GEOLOGY, ROCK AND SOIL GEOCHEMISTRY

THIBERT CREEK PROPERTY

T.C. 1 - 14 CLAIMS GEOLOGICAL BRANCH ASSESSMENT REPORT

Liard Mining Division

British Columbia

Latitude -- 58 deg. 50' N Longitude -- 130 deg. 15' W

by: Dennis Gorc, and R. MacArthur

NORANDA EXPLORATION COMPANY, LIMITED (No Personal Liability)

October, 1984

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THE SHEET MARK

N.T.S. 104 J/16E&W

TABLE OF CONTENTS

						Page
INTRODUCTION	• •	•	· .	•	•	1
LOCATION AND ACCESS	•	•	•		•	1
CLAIMS	e, •	•	•	•	•	2
EXPLORATION HISTORY	•	•		•	•	2
REGIONAL GEOLOGY	•	•	•	•		3
LOCAL GEOLOGY						
Kedahda Formation	•	•		•	•	3
Nazcha Formation		•	•	•		. 4
Shonektaw Formation	•	•	. •	•		4
Limestone	•	•	•	•		4
Granodiorite (Late Triassic & Early Jurassic	•	•	•	•	•	5
Ultramafic (Mississipian to Permian)		•		•	•	5
Perido tite	•	•,	•	•	•	5
Serpentinite	•	•	•	•		6
Quartz-Carbonate-Mariposite Alteration		•	•	•	•	6
GEOCHEMISTRY						
Collection	•	•	•		•	6
Analysis	•	•	•		•	7
Results	•	•	•	•	•	7
RECOMMENDATIONS						8

LIST OF FIGURES

Fig.

1	Location Map	Scale 1:250,000	Page 2a
2	Regional Geolog	TO THE REPORT OF THE PARTY OF T	Page 3a
3	Regional Geolog	gy and Claim Map Scale 1:50,000	In Pocket
4	Sheets 1 to 6	Geology, Rock Geochemistry, Silt Geochemistry and 1983 Soil Geochemistry Scale 1:5,000	In Pocket
5	Sheets 1 to 3	1984 Soil Geochemistry Pb,Ag Scale 1:5,000	In Pocket
6	Sheets 1 to 3	1984 Soil Geochemistry Au, As Scale 1:5,000	In Pocket

APPENDICES

APPENDIX A

Analytical Method - Noranda LAB

APPENDIX B

Cost Statement

APPENDIX C

Statement of Qualifications

INTRODUCTION:

In September 1983 the TC 1-14 claims (250 units) were staked for Noranda Exploration, 40 kilometers northwest of the settlement of Dease Lake in the Thibert Creek area. These claims overlie several gold placer creeks which had produced more than 70,000 oz. (2,000 kg) of gold up to 1949. Mother Lode Belt type gold mineralization was the target during the 1983 and 1984 exploration efforts.

During late September and early October 1983 293 soil samples, 104 rock ship samples and 2 silt samples were taken on the property. Soil and silt samples were analyzed for Cu, Zn, Pb, Ag, Mo, Ni, Co, As and Au. Rock samples were analyzed for Au, Ag, and As. Some geological mapping was also done and several exposures of quartz-carbonate-mariposite alteration were discovered within ultramafic rocks.

From September 17 to October, 1984, D. Gorc and two assistants flagged a grid over the central portion of the TC 8-14 claims. This grid was designed to traverse the Thibert Creek Fault. Stations were established every 25 m along each line. Lines were spaced 300 m apart. Soil samples were taken at each station and every 100 m along the baseline. A total of 1050(?) soil samples were taken and analyzed for Au??

Additional geological mapping was also done with special attention paid to the bodies of ultramafic rock. Several lines of continuous rock chip sampling was done across several of the larger ultramafic exposures. These rock chip samples were analyzed for Au.

Both programs were carried out under the direction of R. MacArthur, District Geologist, Noranda Exploration.

LOCATION AND ACCESS:

The TC claims are located on mapsheet 104J/16 East and West, 40 kilometers northwest of the settlement of Dease Lake and 1.5 kilometers west of the Stewart-Cassiar highway.

Cat trails and rough roads extend westward from Dease Lake to several of the small gold placer operations which still operate sporadically. It is said that these roads can be reached by fords across the Dease River during low water.

The most reliable access is by helicopter from the settlement of Dease Lake. Float planes can land at Adsit Lake from which there is a rough cat road to the placer operations on Defot Creek.

CLAIMS:

Table 1 <u>Claim Data - Thibert Creek</u>

Claims Owned by Noranda Exploration Company, Ltd.

(1983) 18	(1984) 12	00(5(10)	
	12	006=(10)	
	12	00(=(10)	
10		2965(10)	Oct. 11/83
10	12	2966(10)	11 11
18	12	2967(10)	11 11
18	12	2968(10)	11 11
18	9	2969(10)	
18	9	2970(10)	11 11
18	18	2971(10)	11 11
18	18	2972(10)	11 11
18	18	2973(10)	11 11
20	16	2974(10)	11 11
20	20	2975(10)	" "
20	12	2976(10)	11 11
8	4	2977(10)	n n
20	12	2978(10)	11 11
250	184		
	18 18 18 18 18 18 20 20 20	18 12 18 12 18 9 18 18 18 18 18 18 20 16 20 20 20 12 8 4 20 12	18 12 2967(10) 18 12 2968(10) 18 9 2969(10) 18 9 2970(10) 18 18 2971(10) 18 18 2972(10) 18 18 2973(10) 20 16 2974(10) 20 2975(10) 20 12 2976(10) 8 4 2977(10) 20 12 2978(10)

Grouping of claims: Reduced October 1984

Group	Name	claims	# Units
TC	East	TC 1-7	84
TC	West	TC 8-14	100

EXPLORATION HISTORY:

Placer gold was first discovered, in what is now Thibert Creek in 1873. This discovery was made by a member of a party of prospectors lead by Henry Thibert, about three miles (4.8 km) above the mouth of Thibert Creek near Delure Creek. Other areas draining into and near Thibert Creek were soon found to contain gold. The creeks that were actively mined as well as Thibert and Delure included Boulder, Defot, Mosquito, Porcupine and Vowell Creeks. The production from these creeks is recorded as being more than 70,000 ounces (2,000 kg) up until 1949. Most of the production occurred before the Klondike

gold rush lured away most of the local prospectors. There have been short periods of intensive work since then and presently there are a few placer operations active in the area.

About two-thirds of the gold production was from Thibert Creek where economic gold placers are restricted to rock benches 5 to 200 feet (1.5 m to 61 m) above the present stream channel.

It has been reported that concentrates from the Thibert Creek placer operations contained about 2 oz/ton platinum.

The only hard rock gold source noted in government literature is the Keystone showing. This is described as being on 8 claims on Thibert Creek below Berry Creek. "Open-cutting and stripping has exposed a zone of quartz stringers in quartz porphyry". The owner reported gold values up to \$5.50/ton (gold at \$17/oz.) across a width of 40 feet (12 m).

This showing was not located during the 1983-84 field work.

The Dease Lake area was covered by reconnaissance prospecting-sampling for porphyry type deposits early in the 1970's.

REGIONAL GEOLOGY:

The Thibert Creek occurs along the northeastern boundary of the Atlin Terrane which is a fault-bounded area of Upper Paleozoic rocks. Many sections of this fault boundary, including the Thibert Creek area, are marked by small ultramafic bodies. Structural evidence suggests that the Atlin Terrane is a large thrust sheet affected by compressional forces and marked at least on the southern edge by thrust or reverse faults.

The upper Paleozoic rocks of the Dease Lake area have been affected by two phases of deformation. The older phase is marked by penetrative foliation and associated pumpellyite-chlorite regional metamorphism. The second and more common phase consists of crumbling associated with strain-slip clevage.

LOCAL GEOLOGY:

Kedahda formation (Mississippian to Permian)

On the property this formation consists of very schistose quartzite and lesser black, platy argillite. The strike of the well developed schistosity of foliation roughly parallels the Thibert Creek Fault. The schistosity generally dips 60 to 70 degress southerly.

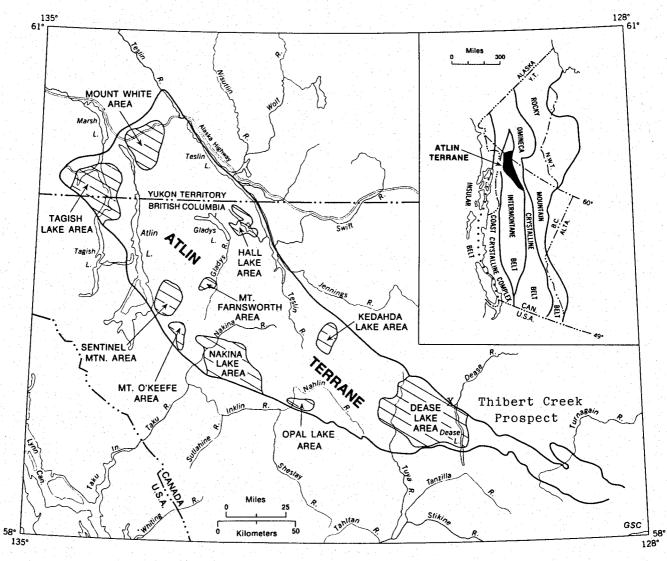


Figure 1. Index maps showing (a) location of the Atlin Terrane within the Canadian Cordillera, and (b) areas studied in detail within the Atlin Terrane.

After Monger (1975)

(1) - 1/45

These rocks contain numberous coarse-grained white quartz lens within a 200 m to 400 m wide band south of the Thibert Fault. Such lens range up to 30 cm in width and 6 meters in length but are generally much smaller. Only rare trace sulphides were noted within these lenses. No alteration was noted adjacent to the lenses.

Nazcha Formation (Upper Triassic)

This formation underlies the northwestern portion of the property.

The formation consists of fine grained, well bedded light grey sandstone with varying but significant amounts of black argillaceous rocks. Bedding varies from 10 cm to 1 metre in thickness with occasional more massive horizons.

Exposures of this formation are found along a branch of Defot Creek in the westernmost portion of the property. At this location the formation can be divided into three units. The easternmost consists of massive to thickly bedded sandstone with less than 10% argillite. A central unit with alternating horizons of sandstone and argillite vary from several metres to 5 - 25 cm in thickness. The westernmost unit consists of alternating sandstone and argillite horizons but such horizons are generally 5 cm or less thick giving the rock a distinctive banded appearance. Graded bedding is readily visible within this unit with tops consistently up. Occasional sandstone horizons are up to 30 cm thick.

Proceeding southwest from Defot Creek along the above branch, one is struck by the increased crumbling, folding, and shearing within the formation as one nears the Thibert Creek Fault. Two degree bedding azimuth dipping 12 degrees easterly. Similar contorted bedding is seen near sample site 61108. Despite abundant contortions and bedding as flat as 20 degrees, beds generally dip 75 degrees N.

Shonektaw formation (Upper Triassic)

This formation occurs within the central portion of the claim group. The formation consists of augite andesite and basalt. Only a few outcrops of this formation were observed. These formations consisted of fine grained, greenish, volcanic. The greenish colour is suggestive of small amounts of chlorite and perhaps epidote. At the eastern end of Grid 2 several exposures are fractured and sheared with small amounts of ironstaining.

Limestone

Outcrops of limestone up to 80 m wide are exposed along the upper parts of Porcupine Creek. Sporadic exposures occur for a distance of 500 m along the creek. These outcrops can be seen from a distance due to their whitish weathered surfaces.

On a fresh surface the limestone is light grey with a distinctive ribboned appearance. Such a texture is suggestive of algal layering. The limestone seems to consist of pure carbonate with no other material other than carbonate noted within the rock. Crosscutting white calcite veinlets are common. Locally the limestone appears to be partially silicified. No sulphides were noted within this formation.

Government mapping has shown both the Nazcha Formation and Kedahda Formation to contain limestone lens. The limestones seen along Porcupine Creek likely belong to the Nazcha Formation but this is uncertain.

Gradondiorite (Late Triassic and Early Jurassic)

Granitic rocks, including biotite-hornblende quartz diorite, granodiorite, quartz monzonite and diorite, underlie the northern portions of several claims.

ULTRAMAFIC (Mississipian to Permian)

Ultramafic bodies in the Atlin Terrane have been divided into three types; elongate bodies occuring along the fault contacts to the Atlin Terrane, equidimensional bodies within the Atlin Terrane and bodies associated with Permo-Triassic volcanism at the northwestern end of the terrane.

These rocks are described by Monger (1975): "These rocks are predominately enstatite-bearing periodotite or harzburgite and dunite; partially or wholly serpentinized and serpentine of indeterminate origin. Locally they contain irregular lenses and layers of pyroxmite; some of which contain clinopyroxene that may form pickilitic crystals enclosing olivine grains."

The ultramafics at Thibert Creek would be classified as "alpine type" ultramafics.

For reference several of the Thibert Creek ultramafic bodies have been labelled "A", "B", "C", "D", "E", "F".

The exposures of ultramafic can be divided into three types;

- a) unaltered, fine grained, black peridotite
- b) serpentinite
- c) quartz-carbonate-mariposite altered rock

Peridotite:

Small pockets of black, fine grained peridotite are found within all ultramafic bodies visited. Such pockets vary from a few meters to a few centimetres in width. Occasionally such rock was seen near the outer edges of ultramafic bodies. Periodotite would comprise less than 1% of most ultramafic bodies.

<u>Serpentinite</u>:

Dark green waxy serpentine comprises a significant proportion of the ultramafic rocks found between Porcupine Lake and Thibert Creek. No serpentine was seen in ultramafics "A", "B", and "C". Serpentine with trace asbestos was noted within a 15 m wide shear zone crosscutting ultramafic "D".

Quartz-Carbonate-Mariposite Alteration:

The ultramafic bodies occuring along Thibert Creek consist largely of quartz-carbonate-mariposite altered rock. Many of the ultramafic bodies, such as bodies "A", "B", "C", and "D" consist of greater than 90% altered rock.

Silica would appear to be by far the predominant constituent. Emerald green mariposite is present in variable amounts but is also present even if in only trace amounts. Small amounts of calcite and whitish carbonate tentatively identified as magnesite are also present. Since magnesite often incorporates silica into its lattice and forms, a chert-like appearance, some of what appears to be silica may be magnesite and therefore the amount of carbonate may be much greater than it appears.

Outcrops of this altered rock are characteristically brightly iron-stained with orange goethite. Outcrops are also often laced with abundant quartz veinlets generally less than 1 cm thick. Only very rare trace pyrite was seen in such veins. Similar networks of thin quartz veinlets was observed within sedimentary rocks adjacent to the ultramafic bodies (sample sites 054067, 61044, 61020).

Small flecks of a silvery-grey sulphide tentatively identified as arsenopyrite was seen on some fracture surfaces.

GEOCHEMISTRY:

Collection

During 1983, 104 rock, 293 soil and 2 silt samples were collected at locations as shown in fig. #4 (6 sheets). Samples were collected on reccy compass and flag lines or during the course of geological prospecting traverses. All samples were given five or six digit numbers (using numbered sample tickets) and the site marked with a corresponding flag.

During 1984, 193 rock, 1050 soil and 1 silt samples were collected. The results of the rock and silt sampling are shown on fig. #4 (6 sheets) and the results of soil sampling are shown on fig. #5 (3 sheets) and fig. #6 (3 sheets).

All soil samples were collected from the "B" horizon where distinguishable. However, due to the poor soil profile development the actual sample material often consisted of mixed "B" and "C" horizens. Samples were placed in Kraft envelopes and air dried then shipped to the Noranda Lab in Vancouver for analysis.

Silt samples were collected from the finest clastic sediment available in the active stream channel. These were placed in Kraft envelopes, air dried and shipped to the Noranda Lab in Vancouver.

Rock geochem samples were collected by collecting a .25 to 2 kg sample of rock chips from outcrop, or rubble around the sample site. In areas where the sample site is indicated by a long line with two arrows, a composite sample was collected roughly along the indicated line. These samples were generally larger than samples from individual sites.

Analysis:

The 1983 rock samples were analysed for Au, Ag, As. The 1983 silt and soil samples were analysed for Cu, Zn, Pb, Ag, Mo, Ni, Co, As, Au.

The 1984 samples were analysed for Au only. The 1984 silt and soil samples were analysed for Au, Ag, As, Pb.

A description of the analytical technique used is given in Appendix #1.

Results:

A review of the data indicates one main area of interest indicated as "Anomaly A" fig. #6, sheet #2. The area occurs between Line 139+00E and 148+00E north of the Base line 100+00N. Within this area most values are anomalous in either Au or As with values of up to 430 PPb Au and 1000 PPM As recorded. A comparison with the geology and rock geochem data (fig. #4) indicates the area is underlain by ultramafic rocks with a north south trending fault zone having been mapped. In addition the highest values from rock sampling in the 1983 work and 1984 work came from this area.

Other areas of potential interest are "Anomaly B" (see Fig #5, sheet 1, line 127+00E north of BL 100+00N) with values of 20 PPb Au and up to 240 PPM As as well as anomalous Ag values greater than 1 PPM and Pb values greater than 20 PPM. "Anomoly C" (see Fig. #5, sheet 1, line 97+00E and line 100+00E south of BL 100+00N) with As values up to 1000 PPM (1984 soils) and 1400 PPM (1983 soils) High Ni values up to 1800 PPM are also associated with this anomaly. A weak Pb-Zn-Ag anomaly flanks the area of high As values to the south and west.

RECOMMENDATIONS:

The area indicated an Anomaly "A" should be followed up with more detailed mapping, soil and rock sampling. Magnetometer and VLF-EM surveys could be useful in mapping the structure and different phases or alteration of the ultramafic in the area.

Further prospecting and sampling is warrented in the other areas indicated "Anomoly B" and "Anomoly C".

If the north trending structure indicated in the area of "Anomoly A" proves to be significant then the data on the entire area should be reviewed with this in mind. Since the work done to date has been on relatively wide spaced lines (300 m) run in a northeast southwest direction they could straddle a significant northsouth structure.

REFERENCES

Gabrielse, H.: Monger, J.W.H. et al, "Geology Dease Lake (104J) Map Area", Open File 707 Geological Survey of Canada, 1979.

Hader, Kent: "Thibert Creek Property", Noranda Exploration Memorandum, November 1983.

Johnston, W.A.: "Gold Placers of Dease Lake Area, Cassiar District, B.C.", Summary Report, 1925, Part A Geological Survey of Canada.

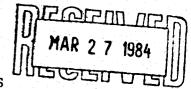
Monger, J.W.H.: "Upper Palezoic Rocks of the Atlin Terrane Northwestern British Columbia and South-Central Yukon", Paper 74-47, Geological Survey of Canada, 1975.

Map 21-2962: "Dease Lake (104J)", Geological Survey of Canada, 1962

B. C. Department of Mines, Bulletin #21, pg. 19, and #28, pg. 57

B. C. Minister of Mines, Annual Report 1931, pg. A53

APPENDIX A



ANALYTICAL METHOD DESCRIPTIONS FOR GEOCHEMICAL ASSESSMENT REPORTS

The methods listed are presently applied to analyse geological materials by the Noranda Geochemical Laboratory at Vancouver.

Preparation of Samples

Sediments and soils are dried at approximately 80° C and sieved with a 80 mesh nylon screen. The -80 mesh (0.18 mm) fraction is used for geochemical analysis.

Rock specimens are pulverized to -120 mesh (0.13 mm). Heavy mineral fractions (panned samples * from constant volume), are analysed in its entirety, when it is to be determined for gold without further sample preparation.

Analysis of Samples

Decomposition of a 0.200 g sample is done with concentrated perchloric and nitric acid (3:1), digested for 5 hours at reflux temperature. Pulps of rock or core are weighed out at 0.4 g and chemical quantities are doubled relative to the above noted method for digestion.

The concentrations of Ag, Cd, Co, Cu, Fe, Mn, Mo, Ni, Pb, V and Zn can be determined directly from the digest (dissolution) with a conventional atomic absorption spectrometric procedure. A Varian-Techtron, Model AA-5 or Model AA-475 is used to measure elemental concentrations.

Elements Requiring Specific Decomposition Method:

Antimony - Sb: 0.2 g sample is attacked with 3.3 ml of 6% tartaric acid, 1.5 ml conc. hydrochloric acid and 0.5 ml of conc. nitric acid, then heated in a water bath for 3 hours at 95° C. Sb is determined directly from the dissolution with an AA-475 equipped with electrodeless discharge lamp (EDL).

Arsenic - As: 0.2 - 0.3 g sample is digested with 1.5 ml of perchloric 70% and 0.5 ml of conc. nitric acid. A Varian AA-475 equipped with an As-EDL is used to messure arsenic content in the digest.

Barium - Ba: 0.1 g sample digested overnight with conc. perchloric, nitric and hydrofluoric acid; Potassium chloride added to prevent ionization. Atomic absorption using a nitrous oxide-acetylene flame determines Ba from the aqueous solution.

Bismuth - Bi: 0.2 g - 0.3 g is digested with 2.0 ml of perchloric 70% and 1.0 ml of conc. nitric acid. Bismuth is determined directly from the digest with an AA-475 complete with EDL.

Gold - Au: 10.0 g sample is digested with aqua regia(1 part nitric and 3 parts hydrochloric acid). Gold is extracted with MIBK from the aqueous solution. AA is used to determine Au.

Magnesium - Mg: 0.05 - 0.10 g sample is digested with 4 ml perchloric/nitric acid (3:1). An aliquot is taken to reduce the concentration to within the

range of atomic absorption. The AA-475 with the use of a nitrous oxide flame determines Mg from the aqueous solution.

Tungsten - W: 1.0 g sample sintered with a carbonate flux and thereafter leached with water. The leachate is treated with potassium thiocyanate. The yellow tungsten thiocyanate is extracted into tri-n-butyl phosphate. This permits colourimetric comparison with standards to measure tungsten concentration.

Uranium - U: An aliquot from a perchloric-nitric decomposition, usually from the multi-element digestion, is buffered. The aqueous solution is exposed to laser light, and the luminescence of the uranyl ion is quantitatively measured on the UA-3 (Scintrex).

* N.B. If additional elemental determinations are required on panned samples, state this at the time of sample submission. Requests after gold determinations would be futile.

LOWEST VALUES REPORTED IN PPM

Ag - 0.2	Mn - 20	Zn –	1	Au - 0.01
Cd - 0.2	Mo - 1	Sb -	1	W - 2
Co - 1	N1 - 1	As -	1	U - 0.1
Cu - 1	Pb - 1	Ba -	10	
Fe - 100	V - 10	Bi -	1	

EJvL/ie March 14, 1984

APPENDIX B

NORANDA EXPLORATION COMPANY, LIMITED

STATEMENT OF COST

DATE

October 1984

PROJECT - Thibert Creek TYPE OF REPORT Geology, Geochem & Linecutting

a) Wages:

No. of Days - 85 Rate per Day - 109.30

Dates From - Sept. 83 - Oct 84

Total Wages 8088

b) Food and Accommodation: and Supplies

No. of Days - 85

Rate per Day - 20.85
Dates From - Sept. 83 - Oct. 84

Total Cost - 1,772.25

c) Transportation:

No. of Days - 85

Rate per Day - 110.85

Dates From - September 83 - October 84

Total cost 8,202.90

d) Analysis \$12,628.70

\$ 12,628.70

\$ 1,500.00

\$ 9,422.25

\$ 9,290.50

\$ 1,772.25

e) Cost of Preparation of Report

Author

\$800 Drafting \$600

Typing \$100

f) Other:

Contractor

Total Cost

\$ 34,613.70

UNIT COSTS

Unit Costs for Geology

No. of Days -

No. of Units -

Unit costs - \$258.647

Total cost - \$13,191.00

Unit Costs for Geochem

No. of Days - 34

No. of Units -

Unit Costs - \$258.64

Total cost - \$8,794.00

ANALYSIS

1983

Rock Geochem

104 x As, Ag, Au 104×9.60

998.40

Soil

293 x Cu, Zn, Pb, Ag, Mo, Ni, Co, As, Au

293 x \$11.20

3,281.60

Silt

2 x Cu, Zn, Pb, Ag, Mo, Ni, Co, As, Au

2 x \$11.20

22.40

\$ 4,302.40

1984

Rock Geochem

193 x Au

193 x \$5.50

1,061.50

Soils

1006 x Au, Ag, As, Pb

 $1006 \times \$7.20$

7,243.20

Silt

1 x Au, Ag, As, Pb

1 x \$7.20

21.60

\$12,628.70 Total Analysis

APPENDIX C

STATEMENT OF QUALIFICATIONS

- I, Ronald G. MacArthur hereby certify that:
 - 1. I am a graduate of Dalhousie University with a Bachelor of Science Degree in Geology (1972).
 - 2. I have been employed as a Geologist by Noranda Exploration since 1972, and currently hold the position of District Geologist, Central Cordillera District.
 - 3. I am a member of the Canadian Institute of Mining and Metallurgy.
 - 4. I am a member of the Geological Association of Canada

Ronald G. MacArthur
District Geologist,
Central Cordillera District
NORANDA EXPLORATION COMPANY, LIMITED
(No Personal Liability)

