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Apr. 4/05

NORANDA EXPLORATION COMPANY, LIMITED

EXECUTIVE SUMMARY REPORT

KATIE PROJECT

SALMO, B.C.

Commodities:

Cu, Au

Date

: September, 1991

Author

W. Epp

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### SUMMARY

Exploration, to date, on the Katie Porphyry Cu-Au Project has produced encouraging diamond drill results and as such continued exploration drilling on the Katie claims is warranted.

The Katie property and zones of Cu-Au porphyry style mineralization are situated at the northern end of a large regional and linear magnetic signature which is seen to persist to the south and west for a distance of 10.0 km. Based on characteristics not unlike that occurring on the Katie property, a regional exploration program is recommended to evaluate this favourable magnetic signature for additional zones of porphyry style Cu-Au mineralization.

The target envisaged for the Katie project is 200-300 million tonnes of open pittable low strip reserves grading 0.35 % Cu and 0.6 g/tonne (0.02 oz/ton).

The most encouraging results to date come from DDH 91-13 which encountered 132.5m @ 0.22% Cu and 0.31 g/tonne (0.009 oz/ton) Au and Hole 91-17 intersected 67.5 m of 0.32% Cu and 0.31 g/tonne (0.009 oz/ton) Au.

These intersections have a signature characterized by a moderate I.P. chargeability and magnetics anomaly, a coincident Cu-Au soil anomaly, and downhole enrichments and positive correlation of Cu grade (>0.20%) with K, Sr, Ba values and epidote alteration.

Four areas warrant additional diamond drilling. Target areas a) and b) below will be tested in the next phase of drilling.

a) further wide spaced diamond drilling on the Katie ground in the vicinity of DDH 91-17 and DDH 91-13.

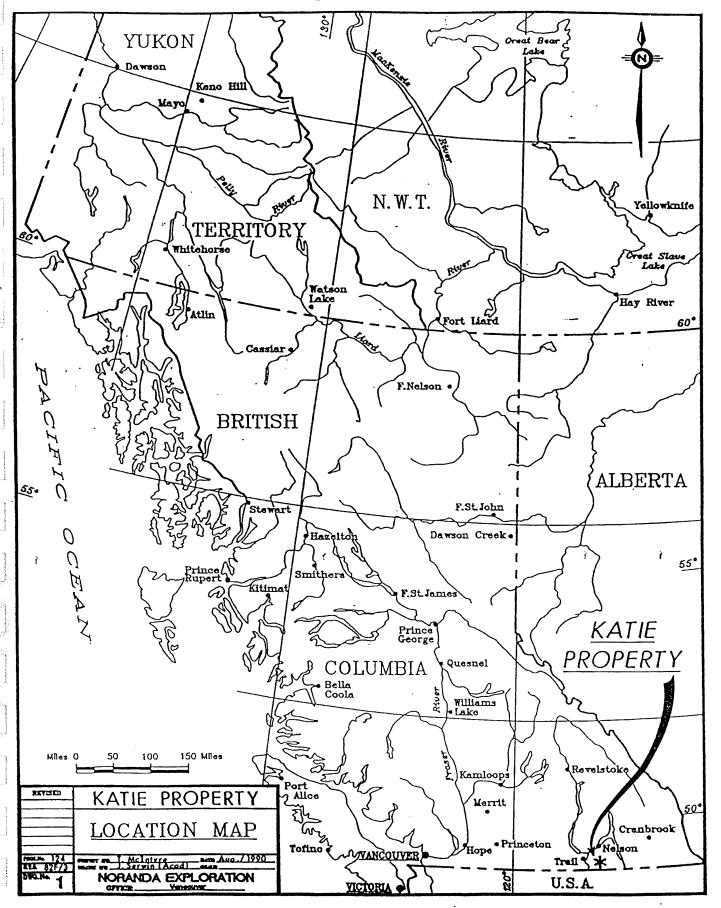
- b) drilling to test the northeastern extension of the Katie grid soil and geophysical anomalies where the NE trending diorites and intruded volcanic stratigraphy appear to strengthen in magnetic character as indicated by ground magnetic surveys and I.P. chargeability.
- c) drill testing of the northerly extension of favourable geology, coincident soil geochemical and moderate I.P. chargeability anomalies along the northern flanks of the high I.P. central zone and
- d) drill one hole in the vicinity of DDH-90-9 (169.5m @ 0.16 % Cu and 0.005 Au) in the SW of the grid.

Regional exploration to evaluate the southwest trending magnetic signature will consist of gridding with winglines established at 200 m centres over which soil sampling will be completed at 100 m intervals. Mapping and outcrop sampling will be performed beyond the limits of the existing grid designed to cover the Swift, Gus and Elise groups. Follow-up in areas identified as having anomalous stream silt and pan geochem results is warranted.

# 1.0 Location and Access (Figures 1, 2)

The Katie group of claims are located in the Nelson Mining Division (NTS 82F/3) approximately 7 km SW of Salmo, B.C. and are accessed by paved and gravel logging roads.

The topography is moderate hills and valleys with elevations ranging from 1250 metres to 1700 metres. Outcrop is limited due to extensive glacial overburden cover.



Series Se M82F/3W 8413 (1a) SEE P BOF/SW) RELY 5 3576 (8) ATT 1 0 E \$ 52.14(8) ELISE IO 5215(8) KATIE EUSE 5 5100 (8) ELISE 1 5196(0) SHEEC 5/99(8) 11/31 58 : 5253(8) KEN MURRAY-KEN MURRAY ELISE 3 5198(8) ELISE 2. ELISE 6 5201 (8) ELISE 60 FALCONBRIDGE **CORONA** ELISE 31 5226(8) ELISE ELISE 34 51.29(8) 5225 (8) ELISE 44 5239(0) ELISE, +3 ELISE ELIST 20 ELISE 40 5238(0) 5234(0) 5235(8) SALMO JOINT VENTURE non s CLAIM MAP DATE: Sept. / 1991 SURVEY BY: \_ PROJ.No. N.T.S. 82F/3W METRES 1000 2000 3000 METRES 1000 SCALE: DWG, No. NORANDA EXPLORATION OFFICE: VANCOUVER

### 2.0 GEOLOGY

# 2.1 Regional Geology (Figure 3)

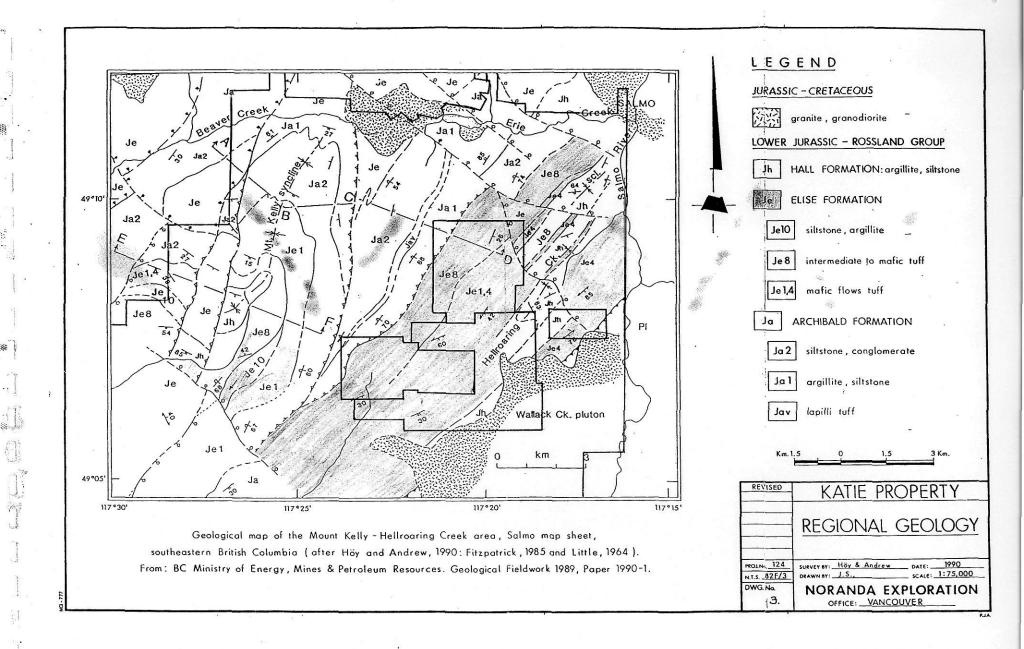
The Salmo area is underlain by Lower Jurassic Rossland Group intermediate volcanic, volcaniclastic and sedimentary rock assemblages which are intruded by Lower Cretaceous Nelson granodiorites.

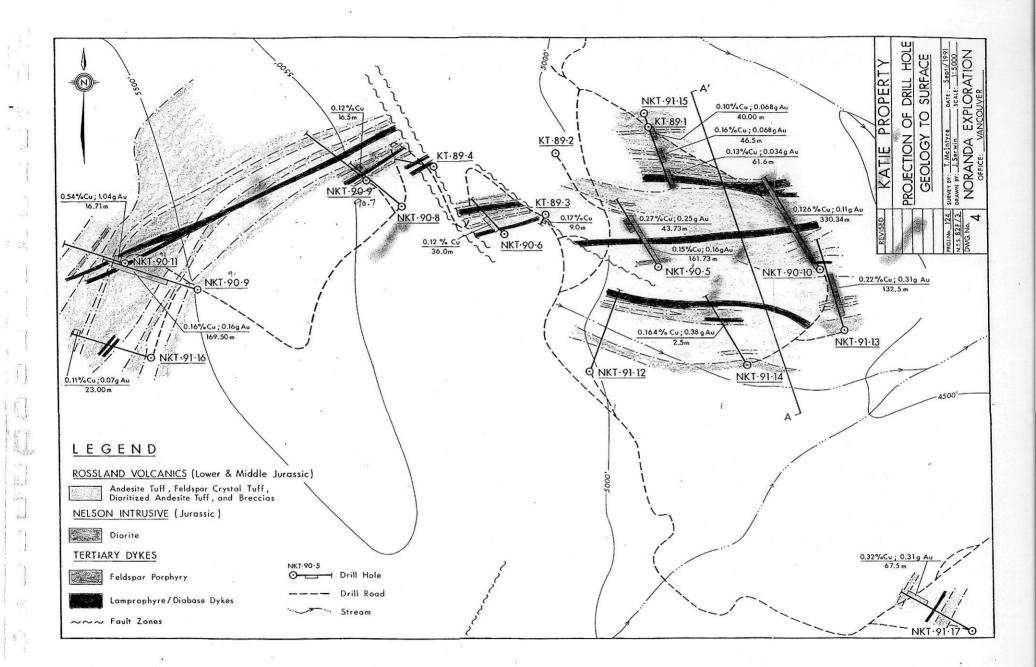
The Rossland Group is host to numerous precious metal deposits and is now recognized as having potential for the occurrence of porphyry copper-gold mineralization associated with alkaline intrusions.

## 2.2 Local Geology (Figures 4,5)

Outcrop on the Katie property is scarce amounting to approximately 2% exposure limited to ridge tops. A thin veneer of overburden has been indicated through drilling with a maximum depth of 15 m. As drilling progresses to the east, overburden thickness is expected to increase. and The Katie property zones of known mineralization as defined by soil geochemistry and drilling are confined to an east facing valley at the headwaters of Hellroaring Creek. Geological knowledge of the underlying stratigraphy is interpreted through 17 widely spread drill holes.

The area as defined by drilling, totalling 1500 m x 600 m suggests a north to near NE trending stratigraphic succession of Lower to Middle Jurassic Aged Rossland Group Volcanics consisting of andesite tuff, feldspar crystal tuff, and andesite breccias. Intruding the stratigraphy are Jurassic aged Nelson Intrusives, dioritic in composition as stocks and dykes. Late Tertiary intrusives of feldspar porphyry, lamprophyre and diabase dykes crosscut the stratigraphy thought to follow zones of structural weakness. Northwest trending faults and shear zones occupy the central portion of drilled stratigraphy exhibiting right lateral offsets.





A' Α NKT-91-13 NKT-90-10 NKT-91-14 NKT-91-15 **GRADES** LEGEND NKT-90-10 330.3 m 0.126%Cu 0.11 g Au GEOLOGY 132.5m NKT-91-13 0.22%Cu 0.31g Au ROSSLAND VOLCANICS NKT-91-15 40.0m 0.10%Cu 0.068 g Au Andesite Tuff , Feldspar Crystal Tuff , Dioritized Andesite Tuff , 0.068g Au 0.034g Au 46.5 m 0.16%Cu 61.6 m 0.13%Cu Breccia 0.16%Cu NKT-91-14 2.5m 0.38g Au NELSON INTRUSIVE REVISED **KATIE PROPERTY** Diorite SCHEMATIC CROSS SECTION TERTIARY DYKES VIEW LOOKING EAST Feldspar Porphyry PROJ.No. 124 SURVEY BY: T. McIntyre DATE: Sept. / 1991 Lamprophyre/Diabase N.T.S. 82F/3 DRAWN BY: 1, Serwin DWG. No. NORANDA EXPLORATION OFFICE: VANCOUVER

### 3.0 PREVIOUS EXPLORATION, RESULTS, and INTERPRETATION

The earliest recorded work (1980 - Amoco) in the Katie area was a soil geochemical and prospecting program which revealed a 1200 m by 400 m zone of anomalous copper.

In 1986 follow-up soil surveys were conducted over this anomaly by local prospector, Ken Murray the results of which further enhanced the anomaly by delineating a zone of 200 to 1200 ppm copper in an area measuring 400 by 500 m.

The grid was extended in 1987 and in 1988 VLF-EM and Total Field Magnetic geophysical surveys were conducted which identified four significant conductors and a high magnetic structure.

Baloil Lassiter Petroleum Ltd. trenched, sampled and drilled 4 holes totalling 249.1 m testing VLF-EM anomalies and intersected anomalous gold values in shear zones. Copper anomalies occurred adjacent to the shear zones. Baloil dropped their option and Noranda entered into an agreement in late 1989.

Noranda has since conducted further mapping, soil geochemistry, induced polarization and magnetometer surveys which led to two diamond drilling programs.

Table 1 documents the surface exploration statistics conducted to date by Noranda.

The first phase of drilling in 1990 by Noranda was designed to evaluate geophysical mag and I.P. high chargeability in areas of coincident Cu-Au soil response. The results of the program produced mixed yet encouraging results of 0.1 to 0.3% Cu and 0.034 to 0.34 gmt Au over core widths up to 300 m in length.

Recognizing that similar geophysical I.P. signatures host major porphyry Cu-Au deposits as illustrated at Cariboo Bell and Ingerbelle where high I.P. chargeability flanks the deposit, a drill program was proposed to test the flanking moderate chargeability zones and coincident soil Cu-Au anomalies in 1991. The best results of the 1991 drill program were returned in NKT91-17 where 67.5 m of altered andesite tuff reported 0.32% Cu and 0.310 gmt Au and NKT91-13 returning 132.5 m of 0.22% Cu and 0.31 gmt Au.

The results of the 1991 drill program suggest zones of high chargeability demarcate halo zones of a higher pyrite low copper zone and the main copper - Au zone is reflected by moderate I.P. with associated Cu-Au gold soil and magnetic response. Copper-gold mineralization is elevated in NKT 91-17 with a positive correlation between enriched K, Ba and Sr indicating the proximity to the potassicly mineralized core of the porphyry Cu-Au system. The areas as defined by NKT 91-10, 13 and 17 are open for extension to the south, east and northeast.

The Falconbridge, Corona and Ken Murray ground to the south of the Katie cover a large linear NE-SW trending airborne magnetic anomaly contiguous with the mag anomaly on the Katie block. This anomaly has potential to produce similar I.P., ground magnetic and Cu-Au soil geochemical responses as seen on the Katie property.

Exploration in the past in this area was for only gold which was thought to be contained within shear zones and thus systematic exploration for copper-gold deposits along the magnetic anomaly were not conducted.

Further exploration in the form of prospecting, mapping and follow-up soil and rock geochemical surveys are required in the areas of pan concentrate silt sample gold and copper anomalies which occur throughout the Corona and Falconbridge ground (Figure 9).

TABLE 1

Detailed production statistics for work carried out on the Katie claims are as follows:

DESCRIPTION '	SURVEY						
	Geochemical	Geophysical (km)	Geological (km)	Linecutting Grid Establ.			
Total no. of samples submitted for analysis:  i) Soils ii) Rocks iii) Drill Core 1990	792 30 1127 899	, neer					
* Total no. of soils not submitted for analysis:	260	·					
Total km of Geophysical Surveys i) I.P. ii) Magnetometer		14.25 36.25					
Total km of Geological Mapping			42	,			
Total km of Linecutting or Grid Establishment:				49.4			

<sup>\*</sup> These samples represent the 50 metre station intervals held in storage at Noranda's Laboratory.

### 4.0 Styles and Controls to Mineralization and Alteration

Copper mineralization occurs predominantly as chalcopyrite with subordinate and variable amounts of bornite, chalcocite, malachite and azurite.

Chalcopyrite occurs as fine disseminations and within fractures filled with calcite. In the higher grade intercepts chalcopyrite forms narrow fracture controlled stringers and coarse aggregates. Gold occurs as inclusions with chalcopyrite or fractures in pyrite.

Mineralization appears to have some lithological and structural control since the best grades are within an altered andesite termed dioritized andesite and often occurs within fractures in this unit. The mineralized zones are found within larger NE to E trending fault lineaments which may also be controlling the geology on the property.

Propylitic alteration characterized by abundant epidote predominates however potassic alteration zones were encountered in DDH 91-17 possibly indicating this hole is proximal to the potassic core of the hydrothermal system.

### 5.0 Exploration Model and Target

The Katie mineralized system has many of the characteristics of a alkalic porphyry copper gold model (Figure 10) in that:

- a) mineralization is within propylitically altered andesitic volcanics and associated with alkalic intrusions,
- b) secondary magnetite is associated with the mineralization,

- a pyrite zone with sub-economic copper grades has been identified by drilling and is expressed by a high chargeability I.P. anomaly. This zone has been subjected to an increase in post mineralization dyking and faulting possibly contributing to more widespread pyritization. There are indications that this zone may have a ringlike surface expression.
- d) K, Sr and Ba enrichments correlate with the best copper grades known to date,
- e) Mineralization is disseminated and microfracture controlled and has been intersected over intervals of up to 300 m long.

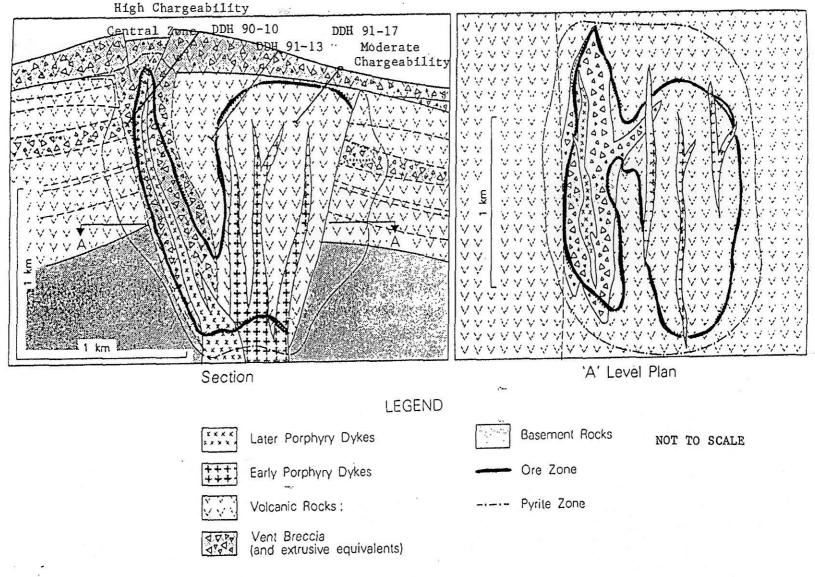
Figure 10 illustrates the section and plan view of the porphyry model and shows where the Katie system is interpreted to lie.

The target for the Katie Project is 200-300 million tonnes of open pittable low strip reserves grading 0.35 % Cu and 0.60 g/tonne (0.02 oz/ton) gold.

### 6.0 Exploration Strategies

Modern exploration strategies for alkalic porphyry copper deposits include:

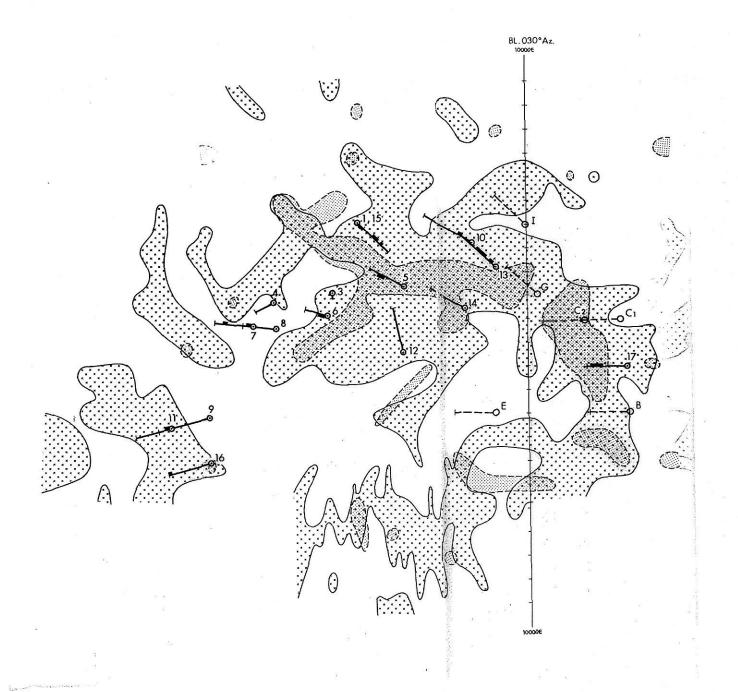
- a) regional and detailed magnetic surveys to isolate areas of high magnetic susceptibility,
- b) detailed mapping to delineate intrusive volcanic rock contacts,
- c) I.P. surveys to locate the sulphide systems,
- d) alteration studies to locate the high potassium zones (gamma ray spectrometer surveys to determine K 40 isotope anomalies and lithogeochemistry whole rock analysis),
- e) multi-element soil and rock geochemistry



INTERPRETATIVE LOCATION OF KATIE MINERALIZATION
WITHIN THE PORPHYRY MODEL

Figure 1º Model of volcanic-type porphyry copper deposits. (After Sutherland Brown, 1976).

£ 11400 N\_\_ \_\_L 11400 N \_\_L 11200 N 11000 N \_\_L 11000 N L 10800 N\_\_\_ \_\_\_L 10800 N 1/5 = 1 10800 N \_\_L 10800 N LEGEND \_\_L 10400 N INDUCED POLARIZATION SURVEY POLE-DIPOLE ARRAY DIPOLE SEPARATION: 50 METERS \_\_L 10200 N CURRENT ELECTRODE EAST OF POTENTIAL DIPOLE CONTOUR INTERVALS 5.0 MSEC 25 0 MSEC L 9800 N\_\_\_ 7900 E 7900 E 8000 E 8100 E 8200 E 8300 E 8400 E 8600 E 8600 E 8600 E 8600 E 8600 E 8600 E 8000 E 9100 E 8600 E 8600 E 8600 E 9100 E 10100 E 10100 E 10100 E 10100 E 10100 E 10100 E NORANDA EXPLORATION CO. LTD. KATIE PROJECT COMBINED GRIDS 1989 AND 1990 Nelson Mining Division Salmo, British Columbia CHARGEABILITY 15 POINT TRIANGULAR FILTER NTS 82 F/3 AND 82 F/4 · Drawing 90305-11 Scale LLOYD GEOPHYSICS INC.



Cu geochem > 80 ppm

( Au geochem > 10 ppb

Drill hole location with significant intersection

O— - Proposed drill holes

7700 E 7500 E 7000 E 6000 E 6101 E 8500 E 8500 E 6500 E 65

11200 N\_\_\_

11 / N....

10-000 N\_\_\_

1 .3 N\_\_

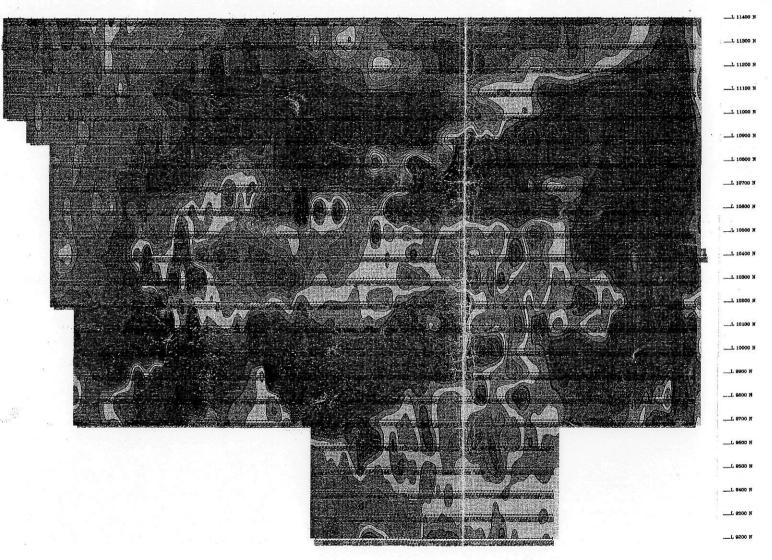
16300 K\_

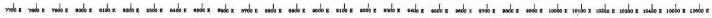
1 D H\_

L 0000 N\_\_\_

L 0 N\_

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#### LEGEND

CONTOUR INTERVALS

100 nT

2500 -m

BASE LEVEL OF 55000 DT REMOVED FROM ALL READIN

INSTRUMENT

EDA OMNI PLUS
EDA OMNI IV BASESTATION

NORANDA EXPLORATION CO. LT.

KATIE PROJECT
COMBINED GRIDS 1989 AND 1990
Nelson Mining Division
Salmo, British Columbia

TOTAL FIELD MAGNETIC CONTOU

NTS 82 F/3 AND 82 F/4

Scale

Drawing 90305-1

LLOYD GEOPHYSICS INC.

## f) high density drilling

Note: Many Cordilleran alkalic porphyry erratically deposits have very distributed economic grade mineralization within the mineralized zones. At Ingerbelle, Copper Mountain it was difficult to correlate geology and copper grades even with 100 ft. drill centres. Daily grade control is based on 20 ft. spaced blast hole assays. average ore grade intersection in the Ingerbelle pit definition drilling is 22 metres.

## 7.0 Recommendations

Recommendations for further work on the property include continued drilling of the geophysical and geochemical anomalies on the Katie claims, and surface exploration using geological, geochemical and geophysical surveys over the N-S trending linear mag anomaly to the south.

## 7.1 Katie Claim Block

## 7.1.1 <u>Diamond Drilling</u> (Figures 6,7)

A program of 1350 m is recommended to further test the Katie area in the next phase of drilling.

Area A - DDH 91-13, 17 Zone - High Priority

Drilling in this area will test:

- a) the area in the immediate vicinity of DDH 91-17.
- b) two linear n-s trending moderate I.P. chargeability responses with coincident copper Au soil and magnetic anomalies proximal yet south and west of DDH 91-17 and,

c) the area between DDH 91-13 and DDH 91-17

Area B - North East extension of Central Zone - High Priority

Drilling in this area is designed to test:

a) the grid NE extension of the geology, soil geochemistry and flanking moderate I.P responses.

This area (approx 650m x 700 m) contains thick overburden and consequently weak sporadic Cu-Au soil anomalies. Moderate I.P. chargeability anomalies extend from the central zone indicating an extension of the sulphide system to the northeast.

## 7.2 Ken Murray Claim Block

The Ken Murray Claim Block lies south of the Katie Area and is within the boundaries of the Falconbridge ground.

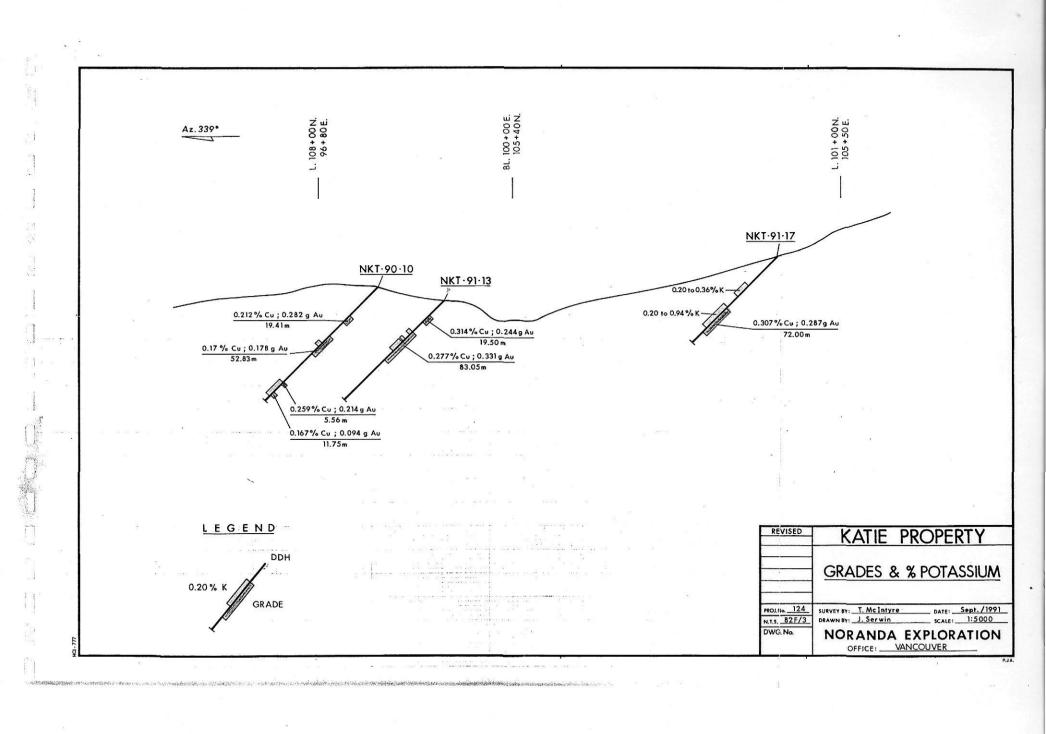
The large, linear northeast-southwest magnetics anomaly bisects this ground. Past exploration concentrated solely on locating the presence of gold mineralization which met with limited success.

Exploration experience on the Katie Block suggests that porphyry copper-gold targets will be associated with the magnetic anomaly and as such gridding, soil sampling, mapping and geophysical surveys are warranted.

## 7.3 Falconbridge Ground (Swift Claims)

The Falconbridge ground is contiguous with and lies south of the Katie Claims and contains the Ken Murray Claim block.

The same magnetic anomaly extends through the Falconbridge claims and requires an exploration program of gridding, soil geochemistry, geophysical surveys and mapping to delineate porphyry copper-gold style drill targets.



## 7.4 Corona Claim Area (Elsie Claims)

The above magnetic anomaly extends further southwest onto Corona ground for 2000 m and then swings east west for an additional 4000 m. Further Phase 1 exploration of gridding, soil and geophysical surveys in conjunction with mapping is warranted to identify areas of potential porphyry copper-gold mineralization.

Numerous pan concentrate copper and gold anomalies occur in drainages within the area of the mag anomaly as well as outside areas. Prospecting, mapping, rock chip sampling is proposed as a first phase exploration program.

Any anomalous zones should then be followed up by more detailed grid soil geochemical surveys and ground I.P. and magnetometer surveys.

A budget of \$150,000 is proposed to conduct the above work.

### 8.0 Recapitulations and Conclusions

Exploration to date on the Katie Project has identified a major sulphide system which has the potential for the discovery of moderate to large tonnage open pittable porphyry copper gold reserves.

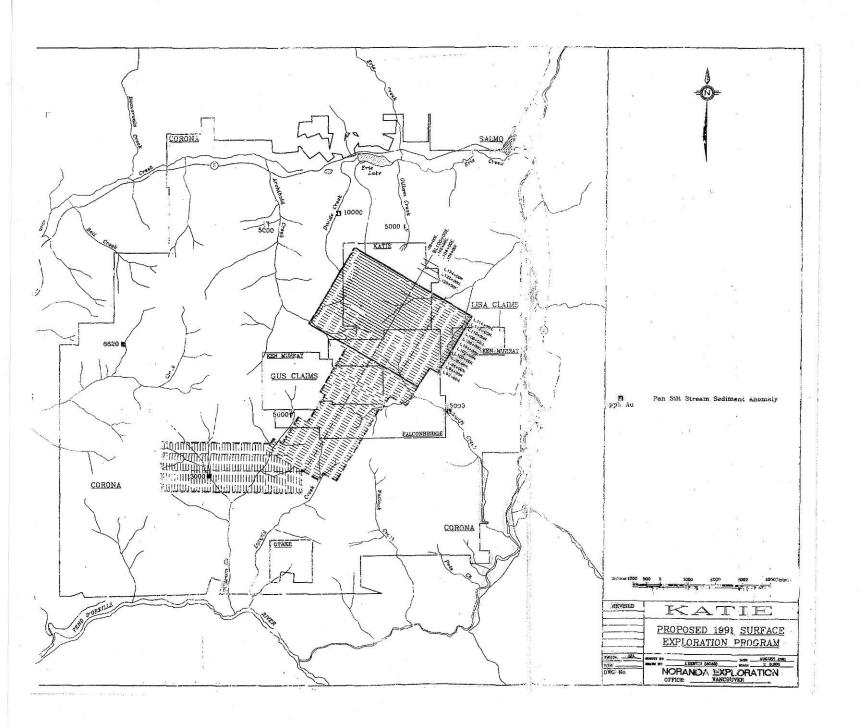
The earmarks of the system/model recognized to date are:

a) association with a large linear (> 10 km) north-south trending airborne magnetic anomaly presumably outlining magnetite bearing dioritic intrusive rocks.

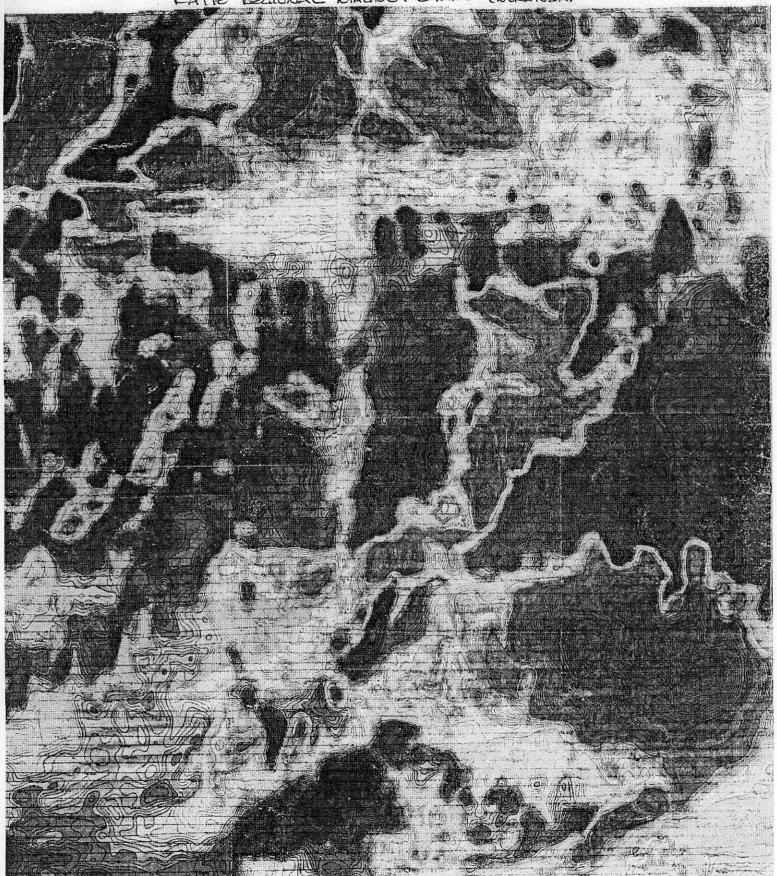
- b) high chargeability zones and coincident anomalous Cu-Au soil geochemistry and associated mag low which may be reflecting the pyritic rim to a copper bearing portion of the system. This area is subject to an increase in post-mineralized dyking and faulting possibly contributing to more dispersed pyritization.
- c) moderate chargeability with associated coppergold soil and moderate mag anomalies reflecting the best Cu grades intersected to date, and
- d) a strong positive correlation between enrichments in K, Ba, and Sr in the zones of best copper grades possibly indicating proximity to the mineralized core of the intrusive hosted sulphide system.

Further wide spaced drilling is required to adequately test the E, N, NE, and NW flanks of the high chargeability/pyrite system for copper-gold orebodies on the Katie Claim.

The magnetics anomaly extends south of the Katie Claims over Falconbridge and Corona ground. Grid mapping, soil geochemistry and geophysical surveys are recommended in order to delineate drill targets for additional Cu-Au porphyry bodies.



KATIE REGIONAL MAGNETIC MAP. (NORANDA)



# SUMMARY OF DIAMOND DRILLING

# TO DATE ON THE KATIE PROPERTY

HOLE NO.	COORDINATES	AZ	DIP	LENGTH (m)	SIGNIFICANT RESULTS		
					Intv. (m)	Cuł	Au g/T
KT-89-1	108+26N 92+95E	13°0	<b>-</b> 4°5	82.35	9.00	0.137	0.070
KT-89-2	ABANDONED IN	OVERBU	RDEN				
KT-89-3	105+33N 91+68E	180	<b>-</b> 65	45.75	9.00	0.17	0.080
KT-89-4	105+05N 89+11E	24°5	<b>-</b> 4°5	121.00	6.00	0.24	0.20
4NKT-90-5	105+57N 94+72E	33°0	<b>-</b> 4°5	238.7 (includes	161.73 ) 43.73	0.151 0.271	0.16 0.25
1KT-90-6	104+46N 91+48E	31°7	<b>-</b> 4°5	150.3	36.00	0.116	0.035
IKT-90-7	104+06N 88+18E	30°9	<b>-</b> 4°5	238.7	4.36	0.145	0.436
1KT <b>-</b> 90-8	103+93N 89+15E	30°9	<b>-</b> 4*5	202.1	16.50	0.117	0.073
NKT-90-9	99+94N 86+18E	288	<b>-</b> 4°5	308.8 (includes	169.50 ) 16.71	0.161 0.538	0.16- 0 1.04- /

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HOLE NO.	COORDINATES	AZ	DIP	LENGTH (m)	SIGNIFI Intv. (m)	CANT RES	ULTS Au g/T	
NKT-90-10	107+35N 97+75E	33 <b>°</b> 0	<b>-</b> 4°5	339.2	330.34	0.126	0.11	
NKT-90-11	99+62N 84+57E	288	<b>-</b> 4°5	214.3	7.50	0.180	0.081	
NKT-91-12	102+83N 94+58E	02 <b>°0</b>	<b>-4</b> °5	271.3	No Sign	ificant P	Results	
NKT-91-13	106+31N 98+80E	34°4	<b>-</b> 4°5	295.6	132.5	0.22	0.310	0.40
NKT-91-14	104+63N 97+38E	33°1	<b>-</b> 4°5	246.9	2.50	0.164	0.382	0.39
NKT-91-15	108+30N 92+81E	162	<b>-</b> 4°5	246.9	40.0 46.5 61.6	0.10 0.16 0.13	0.068 0.068 0.034	
NKT-91-16	98+41N 86+24E	288	-4°5	265.2	23.00	0.11	0.068	
NKT-91-17	102+03N 104+41E	30°0	<b>-</b> 4°5	256.0	67.5	0.32	0.310	0.50