GEOLOGICAL, GEOPHYSICAL AND

GEOCHEMICAL REPORT

ON THE

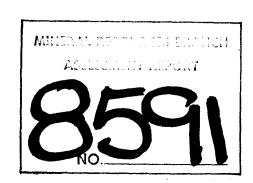
Soc 1 and 2 Mineral Claims

Located in the Revelstoke Mining Division

at Coordinates

51' 29' 118' 11'

82 M /8 E



Ву

G. A. Mathieson-T.Lewis, P. Eng.

(Kamloops)

Noranda Exploration Company, Limited

(No Personal Liability)

July, 1980

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SUMMARY

The Sorcerer Creek tungsten-copper property consists of the Soc 1 and 2 mineral claims, totalling 40 units, staked by A. J. Hurlbert on November 6th, 1979. This report describes the results of five days mapping, geophysics and geochemistry undertaken between May 29th and June 2nd, 1980. It incorporates data obtained in November 1979 during initial geophysical and geochemical surveying of the property.

The claims are located in the Selkirk Mountains, 62 kilometers north of Revelstoke. Access to the property is obtained by helicopter from Revelstoke or Mica Creek Dam. Also, a skid trail exists up Downie Creek, but is in a state of poor repair.

The property covers an area of Cambrian sediments and metasediments consisting of quartzites, phyllites and limestones. These are intruded by a gran-odiorite stock of possible mid-Jurassic age. This intrusion caused contact metamorphism and metasomatism of the surrounding country rocks which in turn caused skarn mineralization to occur in places. Sulphides and scheelite occur in the skarn zone.

A large geochemical anomaly occurs in the south of the surveyed area, however, this does not coincide with any known mineralization.

A magnetometer survey shows a large anomaly, up to 43,000 gammas, over the main sulphide showing. The anomaly continues at a much reduced level southwestwards and may reflect the granodiorite-limestone contact.

CONCLUSIONS AND RECOMMENDATIONS

The Sorcerer Creek property covers a small garnet-pyroxene skarn developed at the contact of a granodiorite intrusion with limestone country rocks. This skarn is mineralized in places with sulphides (pyrrhotite, chalcopyrite, molybdenite and pyrite) and scheelite. Assay results indicate low concentration of copper and tungsten. A possible extension of the skarn to the southwest across Downie Creek is indicated by the magnetometer survey. An extension to the northeast is unlikely at surface but may occur downdip.

It is recommended that the skarn mineralization on the east side of Downie Creek be drilled perpendicular to bedding by one or two diamond drill holes to assess the extent and quality of mineralization downdip of the main showing. From outcrop observations, the mineralization appears to have a lateral extent

of between 5 to 7 meters, with a true thickness of approximately 5 meters. Therefore, it would have to widen out at depth and extend at least a few hundred meters more to be considered economic.

A second anomaly was detected in the southern part of the surveyed grid. High values in lead, zinc and copper in the soils demand follow-up sampling to determine the source and the extent of the mineralization.

INTRODUCTION

The Sorcerer Creek Property consists of two mineral claims, Soc 1 and 2, which were staked in November, 1979. Previously this area had been covered by=various claims belonging to A. J. Hurlbert.

Previous work in the area by Noranda Exploration Company, Limited dates back to 1976. At this time, Gordon Gibson, and later Brian Hughes (1979) performed preliminary examinations on the sulphide showings on the northeast side of Downie Creek.

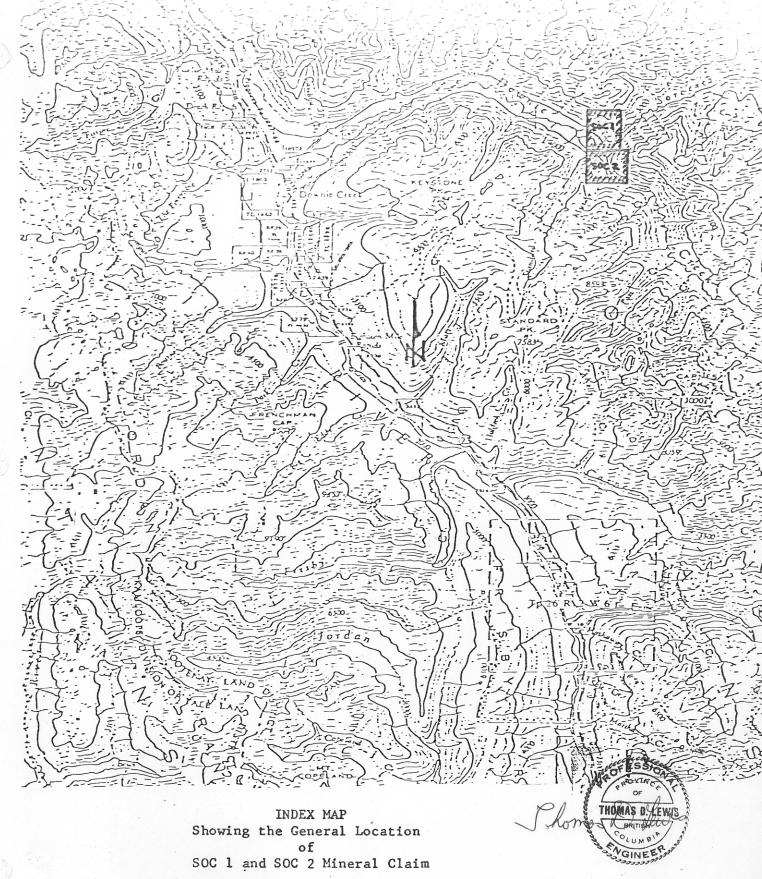
During December, 1979, a control grid was established by B. B. Hughes and I. Saunders on an area on the east side of Downie Creek and also part of the west side. Soil samples were collected at 50 meter intervals on a 50 meter grid, and a magnetometer and VLF survey was undertaken.

At the end of May, beginning of June, 1980, the control grid was completed on both sides of Downie Creek and soil samples were collected as before by the Snake River Contracting Company. Geological Mapping of the property was carried out by G. A. Mathieson and completion of the geophsical survey was performed by T. D. Lewis, L. Warner and R. Forman.

LOCATION AND ACCESS

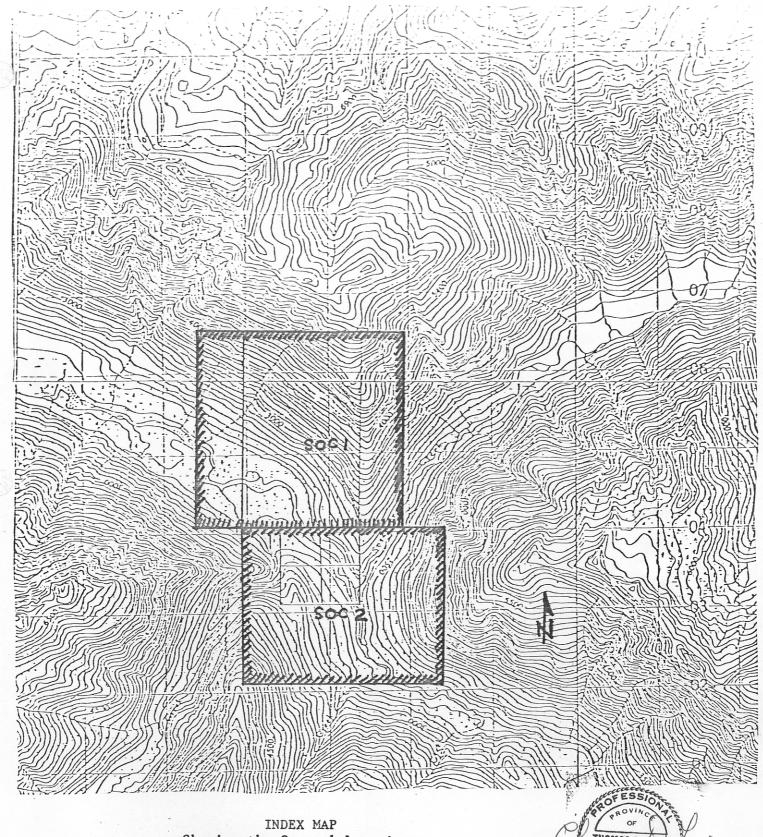
The Sorcerer Creek Property is located in the Selkirk Mountains approximately 62 kilometers north of Revelstoke and 20 kilometers east of the Columbia River-Downie Creek junction. The Soc 1 and 2 claims are centered around junction of Downie and Sorcerer Creeks.

Elevations on the property range from 640 meters to 1525 meters although the area mapped had a maximum elevation of only 945 meters.



Sorcerer Creek Area B.C. Noranda Exploration Company, Limited

Scale 1:250 000 Map Sheet 82M Revelstoke Mining Division August 1980



INDEX MAP
Showing the General Location
of
SOC 1 and SOC 2 Mineral Claim
Sorcerer Creek Area B.C.
Noranda Exploration Company, Limited

Revelstoke
Mining Division

August 1980

Scale 1: 50 000 Map Sheet 82M /8E, 82 M/9E

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Access to the property was achieved by helicopter. Logging roads do exist in the area to the west but none penetrate as far as Sorcerer Creek. Islands in Downie Creek were suitable helicopter pads, but access to these from shore depends on the state of the river.

Sorcerer Creek consists of good open forest to the east of Downie Creek but very thick underbrush and numerous fallen trees make the west side difficult to work in.

CLAIM STATISTICS

Soc 1 and 2 mineral claims are registered in the Revelstoke Mining Division and are owned by Allan J. Hurlbert, Box 921, Salmon Arm, B. C. VOE-2TO. An option agreement exists between Mr. Hurlbert and Noranda Exploration Company, Limited (No personal liability).

Claim Name	Record No.	Units	Record Date			
Soc 1	812	20	Nov. 8, 1979			
Soc 2	813	20	Nov. 8, 1979			

REGIONAL GEOLOGY

The Sorcerer Creek Property lies in an area of Cambrian sediments and metasediments which have been intruded to the west by plutons of monzonite or granodiorite of Mid ?- Jurassic age.

Two sedimentary groups occur prominently in this area: the Hamill group in the east and the Lardeau group to the west and, south of Downie Creek. The Hamill group consists predominately of pure quartzite with rusty weathering, dark grey phyllite occurring south of Sorcerer Creek, and some rare interbeds of rusty-brown carbonate. A large development of greenstone occurs in the Hamill group between Goldstream River and Sorcerer Creek but does not occur on the property. The Lardeau group in this area has a confused stratigraphy. South of Downie Creek dark grey, crenulated phyllite tends to predominate with interbedded light and dark grey limestones. To the north of Downie Creek, at the southeastern end of the acid intrusion, the Lardeau rocks show contact metamorphism to hornfels. Limestones on the north side of the creek, show strong development of skarn mineralization near the contact.

The Bigmouth Creek Stock, which yields K-Ar dates of Mid?-Jurassic age, intrudes the area. It is characteristically porphyritic, of quartz monzonite comp-

osition, which may vary to hornblende syenite in places. Contacts with a many rocks tend to be smooth, sharp, and discordant.

PROPERTY GEOLOGY

Mapping of the property was undertaken using the grid for reference. Outcrop was generally restricted to the higher parts of the ridges and the banks of the creek, which tended to have difficult access and were cliff-like in many places. The local strike of the rocks on the property is northwest and dips are generally to the east and southeast at 40 to 50 degrees.

The area examined consists almost entirely of sedimentary rocks, those close to the intrusion showing contact metmorphic minerals and features.

The major rock types mapped include fine to medium grained crystalline limestones or marbles. They vary in colour from white, or light grey, to dark grey
and may appear 'massive' or colour banded. Well developed wollastonite indicates
contact-metamorphism of the limestones. Dolomitic limestones or marbles also occur in the area but these are patchy in occurrence and could not be traced far in
the outcrop. The limestones in places have fine black micaceous or carbonaceous
laminations which parallel bedding. Generally, recrysalization has occurred in
these rocks.

The limestones are interbedded with a series of phyllites and siltstones varying from very fine grained, silvery coloured crenulate micaceous phyllite to finely laminated siliceous siltstones occassionally containing quartz-pyrite laminations. Azurite and malachite staining was observed on a fracture surface in a dark-grey sandy siltstone.

These siliceous siltstones are observed directly overlying the main showing which occurs sandwiched between these and underlying limestones.

IGNEOUS ROCKS

A small acid pluton thought to be part of the Bigmouth Creek Stock, intrudes the area and is thought to be responsible for the contact metamorphism, skarn, and mineralization occurring on the property.

The rocks in this area are light grey, coarse grained and consist of quartz, plagioclase and K-feldspar, minor biotite and \pm hornblende. Mafics, especially hornblende, increase towards the contact with the country rock. White feldspar may occur as large phenocrysts up to a few centimeters in length.

The intrusion varies from granodiorite to quartz monzonite in composition and is cut pervasively by quartz veins running perpendicular to the river.

METAMORPHIC ROCKS AND MINERALIZATION

These include the contact metamorphosed wollastonite marbles, previously described, and the skarn mineralization.

A well developed garnet skarn exists close to the contact with the intrusion on both east and west sides of the river. Coarse grained garnets predominate although some coarse, well developed pyroxene crystals are also present along with calcite and quartz. The skarn appears to be a maximum of six meters in width, and forms a sharp contact with crystalline limestone. At east shore skarn, a sharp contact exists with the overlying siliceous phyllites. The skarn lies parallel to bedding in the surrounding rocks and may be the result of replacement along a specific sedimentary horizon.

Skarn mineralization consists of large brownish-red garnets and dark green pyroxene, which may be medium grained or idiomorphic coarse vug infillings. Minor calcite and quartz magnetite, pyrite and small amounts of colourless scheelite are also present along with traces of molybdenite. The skarn on the west bank of Downie Creek is the same mineralogically as that on the east bank but does not appear to have the same amount of sulphide mineralization.

Slickensides were observed on some surfaces in the garnet skarn and appear to indicate movement parallel to Downie Creek, with perhaps a small downthrow to the west.

MINERALIZATION

Mineralization occurs in the skarn zone and also in what appears to be pods or fault gouge zones both cutting and paralleling the limestone bedding. Mineralization in these pods consisted mainly of pyrrhotite, magnetite, minor pyrite, chalcopyrite and scheelite hosted in a green chlorite or amphibolite schist. Sulphides occurred as dissemination and stringers within these zones.

Mineralization at the main showing on the east shore of Downie Creek occurs as massive sulphides consisting of pyrrhotite, minor chalcopyrite and pyrite, along with magnetite and scheelite in a garnet-pyroxene skarn host. It is estimated that the stratigraphic extent of the mineralization is, at a maximum, six to seven meters wide. Its continuation horizontally or downdip is unknown.

A large magnetic anomaly lies over the area of this showing and may be due to the high proportion of magnetite and pyrrhotite in the skarn.

Approximately 22 meters of skarn exists parallel to the intrusive-limestone contact. Beyond this (ie-along the strike) no skarn or mineralization was seen on either side of Downie Creek. It is thought, however, that the granodiorite-limestone contact can be traced further on the west side of Downie Creek by means of the magnetic anomaly occurring there.

Samples were taken for assay (see detailed map for sample location) and the following results were obtained:

Sample No.	<u>Au</u>	Ag	Cu	W	<u>Mo</u>
P2916	.001	.33	.33	.19	.01
P2917	.001	•28	.02	.08	.01
P2918	Tr	•25	.25	.30	.01

These results show that the skarn on the west side of Downie Creek contains little mineralization whilst that on the east side of the river contains up to 0.3% W and 0.33% Cu.

CONTROL GRID

A 24.5 km grid was established in November, 1970 and in May, 1980, by Nor-anda Exploration Company, Limited crews using chain and compass techniques. Two baselines were established at Lines 100E and 105E, due to the topography of the area. At right angles to the baselines, crosslines were flagged and stations marked on teflon tags at 25 meter intervals. Crosslines were established from lines 92N to 105N.

GEOCHEMISTRY

A total of 418 samples were collected at 50 meter intervals along the grid lines of Sorcerer Creek. Less than half the samples were collected when the original grid was established in Nov. 1979: the rest were collected by the Snake River Contracting Company whilst completing the grid.

All the samples were analysed for Cu, Zn, Pb, Ag and Mo in the Noranda Exploration company, Ltd. Laboratory at 1050 Davie Street, Vancouver, B.C. The analyst was R. Fenton.

The soil samples were obtained by digging holes with a mattock to depths of 15-30 cm, and where possible, sampling the B horizon. Each sample was placed in a kraft envelope with the station marked on.

Samples were then dried and sieved to -80 mesh. A 0.2 g quantity of sample was then digested in 2 ml of HClO₄ and HNO₃. The sample was diluted to 5 ml and an Atomic Spectrophotometer was used to determine the parts per million Cu, Zn, Pb, Mo and Ag in each sample.

The theory of Atomic Absorption Spectrophotometer is fully outlined in the literature and will not be described in this report.

DISCUSSION OF RESULTS

Two main anomalies were detected out by the Pb, Zn, Ag data which are not reflected by the Cu, Mo values.

The largest and most extensive anomaly occurs to the south of 96+00N and mainly to the east of the 100+00E baseline, although some high values occur to the west of the line. Very high Zn, Pb and occas ionally Ag values occur in the extreme south of the anomaly around the 100E baseline. Slightly elevated Mo values are also found here.

The northeast-southwest trend of this anomaly closely follows that of a fast flowing creek which crosses the area cutting the regional strike of the rocks on the property. Due to poor exposure in this area, except in certain parts of the stream channel, this anomaly cannot be related to any particular rock type, but it is known that the main rock types in this area are crystalline banded limestones and crenulated siliceous or mecaceous phyllites.

Cu and Mo values are not particularly high over this anomaly. High Cu values are found to the west in a band which appears to follow topography but may reflect a particular stratigraphic horizon. The highest Cu values are centered around 97+50E and 92+50E.

The second main anomaly, seen only in the Pb, Zn and Ag values, occurs at 102+50E, 104+00 to 105+00N. This anomaly strikes at approximately the same angle as the limestone beds occurring in the area, and may reflect elevated parts per million of these elements in the rocks. No evidence of mineralization was seen in outcrop.

An interesting anomaly is seen at 97+00E, 97+50N where high Pb, Zn and Ag values coincide with 32 ppm Mo. This is essentially restricted to one station and no geological evidence is available to explain it.

Two more single station Pb, Zn, Ag anomalies occur at 102+00E, 97+00N and 105+50E, 101+50N. The underlying rock type in both cases is thought to be banded crystalline limestone. Neither of these stations has correspondingly high Cu, mo values.

In the northern part of the grid an extremely high Mo value (62 ppm) occurs at 105+50E, 102+50N. A copper value of 400 ppm is seen at 104+50E, 103+50N which may be explained by the presence of a malachite/azurite stained phyllite occurring up slope from the sample.

This survey shows that generally high Pb, Zn and Ag values occurred independently of high Cu, Mo values.

GEOPHYSICAL SURVEYS

Two types of geophysical survey were undertaken on the Sorcerer Creek property: a magnetometer survey and a VLF survey. Readings for these were taken every 25 meters on the 50 meter grid.

MAGNETOMETER SURVEY

The Magnetometer Survey untilized a Scintrex MF-2 vertical Field Fluxgate Magnetometer. Approximately 24.5 km of line were flagged with teflon tags and readings taken every 25 meters.

METHOD

Initially, readings were recorded along the baselines in order to establish a series of base stations. During the coarse of the survey, readings were recorded at these base stations and differences plotted against time to obtain the diurnal variations. Reduced data was obtained by "removing" the diurnal and day to day variations of the magnetometer intensity. The data was then corrected to relate to data from the previous survey by I. Saunders in 1979.

DISCUSSION OF RESULTS

a) Magnetometer Survey

Two anomalous areas were picked up by this survey:

1) L 100±50N/ L 100±00E- this anomaly, which occurs over the main sulphide showing, shows a pronounced magnetic high. A reading of + 43, 000 gammas was recorded over the showing which is known to contain sulphides and magnetic in the skarn. This high drops away sharply with distance from the skarn. On the west side of Formie Creek a weak continuation of this anomaly can be seen

striking at 045. This could indicate the granodiorite-limestone contact below surface.

2) L 100+50N/ L 104+50E- A sizeable anomaly trending north-south lies in this area. A magnetic high of + 3000 gammas has been recorded. The anomaly roughly parallels the outcrop pattern in the area but no evidence to account for the anomaly was found.

A magnetometer base station was established outside camp, and readings were taken there prior to, and after completing a day's work. Correction for drift could then be made. Magnetometer readings were consistently taken facing northwards. The data collected from this visit to the property was corrected to correspond with the work carried out by I. Saunders the previous year. The VLF E.M. data was recorded in a west to east direction for the purposes of filtering.

b) VLF E.M. Survey

The VLF E.M. data was filtered using the Fraser Method and results are presented (see accompanying maps). A number of conductors with north-south trending axes can be picked out.

VLF - E.M. SURVEY

Introduction

The receiver used was manufactured by Sabre Electronic Instuments Limited of Burnaby, B.C. The transmitter is located in Seattle, Washington, Transmitting at a frequency of 18.6 KH₂.

The tilt angle null (in degrees) and field strength were recorded at 25 meter intervals, for a total of 8.8 line kilometers.

Field Procedures

With the V.L.F. receiver held horizontally, the instrument is rotated in the plane until a null is observed. In this position, the coil axis points in the direction of the transmitter. This defines a vertical plane, perpendicular to the transmitter.

The receiver is then held in this vertical plane (operator facing the transmitter) and rotated until a minimum signal is observed. The dip angle of the null is read on the receiver inclinometer and recorded. The following sign convention is used:

- a) Top of the coil axis to the right of operator-sign positive.
- b) Top of the coil axis to the left of operator-sign negative.

Presentation of Results

The VLF - EM dip angle results are plotted on a grid plan map (see dwg.) at a scale of 1:5,000. The resultant dip angles are shown as continuous profiles with a vertical scale of lcm.=20°. In addition the date has been filtered using the Fraser Method, and the filtered data plotted.

APPENDIX I
Statement of Qualifications

STATEMENT OF QUALIFICATIONS

- I, Gillian A. Mathieson of the City of Aberdeen, Scotland, do certify that:
- 1. I have been employed as a Senior Field Geologist by Noranda Exploration Company, Limited since May, 1980 as a summer employee.
- 2. I am a graduate of the University of Aberdeen, Scotland with a Bachelor of Science Degree with Honours in Geology (1979).
- 3. I am presently studying for a Master of Science Degree at Queen's University, Kingston, Ontario.

G. A. Mathieson Geologist Noranda Exploration Company, Limited (No Personal Liability)

STATEMENT OF QUALIFICATIONS

- I, Thomas D. Lewis of the City of Kamloops, Province of British Columbia, do certify that:
- I have been employed as a geologist by Noranda Exploration Company, Limited since April, 1979.
- 2. I am a graduate of Queen's University with a Bachelor of Applied Science in Geology (1975).
- 3. I am a member of the Association of Professional Engineers of the Province of British Columbia.
- 4. I am a member of the Canadian Institute of Mining and Metallurgy.

Thomas D. Laws P Eng., Geologist, Ginee

Noranda Exploration Company, Limited (No Personal Liability)

APPENDIX II
Statement of Costs

NORANDA EXPLORATION COMPANY, LIMITED

STATEMENT OF COST

PROJECT SORCERER CREEK DATE TYPE OF REPORT

a) Wages:

> No. of Days 108

Rate per Day \$77.7310

Dates From: Nov. 12 1979 to Aug. 31 1980

Total Wages × \$ 77.7310 108

8,394.95

b) Food and Accomodation:

No of days 108

Rate per day \$35.59305

Dates From: Nov. 12 1979 to Aug. 31 1980

Total Cost 108 x \$ 35.59305

3,844.05

c) Transportation:

108 No of days

Rate per day \$48.5322

Dates From: Nov. 12 1979 to Aug. 31 1980

Total Cost 108 X \$ 48.5322

5,241.48

d) Instrument Rental:

Type of Instrument EM Unit

No of days 10

Rate per day \$16.00

Dates From:

Total Cost 10 X \$ 16.00

160.00

NOVEMBER 1980

Type of Instrument MAG

10 No of days

\$ 14.00 Rate per day

Dates From:

Total Cost 10 X \$14.00

140.00

f)	Analysis (See attached	schedule)		1,433.75
g)	Cost of prepara	ation of Repo	ort	
	Author	•	734.82	
	Drafting		875.53	1
	Typing		400.00	2,010.35
h)	Other:			
	Contractor: Sn	ake River	2,238.32	2
	Camp & Field Su	pplies	37.73	3
	Communications		18.58	2,294.63
	r			
	:			
.	1.0			23,519.21
lot	al Cost			23,527,621
				•
e)	Unit costs for	Geology Sur	vey	
	No of days	46		
	No of units	46 Employee	Days	
	Unit costs	\$196.56347	/ Employee Day	
	Total Cost	46 x	\$196.56347	9,041.92
	Unit Cost for E	M Curvou		
	No. of Units	24.5 km		
	Unit Cost	\$77.9563 /	km	
	Total Cost		\$77.9563	1,909.93
	Unit Cost for M	IAC Curriou		
	No. of Units	24.5 km		
	Unit Cost	\$105.71	¢105 71	2,589.90
	Total Cost	24.5 X	\$105.71	2,505.50
	Unit Cost for C	Geochem Surve	у	
	No. of Units	275 Samples		
	Cost per Unit	\$20.4168 /	Sample	
	Total Cost	275 X \$	20.4168	5,614.62

Unit Cost for Line Preparation

No. of Units:

24.5 km

Cost per Unit:

\$178.0751

Total Cost:

24.5 X \$178.0751

4,362.89

\$23,519.21

NORANDA EXPLORATION COMPANY, LIMITED (WESTERN DIVISION)

DETAILS OF ANALYSES COSTS

PROJECT: SORCERER CREEK

NOVEMBER 1980

ELEMENT	NO. OF DETERMINATIONS	COST PER DETERMINATION	TOTAL
Cu	275	1.25	343.75
Zn	275	.60	165.00
РЪ	275	.60	165.00
Ag	275	.60	165.00
Мо	275	.60	165.00
W	215	2.00	430.00

\$1,433.75

APPENDIX III
Assay Results



KAMLOOPS RESEARCH & SSAY LABORATORY LTD.

B.C. LICENS ISSAYERS GEOCHEMICAL ANALYSTS METALLURGISTS

2095 WEST TRANS CANADA HIGHWAY - KAMLOOPS B.C. VIS 1A7 PHONE: (604) 372-2784 — TELEX: 048-8320 CERTIFICATE OF ASSAY

10	Noranda Exploration Co. Ltd.	
	201 - 156 Victoria St.	Certificate No. K-2822
	Kamloops, B.C.	Date <u>June 16, 1980</u>

Il harolin cortifu

0/ 1E/4	Marked	GOLD	SILVER	Cu	Мо	W				
		Ounces Per Ton	Ounces Per Ton	Percent	Percent	Percent	Percent	Percent	Percent	Percent
2	P 2916 P 2917 P 2918	.001 .001 TR	.33 .28 .25	.33	.01 .01 .01	.19				
	TR indicates 'trace'									
							•	•		
	·				• 36					

".OIE Hejects retained three weeks. ruips retained months

