

3809

GEOLOGY AND ROCK GEOCHEMISTRY

LOLJUH PROPERTY

54° 25'N, 127° 10'W

ASGER BENTZEN

under the supervision of

G. E. DIROM P. ENG.

NORANDA MINES LIMITED

OMINECA MINING DIVISION

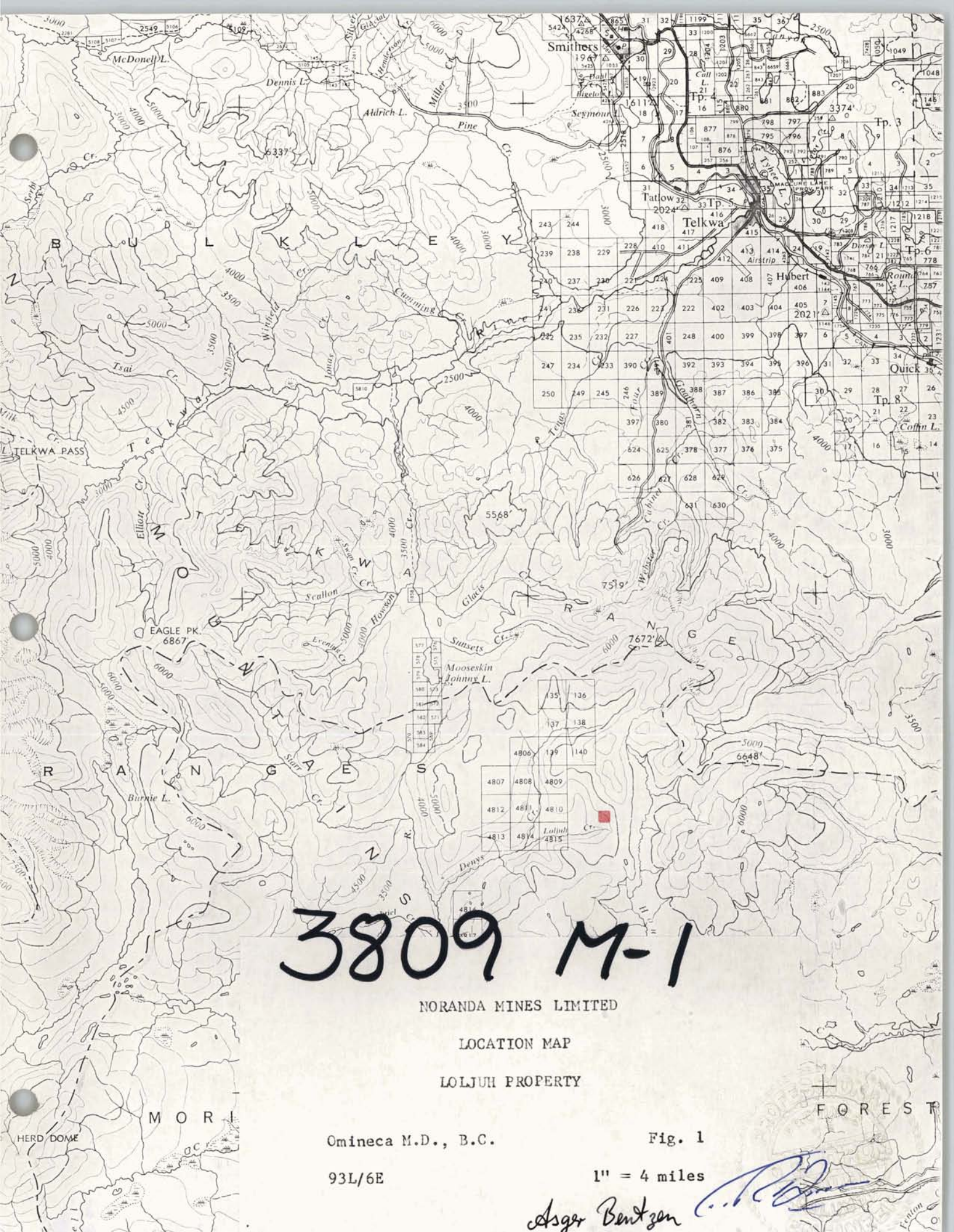
July 4th, 1971 - July 11th, 1971

July 7th, 1972 - July 15th, 1972

Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. 3809 MAP

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NORANDA MINES LIMITED

LOCATION MAP

LOLJUH PROPERTY

Omineca M.D., B.C.

Fig. 1

93L/6E

1" = 4 miles

Asger Bentzen

*[Handwritten signature]*

GEOLOGICAL AND ROCK-GEOCHEMICAL SURVEY REPORT

ON THE

LOLJUH PROPERTY

NORANDA MINES LIMITED

INTRODUCTION:

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

The property consists of 11 contiguous mineral claims in the Omineca Mining Division of British Columbia (See Fig. 2).

The claims are as follows:

<u>Claim</u>	<u>Record Date</u>	<u>Record Number</u>	<u>Owner</u>
Rock #107 - 114	June 29th, 1972	50414 - 50421	Noranda Mines Limited
Rock #134 - 135	August 1st, 1972	51999 - 52000	Noranda Mines Limited
Rock #1 Fr.	July 18th, 1973	?	Noranda Exploration Company, Limited

Exploration work carried out on this property intermittently since 1967, includes a cut and flagged grid, a soil-geochemical survey, seven diamond drill holes, and a magnetometer and electromagnetic survey. The writer and one assistant spent the periods July 4th to July 11th, 1971 and July 7th to July 15th, 1972 on the property conducting geological and rock-geochemical

surveys to aid in the evaluation of its mineral potential and the interpretation of earlier surveys.

Control for this work was provided by an earlier established chain and compass grid, topographic mapping by Lockwood Survey Corporation from B. C. Government air photographs, and the air photographs themselves.

The main area of the claims is located on a bench-like structure with an elevation of 4,000' to 4,400' and is bounded to the south-east by the valley of Loljuh Creek and to the north by a peak of 5,600'. The area is well forested, but there are many swamps, and drainage is poor. The treeline is at 5,000'. Depth of overburden near the drill-sites averages eleven feet but may increase to the south-east. Rock exposure is mainly confined to alpine ridges.

#### SUMMARY:

The claim group is underlain by andesitic and dacitic tuffs, flows and greywackes of Middle Lower Jurassic age belonging to the Hazelton Group. These rocks have been intruded within the claim group by a monzonite stock of possible Upper Cretaceous or Early Tertiary age, and by small bodies of quartz diorite and feldspar porphyry. Associated with the intrusions is a magnetite halo occurring in the volcanic rocks bordering the igneous contact, and a discontinuous zone of pyritization in the rocks on both sides of the contact. Copper mineralization is associated with the pyrite, but occurs also, though to a lesser extent, in the intrusive rocks.

#### GEOLOGICAL SETTING:

The eastern part of the Telkwa Range is underlain by andesitic and dacitic volcanoclastic rocks with minor sediments belonging to the Middle Lower

Jurassic section of the Hazelton Group. Red hematitic tuffs and tuffaceous breccias, commonly with orthoclase veining, are typical. Regional metamorphism is in the prehnite or epidote facies. (Richards, 1972). Emplaced in the volcanics are stocks of Upper Cretaceous or Early Tertiary age (Armstrong, 1944). Commonly the volcanic rocks bordering on the intrusions become darker due to an enrichment in magnetite. (Brown, 1967; Richards, 1972).

GEOLOGY:

Approximately half of the area covered by the Loljuh claim group is underlain by rocks of volcanic origin; the balance by plutonic rocks.

For descriptive purposes the volcanic rocks have been divided into three units:

Unit "A" occurring in a single outcrop near the western corner of the property, consists of red and green pyroclastic rocks. The red colour is attributed to the presence of abundant hematite and the green colour to the presence of chlorite.

Unit "B", comprising dense greenish-black pyroclastic rocks and minor undifferentiated amygdaloidal andesites, is considered an altered equivalent of Unit "A". It underlies the north-western and far south-eastern sides of the claim area. The effects of contact metamorphism are indicated in this unit by the presence of magnetite rather than hematite and weak to intense hornfels alteration. Epidote and orthoclase veins and replacement masses are common; however, these may in part reflect the effects of regional metamorphism.

Unit "C" located in the northern corner of the property, consists of

a section of well-bedded volcanic sediments, commonly a medium to coarse grained greywacke, which in hand specimen appears fresh and unaltered.

Units A, B, and C correlate with the Middle Lower Jurassic section of the Hazelton Group found locally and are likely the "Red Volcanic" unit as described by Tipper (Tipper, 1971).

The plutonic rocks comprise three units:

Unit "D", a medium-grained monzonite, extends as a stock about 3,000' across into the central part of the property from the north-east. The composition is 40% plagioclase, 25% orthoclase, 25% hornblende, and 10% biotite. The intrusive is slightly porphyritic with respect to plagioclase. The hornblende occurs generally as anhedral masses, but may also occur as fine needles.

Unit "E" is a minor outcropping of feldspar porphyry in the western contact zone of the monzonite, and may be either a dyke or a very small intrusion. The rock has a somewhat variable composition, but a typical sample contained: 35% partially resorped phenocrysts of plagioclase, about 2 mm in diameter, 30% fine-grained mafic minerals, 35% groundmass, and a minor amount of pyrite and chalcopyrite.

Unit "F" is found only in diamond drill holes number 2 and 4, which are situated on the western contact zone of the monzonite stock. The petrographic name of the rock is uncertain since its true nature is obscured considerably by orthoclase, quartz, and pyrite veining and replacement, however, a tentative identification is fine-grained quartz diorite.

The monzonite stock was mapped by Armstrong as being of Upper Cretaceous or Early Tertiary age (Armstrong, 1944).

Except for a dyke of unit "F" in the volcanic rocks there is no

direct field evidence to indicate the relative age of the two minor plutonic units.

A set of well developed joints with an average spacing of 5 cm and an attitude of  $65 \pm 10/90$  is found in units "B" and "E". This set also occurs weakly in the monzonite.

Pyrite veining is common, though spotty, in outcrop near the contact, but in places the pyritization is sufficiently intense to have developed in the matrix of the rock. Pyrite content up to 10% was noted. The attitude of the pyrite veins frequently coincides with that of the above mentioned joints.

The available geological evidence favours the idea that the contact between the volcanics and the monzonite unit should be detectable by a magnetometer survey. The writer, therefore, concurs with the conclusion drawn by Dirom regarding its location (Dirom, 1969).

#### ROCK-GEOCHEMISTRY

Chemical analysis of rock chips sawn from rock samples obtained from the 1971 survey indicated that a rock-geochemical survey might be helpful in interpreting the copper soil-geochemical anomaly located parallel to and west of the baseline between line 8 north and line 28 south. As a result, sixteen samples were obtained in 1972 with the majority from this area.

The sampling technique involved designating one or two areas on an outcrop to be sampled, and then collecting sixteen rock chips of approximately the same size from random locations within each area. The samples were placed in 8" X 13" sample bags of 6 mil plastic, on which were marked an identification



number with an indelible felt pen. All samples were submitted to Core Laboratories-Canada, Ltd. and analyzed for copper, molybdenum, zinc and silver by N. Garner.

The samples were crushed and pulverized to -100 mesh, 1.0 g of each sample were weighed out into a test tube containing 5 ml of 1:4 perchloric nitric acid and digested in a water-bath for 4 hours at 180°F. After cooling each sample was diluted to 15 ml with a solution of  $AlCl_3$  giving a resultant concentration of 1%  $AlCl_3$ . The solutions were then analyzed for copper, molybdenum, zinc and silver on a Jarrell-Ash Atom-Sorb Model spectrophotometer. The standards used were diluted solutions from prepared 1,000 ppm Fisher standards and acid concentrations were the same for both sample and standard.

The rock-geochemical results have been listed in Table 1 and shown on Fig. 2. These results plus those from drilling reveal that within the soil-geochemical anomaly, bedrock is frequently anomalous in copper. In taking into consideration drainage patterns and depth of overburden, it is concluded that in this instance, at least, the soil geochemical anomaly reflects the copper content of the under-lying bedrock. Molybdenum, zinc and silver rock-geochemical values show no significant trends.

#### ECONOMIC GEOLOGY:

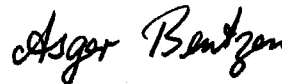
Copper has two modes of occurrence on this property. It occurs as chalcopyrite associated with the pyrite mineralization straddling the contact zone of the monzonite stock, and interstitially as chalcopyrite in the monzonite.

The area of the soil-geochemical anomaly which coincides with part of the area of pyritization, has been investigated by drilling, and by the

present geological and rock-geochemical survey. It is concluded that this mineralization is erratic and not of economic interest.

The quality of information available on the second mode of occurrence is low. Topographically the monzonite intrusion is highly recessive and only a few outcrops are available. Furthermore, overburden tends to be deeper, thus reducing the effectiveness of soil geochemistry. Since this type of intrusion is potentially a good host for economic concentrations of copper, and since both the stock and the area surrounding it are geochemically anomalous with respect to copper, it is recommended that further work, such as an induced polarization survey and/or trenching be carried out.

Respectfully submitted,



Asger Bentzen



Gavin E. Dirom, P. Eng.

July 31, 1972.

TABLE 1

Assay results on rock-geochemical samples.

Assays by Core Laboratories - Canada Limited.

<u>Sample No.</u>	<u>Rock Unit</u>	<u>Cu, ppm</u>	<u>Mo, ppm</u>	<u>Zn, ppm</u>	<u>Ag, ppm</u>
23/1	B	148	< 3	20	< 1
23/2	B	42	< 3	16	< 1
23/3/1	D *	279	< 3	36	< 1
23/3/2	D	13	< 3	24	< 1
23/4	E	337	< 3	47	< 1
23/5	E	530	< 3	38	< 1
23/10	D	99	< 3	53	< 1
23/13	B	107	< 3	17	< 1
23/14	B	196	< 3	28	< 1
23/15	B	154	< 3	21	< 1
23/16	B	1150	< 3	20	1
23/18/1	B	175	< 3	23	< 1
23/18/2	B <sup>†</sup>	52	< 3	24	< 1
23/18/3	B <sup>†</sup>	28	< 3	28	< 1
23/20	B	23	< 3	63	< 1
23/21	B	237	< 3	55	< 1

\* Area on outcrop with visible chalcopyrite.

† Areas on outcrop free of pyrite.

REFERENCES

- Armstrong, J. E., G.S.C., Paper (Map) 44-23, 1944
- Brown, A. Sutherland, B.C. Minister of Mines & Petroleum Resources,  
Annual Report, 1967, p. 97.
- Dirom, G. E., Assessment Report "Magnetometer and Electromagnetic  
Surveys on the Loljuh Property", 1969.
- Richards, T.A., personal communication, 1972.
- Tipper, H. W., Lower Jurassic Volcanic Rocks of the West Half of  
Smithers Map-area, B.C. (93L), 1971
- N.T.S., Smithers, 93L.
  - B. C. Govt., Air Photos, BC 5302-257, BC 5302-258.

CERTIFICATE

I, ASGER BENTZEN, of the city of Vancouver, Province of British Columbia, do certify that:

1. I am a geologist residing at 3715 West 12th Avenue, Vancouver B.C.
2. I am a graduate of the University of British Columbia with a B.Sc. Degree (1968), Major in geology.
3. I have been employed as a geologist for Noranda Exploration Company, Limited for the summers of 1969, 1970, 1971 and 1972.

Dated at Smithers this 31st day of July, 1972.

*Asger Bentzen*

Asger Bentzen, B.Sc.

CERTIFICATE

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

1. I am Geological Engineer 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 (1962) in the geophysical option of Geological Engineering and a M.A.Sc. Degree (1965) 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.
5. I have been employed as a geologist for Noranda Exploration Company, Limited since June, 1962 and have held the position of District Geologist - Northern B.C. since March, 1967.

Dated at Smithers this 31st day of July, 1972.



GAVIN E. DIROM, M.A.Sc., P.Eng.

# Canada

Province of British Columbia

To Wit:

**In the Matter of** a statement of Exploration Expenses on 1<sup>0</sup> contiguous Mineral Claims in the Omineca Mining Division having Record Nos: 50414 - 50421, 51999 - 52000

I, Asger Bentzen (F.M.C. 109106 Issued April 28, 1972 at Vancouver) of P. O. Box 2169, Smithers, B.C., agent for Noranda Mines Limited, (N.P.L.) (F.M.C. 109101 issued April 28, 1972 at Vancouver) of 1050 Davie Street, Vancouver 5, B.C.

I,

, of

in the Province of British Columbia.

**Do Solemnly Declare that** The actual costs of geological mapping and rock geochemistry including topographic mapping on the above listed Mineral Claims between July 4/71 - July 11/71 & July 7/72 - July 15/72 were:

1. LABOUR

Asger Bentzen & J. Craig.

July 4/71 - July 11/71

16 man-days @ \$31.30/man-day = \$500.80

Asger Bentzen & K. Bond.

July 7/72 - July 15/72

10 man-days @ \$31.30/man-day = \$313.00

Total Labour

- \$ 813.80

2. TRANSPORTATION

1971 - Okanagan Helicopter. Bell-206A

- 75 mins @ \$250/hr. = \$311.70

1972 - Okanagan Helicopter. Bell-206B

- 80 mins @ \$258/hr. (Not claimed for assessment credit) = N. C.

Total Transportation

- \$ 311.70

3. TOPOGRAPHIC MAPPING

- Lockwood Surveys - \$455.40 (1971)

- estimated portion applicable - 25% - \$ 113.85

4. ROCK GEOCHEMISTRY

- 4 elements (Cu, Mo, Zn, Ag) - \$ 55.20

5. FIELD COSTS

- 26 man-days @ \$7.00 - \$ 182.00

Total - \$1,476.55

\$1,000.00 of this total is being claimed for assessment credit.

And I make this solemn Declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath, and by virtue of the Canada Evidence Act.

Declared before me

at SMITHERS

in the Province of British Columbia.

this 15<sup>th</sup> day of

August

A.D. 1972

*Asger Bentzen*

*[Signature]*

LEGEND

SEDIMENTARY ROCKS

Middle Lower Jurassic  
HAZELTON GROUP

**A** andesitic and dacitic tuffs and tuffaceous breccia  
minor undifferentiated andesite. **B** is hornfels

**C** volcanic sediments, greywacke

IGNEOUS ROCKS

Upper Cretaceous or Early Tertiary

**D** monzonite

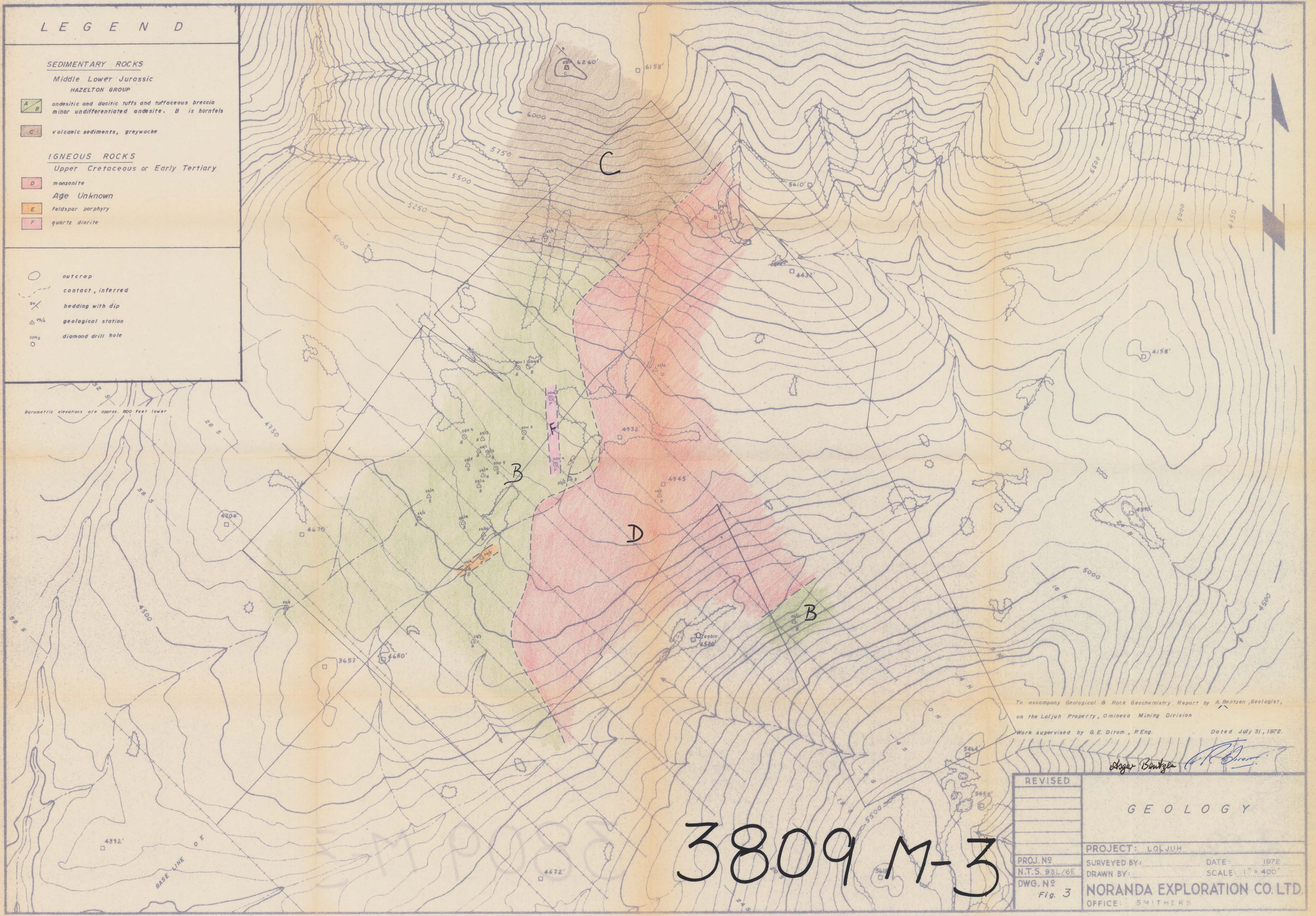
Age Unknown

**E** feldspar porphyry

**F** quartz diorite

- outcrop
- contact, inferred
- bedding with dip
- geological station
- diamond drill hole

Barometric elevations are approx. 600 feet lower



To accompany Geological & Rock Geochemistry Report by A. Bentzen, Geologist,  
on the Laljuh Property, Omineca Mining Division  
Work supervised by G.E. Dirom, P.Eng. Dated July 31, 1972.




*A. Bentzen* *G.E. Dirom*

REVISED	GEOLOGY	
PROJ. NO. N.T.S. 93L/6E	PROJECT: LALJUH	DATE: 1972
DWG. NO. Fig. 3	SURVEYED BY:	SCALE: 1" = 400'
	DRAWN BY:	
	NORANDA EXPLORATION CO. LTD.	
	OFFICE: SMITHERS	

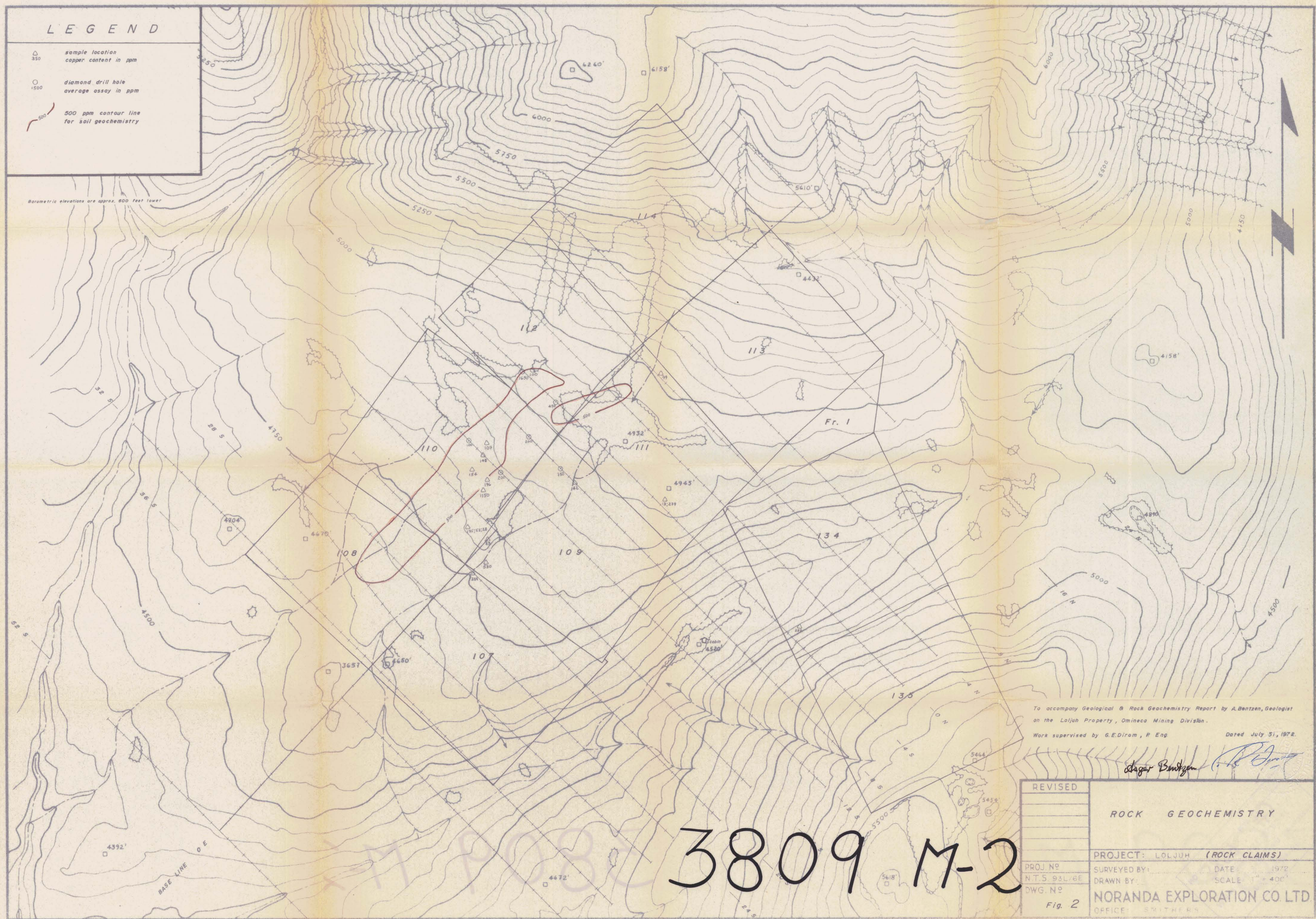
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LEGEND

-  350 sample location  
copper content in ppm
-  1500 diamond drill hole  
average assay in ppm
-  500 ppm contour line  
for soil geochemistry

Barometric elevations are approx. 600 feet lower



To accompany Geological & Rock Geochemistry Report by A. Bentzen, Geologist  
on the Loljuh Property, Omineca Mining Division.  
Work supervised by G.E. Dirom, P. Eng. Dated July 31, 1972.  
*Olaf Bentzen*

REVISED	ROCK GEOCHEMISTRY	
	PROJECT: LOLJUH (ROCK CLAIMS)	
	PROJ. NO. N.T.S. 93L/6E	DATE: 1972
	DWG. NO. Fig. 2	SCALE: 1" = 400'
NORANDA EXPLORATION CO. LTD.		
OFFICE: SMITHERS		

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