

84-#862 - 12924

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

12,924

6/85

**ASSESSMENT REPORT
GEOLOGICAL AND GEOCHEMICAL SURVEY
ON THE
SAPPHO 83 GROUP OF CLAIMS
N.T.S. 82E/2E
49°00'32"N Latitude 118°42'W Longitude
GREENWOOD MINING DIVISION**

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Victoria, B.C.

April 23 - June 14, 1984

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ABSTRACT

During May and June 1984, geological and follow-up geochemical surveys were completed on the Sappho 83 Group of claims by Noranda Exploration Company, Limited.

The claims some 8 km south of Greenwood, B.C., lie on the Canada - U.S.A. border.

Mineralization on the claim group appears to be associated with 4 factors; northeasterly trending Tertiary or Post Tertiary faulting, quartz-feldspar porphyry intrusions, diorite intrusions and possibly original mineralization in the Pre Tertiary greenstone unit (Knobhill ?, Mt. Attwood Formation).

The follow-up geochemical survey consisting of 157 soil samples uncovered a weak east-west trending copper zone with a minor coincidental zinc zone or expression.

1. INTRODUCTION

The Sappho 83 Group of claims, comprising 52 units, is owned by Kettle River Resources Ltd. of Greenwood, B.C. and currently being operated by Noranda Exploration Company, Limited (No Personal Liability), situated at 1050 Davie Street, Vancouver, B.C.

Between April 23rd. and June 14th., 1984 a geological mapping programme (scale 1:12,000) was completed by James. T. Fyles of 1720 Kingsberry Crescent, Victoria, B.C., for Noranda Exploration Company, Limited.

Based on mapping results, an 8.25 km flagged grid was constructed and 157 soil samples were collected. The soils were all analyzed for ppm Cu, Pb, Ag, Zn, Mo and ppb Au.

2. LOCATION AND ACCESS

The Sappho 83 Group of claims are located some 8 km south of Greenwood and 5 km east of Midway, B.C., on the Canada - U.S.A. border. They are centered on longitude 118°42'W and latitude 49°00'30"N, within the Greenwood Mining Division, on N.T.S. mapsheet 82E/2E.

Access is good via the Norwegian Creek road which is followed east from Highway #3 for some 3 km, at which point it crosses Norwegian Creek. From this point it is a .2 km hike south, up an old wagon trail (road) to the Sappho Grid.

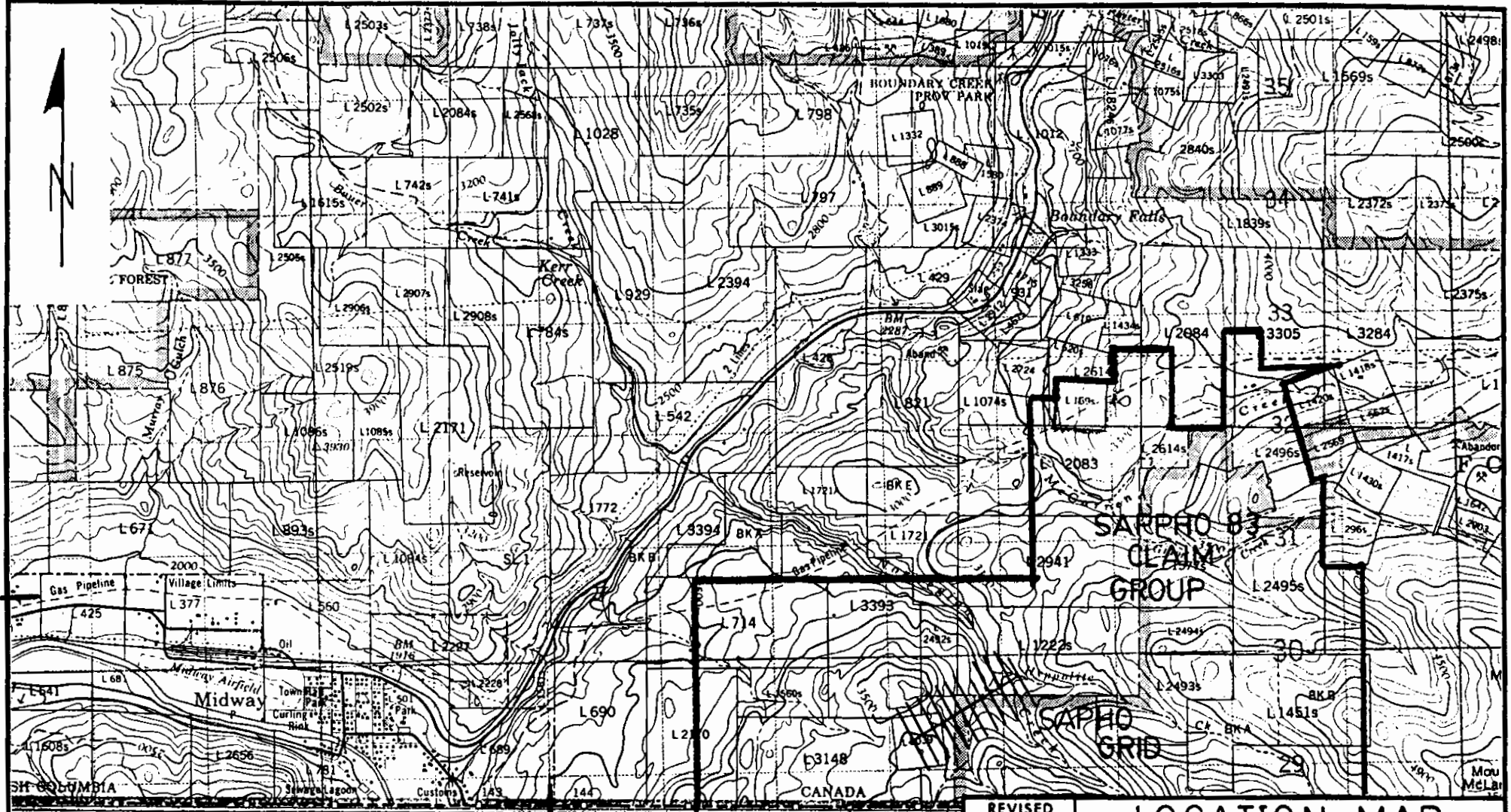
3. TOPOGRAPHY

The Sappho 83 Group of claims encompass the headwaters of Norwegian Creek and part of Hyppolite Creek. Terrain has a moderate slope with a maximum relief of approximately 600 metres and a maximum elevation of 1,370 metres on the Ingerbelle claim at the Canada - U.S.A. border.

4. CLAIM INFORMATION

The following list of Sappho 83 Group claims are those which assessment work is being applied to.

<u>CLAIM NAME</u>	<u>OWNER</u>	<u>RECORD #</u>	<u>ANNIV. DATE</u>
Afton	Kettle River Resources	2280	June 17/84
Amber	Ltd.	3156	July 30/84
Ingerbelle		2773	July 3/84
Wonderful		2961	Dec. 3/84



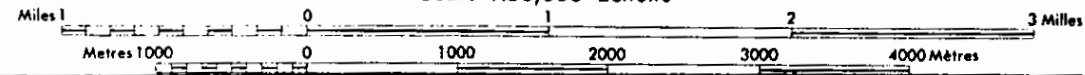
10 67

WASHINGTON 69 70 71 118°45' 73 UNITED STATES OF AMERICA

GREENWOOD

SIMILKAMEEN DIVISION OF YALE LAND DISTRICT
BRITISH COLUMBIA

Scale 1:50,000 Échelle



REVISED	LOCATION MAP	
	SAPPHO 83 GROUP	
PROJ. No. _____	SURVEY BY: _____	DATE: APR. 1, 1984
N.T.S. _____	DRAWN BY: J.K.	SCALE: 1:50,000
DWG. No. _____	NORANDA EXPLORATION	
	OFFICE: _____	

The remaining claims in the Sappho 83 Group are listed below:

CLAIM NAME	OWNER	RECORD #	ANNIV. DATE
Sappho #1	Kettle River Resources	2281	June 17/84
Sappho #2	Ltd.	2282	June 17/84
Sappho #3 Fr.		2732	June 12/87
Sappho #4 Fr.		2733	June 12/87
Sappho #5		2731	June 12/87
PT #1		43	June 10/90
Alki	Noranda Exploration Company, Limited (No Personal Liability)	Tag # 60499	Aug. 27/85

5. HISTORY

The Sappho 83 Group of claims owned by Kettle River Resources Ltd. are centered on the Sappho property which has been a known copper-silver showing since 1916. Over the years minor amounts of gold and platinum have also been associated with the property.

Numerous companies such as Triform Mining Ltd., Coast Exploration Ltd., Silver Standard Mines Ltd. and McIntyre Mines Ltd. have owned, drilled, mapped and done minor geophysics on the Sappho showings in the past, with little success in discovering anything of economic value. (Gilmour, 1981).

6. REGIONAL GEOLOGICAL MAPPING PROGRAMME

6.1 Introduction

During April and May of 1984 a regional mapping programme (scale 1:12,000) was completed by James. T. Fyles of Victoria, B.C. for Noranda Exploration Company, Limited. The programme's purpose was to delineate new or possible extensions of existing mineralized zones.

The following section, written by J.T. Fyles, represents his geological findings.

The claim group contains three blocks or geological assemblages which are terminated by faults within the property. These are:

- a) The No.7 block extending eastward through the No.7 and City of Paris mines;
- b) the Ruby block in the northwest corner of the claim group and beyond;
- c) The Midway Tertiary basin along the western side of the property. Figure 1, is based on the published map of B.N. Church (B.C. M.M. and P.R. Prelim. Map No.2, 1970) and mapping by the writer in April and May, 1984.

6.2 No.7 Block

This block contains northwesterly trending layers of rock which include various types of schist, serpentine, quartz feldspar porphyry greenstone and argillite. South of the quartz feldspar porphyry the formations dip at low to moderate angles to the south, north of it they dip at moderate to steep angles to the north Westward on the Sappho claim group and the quartz feldspar porphyry widens into a massive medium to coarse grained quartz feldspar porphyry stock which is truncated on the west by a northeasterly trending fault. Map patterns suggest that the quartz feldspar porphyry, and related granodiorite and quartz porphyry was intruded into a zone of foliated serpentine and schistose rocks as a semi concordant offshoot of the larger stock. Church (1970) however, describes the serpentine as an intrusion younger than the stock.

On the claim group the greenstone south of the stock is dark green massive aphanitic volcanic rock with a poor cleavage only along the upper contact near the phyllitic argillite. The quartz feldspar porphyry intrudes the greenstone along a relatively narrow complex zone of marginal dykes, greenstone inclusions and contact metamorphism. the southern contact of the stock probably dips at low to moderate angles to the south. Dark grey phyllitic argillite above the greenstone appears to be conformable with it, or at least the cleavage (and the bedding (?)) are parallel to the contact. The greenstone continues west through the Sappho showings and both it and the phyllitic argillite are truncated by the northeasterly trending zone of faulting which passes through the showings.

The No.7 block contains may irregular bodies of Tertiary fine to medium grained diorite (see Church 1970 p. 418) regarded by Church as the source of at least part of the gold copper mineralization in the No.7 - City of Paris area.

6.3 Ruby Block

The Ruby Block is northwest along strike from the serpentine schist and quartz feldspar porphyry of the No.7 block. It is separated from the No.7 block by the covered area in McCarren Creek which probably contains a branch of the zone of faulting through the Sappho showings, and from the Midway Tertiary basin by a series of faults the trace of which is northwest.

The Block contains a heterogeneous group of metamorphic, volcanic and sedimentary rocks which generally trend northwest and dip steeply north. Rock units can be traced with difficulty, bedding attitudes are scarce and probably there are two or more north to northeasterly trending faults through the part of the Block which as been studied between McCarren Creek and the Ruby Mine. The sedimentary rocks include a layer of chert and chert breccia about 300 meters wide (and thick ?) which at many places resembles the Brooklyn sharpstone conglomerate. At places along the upper (?) northeast side of this layer are lenses several meters long and a few meters thick of white finely crystalline limestone. Chert breccia close to these limestone lenses commonly contains limestone cobbles. Greenstone and diorite lie northeast and southwest of the breccia. To the southwest lenses of chert are mixed with the greenstone and farther to the west are outcrops of grey phyllitic argillite. One dyke and several small masses of blocky dark green

aphanitic serpentine have been mapped.

Rocks of the Ruby block are cut by dykes and irregular masses of Tertiary diorite. The Ruby copper skarn mineralization is adjacent to one of these dykes near the limestone - chert breccia contact.

6.4 Midway Tertiary Basin

The eastern edge of the Midway Tertiary basin forms the western part of the claim group. The rocks are mainly porphyritic trachyte and andesite of the Marron Formation. A huge lens of a spectacular breccia forms the hill west of the Sappho showings. This breccia contains blocks of all sizes, up to several meters across, mainly of cherty grey argillite, chert, greenstone and rarely fine grained diorite resembling the Tertiary diorite dykes found widely in the area to the east. Also included are lenses of green volcanic conglomerate composed of rounded andesite and diorite clasts up to 20 cm across in a finer matrix of the same material. These lenses on the cliffs west of the Sappho showings trend west to northwest and dip at low to moderate angles to the north. The coarse breccia is overlain on the west and northwest by andesitic rocks with a conglomeratic and breccia structure and passes northward into trachytic lava. Along the eastern side of the breccia are white quartz veins and irregular bodies of quartz with minor pyrite.

The Tertiary rocks of the Midway Basin are in fault contact with older rocks. This contact trends northeastward through the Sappho showings and curves abruptly to the northwest on the ridge south of the confluence of McCarren and Gidon Creeks. This configuration suggests that the sub-Tertiary fault dips at low angles to the west and south. South dipping minor faults are exposed in older rocks in the canyon of McCarren Creek below Folviks barn (just west of the Alki claim) and in the canyon of Boundary Creek below the falls. North and northeasterly trending faults however, offset this contact in its northwesterly trending section and the true dip of the sub Tertiary fault is uncertain.

6.5 Mineral Potential

The significant showings on the claim group are those mapped by Gilmour et al (see Gilmour 1981) mainly on the PT #1 and Sappho #1 claims. In that area the geology is extremely complicated by extensive faulting. Regional mapping indicates that the mineralization is within a complex northeasterly trending zone of Tertiary and Post Tertiary faulting. The showings are at or close to the place where this zone of faulting crosses the layer of altered mafic volcanic rock not far south of (and above ?) the quartz feldspar porphyry stock. The serpentine and ultramafic rocks are probably related to the greenstone and further alteration (epidote, biotite, hornblende) to the intrusion of the quartz feldspar porphyry stock. The feldspar porphyry dykes referred to by Gilmour (1981 p.9) may be offshoots of the stock. Tertiary diorite dykes comparable to those seen commonly in the No.7 - City of Paris area are faulted and locally altered in the area of the showings. All three of these events (quartz feldspar porphyry intrusion diorite dykes and faulting) as well as possible original mineralization in the mafic rocks have had a bearing on the concentration of metal values in the area of the showings.

One area of comparable favourable geology occurs to the northeast where the quartz-feldspar porphyry, and serpentine are crossed by the northeasterly trending zone of faulting in the Valley of McCarren creek on the Alki claim.

7. GEOCHEMICAL SURVEY

7.1 Introduction

Recent regional mapping by James. T. Fyles found the mineralization of the Sappho showings, mapped by Gilmour et al (see Gilmour 1981), to be associated with northeasterly trending Tertiary and Post Tertiary faulting as well as numerous intrusive bodies. The area immediately northeast of the Sappho showings is by and large one of overburden cover with little if no rock exposure (see Drawing 1). For this reason a geochem grid was installed with soil samples taken every 50 metres along wing lines.

Soils were analyzed for parts per million (ppm) copper, zinc, lead, silver, molybdenum and parts per billion (ppb) gold at Noranda Exploration Company, Limited (No Personal Liability) laboratory, situated at 1050 Davie Street, Vancouver, B.C.

7.2 Control

For control a flagged metric grid was constructed, consisting of a 1.1 km baseline (azimuth 60°) and twelve perpendicular wing lines (totalling 7.15 km) spaced every 100 metres, with 50 metre stations along them.

7.3 Soil Sampling Method

Soil samples taken at 50 metre intervals on wing lines, were obtained by digging holes with a maddock to a depth of 15 - 30 cm where the visible B horizon when ever possible was exposed. Samples were then placed in a "Hi Wet Strength Kraft 3 1/2" x 6 1/8" Open End" envelopes with the grid co-ordinates marked on the envelope with an indelible felt pen.

7.4 Laboratory Analytical Methods

7.4.1 Preparation

The soil samples were dried at approximately 80°C and then sieved with a -80 mesh nylon screen. the -80 mesh (0.18 mm) fraction is then used for geochemical analysis.

7.4.2. Analysis

Ag, Cu, Pb, Zn and Mo: 0.200 grams of -80 mesh material is digested in concentrated perchloric acid and nitric acid (3:1) at reflux temperature for 5.0 hours. A Varian-Techtron Model AA-5 or AA-475 Atomic Absorption Spectrophotometer is then used to determine the parts per million (ppm) silver, copper, lead, zinc and molybdenum in each sample.

Au: 10.0 grams of -80 mesh material is digested with aqua regia (one part nitric acid and 3 parts hydrochloric acid). The resulting solution

is subjected to MIBK (Methylisobutyl Ketone) extraction, which extract is analyzed for parts per billion (ppb) gold using an AA-475 Atomic Absorption Spectrophotometer.

7.5 Presentation of Results

Geochemical soil results are presented in Appendix 1 and on Drawings 2,3 and 4 of this report. Each drawing represents one or more element plotted on a 1:2,500scale grid map (see Table 1).

TABLE 1

<u>Drawing</u>	<u>Elements Plotted</u>
2	Au (ppb) Ag, Pb, Mo (ppm)
3	Cu (ppm) contoured
4	Zn (ppm) contoured

7.6 Discussion of Soil Results

The gold, silver, lead and molybdenum analyses were extremely low ranging from 0.2 - 0.4 ppm Ag, 2 - 16 ppm Pb, < 2 ppm Mo and no greater than 10 ppb Au. These 4 elements are of little significance and have been presented together on Drawing 2 without contours.

The copper analyses, generally low, range from 10 to 280 ppm and are presented on Drawing 3 with contour intervals of 60, 80, 100 and 150 ppm. The resulting anomaly is contained mainly to the south-western portion of the grid and appears to form a somewhat east-west trending weak anomalous zone which truncates the grids south-west corner. More anomalous Cu values of 280, 170 and 160 ppm appear to be associated with areas of disturbance (i.e. Sappho showing's trenches and adits, see Drawing 5) and may be due to contamination. This does not take away from the fact that there is a broad zone of somewhat anomalous Cu values which may be similar to the soil geochem expression of the Sappho showings before trenching. For this reason Zone A on Drawing 5 may warrant further investigation.

Zinc analyses are somewhat lower, ranging between 26 and 130 ppm. But, when contoured at 70 and 100 ppm, a number of sporadic Zn zones appear. The majority of these zones are insignificant as is the case with those found on Line 7600E, south of the base line. These probably represent a slight Zn enrichment caused by flooding waters of the stream flowing along Line 7600E (see Drawing 5).

The zinc zones of interest are those marked A and B on Drawing 4. Zone A is associated with the Sappho showing area. It is similar in shape and coincident with the copper geochem zone for the area. Zone B has slightly higher Zn values than Zone A and may represent the beginning of an anomalous area which is coincidental with the west end of the east-west copper trend in Drawing 3. For this reason the area west of Zone B may be of interest.

8. SUMMARY AND RECOMMENDATIONS

Regional geological mapping by James. T. Fyles during May and June of 1984 discovered that the mineralization of the Sappho showings is associated with 4 factors, northeasterly trending Tertiary and Post Tertiary faulting, quartz feldspar porphyry intrusions, diorite dykes and possibly original mineralization in the greenstones and amphibolites of the Knobhill (?) and/or Mt. Atwood Formations.

Following the regional mapping programme, a geochem grid was established on the basis that northeasterly trending faults are associated with mineralization. The grid covers the main Sappho showing as well as a large overburden area to the north-east which appears to be overlying the favourable greenstone-amphibolite formations.

One hundred and fifty seven soil samples were collected from the grid at 50 metre intervals and analyzed for Au, Ag, Cu, Pb, Zn and Mo.

Overall the soil analyses were low with copper and possibly zinc being the only ones of any significance.

Contoured copper results produce a somewhat east-west trending zone of higher than background Cu values, which diagonally bisects the southwestern portion of the grid. Forming a northern arm of this zone is the main Sappho showing area, which contains the highest copper values of 160, 170 and 280 ppm.

These higher values may in part represent contamination due to trenching and underground work.

The zinc analyses were even lower than the copper values, but, when contoured they formed a zone similar in shape and coincidental with the copper zone of the main Sappho showings.

Another weak zinc zone, on the west edge of the grid is coincidental with the western edge of the east-west trending copper zone mentioned previously and probably trends to the west off the grid. This zone as well as the conspicuous east-west trending copper zone, deserve further follow-up.

Westward and southern extensions of the grid with soil sampling every 25 metres is recommended. Also highly recommended, are soil profiles in selected areas to verify that the proper soil horizon is being tested, as the generally low copper values over the main Sappho showing give rise to suspect of improper horizon sampling.

Final recommendation is a geophysical survey (E.M. and magnetometer) covering the large overburden area north-east of the Sappho showings, as this area may be too thick in cover for geochem detection.

REFERENCES

- Church, B.N. (1970) Lexington, B.C.
Ministry of Mines and Petroleum Resources
pp 413-427
- Gilmour, W.R. (1981) Assessment Report on the Sappho Property
for Kettle River Resources Ltd.
GOMS Report #56.

APPENDIX 1

GEOCHEM RESULTS

(Au, Ag, Pb, Zn, Cu, Mo)

NORANDA GEOCHEM LABORATORY

LOCATION GREENWOOD PROJECT 15 COLLECTOR JK DATE RECEIVED JUNE/22/84 CODE 8406.04 SHEET 1

MATERIAL SOIL DATE ANALYSED JUNE/29/84 ANALYST RF

REMARKS Cu, Zn, Pb, Ag, Mo in ppm Au in ppb

1.3g/3ml HClO₄:HNO₃ → 5ml

10g/Agua Regia - MIBK - AA

T.T. NO.	SAMPLE NO.	Cu	Zn	Pb	Ag	Mo	Au						NTS	GCJ
													82 E/2	5140
6	77E-66.5N	18	42	4	0.2	< 2	10							
7	-67	24	54	4	0.2	< 2	10							
8	-67.5	20	50	4	0.4	< 2	10							
9	-68	16	44	4	0.2	< 2	10							
70	-68.5	18	60	4	0.2	< 2	10							
1	-69	16	46	6	0.2	< 2	10							
2	-69.5	14	64	4	0.2	< 2	10							
3	-70	34	66	4	0.2	< 2	10							
4	-70.5	16	50	4	0.2	< 2	10							
5	-71	20	58	4	0.2	< 2	10							
6	-71.5	16	44	2	0.2	< 2	10							
7	-72	40	46	4	0.2	< 2	10							
8	-72.5	18	40	8	0.2	< 2	10							
9	77E-73N	18	52	8	0.2	< 2	10							
80	69E-73N	68	48	12	0.2	< 2	10							
51	69E-72.5N	34	52	6	0.2	< 2	10							

MATCH TO
WAD + FIVE

6/1/84

NORANDA GEOCHEM LABORATORY

LOCATION GREENWOOD PROJECT 15 COLLECTOR JK DATE RECEIVED JUNE/22/84 CODE S406-649 SHEET 2
 MATERIAL SOIL DATE ANALYSED JUNE/29/84 ANALYST RF
 REMARKS Cu, Zn, Pb, Ag, Mo in ppm; Au in ppb

T.T. NO.	SAMPLE NO.	Cu	Zn	Pb	Ag	Mo	Au	NTS	GCS
82	69E-72N	24	44	4	0.2	< 2	10	82E/2	
3	-71.5	40	58	6	0.2	< 2	10		
4	-71	42	66	8	0.2	< 2	10		
5	-70.5	28	74	6	0.2	< 2	10		
6	-70	130	78	8	0.2	< 2	10		
7	-69.5	72	82	10	0.2	< 2	10		
8	-69	88	62	6	0.2	< 2	10		
9	-68.5	88	62	6	0.2	< 2	10		
90	-68	58	54	6	0.2	< 2	10		
1	-67.5	74	54	8	0.2	< 2	10		
2	69E-67N	70	58	6	0.4	< 2	10		
3	76E-66.5N	16	120	4	0.2	< 2	10		
4	-67	28	130	4	0.2	< 2	10		
5	-67.5	34	110	6	0.2	< 2	10		
6	-68	42	58	6	0.2	< 2	10		
7	-68.5	20	110	4	0.2	< 2	10		
8	-69	10	26	2	0.2	< 2	10		
9	76E-69.5N	16	76	2	0.2	< 2	10		
1	76E-70N	54	74	6	0.4	< 2	10		
2	-70.5	16	30	2	0.2	< 2	10		
103	76E-71N	15	84	2	0.2	< 2	10		

NORANDA GEOCHEM LABORATORY

LOCATION GREENWOOD PROJECT 15 COLLECTOR JK DATE RECEIVED June / 22 / 84 CODE 8406-049 SHEET 6
 MATERIAL Soil DATE ANALYSED July / 3 / 84 ANALYST R.F.
 REMARKS Cu Zn Pb Ag Mo in ppm Au in ppt
0.2 g / 2 mL HClO₄ : HNO₃ → 5 mL 10 g / Aqua-regia : HIOK / H.N

T.T. NO.	SAMPLE NO.	Cu	Zn	Pb	Ag	Mo	Au							
1														
2	78E - 71 N	22	56	8	0.2	< 2	10							
3	67E - 67 N	38	54	4	0.2	< 2	10							
4	67.5	24	70	10	0.4	< 2	10							
5	68	28	70	4	0.2	< 2	10							
6	68.5	54	44	4	0.2	< 2	10							
7	69	64	92	16	0.2	< 2	10							
8	69.5	74	92	6	0.4	< 2	10							
9	70	88	84	12	0.4	< 2	10							
10	70.5	52	58	6	0.4	< 2	10							
1	71	20	60	6	0.2	< 2	10							
2	71.5	22	50	6	0.2	< 2	10							
3	72	28	58	12	0.2	< 2	10							
4	72.5	24	54	8	0.2	< 2	10							
5	67E - 73 N	36	78	16	0.4	< 2	10							
6	68E - 73 N	40	66	8	0.2	< 2	10							
7	72.5	24	40	6	0.2	< 2	10							
8	72	22	52	4	0.2	< 2	10							
9	71.5	180	82	8	0.2	< 2	10							
20	71	170	74	8	0.4	< 2	10							
1	70.5	160	62	6	0.4	< 2	10							
22	68E - 70 N	64	54	6	0.4	< 2	10							

NORANDA GEOCHEM LABORATORY

LOCATION GREENWOOD PROJECT 15 COLLECTOR KJ DATE RECEIVED June / 22 / 84 CODE Yact 049 SHEET 7
 MATERIAL Soil DATE ANALYSED July / 3 / 84 ANALYST R.F.
 REMARKS Cu, Zn, Pb, Ag, Mo in ppm Au in ppb.
0.2 g/2 mL HClO₄ : HNO₃ → 5 mL 10 g/Agave-Pepin : MIBK / A.A.

T.T. NO.	SAMPLE NO.	Cu	Zn	Pb	Ag	Mo	Au							
23	68E-69.5 N	74	52	6	0.4	< 2	10							
4	69	72	50	6	0.4	< 2	10							
5	68.5	84	50	6	0.4	< 2	10							
6	68	120	60	8	0.4	< 2	10							
7	67.5	82	62	8	0.4	< 2	10							
8	68E-67 N	58	100	8	0.4	< 2	10							
1	74E-66.5 N	14	54	6	0.2	< 2	10							
30	67	16	54	6	0.2	< 2	10							
1	67.5	22	52	6	0.4	< 2	10							
2	68	16	60	6	0.2	< 2	10							
1	68.5	14	66	6	0.2	< 2	10							
4	69	14	60	4	0.2	< 2	10							
5	69.5	12	52	4	0.2	< 2	10							
6	70	10	34	4	0.2	< 2	10							
7	70.5	14	34	4	0.2	< 2	10							
8	74E-71 N	22	30	6	0.2	< 2	10							
9	70E-73 N	46	28	8	0.2	< 2	10							
40	72.5	28	52	8	0.2	< 2	10							
1	72	36	50	8	0.4	< 2	10							
2	71.5	26	62	10	0.4	< 2	10							
3	71	28	82	12	0.4	< 2	10							
44	70E-70.5 N	66	56	6	0.4	< 2	10							

NORANDA GEOCHEM LABORATORY

LOCATION GREENWOOD PROJECT 15 COLLECTOR EJ DATE RECEIVED June / 22 / 84 CODE Sub. 549 SHEET 5
 MATERIAL Soil DATE ANALYSED July / 3 / 84 ANALYST R.F.
 REMARKS Cu, Zn, Pb, Ag, Mo in ppm Au in ppb
0.2 g / soil HClO₄: HNO₃ → 5 ml 10 g / Ague. Regia: HClO₄ / PA.

T.T. NO.	SAMPLE NO.	Cu	Zn	Pb	Ag	Mo	Au								
45	70 E - 70 N	60	52	6	0.4	< 2	10								
6	69.5	52	54	6	0.2	< 2	10								
7	69	52	54	6	0.4	< 2	10								
8	68.5	52	58	6	0.4	< 2	10								
9	68	34	46	6	0.2	< 2	10								
50	67.5	52	64	8	0.2	< 2	10								
1	67	14	42	4	0.2	< 2	10								
2	70 E - 66.5 N	130	42	4	0.4	< 2	10								
3	75 E - 66.5 N	12	42	4	0.2	< 2	10								
4	67	12	36	4	0.2	< 2	10								
5	67.5	14	42	4	0.2	< 2	10								
6	68	16	50	6	0.2	< 2	10								
7	68.5	16	50	6	0.2	< 2	10								
8	69	16	56	6	0.2	< 2	10								
9	69.5	16	56	6	0.2	< 2	10								
60	70	16	48	4	0.2	< 2	10								
1	70.5	12	36	6	0.2	< 2	10								
2	71	16	32	4	0.2	< 2	10								
3	71.5	22	24	6	0.4	< 2	10								
4	72	26	68	6	0.2	< 2	10								
5	72.5	18	48	8	0.2	< 2	10								
66	75 E - 73 N	16	56	6	0.2	< 2	10	(5.0)							

APPENDIX 2
STATEMENT OF COSTS

NORANDA EXPLORATION COMPANY, LIMITED

STATEMENT OF COST

PROJECT: Sappho 83 Group

TYPE OF REPORT

a) Wages:

No. of Days	12	
Rate per Day	\$ 90.1625	
Dates From:	April 23 - June 13	
Total Wages	12 x 90.1625	1081.95

b) Food and Accomodation:

No. of days	12	
Rate per day \$	50	
Dates From:	April 23 - June 13	
Total Cost	12 x \$50	600.00

c) Transportation:

No. of days	12	
Rate per day \$	100	
Dates From:	Apr. 23 - June 13	
Total Cost	12 x 100	1200.00

d) Instrument Rental

Nil

f) Analysis

(See attached schedule)

1256.00

g) Cost of preparation of Report

Author 1 day at 90.1625	90.16
Drafting	500.00
Typing	100.00

h) Other: J. T. Fyles, PhD, D. Eng.
Consulting Geologist

2982.80

TOTAL COST

\$7810.91

e) Unit costs for: Geology

No. of days	6	
No. of units	6	
Unit costs	\$554.646/eme day	
Total Cost	\$554.646 x 6	\$3327.88

Unit Costs for Geochemistry

No. of days:	12	
No. of units:	157 samples	
Unit Costs	\$28.5543	
Total Cost	\$28.5543 x 157	<u>4483.03</u>

\$7810.91

NORANDA EXPLORATION COMPANY, LIMITED

(WESTERN DIVISION)

DETAILS OF ANALYSES COSTS

PROJECT Sappho 83

<u>ELEMENT</u>	<u>NO. OF DETERMINATIONS</u>	<u>COST PER DETERMINATION</u>	<u>TOTAL</u>
Au	157	3.50	549.50
Ag	157	1.60	251.20
Cu	157	.60	94.20
Pb	157	.60	94.20
Zn	157	.60	94.20
Mo	157	.60	94.20
	157 Sample Preparations	.50	78.50

1256.00

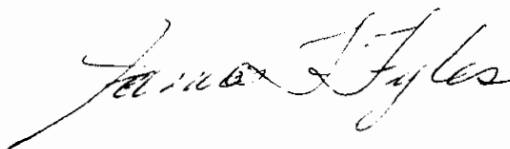
APPENDIX 3

STATEMENT OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

I, James T. Fyles of 1720 Kingsberry Crescent, Victoria, B.C.
hereby certify that:

- 1) I am a consulting geologist and Director of Kettle River Resources Ltd.
- 2) I have practiced my profession in British Columbia since 1948.
- 3) I am a graduate of the University of British Columbia (B.A.Sc. '47, M.A.Sc. '49) and of Columbia University (PhD '54)
- 4) I am a registered Professional Engineer in British Columbia (#2563) Fellow of the Geological Association of Canada, a Fellow of the Society of Economic Geologists and a Member of the Canadian Institute of Mining and Metallurgy.
- 5) This report is based on field work done by me in the area shown on the included map.



James T. Fyles

Victoria, B.C.

STATEMENT OF QUALIFICATIONS

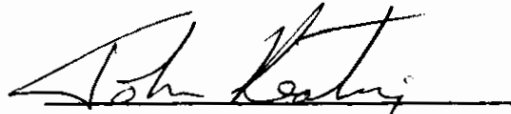
I, John Keating of the City of Vancouver, Province of British Columbia,
do hereby certify that:

I am a resident of British Columbia, residing at 1877 West 5th.
Avenue.

I am a graduate of Concordia University, Montreal, with a Bachelor
of Science Degree in Geology.

I am a member in good standing with the Canadian Institute of
Mining and Metallurgy.

I have been a temporary employee with Noranda Exploration Company,
Limited since May, 1979 and a permanent employee since March, 1983.

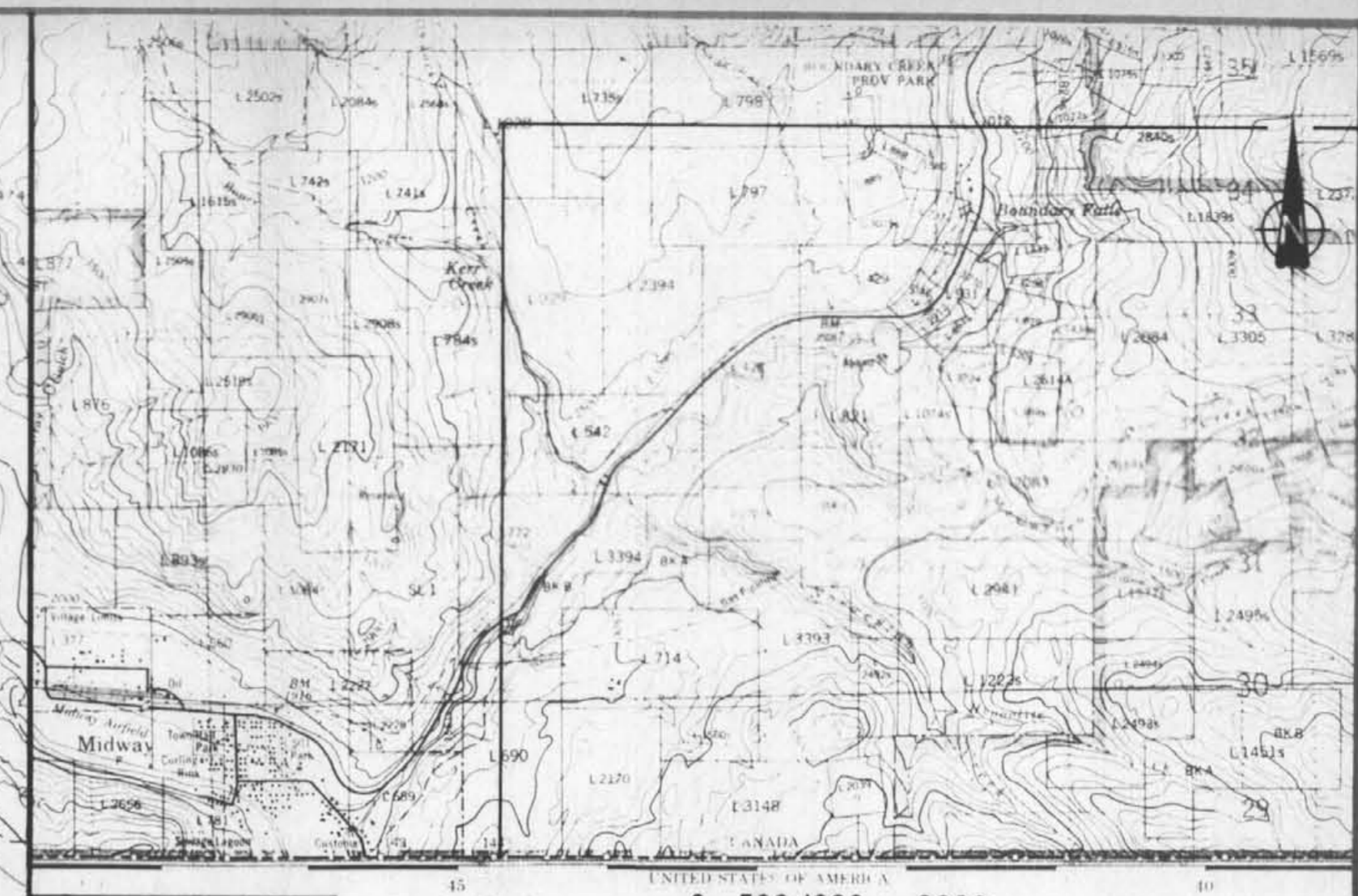


John Keating

Project Geologist

Noranda Exploration Company

Limited(No Personal Liability)



SCALE: 1:50,000
0 500 1000 2000 meters

LEGEND

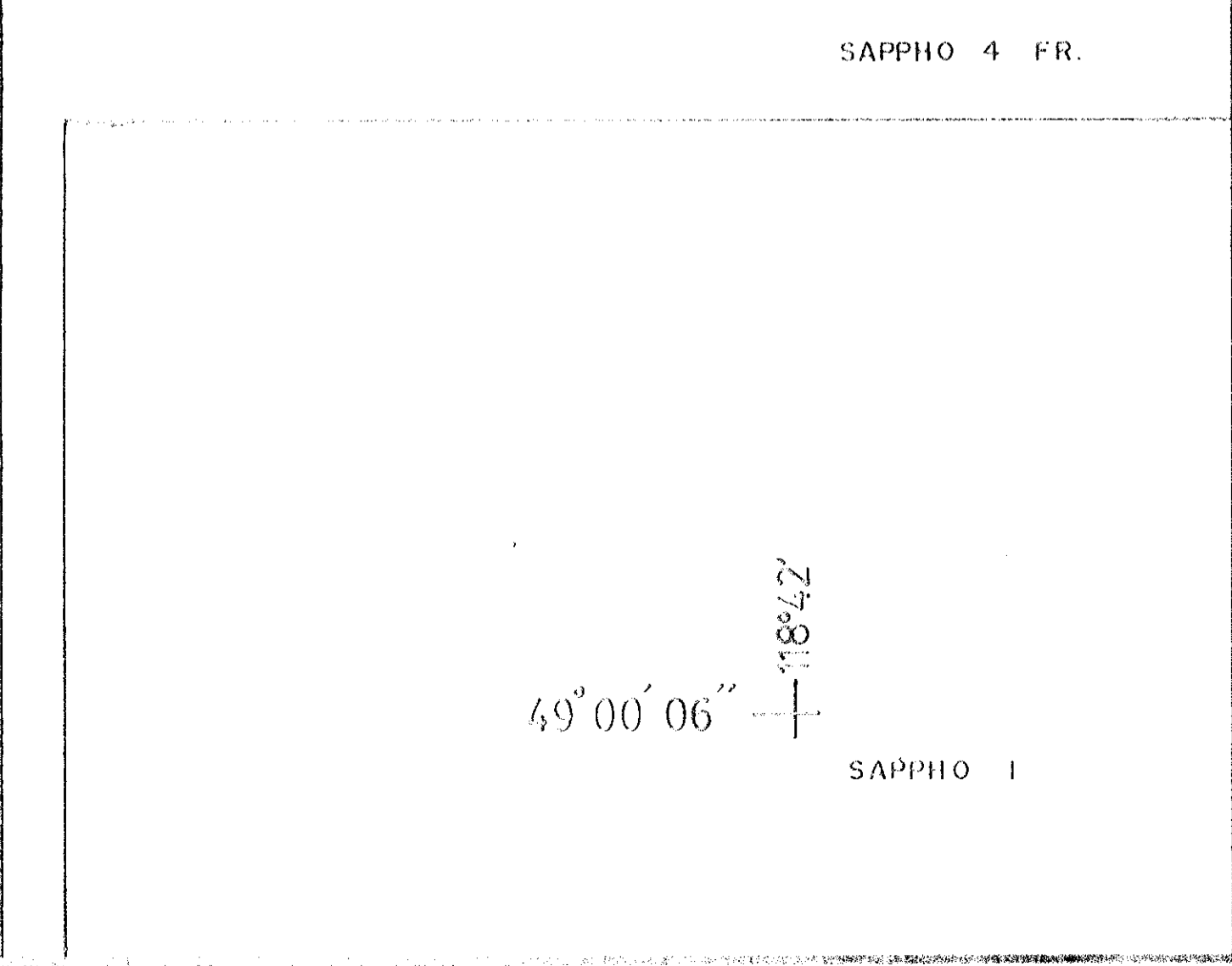
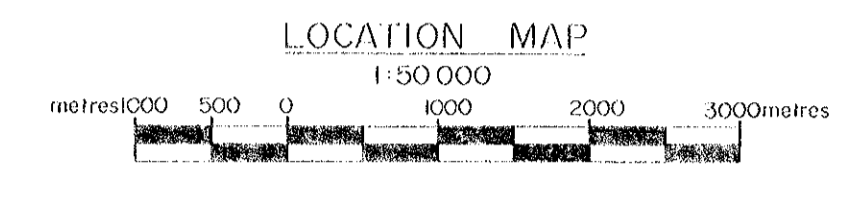
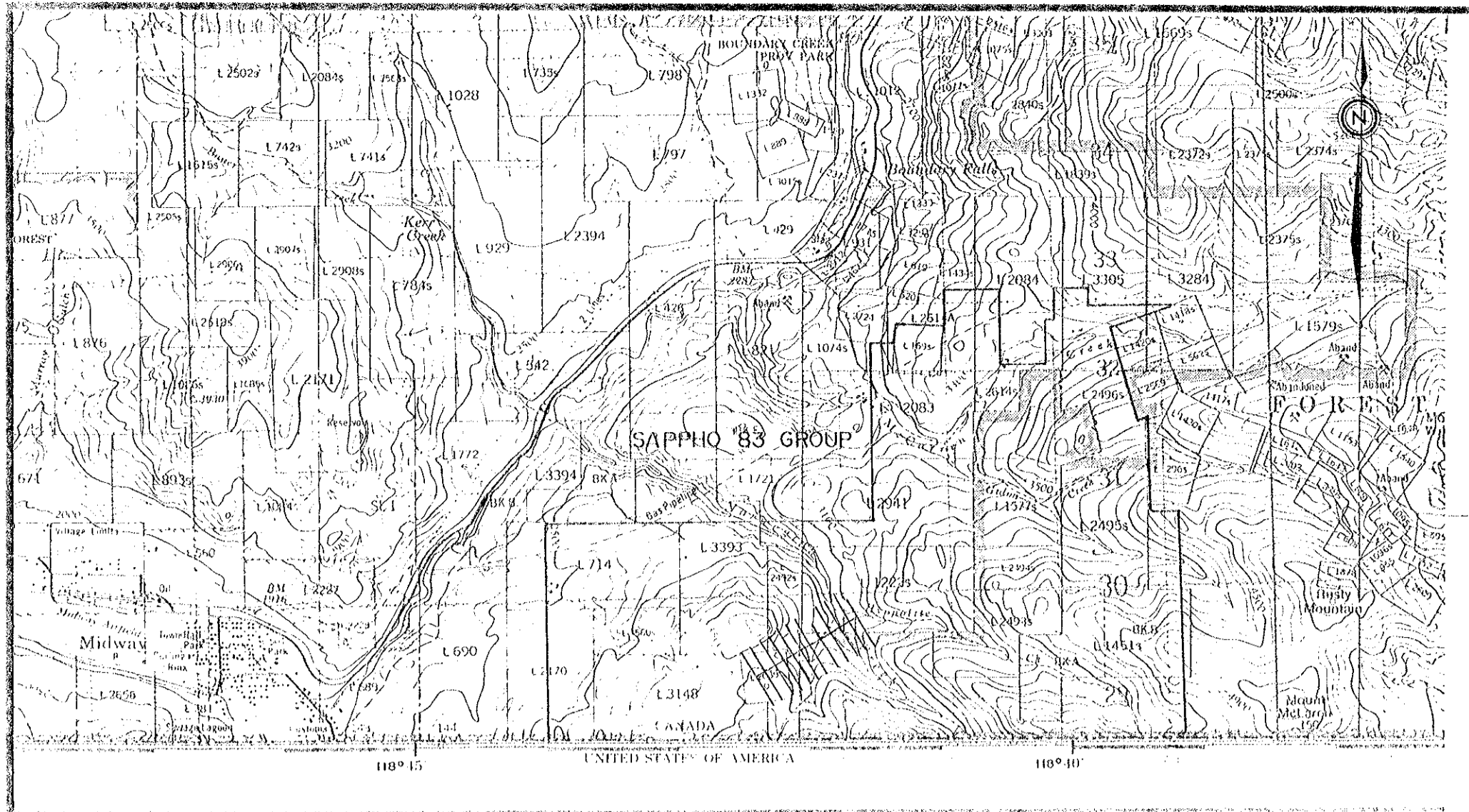
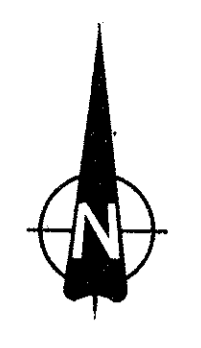
- TERTIARY**
- Td BIOTITE DIORITE
 - Tt TRACHYTE & ANDESITE
 - Tbx BRECCIA (KLONDYKE MTN. FM.)
- PRE-TERTIARY**
- BROOKLYN(?) FORMATION**
- Bgs GREENSTONE
 - Bls LIMESTONE
 - Bbx BRECCIA (SHARPSTONE CONG.)
- KNOB HILL(?) AND ATTWOOD(?) GROUPS**
- a BLACK PHYLLITIC ARGILLITE
 - gs GREENSTONE & AMPHIBOLITE
- INTRUSIVE ROCKS**
- qfp QUARTZ FELDSPAR PORPHYRY
 - dl DIORITE
 - sp SERPENTINE
- AREAS OF LITTLE OR NO OUTCROP
- GEOLOGICAL CONTACT**
DEFINED, APPROXIMATE, ASSUMED
- FAULT**
DEFINED, APPROXIMATE, ASSUMED
- BEDDING & PRIMARY LAYERING**
- SCHISTOSITY**
- LINEATIONS**
- MINE WORKING**
- CLAIM BOUNDARY**

SCALE: 0 100 1000 meters

REVISED	SAPPHO 83 CLAIM GROUP	
	REGIONAL GEOLOGY	
PROJ No 15	SURVEY BY J.F.	DATE JUNE 1984
N.T.S 82E/2	DRAWN BY J.F., W.M.	SCALE 1:12,000
DWG No 1	NORANDA EXPLORATION	
	OFFICE VANCOUVER	

GEOLOGICAL BRANCH
ASSESSMENT REPORT

12,924



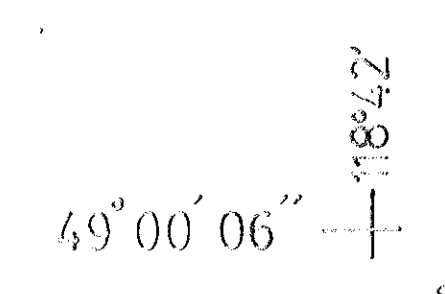
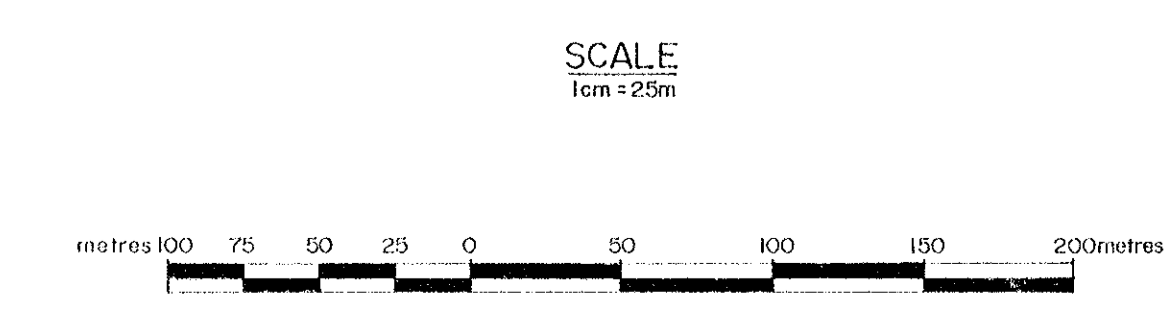
GEOLOGICAL BRANCH
ASSESSMENT REPORT

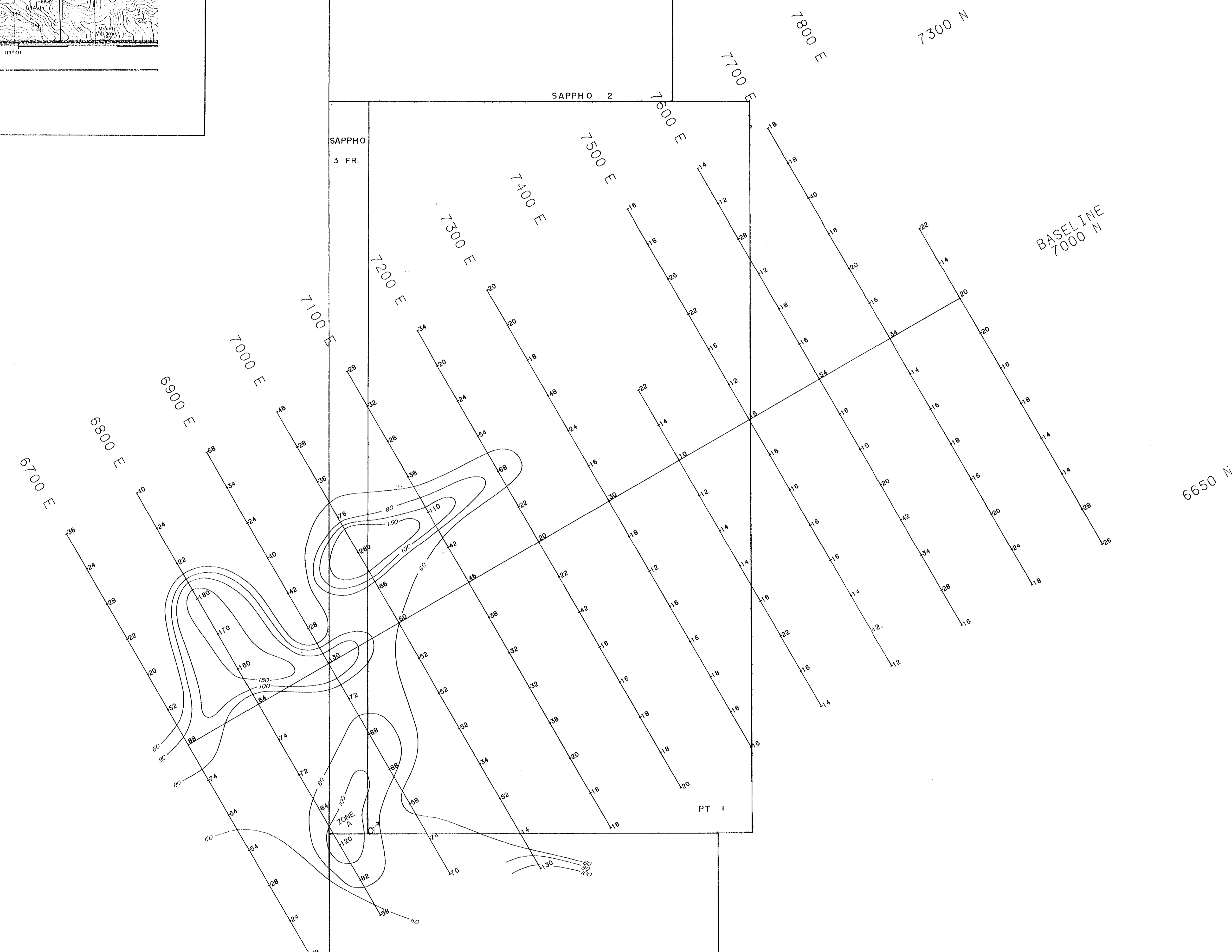
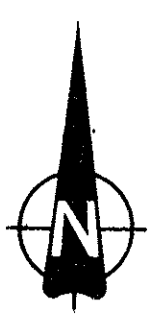
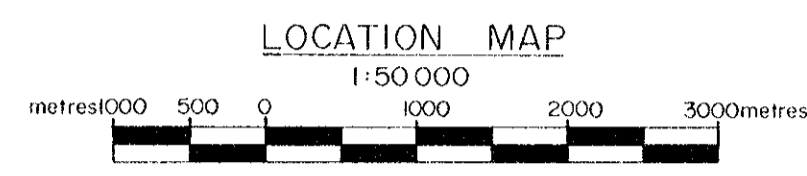
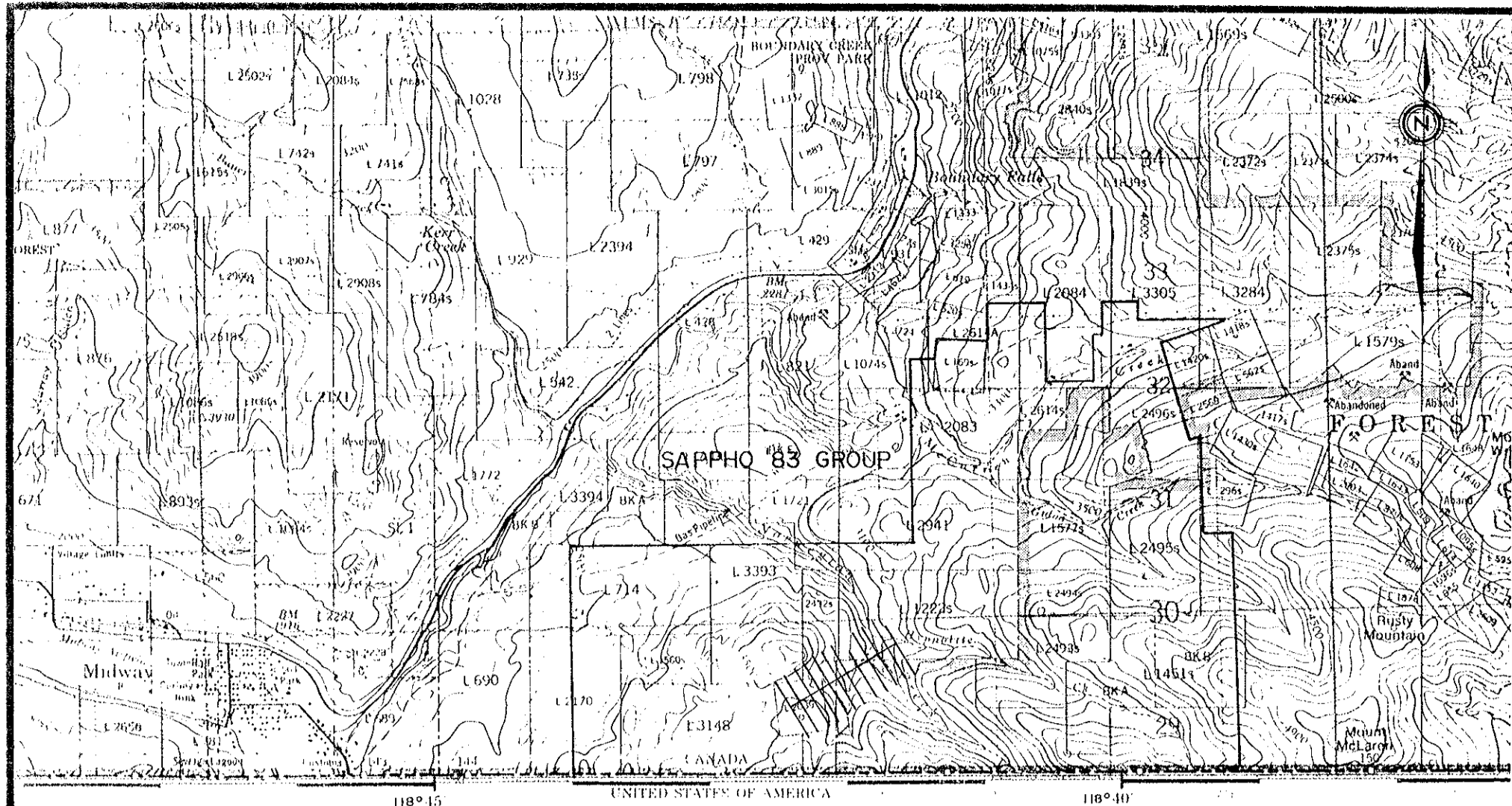
12,924

10/0-2/6/1 - Au(ppb)/Ag(ppm)/Pb(ppm)/Mo(ppm)

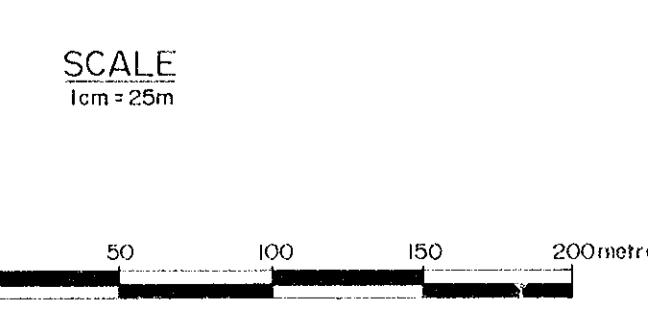
claim boundary and legal Corner Post
Taken from a 1:12,000 topographic claim map.
To Accompany: Assessment Report, Geological and Geochemical
Survey on the Sapho 83 Group of mineral claims, Greenwood,
B.C., B.C. By John Keating, (Project Geologist) and
Dr. James T. Eyles, (Consulting Geologist), April 23 -
June 14, 1984.

REVISED	SAPHO GRID
	GEOCHEMISTRY - Au, Ag, Pb, Mo
PROJ. No. 15	SURVEY BY: JJK. DATE: 1984
N.T.S. 82 E/2	SCALE: 1:2500
DWG. No. 2	NORANDA EXPLORATION
	OFFICE: VANCOUVER





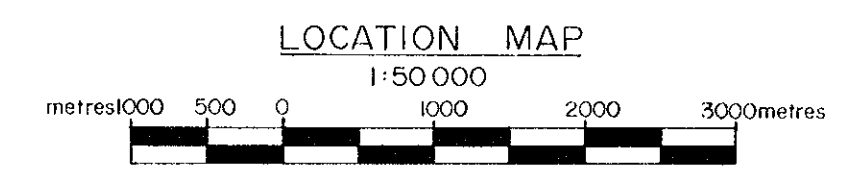
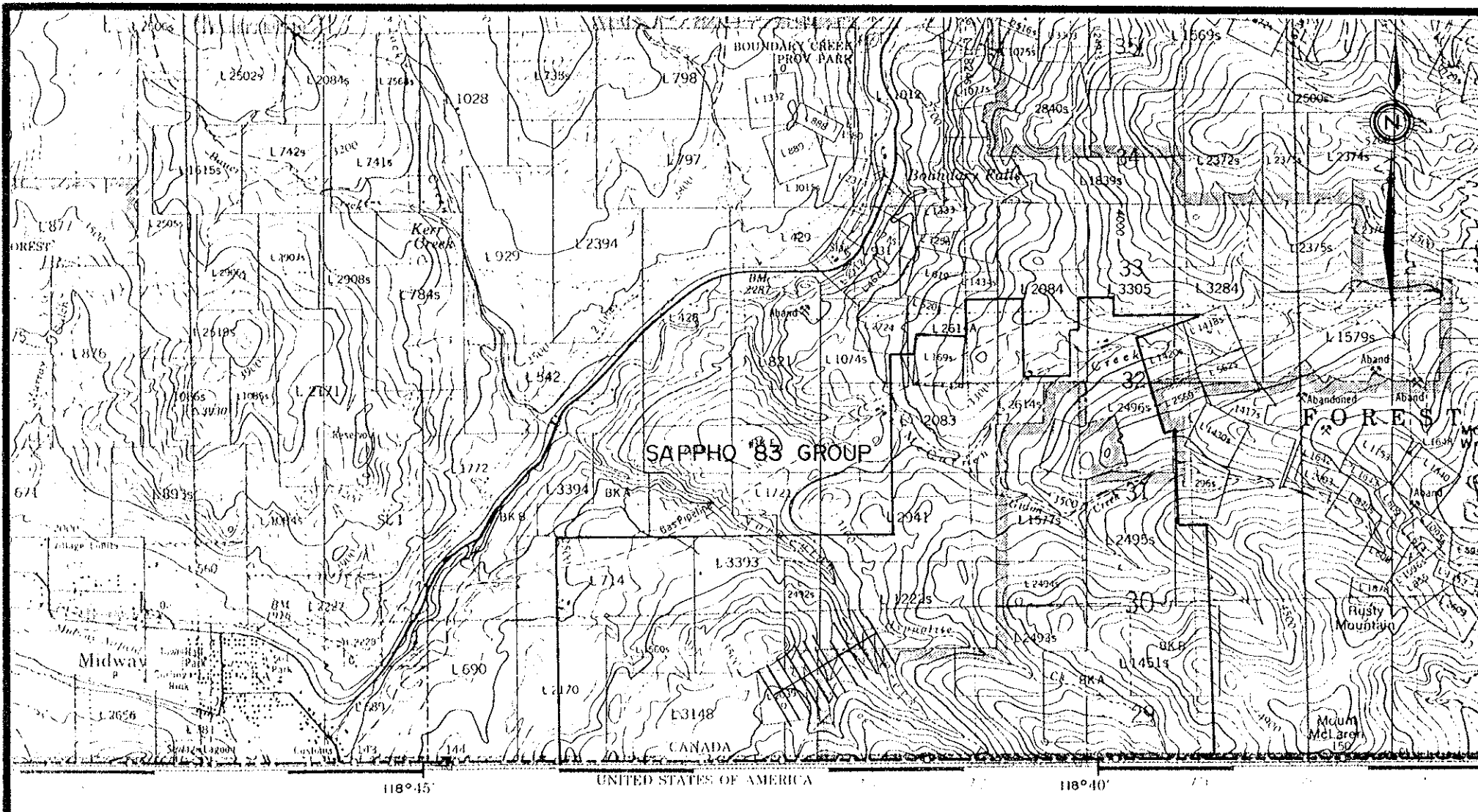
49°00'06" +118°42'



GEOLOGICAL BRANCH
ASSESSMENT REPORT
12,924

Cu contours are at 60, 80, 100 and 150ppm.
claim boundaries and Legal Corner Post
Taken from a 1:12,000 topographic claim map.
To Accompany: Assessment Report, Geological and Geochemical
Survey on the Sappho 83 Group of mineral claims, Greenwood,
N.D., B.C. By John Keating, (Project Geologist) and
Dr. James T. Fyles, (Consulting Geologist), April 23 -
June 14, 1984.

REVISED	SAPPHO GRID
	GEOCHEM - Cu in ppm
PROJ. No. 15	SURVEY BY: J.K. DATE: 1984
N.T.S. B2 E/2	DRAWN BY: W.M. SCALE: 1:2500
DWG. No. 3	NORANDA EXPLORATION
	OFFICE: VANCOUVER



49°00'06" +118°42'

SAPPHO 4 FR.

SAPPHO 1

INGERBELLE

AFTON

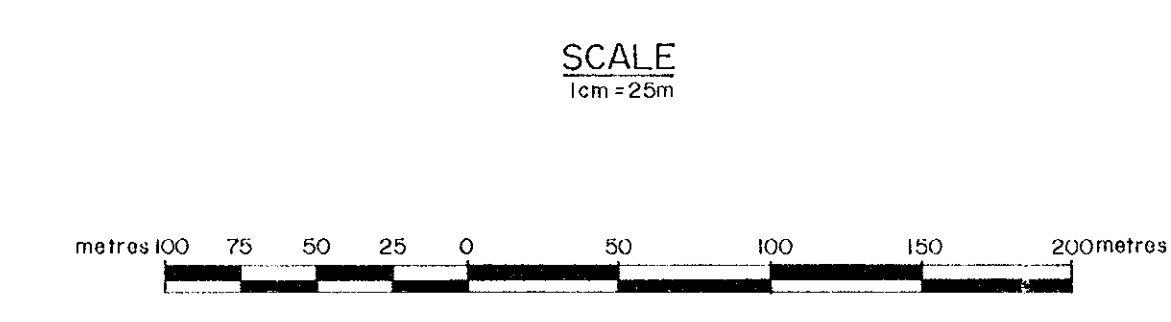
L.C.P.

GEOLOGICAL BRANCH
ASSESSMENT REPORT

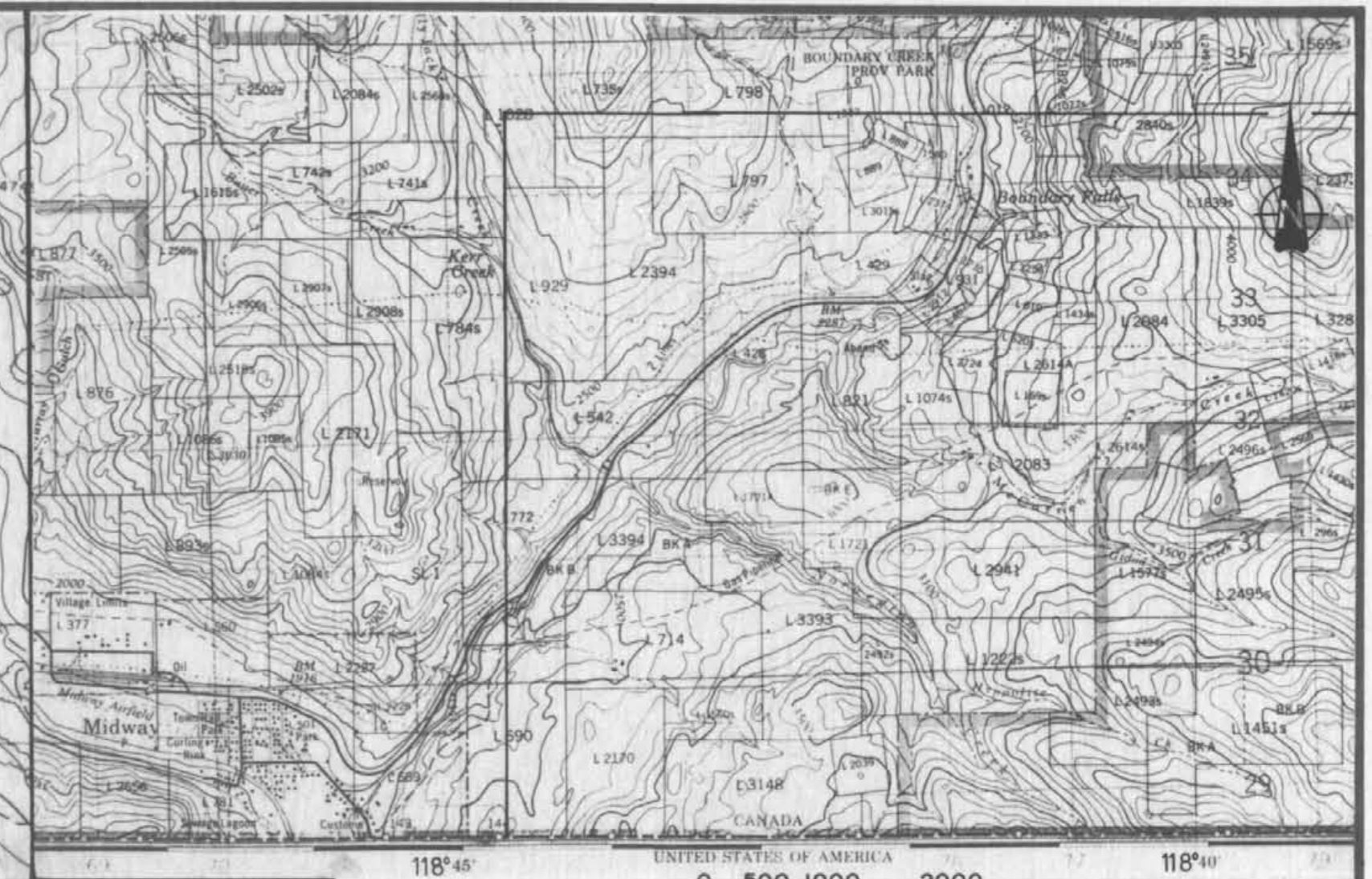
12,924

- Zn contours are at 70 and 100ppm.
- claim boundaries and Legal Corner Point
Taken from a 1:12,000 topographic claim map.

To Accompany: Assessment Report, Geological and Geochemical
Survey on the Sappho 83 Group of mineral claims, Greenwood,
N.B., B.C. By John Kesting, (Project Geologist) and
Dr. James T. Fyles, (Consulting Geologist), April 23 -
June 16, 1984.



REVISED	SAPPHO GRID	
	GEOCHEM - Zn in ppm	
PROJ. No. 15	SURVEY BY: J.K.	DATE: 1984
N.T.S. 82E/2	DRAWN BY: W.M.	SCALE: 1:2500
DWG. No. 4	NORANDA EXPLORATION	
	OFFICE: VANCOUVER	



SCALE: 1:50,000
 0 500 1000 2000 meters

LEGEND

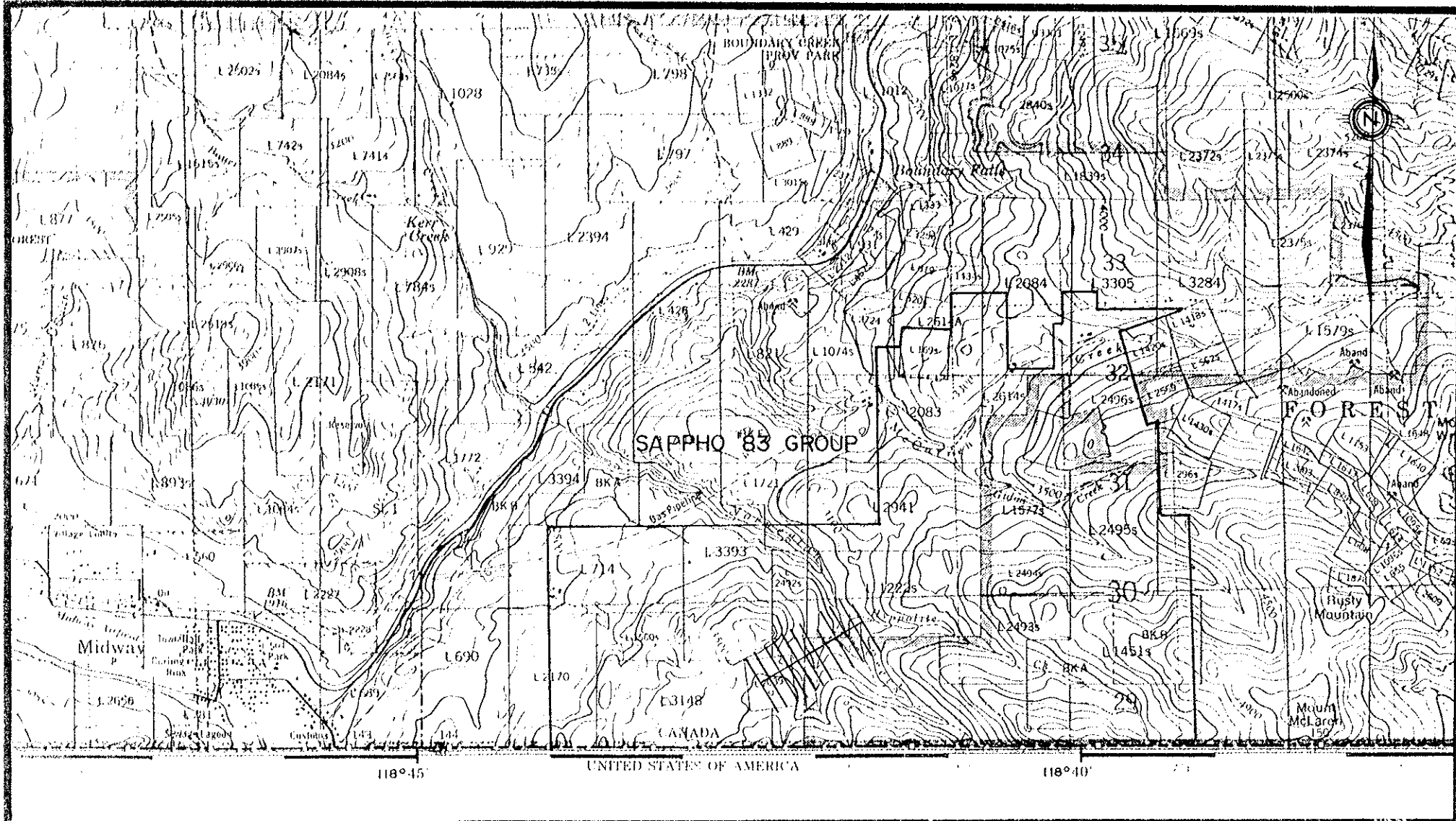
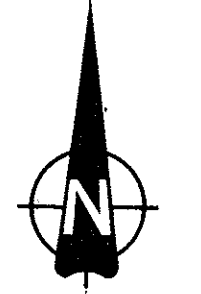
**GEOLOGICAL BRANCH
 ASSESSMENT REPORT**

12,924

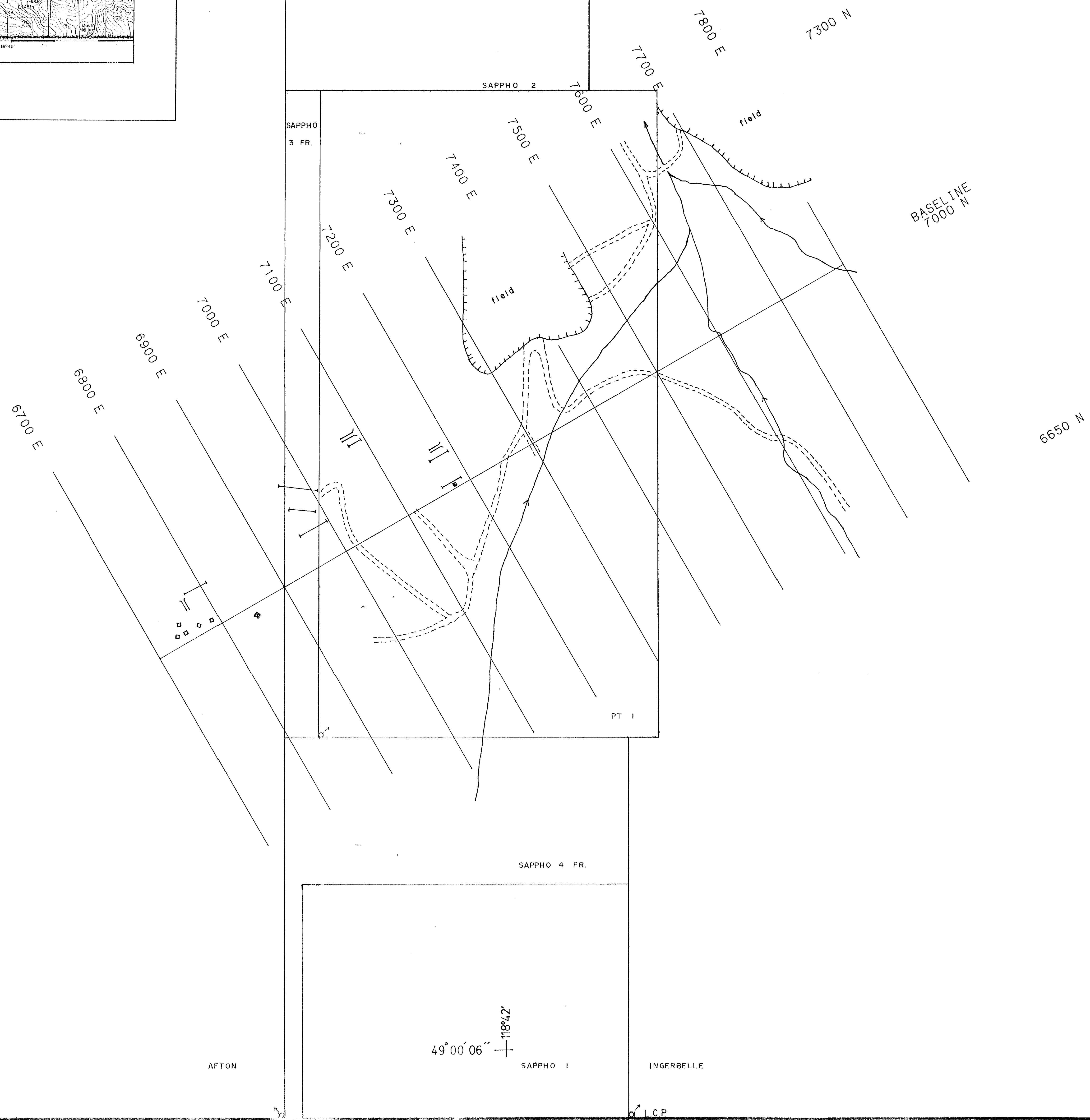
claim boundaries and Legal Corner Post
 Taken From a 1:12,000 topographic claim map.
 To Accompany: Assessment Report, Geological and Geochemical
 Survey on the Sapho 83 Group of mineral claims, Greenwood,
 M.D., B.C. By John Keating, (Project Geologist) and
 Dr. James T. Fyles, (Consulting Geologist), April 23 -
 June 14, 1984.

SCALE: 0 100 1000 meters

REVISED	SAPHO 83 CLAIM GROUP	
	CLAIM MAP	
PROJ. No. 15	SURVEY BY: J.K.	DATE: JUNE 1984
N.T.S. 82E/2	DRAWN BY: WM.	SCALE: 1:12,000
DWG. No. 6	NORANDA EXPLORATION	
	OFFICE: VANCOUVER	



LOCATION MAP
1:50,000
metres 0 500 1000 2000 3000metres

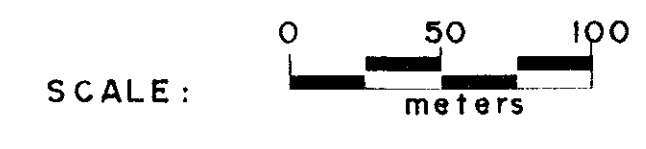


LEGEND	
	CREEK
	ROAD
	FIELD EDGE
	TRENCH
	ADIT
	PIT
	CABIN

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

12,924

claim boundaries and Legal Corner Post
Taken From a 1:12,000 topographic claim map.
To Accompany: Assessment Report, Geological and Geochemical
Survey on the Sappho 83 Group of mineral claims, Greenwood,
N.B., B.C. By John Kouting, (Project Geologist) and
Dr. James T. Fylos, (Consulting Geologist), April 23 -
June 14, 1984.



REVISED	SAPPHO GRID
	SURFACE FEATURES
PROJ. No. 15	SURVEY BY: J.K. DATE: 1984
N.T.S. 82 E/2	SCALE: 1:2500
DWG. No. 5	NORANDA EXPLORATION
	OFFICE: VANCOUVER