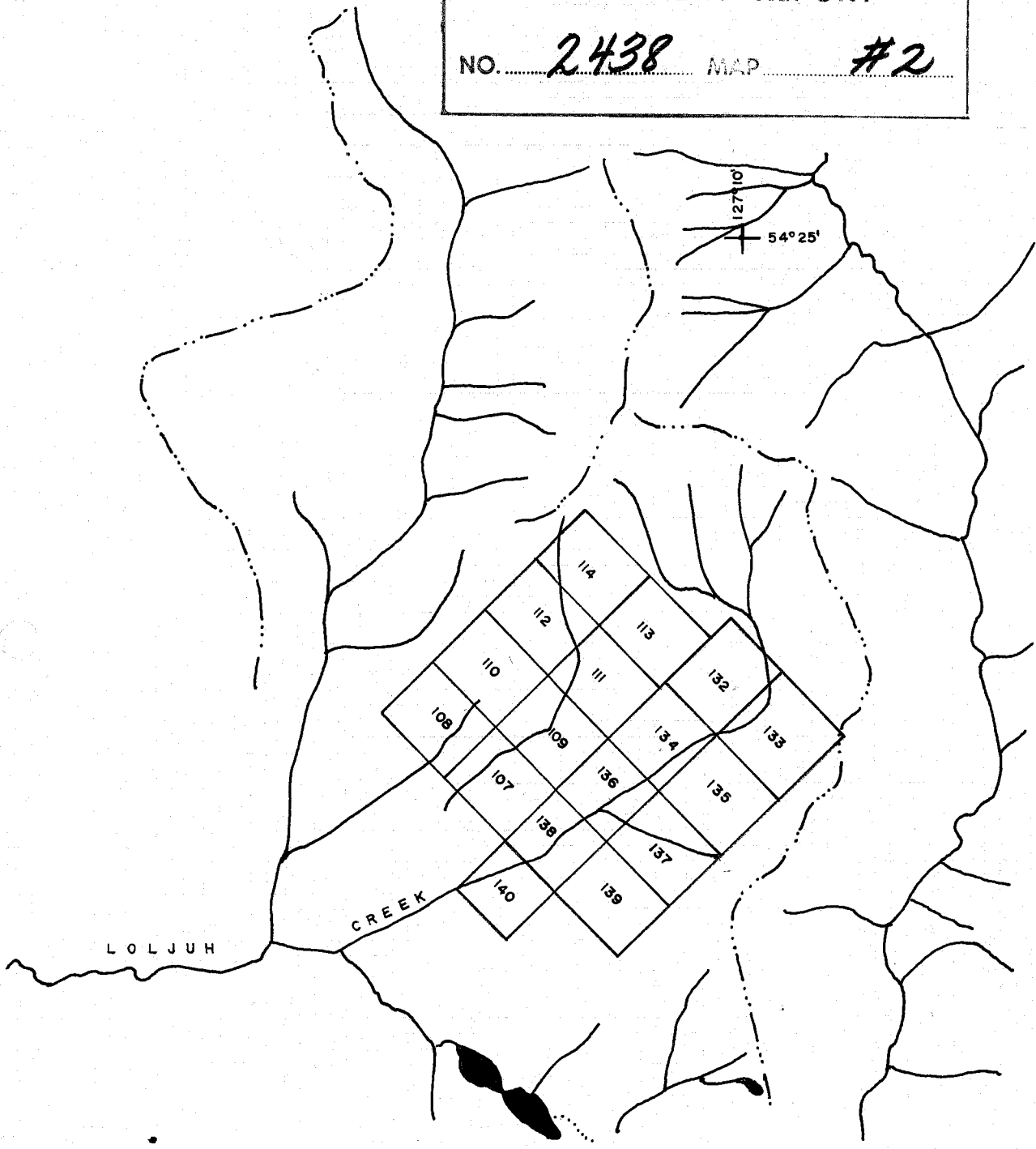
93L/6E

FIG. 1

1" = 4 miles



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LOLJUH

CREEK

LOLJUH PROPERTY  
NORANDA MINES LIMITED  
ROCK M.C.

*[Signature]*  
June 25/70

SCALE 1" = 1/2 mile  
FIG. 2

Company, Limited crew under the direction of G.E. Dirom, P. Eng. between July 30th, 1969 and August 8th, 1969.

GENERAL GEOLOGY:

The area covered by the geophysical surveys is underlain by andesitic tuffs and flows belonging to the Hazelton Group which have been intruded within the claim group by a small granodiorite stock of possible Upper Cretaceous or Early Tertiary age. The geological setting of the property is shown on Preliminary Map 44-23, Smithers, British Columbia prepared by J.E. Armstrong for the Geological Survey of Canada.

GRID PREPARATION:

For the purposes of these geophysical surveys, the 1967 preliminary grid on this property had to be improved by re-marking stations and lines. The base line is oriented N 45° E and is established for a distance of 3,600 feet. Ten grid lines at right angles to the base line were chained and flagged. Stations were established at 100 foot intervals where practical on the base line and grid lines. Two men spent 4 days re-marking and improving the 39,200 feet of grid on the property.

MAGNETOMETER SURVEY:

Method

The magnetometer survey on the Loljuh property was carried out using a McPhar Geophysics Ltd. M700 magnetometer. The M700 magnetometer is a vertical field magnetometer employing the flux gate principle. The instrument is self-levelling, direct reading, and practically insensitive to orientation. It is capable of measuring from zero to  $\pm 100,000$  gammas in

five ranges and is considered readable to  $\frac{1}{4}$  scale division. The maximum sensitivity of the instrument is 20 gammas per scale division on the 1,000 gamma range. The sensitivity of this and the other ranges is given below:

<u>Range - Switch Position</u>	<u>Full Scale in Gammas</u>	<u>Gammas per Scale Division</u>
1K	1,000	20
3K	3,000	50
10K	10,000	200
30K	30,000	500
100K	100,000	2,000

In order that the majority of readings would be taken on the more sensitive scales, the instrument's latitude adjustment was adjusted so as to cause the instrument to read on the 1K scale at the base station at 4+00S, 0+00E. Readings were taken in the prescribed manner at each 100 foot station along the grid lines with the operator facing magnetic west. The base line and grid lines were "looped" so as to permit diurnal corrections and adjustments were made so that all readings are relative to the base station value. An arbitrary value of 2,000 gammas was added to all readings to eliminate negative values. A total of 39,200 line-feet of magnetometer surveying was carried out on the property between June 30th, 1969 and August 8th, 1969.

PRESENTATION OF RESULTS:

Results of this survey are plotted on a plan map at a scale of one inch equals 200 feet (Figure 3). The magnetic values on each grid line were then profiled using a vertical scale of one inch equals 200 gammas.

DISCUSSION OF RESULTS:

Magnetic values obtained during the course of this survey range

from a low of 975 gammas to a high of 6,360 giving an overall magnetic relief of 5,375 gammas. The dominant feature on the magnetic map is the very strong and broad zone of high and erratic magnetic relief that trends northerly across the western portion of the property. This zone corresponds closely with known exposures of basic volcanic tuffs and flows. The eastern portion of the property, in contrast, has much lower and gentler magnetic relief indicating that the area is underlain by material having a more uniform distribution of magnetically susceptible minerals. The few rock exposures seen in the eastern portion of the surveyed area are granodiorite, which suggests that the abrupt change from the area of low and gentle magnetic relief to the area of high and erratic magnetic relief is the approximate location of the contact between the basic volcanic rocks and the granodiorite. Additional geological control is required before the less dominant, but possibly important, magnetic features can be evaluated.

ELECTROMAGNETIC SURVEY:

The electromagnetic survey was carried out using the "shootback" method with J.E.M. single frequency equipment owned by Noranda Exploration Company, Limited and manufactured by Crone Geophysics Limited of Toronto, Ontario.

The theory of the method and operation of the J.E.M. equipment is described by Duncan Crone in Mining Geophysics, volume 1, Society of Exploration Geophysicists, pp. 151-155. This method is patented. A brief description of the equipment and operating method is given here. The equipment consists of two identical units, with each unit consisting of a coil with attached inclinometer, amplifier box, battery and earphones. Each unit



is capable of transmitting and receiving an electromagnetic signal, which in this instance is 1,800 Hz. Two operators are required to carry out a survey with an operator designated "chief" and the other "helper". Each operator carries one unit with the only difference being the alignment of the inclinometers on the units.

To take a reading, the operators maintain a constant separation along the line (200 feet for this survey). The "chief" orients his coil in a plane 15 degrees off vertical and aimed coaxially along the grid lines towards the "helper". The transmitter is turned on and while the chief is transmitting the "helper" with his equipment on receive determines the direction of the transmitted signal. The receiver coil is then held in the horizontal plane and tilted about a horizontal axis perpendicular to the transmitter-receiver line until a signal null is determined with the aid of the earphones. The tilt angle at the null is recorded by the "helper" reading in degrees positive or negative. To obtain the "chief" reading, the above procedure is repeated with the "helper" transmitting and the "chief" receiving. The algebraic sum of the "chief" and "helper" readings is calculated and recorded as the reading for the station mid point between the operators.

Readings were taken at 100-foot intervals along the grid lines with a constant coil separation of 200 feet for a total of 22,400 line-feet of J.E.M. single frequency surveying.

#### PRESENTATION OF RESULTS:

Results of this survey are plotted on a plan map at a scale of one inch equals 200 feet (Figure 4). The resultant dip angles of null in

degrees are plotted at each station. The readings on each grid line were then profiled using a vertical scale of one inch equals 20 degrees.

DISCUSSION OF RESULTS:

The single frequency J.E.M. survey on the Loljuh Property has indicated the presence of several weak electromagnetic conductors within the surveyed area believed underlain by granodiorite.

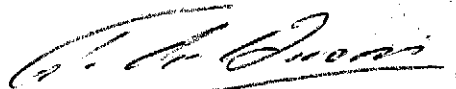
The zone of high and erratic magnetic relief that trends northerly across the western portion of the property distorts the electromagnetic picture to such an extent that it is not practical to infer any definite electromagnetic conductors of possible economic interest in this area. East of the supposed volcanic-granodiorite contact, however, the magnetic distortion of the electromagnetic picture is less severe and a weakly conductive zone can be recognized. This zone, designated Zone A on the enclosed map, has a strike length exceeding 1,200 feet and a possible width of 300 to 400 feet. It lies along and just east of the supposed volcanic-intrusive contact and has not been "cut off" to the south. Two other weak conductors occur on line 0+00N at 7+00E and 19+00E, however, additional electromagnetic surveying is required to determine their significance and extent.

RECOMMENDATIONS AND CONCLUSIONS:

The results of the magnetic survey appears to be of some value in determining the approximate position of the volcanic-intrusive contact on the surveyed portion of the Loljuh Property. This contact has a northerly trend which bisects the grid area with basic volcanic rocks indicated to the west and granodiorite indicated to the east. The results of the electromagnetic survey were distorted in the area believed underlain by basic volcanic

rocks, however, they do show a weakly conductive zone along and just east of the supposed contact. Further exploration work is warranted to investigate the nature and extent of this zone and of the other weak electromagnetic conductors found on the property.

Respectfully submitted,



Gavin E. Dirom, P. Eng.

June 26th, 1970

## APPENDIX "A"

### GENERALIZED INTERPRETATION THEORY FOR CRONE J.E.M. METHOD

An anomaly is usually a resultant reading greater than plus or minus 4 degrees.

The shape and position of the conductor can be determined from a profile of the J.E.M. results. Interpretation of the results is basically simple if two rules are kept in mind:

1. positive resultant dip angles are obtained only when the two men straddle a vertical or near vertical conductor.
2. negative resultant dip angles are obtained under two conditions - a. when both men are over a flat conductor, b. when both men are on one side of a vertical or near vertical conductor.

A conductor with a dip of 45 degrees has a considerable vertical component and thus acts both as a vertical and flat conductor: hence the use of the term "near vertical conductor" to cover such cases.

When positive angles are present then the top of the conductor is centered within the positive angles. Positive angles indicate 1. that the conductor has a vertical component, 2. that the top of the conductor lies within 75' of surface. Dip of the conductor is determined by the relative size of the negative angles. The conductor dips underneath the larger of the negative angles.

A special case occurs when heavy magnetite deposits are traversed. In most cases this causes small positive resultant angles. As with all E.M. methods some experience is necessary to accurately interpret this type of anomaly.

When negative angles only are present the shape of the profile is very important. With deep conductors, the conductor is accurately outlined by simply contouring the readings. When double negative humps occur with peaks 200' to 300' apart the cause is due to a conductor located mid-way between the two peaks. In this case the top of the conductor lies between 50' and 100' from the surface. As with nearer surface profiles the direction of the dip is determined by the relative size of the two peaks.

SUPPLEMENT TO THE REPORT ON THE MAGNETIC AND  
ELECTROMAGNETIC SURVEYS ON THE LOLJUH PROPERTY  
OF NORANDA MINES LIMITED BY GAVIN E. DIROM. P. ENG.

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QUALIFICATIONS OF FIELD PERSONNEL:

Mr. W. R. Bankiner is a senior party leader and has been employed by Noranda Exploration Company, Limited since August 1964 as a senior geophysical operator and crew leader.

Mr. Bankiner was trained in field procedures by Mr. G.E.Dirom, P. Eng., Regional Geologist, Noranda Exploration Company, Limited, Mr. T. Walker, Geophysical Co-ordinator for Noranda Exploration Company, Limited, Vancouver Office and Mr. D.K.Fountain, P. Eng., Consultant Geophysicist, Toronto.

Mr. J. Rowlands has been employed by Noranda Exploration Company, Limited since July 21st, 1969 as a junior geophysical operator and field assistant.

Mr. Rowlands was instructed in the necessary field procedures by senior geophysical operators under the supervision of Mr. G. E. Dirom, P. Eng.

Gavin E. Dirom, P. Eng.



CERTIFICATE

I, GAVIN EWAN DIROM, of the Town of Smithers, Province of British Columbia, do certify that:

1. I am a geologist residing at 52 North 14th Avenue, Smithers, B. C.
2. I am a graduate of the University of British Columbia with a B.A.Sc Degree in the geophysical option of Geological Engineering and a M.A.Sc Degree in Geophysics.
3. I am a Member of the Canadian Institute of Mining and Metallurgy.
4. I am a registered Professional Engineer in the provinces of British Columbia and Ontario, and have been practising my profession for eight years.
5. The statements made in this report are based on a study of published literature and unpublished private reports and geophysical data.

Dated at Smithers this 26th day of June, 1970

GAVIN E. DIROM, M.A.SC. P. ENG.





24 N

16 N

8 N

00

8 S

16 S

24 S

32 S

40 S

36 E

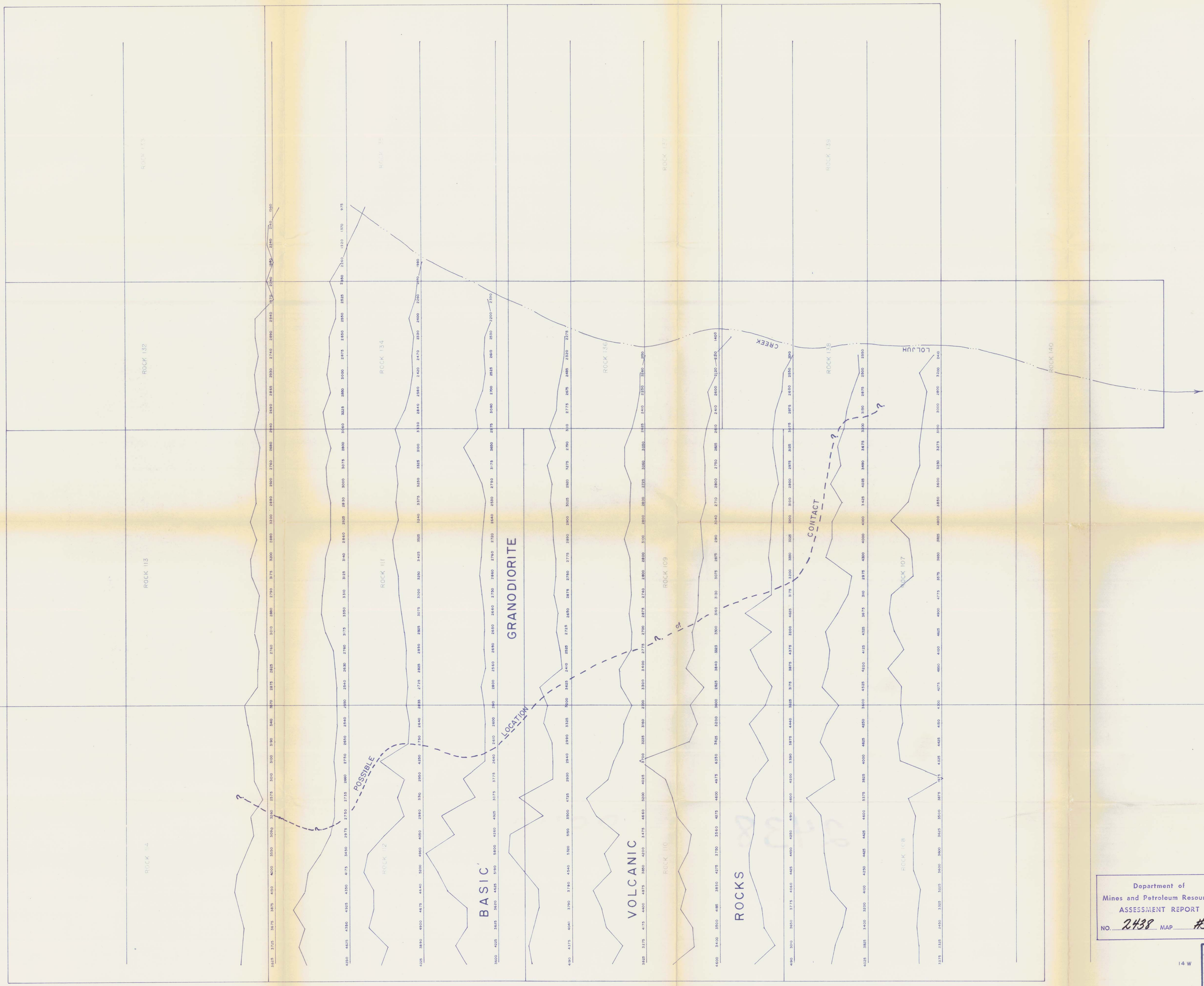
30 E

20 E

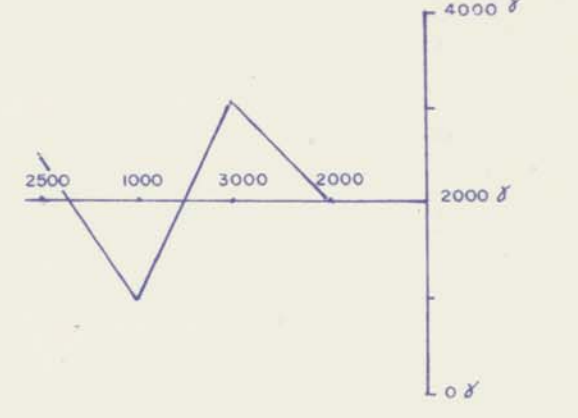
10 E

00

12 W



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NOTE:  
TO ACCOMPANY GEOPHYSICAL REPORT BY G.E. DROM ON THE  
LOLUH PROPERTY, GIMNECA M.D., BRITISH COLUMBIA  
DATED: JUNE 22, 1970

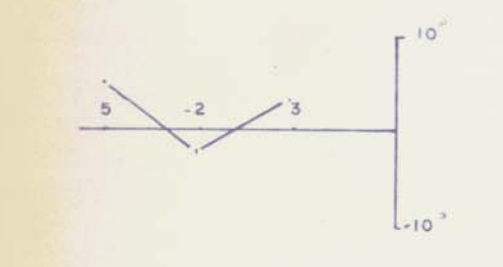
REVISED	
MAGNETOMETER SURVEY	
M-700	Contour Interval - 250 ♂
PROJECT: LULUH PROPERTY	
PROJ. NO.	R. BANKNER
DATE	APRIL 1970
HT. S.	93L/6E
DRAWN BY:	RS
SCALE	1:200 ♂
SWG. NO.	3
NORANDA EXPLORATION CO. LTD.	
OFFICE: SMITHERS	





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- E.M. CONDUCTOR
- - - POSSIBLE E.M. CONDUCTOR
- · - · - VOLCANIC-INTRUSIVE CONTACT AS INTERPRETED FROM MAGNETOMETER SURVEY RESULTS

NOTE:  
TO ACCOMPANY GEOPHYSICAL REPORT BY S.E. DIRON  
ON THE LOLJUH PROPERTY, OWNED 1/2 S., SECTION  
COLUMBA  
DATED: JUNE 22, 1970

REVISED	J.E.M. SURVEY	
	Frequency-1800 cps.	Instrument spread-200'
PROJECT	NORANDA EXPLORATION CO. LTD.	
SURVEYED BY	S. BAWNER	DATE APRIL 1970
DRAWN BY	J. ROWLAND	SCALE 1" = 20'
DWG. NO.	4	
OFFICE: 111, 112, 113		