10962-E226

GEOLOGICAL, GEOPHYSICAL AND GEOCHEMICAL SURVEYS

ECSTALL PROJECT

(RED 1-6 and 10, BLUE 1-4, GREEN 1, AND SKINNY FR.

SKEENA MINING DIVISION

NTS 103H/13E, 14W
53°52'N, 129°30'W

Owner: KIDD CREEK MINES LTD.,

Operator: FALCONBRIDGE LIMITED

December 1987

F.R. Hassard. P.Eng.
P.M. Mar
J.D. Fou

PART 1
OF 2

16711

Province of British Columbia

Ministry of Energy, Mines and Petroleum Resources

ASSESSMENT REPORT TITLE PAGE AND SUMMARY

TYPE OF REPORT/SURVEY(S)	TOTAL COST
GEOLOGICAL, GEOPHYSICAL and GEOCHEMICAL	$151,500.

AUTHOR(S) F.R. Hassard, P.Eng.
P.M. Manojlovic/ J.D. Fournier

SIGNATURE(S) F. R. Hassard, P.Eng.

DATE STATEMENT OF EXPLORATION AND DEVELOPMENT FILED Dec. 3, 1987 YEAR OF WORK 1987

PROPERTY NAME(S) ECSTALL

FILMED

COMMODITIES PRESENT Cu, Zn, S

B.C. MINERAL INVENTORY NUMBER(S), IF KNOWN

MINING DIVISION Skeena NTS 103H/13E,14W

LATITUDE 53°52'N LONGITUDE 129°30'W

NAMES and NUMBERS of all mineral tenures in good standing (when work was done) that form the property [Examples: TAX 1-4, FIRE 2 (12 units); PHOENIX (Lot 1706); Mineral Lease M 123; Mining or Certified Mining Lease ML 12 (claims involved)]:

RED 1 (5019) 16 units, RED 2 (5020) 12 units, RED 3 (5021) 9 units, RED 4 (5022) 15 units, RED 5 (5023) 20 units, RED 6 (5024) 8 units, RED 10 (5054) 8 units, BLUE 1 (5060) 16 units, BLUE 2 (5061) 16 units, BLUE 3 (5062) 10 units, BLUE 4 (5063) 6 units, GREEN 1 (5564) 2 units, SKINNY Fr. (5563) 1 unit

OWNER(S)

(1) Kidd Creek Mines Ltd. - division of Falconbridge Limited

(2)

MAILING ADDRESS

#701 - 1282 West Georgia St.
Vancouver, B.C. V6E 3J7

GEOLOGICAL BRANCH
ASSESSMENT REPORT

OPERATOR(S) (that is, Company paying for the work)

(1) Kidd Creek Mines Ltd.

(2)

MAILING ADDRESS

as above

16,711
PART 1 OF 2

SUMMARY GEOLOGY (lithology, age, structure, alteration, mineralization, size and attitude):

The claims are underlain by metamorphic rocks of the Ecstall Pendant, Central Gneiss Complex of possible early Paleozoic to early Mesozoic age. Metamorphic grade is greenschist ot amphibolite. The property surrounds the Ecstall massive sulphide deposit and is underlain by favourable metavolcanic rocks hosting that deposit. Foliation and bedding strike northerly; dips are steep to the east or west.

REFERENCES TO PREVIOUS WORK Hassard et al, 1986; Geological, Geophysical and Geochemical Surveys and Diamond Drilling, Ecstall Project, Skeena Mining Division; Falconbridge Limited report submitted for assessment.

(over)

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	COST APPORTIONED
GEOLOGICAL (scale, area)			
Ground	1:2000 and 1:5000	RED 2-4, BLUE 1&2, GREEN 1 & SKINNY Fr.	$ 52,100.
Photo	approx. 5 km^2		
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic	and gradiometer 33 km	as above, except BLUE 2	$ 38,700.
Electromagnetic	HLEM and VLF 33 km		
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for ....)			
Soil	838 samples - Cu, Pb, Zn, Ag, Au, Ba, As	as above, except BLUE 2	$ 33,100.
Silt			
Rock			
Other			
DRILLING (total metres; number of holes, size)			
Core			
Non-core			
RELATED TECHNICAL			
Sampling/assaying	38 samples - Cu, Pb, Zn, Ag, Au, Ba, As, Cd, Co	as above, except BLUE 2	$ 900.
~~Petrographic~~			
Mineralogic			
Metallurgic			
PROSPECTING (scale, area)			
PREPARATORY/PHYSICAL			
Legal surveys (scale, area)			
Topographic (scale, area)			
Photogrammetric (scale, area)			
Line/grid (kilometres)	33 km	as above, except BLUE 2	$ 26,700.
Road, local access (kilometres)			
Trench (metres)			
Underground (metres)			
		TOTAL COST	$151,500.

FOR MINISTRY USE ONLY	NAME OF PAC ACCOUNT	DEBIT	CREDIT	REMARKS:
Value work done (from report)				
Value of work approved				
Value claimed (from statement)				
Value credited to PAC account				
Value debited to PAC account				
Accepted ..... Date	Rept. No.			Information Class

GEOLOGICAL, GEOPHYSICAL AND GEOCHEMICAL SURVEYS

ECSTALL PROJECT

(RED 1-6 and 10, BLUE 1-4, GREEN 1, AND SKINNY FR.

SKEENA MINING DIVISION

NTS 103H/13E, 14W
53°52'N, 129°30'W

Owner: KIDD CREEK MINES LTD.,

Operator: FALCONBRIDGE LIMITED

December 1987

F.R. Hassard, P.Eng.
P.M. Manojlovic
J.D. Fournier

SUMMARY

Exploration was performed in the Ecstall River area, on claims owned by Kidd Creek Mines Ltd., between June 30 and August 24, 1987. Work consisted of: cutting a grid, geological mapping and sampling, electromagnetic and magnetic surveys and soil sampling.

Geological investigations of the Ecstall Property indicate that the Thirteen Creek area is prospective for volcanogenic massive sulphide deposits. Mineral occurrences discovered along a 1.7 km strike length during 1987 are within a 200 m wide succession of volcanics. Disseminated and stringer chalcopyrite mineralization, containing up to 4.65% Cu, 26.1 ppm Ag, and 4.9 ppm Au, occurs in altered felsic volcanic or volcaniclastic rocks. Banded sphalerite occurs in altered mafic volcaniclastics.

Soils containing anomalous Cu, Au, Ba, Ag, and Pb cluster near mineral occurrences and indicate probable overburden-covered extensions. Additional prospecting may discover mineral occurrences in some of the areas of anomalous soils.

Electromagnetic surveys detected several conductors. Some conductors in metasediments appear to be formational and may be caused by graphite. However, since the source of conductivity can change rapidly along strike, all conductors require evaluation in the field.

Prospecting and mapping, followed by approximately 1,500 metres of diamond drilling is recommended. This work should focus on areas of chalcopyrite and sphalerite occurrences, associated soil anomalies and conductors.

CONCLUSIONS AND RECOMMENDATIONS

Geological investigations discovered several mineral occurrences and indicate that the Thirteen Creek area is prospective for massive sulphide deposits. Quartz-Sericite-Kyanite Schist and Mixed Gneiss (felsic volcanics or volcaniclastics) host stringer and disseminated chalcopyrite mineralization, with appreciable gold and silver and minor zinc, near Elaine and Phoebe Creeks. Banded sphalerite, considered to be syn-depositional, occurs in calc-silicate associated with mafic volcanics.

Rocks in the Thirteen Creek area have been vertically stretched. Any deposits in that area may have significant downward extent.

Geophysical conductors "A" and "B" are both long and associated with metasediments which locally contain graphite. However, metasediments are poorly exposed in much of the mapped area and parts of these conductors may be within volcanic rocks and/or caused by sulphides . Conductor "C" is of limited strike length, within Mixed Gneiss which locally hosts mineral occurrences, and is prospective.

Anomalous Cu, Au, Ba, Ag and Pb in soil are effective indicators of mineralization; As, and probably Zn, are not effective locally. Anomalous soils occur near and along strike from known mineralization.

Future exploration should focus on: 1) the Quartz-Sericite-Kyanite Schist and Mixed Gneiss and their copper occurrences, associated multi-element soil anomalies I and II and conductor "C", 2) the sphalerite occurrence in Quartz-Chlorite-Biotite Schist, with emphasis on along-strike portions of soil anomalies III and IV, and 3) conductors "A" and "B". Other soil anomalies and/or conductors should be considered in the light of new geological discoveries.

Initially, intensive prospecting, some hand trenching and mapping is required to select the most prospective sites for drill holes. Two to four men will be required for about two weeks for this work. Eight to ten holes, totalling about 1,500 metres will be required to test the various targets. Some holes can likely be drilled west to east, downhill and be located in areas of little vegetation; others will likely be located below treeline and require site preparation prior to drilling.

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APPENDIX		
I	PERSONNEL	accompanying volume
II	GEOCHEMICAL ANALYTICAL DATA SHEETS - Rock Samples	"
III	GEOPHYSICAL REPORT ON THE ECSTALL PROPERTY - Delta Geoscience Limited	"
IV	GEOCHEMICAL ANALYTICAL DATA SHEETS - Soil Samples	"
V	HISTOGRAMS, CUMULATIVE PROBABILITY PLOTS - Soil Geochemistry	accompanying volume

LIST OF ILLUSTRATIONS

INTRODUCTION

Location, Access and Terrain

Claims comprising the Ecstall Project area are within the Skeena Mining District, in NTS 103H/13E and 14W (Fig. 1). The claims lie north and south of the Ecstall River, centered at approximately 53°52'N, 129 30'W (Fig. 2 and 3). Camp is within crown-granted claims north of the river. Area supply centers are Prince Rupert and Terrace, 72 kilometres northwest and 94 kilometres northeast of camp respectively.

Heavy and bulky equipment and supplies can be barged from Prince Rupert and up the Ecstall River to within 8 kilometres from camp, with final positioning by helicopter. Personnel and supplies can be brought from Prince Rupert to Johnston Lake by fixed-wing aircraft; transport to camp from Johnston lake, or alternatively directly from Terrace, is by helicopter.

The property is on rugged forested slopes and low ridges of the Coast Range Mountains; elevations range from 10 to more than 1300 metres above mean sea level. Most of the property below treeline (at approximately 700 metres) is covered by mature conifers and underbrush; small grassy or swampy areas on some benches and ridges provide landing sites for helicopters. Areas above treeline are generally helicopter accessible. Outcrop exists in small creek beds, on steep cliffs, ridges and locally on some benches. Overburden is locally extensive but is generally thin except in the Ecstall River valley.

Previous Work

The area has been explored intermittently since the discovery of the Ecstall deposit (massive pyrite +/- chalcopyrite and sphalerite) in Red Gulch during the late 1890's. This deposit is owned by Kidd Creek Mines Ltd. and has been explored by surface and underground drilling and crosscuts (Bacon, 1952). Reserves are estimated at 6.9 million tonnes

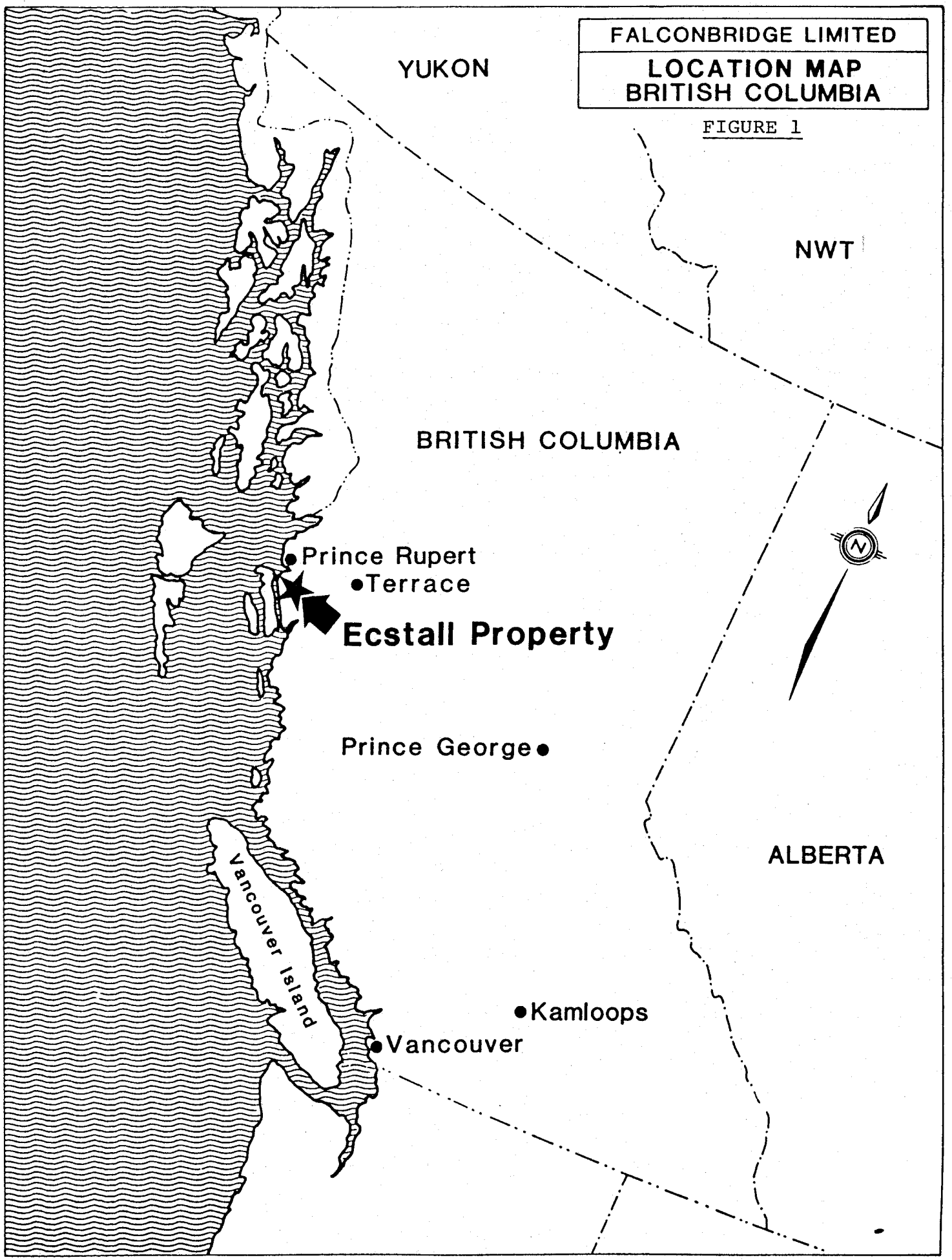

FALCONBRIDGE LIMITED
LOCATION MAP
BRITISH COLUMBIA
YUKON
NWT
BRITISH COLUMBIA
Prince Rupert
Terrace
Ecstall Property
Prince George
ALBERTA
Vancouver Island
Kamloops
Vancouver

FIGURE 1

grading 0.6% copper, 2.5% zinc, 42.3% iron and 48.4% sulphur (Dolmage et al, 1961). Drill core, from the North lens but from only the upper part of the South lens, was analysed for precious metal content; Domage et al (1961) estimate that nearly 65% of the reserves contain an average of 0.5 g/tonne gold and 20 g/tonne silver.

The claims within the Ecstall project were staked to cover the "Mine Series" metavolcanics which hosts the Ecstall deposit. Exploration in 1985 and 1986 consisted of: airborne INPUT and magnetometer surveys (Martyn, 1986), cutting 58 km. of grid, geological mapping, lithogeochemical sampling, prospecting, ground Max Min, VLF-EM and magnetometer surveys, soil and silt sampling and 916 metres of diamond drilling in five holes (Hassard et al, 1986). Occurrences of copper, with significant gold values, were discovered in the Thirteen Creek area and it was considered prospective for massive sulphide deposits.

Summary of Work in 1987

Exploration on claims owned by Kidd Creek Mines Ltd., a division of Falconbridge Limited, was performed between June 30 and August 24, 1987 by personnel of Falconbridge (operator) and those of various contractors (Appendix I). Work consisted of: linecutting, geological mapping and sampling, soil sampling and geophysical surveys.

Grid lines, 100 metres apart and oriented east-west, cross the regional trend of lithologies and airborne geophysical features in the Thirteen Creek area. Cliffs, steep slopes, swamps and thick slide alder are locally a problem although coverage is generally good. A total of 33 km of grid was cut by S.R. Ocsko Exploration Services; Falconbridge personnel cut an additional 0.8 km and accurately slope-chained all lines and placed pickets 20 metres apart. Slopes were surveyed using hand-held inclinometers and ground profiles were prepared to permit the proper orientation of electromagnetic coils (Max Min survey).

The Thirteen Creek area was geologically mapped at 1:2,000 scale and selected other parts of the property at 1:5,000 scale. Mineral occurrences were discovered and sampled.

Ground geophysics included: two-frequency horizontal loop electromagnetic (Max Min), VLF-EM, magnetometer and gradiometer surveys, which were performed by Delta Geoscience Ltd. Bedrock conductors and magnetic features were located.

The Thirteen Creek grid was soil sampled. A total of 838 soil samples were collected and analyzed for: copper, lead, zinc, silver, gold, barium and arsenic. Anomalies occur near a prospective quartz-sericite-kyanite schist unit.

Property Status

The Ecstall property comprises 12 mineral claims and one fraction, totalling 139 units (Figs 2 and 3; Table I), which were staked in 1985 and 1986. These claims are owned by Kidd Creek Mines Ltd.

Twenty-one Crown-granted claims, Lots 111-115 and 2661-2676, also owned by Kidd Creek Mines Ltd., occur within RED 1,2 and 3 and BLUE 1 claims.

TABLE I

PROPERTY - Ecstall Project

Claim No.	Units	Record No.	Date Recorded	Expiry Date
RED 1	16	5019	Nov. 1, 1985	Nov. 1, 1998
RED 2	12	5020	Nov. 1, 1985	Nov. 1, 1998
RED 3	9	5021	Nov. 1, 1985	Nov. 1, 1998
RED 4	15	5022	Nov. 1, 1985	Nov. 1, 1998
RED 5	20	5023	Nov. 1, 1985	Nov. 1, 1996
RED 6	8	5024	Nov. 1, 1985	Nov. 1, 1998
RED 10	8	5054	Dec. 6, 1985	Dec. 6, 1996
BLUE 1	16	5060	Dec. 12, 1985	Dec. 12, 1998
BLUE 2	16	5061	Dec. 12, 1985	Dec. 12, 1996
BLUE 3	10	5062	Dec. 12, 1985	Dec. 12, 1998
BLUE 4	6	5063	Dec. 12, 1985	Dec. 12, 1998
SKINNY Fr.	1	5563	Oct. 7, 1986	Oct. 7, 1998
GREEN 1	2	5564	Oct. 7, 1986	Oct. 7, 1998

NOTE: Expiry date includes filing work included in this report for one year on each of claims: RED 1 - 4, 6; BLUE 1, 3 and 4.

GEOLOGY

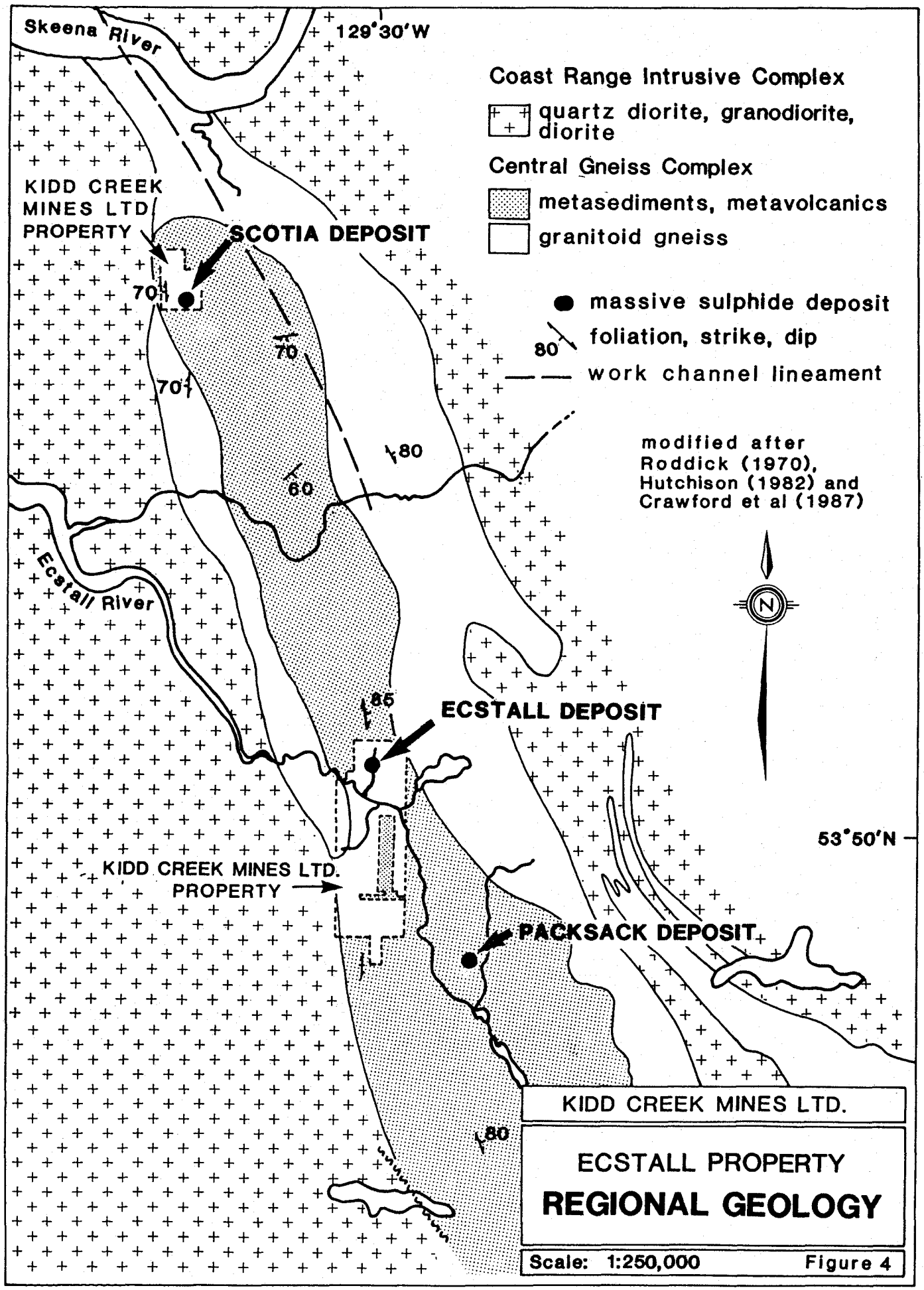
REGIONAL GEOLOGY

The property covers a portion of the northerly trending Ecstall Pendant, a metavolcanic-metasedimentary belt within the Central Gneiss Complex (Roddick, 1970; Hutchinson, 1982). The belt is 4 to 15 km wide and at least 60 km long (Fig.4). It is bounded to the west by the Ecstall Pluton and to the east by the Quottoon Pluton. These plutons are part of the extensive Coast Range Intrusive Complex.

The Ecstall Pendant consists mainly of hornblende-plagioclase amphibolites with lesser amounts of quartzite, marble, migmatite and granitoid rocks of late Paleozoic or early Mesozoic age. These rocks shave been metamorphosed to the amphibolite facies and are locally migmatitic along pluton margins. South of Big Falls Creek upper greenschist facies rocks are sporadically preserved.

The Ecstall Pendant hosts 3 subeconomic massive sulphide deposits; the Ecstall, Packsack and Scotia deposits (Fig.4). The Ecstall and Scotia Deposits are owned by Kidd Creek Mines Ltd. and have been the subject of recent reevaluations (Hassard et al, 1986; 1987). The Packsack Deposit is presently controlled by Active Minerals Ltd.

The Ecstall Deposit lies within the property covered by this report (see Hassard et al, 1986 for reserve estimates) and consists of 2 lenses of massive pyrite containing minor chalcopyrite and sphalerite. The Packsack Deposit is similarily pyrite-rich and contains only minor chalcopyrite and sphalerite (see Graf, 1981 for reserve estimates). The Scotia Deposit is a sphalerite-rich body with promising zinc grades (see Meyers and Moreton, 1981); however, only a small tonnage has been outlined by exploration to date. All three deposits occur in similar geological settings and are hosted by quartz-sericite schist or gneiss.


Skeena River
129°30'W
KIDD CREEK MINES LTD PROPERTY
SCOTIA DEPOSIT
70
70
70
80
60
80
Ecstall River
85
ECSTALL DEPOSIT
KIDD CREEK MINES LTD. PROPERTY
PACKSACK DEPOSIT
53°50'N
80
Coast Range Intrusive Complex
quartz diorite, granodiorite, diorite
Central Gneiss Complex
metasediments, metavolcanics
granitoid gneiss
massive sulphide deposit
foliation, strike, dip
work channel lineament
modified after Roddick (1970), Hutchison (1982) and Crawford et al (1987)
N
KIDD CREEK MINES LTD.
ECSTALL PROPERTY
REGIONAL GEOLOGY
Scale: 1:250,000
Figure 4

PROPERTY GEOLOGY

General

The Ecstall Property is underlain by metamorphosed sedimentary, volcanic, volcaniclastic and related intrusive rocks of the Ecstall Pendant and granodiorite of the Coast Range Intrusive Complex. The Ecstall Pendant is approximately 8 km wide in the vicinity of the property and trends 170 . Coast Range Intrusions form ridges while Pendant rocks occur dominantly along slopes and in valleys. Xenoliths of Pendant rocks commonly occur within the Coast Range Intrusives. The rocks of the Ecstall Pendant have been moderately to strongly deformed and metamorphosed under upper greenschist to middle amphibolite facies conditions which obliterated most volcanic and sedimentary textures.

Property geology is summarized at 1:50,000 scale (Fig. 5) and at 1:5,000 scale in Hassard et al (1986). Rocks of volcanic affinity occur in a northerly trending belt 4 km wide which passes through the property. This belt is flanked by sediments to the east and sediments, deformed plutonic rocks and Coast Range Intrusive rocks to the west. The rocks of the volcanic belt strike 340° to 000° and dip 80° to 90° to the east. Numerous quartz-sericite schists occur within the volcanic belt and these were the focus of exploration on the Ecstall property.

Exploration in 1987 was concentrated near a quartz-sericite-kyanite schist in the Thirteen Creek area. Geology of this area is summarized at 1:5,000 scale (Fig. 6) and presented in more detail at 1:2,000 scale (Figs. 7, 8 and 9).

Lithologies

General:

Rock units mapped on the Ecstall property are listed in Table II. These units are lithologic units and do not imply a stratigraphic succession. Only units occurring in the Thirteen Creek area are described below; additional descriptions may be found in Hassard et al (1986).

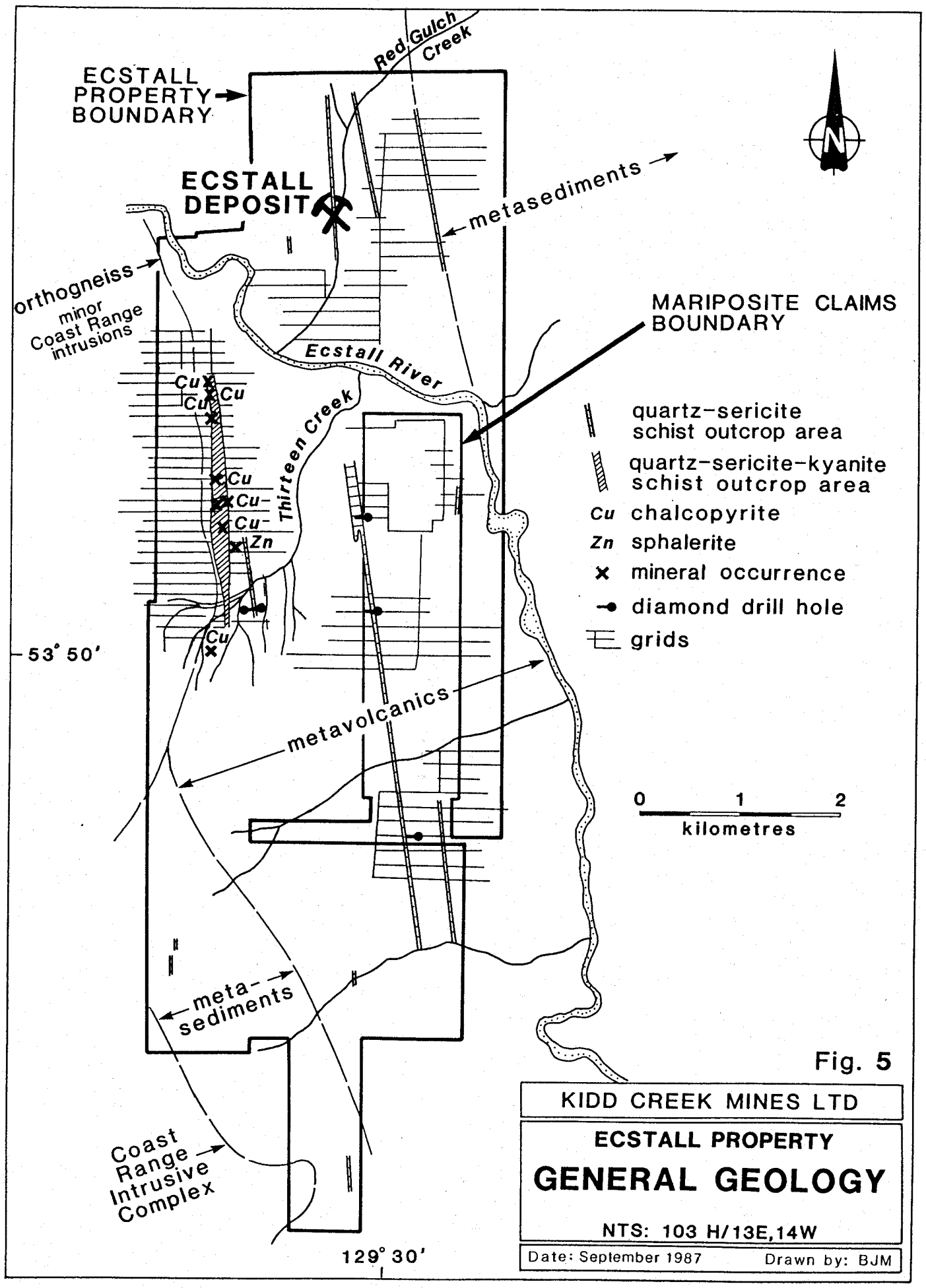

ECSTALL PROPERTY BOUNDARY
Red Gulch Creek
ECSTALL DEPOSIT
metasediments
orthogneiss
minor Coast Range intrusions
MARIPOSITE CLAIMS BOUNDARY
Ecstall River
Thirteen Creek
Cu
Zn
quartz-sericite schist outcrop area
quartz-sericite-kyanite schist outcrop area
Cu chalcopyrite
Zn sphalerite
mineral occurrence
diamond drill hole
grids
53° 50'
metavolcanics
0 1 2
kilometres
meta-sediments
Coast Range Intrusive Complex
129° 30'
Fig. 5
KIDD CREEK MINES LTD
ECSTALL PROPERTY
GENERAL GEOLOGY
NTS: 103 H/13E,14W
Date: September 1987
Drawn by: BJM

TABLE II
LITHOLOGIES

map unit	
	COAST RANGE INTRUSIVE COMPLEX
13	Granodiorite, Quartz Diorite
12	Mafic Dyke
	ECSTALL PENDANT METAMORPHIC ROCKS
	Metaplutonic Affinity
11	Homogeneous Gneiss a. Amphibolite b. Quartzofeldspathic Gneiss
	Metasedimentary Affinity
10	Chert
9	Marble
8	Clastic Metasediments a. Argillite b. Greywacke
	Metavolcanic Affinity
7	Mixed Gneiss
6	Quartz-White Mica Schist a. Quartz-Sericite Schist b. Quartz-Sericite-Kyanite Schist
5	Felsic Breccia
4	Quartz-Biotite Gneiss
	Mafic Volcanics
3	Quartz-Chlorite-Biotite Schist
2	Quartz-Chlorite Schist a. Massive b. Fragmental
1	Chlorite Schist a. Massive b. Pillowed c. Fragmental

Chlorite Schist (map unit 1):

Chlorite Schist is strongly foliated, fine-grained and medium to dark green in colour. These rocks contain appreciable amounts of amphibole and minor amounts of biotite. A limited examination of thin sections indicates that most of the chlorite is Fe-rich and retrograde in origin. Relict volcanic and volcaniclastic textures are locally present in this unit, particularily in the Thirteen Creek Cirque area where fragmental and pillowed features are preserved.

The composition and relict textures present in Chlorite Schist indicates that it is composed dominantly of mafic volcanic flows and pyroclastic material.

Quartz-Chlorite Schist (map unit 2):

Quartz-Chlorite Schist locally contains a significant amount of feldspar and amphibole as well as a minor amount of biotite. These rocks are strongly foliated, fine-grained and medium green in colour. In some cases Quartz-Chlorite Schist may be a silicified equivalent of the Chlorite Schist. Rare fragmental texture has been observed outside the Thirteen Creek area (Hassard et al, 1986).

Quartz-Chlorite Schist is probably a mafic to intermediate volcanic or volcaniclastic that has undergone some weathering and/or alteration.

Quartz-Chlorite-Biotite Schist (map unit 3):

Alternating chlorite-rich and biotite-rich layers characterize the Quartz-Chlorite-Biotite Schist. These layers are a few centimetres wide, fine- to medium-grained, and give the rock a bedded appearance. Up to 250 metres of this unit is exposed in Thirteen Creek. Quartz-Chlorite-Biotite Schist contain calc-silicate layers along the margin of Marble units. At 1615E + 7910N banded sphalerite occurs in this calc-silicate.

The characteristic variable compositional and mineralogical layering in these rocks suggests that they contain a significant proportion of reworked volcanic and volcaniclastic material.

Quartz-White Mica Schist (map unit 6):

Thin Quartz-Sericite Schist (unit 6a) occur throughout the volcano-sedimentary portion of the Thirteen Creek area. These schists appear to be limited in strike length.

Quartz-Sericite-Kyanite Schist (unit 6b) on the other hand occurs as a continuous zone which can be traced for approximately 2 km along strike and has a width of 100 to 150 m. It is in sharp contact with Argillite and Quartz-Chlorite Schist to the east and is gradational with Mixed Gneiss to the west and south. The north end is open and disappears under the Ecstall River flood plain. This schist is medium- to coarse-grained and is composed dominantly of quartz and sericite. Kyanite varies from trace to up to 30% of the rock. Minor biotite, mariposite and calcite are common. Chalcopyrite and pyrite are typically present and range from trace amounts of disseminated grains to a few percent as semi-massive (see Mineralization). The Quartz-Sericite-Kyanite Schist has a strong planar and linear fabric (see Structure) and is the eastern boundary of a zone of higher metamorphic grade.

The highly aluminous nature of these rocks suggests they may be derived from highly altered felsic volcanic or volcaniclastic rocks or alternatively from kaolinite enriched sediments deposited in the vicinity of sea-floor hydrothermal vents.

Mixed Gneiss (map unit 7):

Mixed Gneiss occurs dominantly to the west of the Quartz-Sericite-Kyanite Schist, although thin units do occur east of it.

This unit is characterized by a layered aspect comprised of alternating amphibolitic and quartzofeldspathic metre-wide portions. Major minerals are quartz, feldspar, biotite and amphibole while chlorite, sericite, garnet and magnetite occur locally. Disseminated pyrite and chalcopyrite are common (see Mineralization). This unit is medium-grained and grades into Quartz-Sericite-Kyanite Schist. Mixed Gneiss in the Thirteen Creek Cirque area is intermediate in composition and contains clotty chlorite. Limited thin section work indicates that most of this chlorite is retrograde in origin and Fe-rich.

The Mixed Gneiss unit is likely a highly metamorphosed package of mixed felsic and mafic plutonic, volcanic and volcaniclastic rocks which have been altered and/or reworked.

Clastic Metasediments (map unit 8):

A number of schists exposed in the Thirteen Creek area have been identified as having a clastic metasedimentary parentage.

Dark, fine-grained aphanitic rocks with quartz, biotite and locally graphite have been termed Argillite (unit 8a). These rocks are often strongly deformed with numerous small scale folds.

Medium-grained schists (unit 8b) composed essentially of biotite, sericite, chlorite and quartz, with minor garnet are considered to be pelite to greywacke in origin. Rocks of this type are commonly intercalated with Argillite, and near Phoebe Creek fragments of argillite occur within this unit.

Clastic Metasediments in the Thirteen Creek Grid area are thin and probably represent a local reworking of the mafic volcanic and volcaniclastic rocks.

Marble (map unit 9):

Marble units in the Thirteen Creek area occur as thin layers within Argillite. They are generally less than 1 metre wide but can exceed 5 metres. Pinch and swell structures are common. Marbles are grey, massive, coarse-grained, and are composed entirely of calcite.

Marbles have no visible internal structure and were probably chemically precipitated rather than being organically formed.

Chert (map unit 10):

A buff coloured, cryptocrystalline, chert horizon (30 to 50 cm wide) has been traced for approximately 100 m along the western side of the Thirteen Creek Cirque. Locally this horizon contains semi-massive to massive pyrite-chalcopyrite (see Mineralization).

Homogeneous Gneiss (map unit 11):

A succession of gneisses, which are relatively homogeneous in nature, occur west of the Mixed Gneiss unit. These homogeneous gneisses have been divided into amphibolitic and quartzofeldspathic varieties.

Amphibolite (unit 11a) occurs as a continuous zone approximately 100 m wide situated due west of the Mixed Gneiss. Amphibole and feldspar are abundant in these rocks while quartz, chlorite and biotite are minor constituents. These rocks are medium- to coarse-grained, strongly foliated, and highly folded in places. Thin, 5-10 cm wide quartz-pyrite-chalcopyrite-pyrrhotite veinlets are present in minor shear zones which locally cross-cut these gneisses (see Mineralization). Relict clotty, subophitic texture is locally preserved suggesting that this unit is plutonic in origin; however, a mafic flow origin cannot be dismissed.

Quartzofeldspathic Gneiss (unit 11b) occupies a large terrain west of the Amphibolite. Quartzofeldspathic Gneiss is medium-grained, moderately foliated and contains minor biotite, amphibole, chlorite, garnet and magnetite. Original layering is not present; however, a faint flaser-like texture occurs.

The mineralogy and texture of this unit are remarkably constant over a large area (over 1 km ^{2} in places) which suggests that this unit is likely a metamorphosed and deformed plutonic body.

Mafic Dyke (map unit 12):

Two types of undeformed mafic dykes occur in the Thirteen Creek area. A 2 to 3 m wide gabbroic dyke can be traced discontinuously up Thirteen Creek and into the Cirque area. This dyke cross-cuts all lithologies and contains pyroxene and plagioclase. Grain size ranges from fine, at the dyke margin, to coarse, in the dyke core. A second type of dyke, occurring in swarms, is confined to the Mixed Gneiss and Quartz-Sericite-Kyanite Schist units. These dykes are thin (< 0.5 m), parallel the foliation, and are composed of plagioclase and amphibole. The grain size of these dykes is medium to coarse with no variation evident from core to rim.

Granodiorite, Quartz Diorite (map unit 13):

Granodiorite and Quartz Diorite of the Coast Range Intrusive Complex outcrop along the western edge of the property. These rocks are medium- to coarse-grained, contain abundant feldspar and amphibole, as well as minor but pervasive epidote. The contact of these plutons with Quartzofeldspathic Gneiss of the Pendant rocks is usually gradational; however, contacts are sharp with mafic volcanics and metasediments.

Structural Geology

The structural geology of the Ecstall Property is quite complex. This complexity is due in part to its setting in the postulated southern extension of the Work Channel lineament (S. Gareau, per. comm.).

In the Thirteen Creek area, foliation strikes 340° to 350° and dips 75° to 85° to the east (Fig. 10). North of Phoebe Creek, dips swing to the west at 80° to 85°. Numerous tight, small-scale, folds are present, particularily in the Quartz-Sericite-Kyanite Schist, Mafic Gneiss and Argillite units. Fold axial planes parallel the foliation and have axes which dip steeply to the north or south (Fig. 11). Fold axes are roughly parallel to mineral lineations and stretched mafic fragments which are vertical (Fig. 12).

Stratigraphic top indicators are rare due to destruction of most primary features by deformation and metamorphism; however, a few examples are preserved. Deformed pillows in mafic volcanics, graded beds in felsic lapilli tuff, rip-up clasts of argillite and volcanic breccia all indicate tops are to the east (Hassard et al, 1986; p.29).

No major late faults are present in the Thirteen Creek area; however, a number of small faults do occur. These faults are generally oriented at 245° and are vertically dipping. A right lateral offset has been determined for a few of the faults. Undeformed mafic dykes, in the Thirteen Creek Cirque area, have roughly the same trend and this suggests that the faults were formed during a period of late extension.

The absence of any large scale folding and the structural style found in the Thirteen Creek area is typical of transposed and strongly sheared zones (Hobbs, Means and Williams, 1976). Mineral lineations and stretched mafic fragments indicate there was significant vertical tectonic transport in this region. A similar vertical tectonic displacement has been postulated for the Work Channel lineament where it has been suggested that the eastern side has been displaced upward relative to the western side (Crawford et al, 1987).

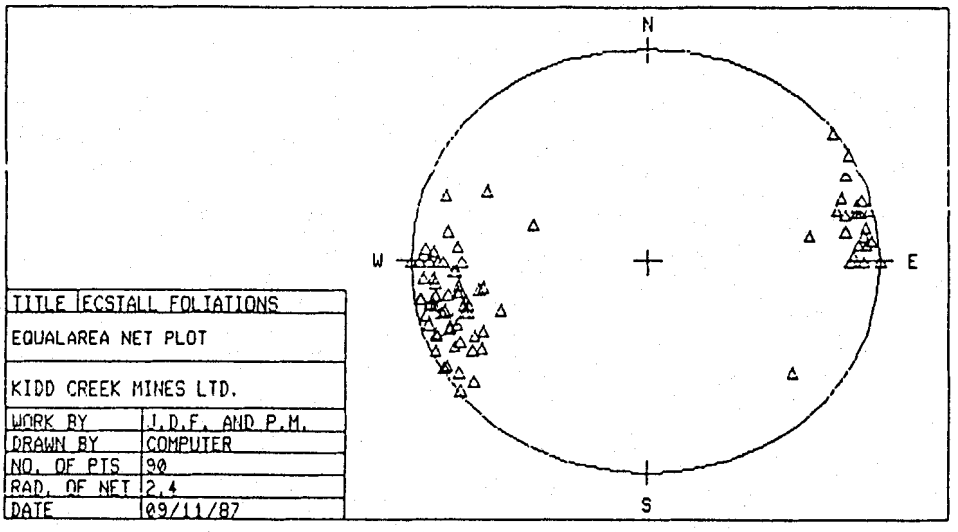


Figure 10. Equal Area Net Plot of Ecstall Foliations.

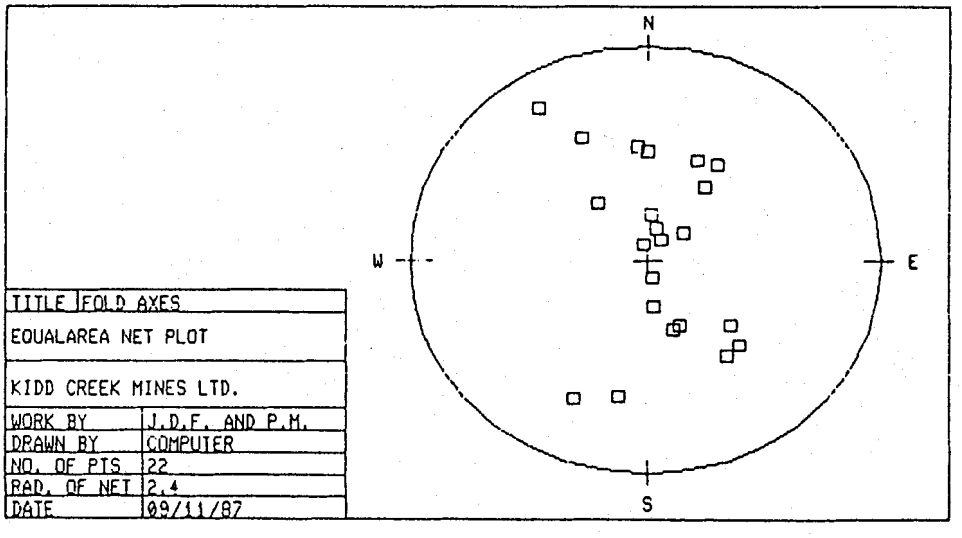


Figure 11. Equal Area Net Plot of Ecstall Fold Axes.

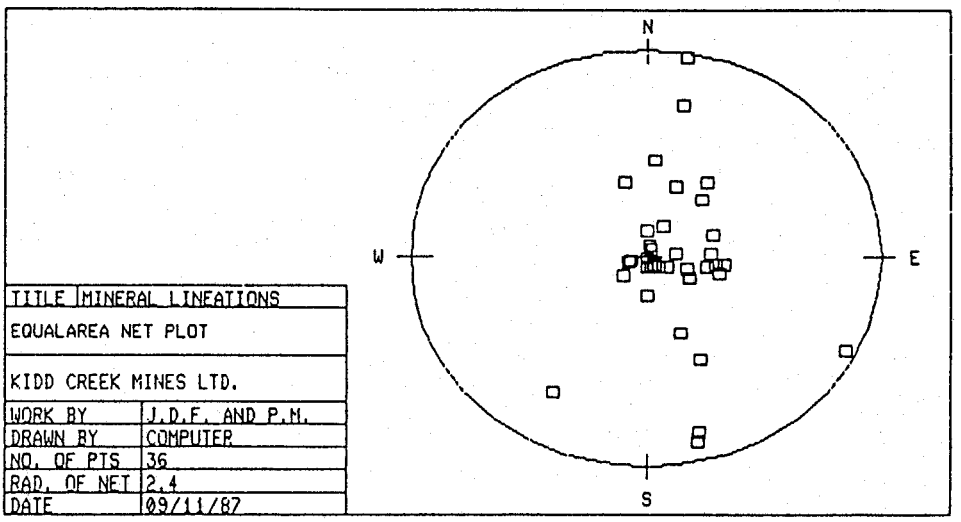


Figure 12. Equal Area Net Plot of Ecstall Lineations.

Mineralization

General:

The Ecstall property hosts several mineral occurrences, including: the Ecstall Deposit, the "Third Outcrop" showing and others described previously (Hassard et al, 1986) and occurrences in the Thirteen Creek area (Figs. 6-9). Minor pyrite and chalcopyrite showings were known in the Thirteen Creek area prior to 1987; however, several significant mineral occurrences were discovered this year and are described below. The reader is referred to selected analyses in Table III and metal ratios in Table IV, which follow the descriptive sections, and to the full analyses in Appendix II.

Sphalerite Showing:

Banded sphalerite occurs within a green, medium-grained, calc-silicate horizon at the contact between Quartz-Chlorite-Biotite Schist and Marble at 1615E + 7910N. The sphalerite occurs within a lens, up to 4 cm wide exposed over 2.2 m, and is open along strike and at depth. A grab sample contains 6.00% Zn, 579 ppm Cu, 28 ppm Pb, 1.5ppm Ag, 15 ppb Au and 746 ppm Cd.

Elaine Creek Showings:

Quartz-Sericite-Kyanite Schist in and around Elaine Creek contains numerous 1 to 3 cm wide stringers of chalcopyrite most of which cannot be traced for more than a few metres. Disseminated and blebby chalcopyrite is also locally present. Three distinct areas will be discussed: Central Elaine Creek (1500E + 8400N to 1400E + 8500N), South Elaine Creek (1450E + 8400N to 1480E + 8500N) and the south Quartz-Sericite-Kyanite Schist (1500E + 8050N to 1500E + 8300N).

Seven grab samples of stringer material were collected in the Central Elaine Creek area. These samples average 3.04% Cu, 695 ppm Zn, 11.7 ppm Ag and 1525 ppb Au.

Six grab samples of stringer material were collected in the South Elaine Creek area. These samples average 2.96% Cu, 913 ppm Zn, 9.63 ppm Ag and 800 ppb Au.

Stringer material in the south Quartz-Sericite-Kyanite Schist were traced for up to 10 metres. Four samples of this material were collected and assayed. Average values are 1.55% Cu, 140 ppm Zn, 7.75 ppm Ag and 369 ppb Au.

There appears to be a metal zonation from south to north in the Elaine Creek area. Cu/Cu+Zn ratios are high and consistent for the three areas; however, Au/Au+Ag and Cu/Cu+Au ratios vary systematically and suggest an overall gold enrichment to the north.

Au/Au+Ag ratios increase from 0.04 to 0.12 while Cu/Cu+Au ratios decrease from 0.81 to 0.69 from the south Quartz-Sericite-Kyanite Schist to the Central Elaine Creek area.

Phoebe Creek Showings:

Stringer and disseminated chalcopyrite occurrences occur dominantly within Quartz-Sericite-Kyanite Schist and to some extent in Mixed Gneiss in the Phoebe Creek area. Two areas will be discussed: the "disseminated chalcopyrite" zone (1340E + 9500N) and the Phoebe Creek stringer showings (between 1250E and 1350E on Phoebe Creek and 1360E + 9390N).

The "disseminated chalcopyrite" zone contains up to 5% disseminated chalcopyrite in a 6.5 metre wide zone within Quartz-Sericite-Kyanite Schist. This zone is not well exposed and is open along strike and to the west. Seven composite chip samples, taken across 1 metre intervals, indicate that the mineralization is fairly consistent and averages 0.69% Cu, 66 ppm Zn, 2.22 ppm Ag and 251 ppb Au.

Quartz-Sericite-Kyanite Schist and Mixed Gneiss in the Phoebe Creek area locally contain stringers of chalcopyrite. These stringers are 1 to 3 cm in width and have been traced over a few metres. Grab samples contain up to 6.56% Cu, 2041 ppm Zn, 19.10 ppm Ag and 880 ppb Au.

Metal zonation indicates that there is an enrichment of Au to the north. Cu/Cu+Zn ratios are relatively constant among the Phoebe Creek showings; however, the "disseminated chalcopyrite" zone contains relatively more gold, indicated by its lower Cu/Cu+Au ratio and higher Au/Au+Ag ratio. It is notable that the metal ratios of the "disseminated chalcopyrite" zone and the Central Elaine Creek showings are remarkably similar in all aspects.

Mineralized Shear Zones:

At 1300E + 8400N thin (< 10 cm wide), boudinaged, quartz veins occur in a small shear zone which cuts Amphibolite (unit 11a). These quartz veins contain semi-massive chalcopyrite and pyrite along their margins. Sample AD01909 of this material contains 2.98% Cu, 198 ppm Zn, 28.45 g/tonne Ag and 1.44 g/tonne Au. A semi-massive 2 to 3 cm wide stringer of pyrite, chalcopyrite and pyrrhotite was found in a small shear zone in amphibolite (unit 11a) at 1250E + 8770N. A sample of this material (AD01821) contains 0.72% Cu, 2059 ppm Zn and 2414 ppm Co. At 800E + 8400N a small shear zone cutting through Quartzofeldspathic Gneiss (unit 11b) contains 5 to 10% pyrite. Only slightly elevated Cu and Zn values occur in this zone.

Thirteen Creek Cirque:

A 30 cm wide chert bed with pods of massive pyrite-chalcopyrite mineralization has been traced for 100 m at the south end of Thirteen Creek Cirque (Fig. 6). A grab sample of massive sulphide assayed 8.06% Cu, 0.53% Zn, 350 g/tonne Ag and 2400 ppb Au (Hassard et al, 1986).

TABLE III
SELECTED ASSAYS - MINERAL OCCURRENCES

SAMPLE NO.	CU (%)	ZN (ppm)	AG (ppm)	AU (ppm)	OTHER (ppm)
		SPHALERITE SHOWING			
AD01700	0.06	6.00%	1.5	0.02	Cd = 746
		CENTRAL ELAINE CREEK			
AD02130	4.65	126	26.10	4.90	
AD02131	4.22	2033	17.20	0.76	
AD02132	4.80	<1	10.60	0.92	
AD02133	1.93	111	3.20	1.03	
AD02134	2.19	1839	12.30	1.89	
AD02135	1.28	91	2.90	0.44	
AD02136	2.20	668	9.80	0.74	
AVERAGE	3.04	695	11.70	1.53	
		SOUTH ELAINE CREEK			
AD01913	1.94	829	9.80	0.70	
AD01917	2.20	324	10.10	0.32	
AD01935	2.22	199	4.10	0.32	
AD01942	2.06	186	7.50	0.84	
AD02111	4.37	237	9.10	0.22	
AD02112	4.97	0.37%	17.20	2.40	
AVERAGE	2.96	913	9.63	0.80	

SOUTH QUARTZ-SERICITE-KYANITE SCHIST

AD02020	0.18	32	NA	0.02	
AD02021	0.18	92	NA	0.08	
AD02022	2.38	104	16.70	0.60	
AD02023	3.46	332	14.30	0.78	
AVERAGE	1.55	140	7.75	0.37	

DISSEMINATED CHALCOPYRITE ZONE

AD02123	0.50	46	2.20	0.24	
AD02124	0.72	67	2.70	0.24	
AD02125	0.73	61	2.10	0.24	
AD02126	0.59	36	1.10	0.18	
AD02127	0.94	171	3.90	0.32	
AD02128	0.97	64	2.50	0.32	
AD02129	0.79	36	2.10	0.44	
AVERAGE	0.69	66	2.22	0.25	

PHOEBE CREEK STRINGER SHOWINGS

AD01931	2.24	0.20%	10.80	0.88	
AD01939	6.56	296	19.10	0.15	

MINERALIZED SHEAR ZONES

AD01909	2.98	198	28.45	1.44	
AD01821	0.72	0.21%	NA	0.03	Co = 2414
AD01939	6.56	296	19.10	0.15	

NA = Ag below detection limits; ppm = g/tonne

TABLE IV
METAL RATIOS

SAMPLE NO.	CU/CU+ZN	AU*/AU*+AG	CU/CU+AU#
	SPHALERITE SHOWING		
AD01700	0.01	0.01	0.79
	CENTRAL ELAINE CREEK		
AD02130	1.00	0.16	0.49
AD02131	0.95	0.04	0.85
AD02132	1.00	0.08	0.84
AD02133	0.99	0.24	0.65
AD02134	0.92	0.13	0.54
AD02135	0.99	0.13	0.74
AD02136	0.97	0.07	0.75
AVERAGE	0.97	0.12	0.69
	SOUTH ELAINE CREEK		
AD01913	0.96	0.07	0.73
AD01917	0.99	0.03	0.87
AD01935	0.99	0.07	0.87
AD01942	0.99	0.07	0.87
AD02111	0.99	0.02	0.95
AD02112	0.93	0.12	0.67
AVERAGE	0.98	0.07	0.80

SOUTH QUARTZ-SERICITE-KYANITE SCHIST

AD02020	0.98	NA	0.90
AD02021	0.95	NA	0.71
AD02022	1.00	0.03	0.80
AD02023	0.99	0.05	0.82
AVERAGE	0.98	0.04	0.81

DISSEMINATED CHALCOPYRITE ZONE

AD02123	0.99	0.10	0.68
AD02124	0.99	0.08	0.75
AD02125	0.99	0.10	0.75
AD02126	0.99	0.14	0.77
AD02127	0.98	0.08	0.75
AD02128	0.99	0.11	0.75
AD02129	1.00	0.17	0.64
AVERAGE	0.99	0.11	0.73

PHOEBE CREEK STRINGER SHOWINGS

AD01931	0.92	0.08	0.72
AD01939	1.00	0.01	0.98

MINERALIZED SHEAR ZONES

AD01909	0.99	0.05	0.67
AD01821	0.78	NA	0.96
AD01939	1.00	0.01	0.98

*AU = PPM; #AU = PPBX10; NA = AG below detection limit

GEOPHYSICAL SURVEYS

Ground Geophysical Surveys

Ground geophysical surveys were performed over the Thirteen Creek grid by Delta Geoscience Ltd. between July 25 and August 14, 1987. Geophysical surveys include: Max Min, VLF-EM, magnetometer and gradiometer. A report by G.A. Hendrickson, P.Geoph. (Appendix III) describes the survey methods, equipment used, results and personnel. Conductor axes are plotted on plan (Figure III-2) and data is plotted as a series of profiles along with topography for each grid line (Figs III-3 to 9).

In general, many conductors correlate well from line to line, have considerable strike length and appear to be formational. Several of these occur within metasedimentary units and are likely attributable to graphite. Conductors of shorter strike length and occurring within metavolcanic units are considered to be more prospective.

GEOCHEMICAL SURVEY

General

A total of 838 soil samples were collected; these include 9 duplicates to check analytical precision. Sample data, including: colour, texture, depth and size fraction, was recorded on sheets which are on file with Falconbridge Limited in Vancouver.

The Thirteen Creek area is dominantly underlain by ferro-humic podzol soil (Clayton et al, 1977). Samples were collected from the dark brown or reddish brown "B" horizon where possible. Samples were collected from the grey or buff "C" horizon, or alternatively from black organic-rich "A" horizon where suitable "B" horizon was not available.

Soil samples were collected along grid lines, which are usually 100 meters apart. Samples were taken from holes up to 0.5 metres deep; Pulaski tools were used to penetrate the near-surface roots and underbrush. Sampling was conducted at 20 metres intervals over and near the steeply dipping Quartz-Sericite-Kyanite Schist. Spacing of sample sites was increased to 40 metres adjoining this prospective unit.

Samples were air-dried in camp and shipped to Bondar-Clegg & Company Ltd. in Vancouver for gold, copper, lead, zinc, silver, barium and arsenic analyses. Analytical data and a description of geochemical procedures is included in appendix IV. Sample numbers and metal content are plotted at 1:2000 scale (Figs. 13-18); anomalous samples, determined by a statistical analysis of the data, are indicated by symbols and are compiled at 1:5000 scale, with general geology (Figs. 19-21).

Statistical analyses for Au, Cu, Pb, Zn, Ag, Ba and As were performed for each horizon separately. Histograms and cumulative probability plots are included in appendix V.

The various elements are log normally distributed and positively skewed. Although in most cases an "anomalous" population is evident, there is often considerable overlap with the much larger "background" population and separation of the two is difficult. Therefore, samples considered "possibly anomalous" include some high "background" samples as well as some from the "anomalous" population. Lower thresholds and/or limits selected for "possibly anomalous" and "anomalous" populations are listed for each element and soil horizon in Table V.

TABLE V

SOIL GEOCHEMICAL SUMMARY

	GEOCHEMICAL VALUE		
Horizon	A	B	C
Category			
Pos. Anom. Au	6- 27ppb	6- 54ppb	6- 54ppb
Anom. Au	> 27ppb	> 54ppb	> 54ppb
Pos. Anom. Cu	61-399ppm	205-319ppm	>160ppm
Anom. Cu	>399ppm	>319ppm	N/A
Pos. Anom. Pb	> 11ppm	13- 20ppm	> 11ppm
Anom. Pb	N/A	> 20ppm	N/A
Pos. Anom. Zn	43- 99ppm	69-101ppm	41- 63ppm
Anom. Zn	> 99ppm	>101ppm	> 63ppm
Pos. Anom. Ag	0.6-1.0ppm	0.4-1.0ppm	0.4-1.0ppm
Anom. Ag	>1.0ppm	>1.0ppm	>1.0ppm
Pos. Anom. Ba	370-649ppm	450-709ppm	440-979ppm
Anom. Ba	>649ppm	>709ppm	>979ppm

Interpretation

Geochemical soil sampling of the Thirteen Creek Grid successfully outlined multielement anomalies. Anomalous areas are indicated by most of the elements analyzed, with the exception of arsenic and possibly zinc. Arsenic values are low and an anomalous population could not be identified. Zinc anomalies are scattered, with little clustering and are underlain by all lithologies in the grid area. This is likely caused by an overlap between a large background and a relatively small anomalous population. Nevertheless, some diffuse clusters coincide with sharply defined clustering of other elements and therefore may be valid anomalies. Only multistation, multielement anomalies are discussed in the following section; the location of individual anomalies and anomaly areas numbered below are plotted on figures 19-21.

Anomaly I:

Anomaly I extends 900 metres north from line 9000N. The anomaly is parallel to and overlies units 6b, 7 and 8. Anomalous and possibly anomalous values of gold, copper and barium are present throughout the anomaly area, whereas elevated values of silver and lead are concentrated north of Phoebe Creek. Anomaly I is the largest and most pronounced anomaly on the grid. The highest values for gold, copper, lead, zinc and barium from the 1987 survey occur in soil from this area.

Anomaly II:

Anomaly II is an area of high gold and copper. It extends from line 7500N to 8700N and overlies units 6b, 7 and 8. Gold and copper values are greatest north of line 8100N where they coincide with known chalcopyrite showings.

Anomaly III:

Anomaly III is an area of high silver and barium which extends from 7900N to 8300N and overlies units 6b, 7 and 8. Most of the high barium values are confined to a corridor bounded by the eastern margin of unit 6b and the western margin of unit 8, this tendency is also observed in anomaly I. The highest silver value obtained during the survey (5.6 ppm) occurs at 100 metres north of the "Sphalerite Showing". Values for all other elements at this site are well below the possibly anomalous threshold, thus suggesting that this high silver value could be background. Anomaly III overlaps with the central portion of anomaly II.

Anomaly IV:

Anomaly IV is an area of high lead and zinc extending from 7900N to 8600N. The anomaly overlies units 2 and 3 in the north and units 7 and 8 in the south where it overlaps Anomalies II and III. The lack of anomalous zinc near or below from the sphalerite showing is likely due to the narrow, recessive-weathering nature of the zone and karsting of the adjacent and downslope limestone, which might deflect groundwater.

Anomaly V:

The multielement anomaly V is located at the southeast end of the grid and occurs mostly over unit 1. It is mainly a barium anomaly but possibly anomalous Au, Cu, Ag, Pb, and Zn are also present. Anomaly V may be an extension of Anomalies II, III and IV, however the steepness of the terrain precluded sampling the area between the anomalies.

Anomaly VI:

Anomaly VI occurs along the western part of lines 8800N and 8900N. It is a small, multielement anomaly characterized by the highest concentration of anomalous and possibly anomalous lead values present on the grid. Barium, zinc, silver and gold are also present at Anomaly VI.

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STATEMENTS OF QUALIFICATIONS

I, Franklin R. Hassard, of Burnaby, British Columbia, do hereby certify that:

1. I am a Senior Exploration Geologist with Falconbridge Limited at #701, 1281 West Georgia Street, Vancouver, B.C., V6E 3J7.

2. I am a graduate of the University of British Columbia with a B.A.Sc. degree in Geological Engineering (1970).

3. I have practiced my profession for over 17 years.

4. I am a member of the Association of Professional Engineers of Ontario and a Fellow of the Geological Association of Canada.

5. Exploration during 1987 and the subject of this report was carried out under my supervision by geologists P.M. Manojlovic, J.D. Fournier and other trained and competant personnel listed in Appendix I of this report.

Dated this 17th day of December, 1987 at Vancouver, B.C.

F.R. Hassard

Franklin R. Hassard, P.Eng.

STATEMENT OF QUALIFICATIONS

I, Peter M. Manojlovic, an employee of Falconbridge Limited, with offices at #701-1281 West Georgia Street, Vancouver, B.C., do hereby declare that:

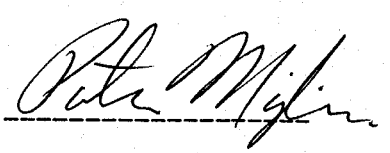
1. I am a graduate of the University of Western Ontario, London, Ontario with an Honours B.Sc. degree in Geology (1983).

2. I am a graduate of Carleton University, Ottawa, Ontario with a M.Sc degree in Geology (1987).

3. For the past eight years I have been involved in mineral exploration and geological research in Ontario, Saskatchewan, British Columbia and the Northwest and Yukon Territories.

4. I am an Associate Member of the Geological Association of Canada.

Dated this 17 day of December, 1987 at Vancouver, B.C.



Peter M. Manojlovic

STATEMENT OF QUALIFICATIONS

I, Jean-Denis Fournier, an employee of Falconbridge Limited, with offices at 701-1281 west Georgia St. Vancouver B.C., do hereby declare that:

1. I am a geologist; graduate of the University of Alberta, Edmonton, Alberta, in 1987 with a B.Sc. in Geology.

2. For the past three years I have been involved in mineral exploration in the Northwest Territories and British Colombia.

3. I am a registered Geologist In Training with the Association of Professional Engineers, Geologists and Geophysicists of Alberta.

4. I am an associate member of the G.A.C..

5. I carried out the work described in the report.

Dated at Vancouver, B.C., this 17th day of December, 1987.

Jean-Denis Fournier B.Sc.

COST STATEMENTS

ECSTALL PROJECT - EXPENDITURES IN 1987

GROUP ECSTALL K-1
(RED 1 to 4 and 6; BLUE 1,3 and 4; GREEN 1; SKINNY FRACTION)

LINECUTTING

S.R. Oscsko Exploration Services:

Linecutting:	
33 km grid lines @ $275. (measured horizontally)	$ 9,075.
mob. & demob. men & equipment: Ocsko invoice	$ 1,250.
3 men, 16 days	
Falconbridge Limited:	
Falconbridge wages:	$ 4,300.
chaining 33.8 km; cutting 0.8 km grid	
4 men, 10 days @ $85.50 average,	
cook 8 days (pro rata) @ $114.	
General:	
Camp costs:	$ 5,300.
total of 96 man-days (Ocsko & Falconbridge) @ $55.	
(Camp Cost rate is averaged for program and includes cost of: food, camp mob. & demob., service by fixed-wing aircraft and helicopter, fuel, supplies and equipment purchase and repair; divided by the total man-days out of the camp.)	
Helicopter:	$ 6,400.
12.5 hrs. @ $508.63 (incl. fuel & oil)	
Fixed-wing Aircraft:	$ 400.
crew mob. by TPA Otter @ $428.	
(demob. by helicopter)	
Total Linecutting:	**$ 26,700.**

GROUND GEOPHYSICS

Delta Geoscience Ltd.:

4 man crew: Max Min (3 men) + VLF, Mag. - 14 days @ $950	$ 13,300.
3 man crew: Max Min (2 men) + VLF, Mag. - 5 days @ $875 total 71 man-days on property	$ 4,375.
Mob. & demob. (men & equipment)	$ 3,081.
Crew travel - 2 days	$ 1,248.
Travel charges: Fixed-wing aircraft TPA: 2 Beavers @ $301., 1 Otter @ $428.	$ 1,030.
Falconbridge wages: (cooking - 11 days,pro rata @ $114. supervision & grid orientation - 2 days @ $124.) total 13 man-days on property	$ 1,500.
Camp costs: 84 man-days (Delta & Falconbridge crews) @ $55.	$ 4,600.
Helicopter: 14.1 hrs, @ $508.63	$ 7,170.
Report, interpretation and drafting Delta Geoscience 8 days @ $300.	$ 2,400.
Total Ground Geophysics:	**$ 38,700.**

GEOCHEMISTRY

Analyses: 838 soil samples (Cu, Pb, Zn, Ag, Au, As, Ba) by Bondar-Clegg (AA-5 elements, colourimetric, XRF) @ $18.25 + 0.90 prep.; sample bags @ $16./100, shipping containers and freight costs.	$ 16,340.
Helicopter: 14.4 hrs @ $508.63 (incl. fuel & oil)	$ 7,320.
Falconbridge wages: 32 mandays @ $85.50 average for 4 man crew; collecting, drying, plotting & shipping samples - 24 mandays, plus 8 days travel and weather delays; cook 8 days (pro rata) @ $114.	$ 3,750.
Camp costs: total of 40 mandays @ $55.	$ 2,200.
Report: Falconbridge personnel wages for computer data entry, processing, plotting, interpretation, drafting plus materials	$ 2,800.
Travel: mobilization & demobilization - 2 men pro rata Vancouver - Terrace return	$ 700.
Total Geochemistry:	**$ 33,100.**

GEOLOGY

Falconbridge wages: 2 Geologists, 50 mandays each, @ $112. average 3 Assistants, total 80 mandays, @ $87. average mapping, sampling & prep., plotting & data prep., incl. travel & weather delays	$ 18,160.
Camp costs: total of 180 mandays @ $55.	$ 9,900.
Helicopter: 36.1 hrs. @ $508.63	$ 18,360.
Analyses: 38 rock samples, analysed by Bondar-Clegg (see Appendix II for elements and methods) @ $19. + $3.75 prep. + shipping & materials	$ 900.
Travel: mobilization & demobilization - 2 men pro rata Vancouver - Terrace return	$ 700.
Report: Data compilation, computer, writing and drafting Wages for 2 geologists, draftsperson, room & board	$ 5,000.
Total Geology:	**$ 53,000.**
TOTAL EXPENDITURES IN 1987:	**$151,500.**

1987 THIRTEEN CREEK GRID

MARIPOSITE GRID

1986 WEST GRID

ECSTALL RIVER

INDIAN RESERVE 68

Slide Pond

Phoebe Creek

Elaine Creek

Thirteen Creek

North Branch

Central Branch

South Branch

Rusty Boulder Creek

Mariposite Lake

Lake

Ice Field

ALLAIRE RIDGE

SKINNY FR. RED 3 (3S, 3E)

RED 4 (5S, 3E)

RED 6 (8S, 1E)

MARIPOSITE 1 (8N, 2E)

MARIPOSITE 2 (8S, 2E)

DDH-86EC2

DDH-86EC3

GREEN 1 (1N, 2W)

BLUE 2 (8S, 2W)

I, II, IV, V, VI

SYMBOLS

- Outcrop, small outcrop
- Geological contact (approximate, inferred)
- Foliation / gneissosity strike and dip
- Minor fold, fold axis and axial plane indicated
- Pillow facing direction
- Fault (approximate, inferred)
- Diamond drillhole
- Property boundary
- Legal corner post
- 1987 grid
- 1986 grid

MINERALS

CPY Chalcopyrite

SP Sphalerite

LITHOLOGIES

COAST RANGE INTRUSIVE COMPLEX

13 Granodiorite, Quartz Diorite

12 Mafic Dyke

ECSTALL PENDANT METAMORPHIC ROCKS

METAPLUTONIC AFFINITY

11 Homogeneous Gneiss
- a Amphibolite
- b Quartzofeldspathic Gneiss

METASEDIMENTARY AFFINITY

10 Chert

9 Marble

8 Clastic Metasediments

METAVOLCANIC AFFINITY

7 Mixed Gneiss

6 Quartz-White Mica Schist
- a Quartz-Sericite Schist
- b Quartz-Sericite-Kyanite Schist

5 Felsic Breccia

4 Quartz-Biotite Gneiss

3 Quartz-Chlorite-Biotite Schist

2 Quartz-Chlorite Schist
- a Massive
- b Fragmental

1 Chlorite Schist
- a Massive
- b Pillowed
- c Fragmental

HORIZON	A	B	C
Anomalous Pb		>20ppm	
Possibly anomalous Pb	>11ppm	13-20ppm	>11ppm
Anomalous Zn	>99ppm	>101ppm	>63ppm
Possibly anomalous Zn	43-99ppm	69-101ppm	41-63ppm

VI Anomalous area

KIDD CREEK MINES LTD.

ECSTALL PROPERTY

SOIL ANOMALIES-Pb,Zn

NTS 103H/13E, 14W Project No. 114

WORK BY	DRAWN BY	DATE: Nov. 1987
	VJG	

100 0 100 200 300 500 m

SCALE IN METRES 1 : 5000

Figure: 21

1987 THIRTEEN CREEK GRID

1986 WEST GRID

MARIPOSITE GRID

ECSTALL RIVER

INDIAN RESERVE 68

Slide Pond

Phoebe Creek

Elaine Creek

Thirteen Creek

North Branch

Central Branch

South Branch

Rusty Boulder Creek

Mariposite Lake

Lake

Ice Field

ALLAIRE RIDGE

Mariposite Creek

SKINNY FR. RED 3 (3S,3E)

RED 6 (8S,1E)

RED 4 (5S,3E)

GREEN 1 (1N,2W)

BLUE 2 (8S,2W)

MARIPOSITE 1 (8N,2E)

MARIPOSITE 2 (8S,2E)

DDH-86EC2

DDH-86EC3

I II III V VI

SYMBOLS

- Outcrop, small outcrop
- Geological contact (approximate, inferred)
- Foliation / gneissosity strike and dip
- Minor fold, fold axis and axial plane indicated
- Pillow facing direction
- Fault (approximate, inferred)
- Diamond drillhole
- Property boundary
- Legal corner post
- 1987 grid
- 1986 grid

MINERALS

CPY Chalcopyrite

SP Sphalerite

LITHOLOGIES

COAST RANGE INTRUSIVE COMPLEX

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12 Mafic Dyke

ECSTALL PENDANT METAMORPHIC ROCKS

METAPLUTONIC AFFINITY

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METASEDIMENTARY AFFINITY

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4 Quartz-Biotite Gneiss

3 Quartz-Chlorite-Biotite Schist

2 Quartz-Chlorite Schist
- a Massive
- b Fragmental

1 Chlorite Schist
- a Massive
- b Pillowed
- c Fragmental

HORIZON	A	B	C
Anomalous Ag	0.6-1.0ppm	0.4-1.0ppm	0.4-1.0ppm
Possibly Anomalous Ag	>1.0ppm	>1.0ppm	>1.0ppm
Anomalous Ba	>649ppm	>709ppm	>979ppm
Possibly anomalous Ba	370-649ppm	450-709ppm	440-979ppm

VI Anomalous area

GEOLOGICAL BRANCH ASSESSMENT REPORT

16,711

Part 1 of 2

KIDD CREEK MINES LTD.

ECSTALL PROPERTY

SOIL ANOMALIES-Ag,Ba

NTS 103H/13E, 14W Project No. 114

WORK BY	DRAWN BY	DATE: Nov. 1987
	VJG	

100 0 100 200 300 500 m

SCALE IN METRES 1:5000

Figure: 20

1987 THIRTEEN CREEK GRID

1986 WEST GRID

MARIPOSITE GRID

ECSTALL RIVER

INDIAN RESERVE 68

Slide Pond

Phoebe Creek

Eloine Creek

Thirteen Creek

North Branch

Central Branch

South Branch

Rusty Bowder Creek

Mariposite Lake

Lake

ALLAIRE RIDGE

Ice Field

SKINNY FR. RED 5 (3S, 3E)

RED 6 (8S, 1E)

RED 4 (5S, 3E)

GREEN 1 (1N, 2W)

BLUE 2 (8S, 2W)

MARIPOSITE 1 (8N, 2E)

MARIPOSITE 2 (8S, 2E)

DDH-86EC2

DDH-86EC3

I

II

V

VI

SYMBOLS

- Outcrop, small outcrop
- Geological contact (approximate, inferred)
- 80 Foliation / gneissosity strike and dip
- Minor fold, fold axis and axial plane indicated
- Pillow facing direction
- Fault (approximate, inferred)
- Diamond drillhole
- Property boundary
- Legal corner post
- 1987 grid
- 1986 grid

MINERALS

CPY Chalcopyrite

SP Sphalerite

LITHOLOGIES

COAST RANGE INTRUSIVE COMPLEX

13 Granodiorite, Quartz Diorite

12 Mafic Dyke

ECSTALL PENDANT METAMORPHIC ROCKS

METAPLUTONIC AFFINITY

11 Homogeneous Gneiss
- a Amphibolite
- b Quartzofeldspathic Gneiss

METASEDIMENTARY AFFINITY

10 Chert

9 Marble

8 Clastic Metasediments

METAVOLCANIC AFFINITY

7 Mixed Gneiss

6 Quartz-White Mica Schist
- a Quartz-Sericite Schist
- b Quartz-Sericite-Kyanite Schist

5 Felsic Breccia

4 Quartz-Biotite Gneiss

3 Quartz-Chlorite-Biotite Schist

2 Quartz-Chlorite Schist
- a Massive
- b Fragmental

1 Chlorite Schist
- a Massive
- b Pillowed
- c Fragmental

HORIZON	A	B	C
Anomalous Au	>27ppb	>54ppb	>54ppb
Possibly anomalous Au	6-27ppb	6-54ppb	6-54ppb
Anomalous Cu	>399ppm	>319ppm	
Possibly anomalous Cu	61-399ppm	205-319ppm	>160ppm

VI Anomalous area

KIDD CREEK MINES LTD.

ECSTALL PROPERTY

SOIL ANOMALIES-Au,Cu

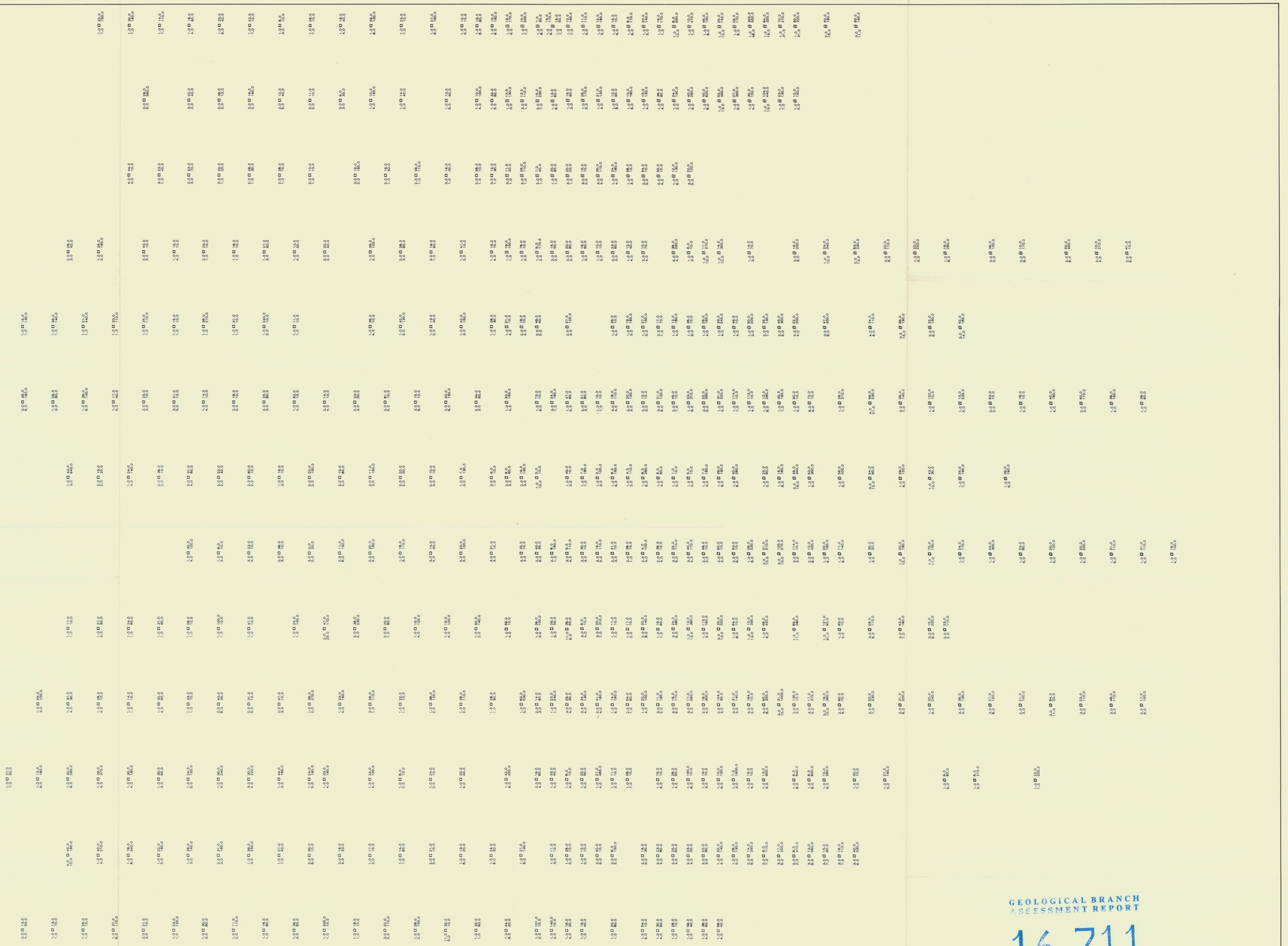
NTS 103H/13E, 14W Project No. 114

WORK BY | DRAWN BY: VJG | DATE: Nov. 1987

100 0 100 200 300 500 m

SCALE IN METRES 1:5000

Figure: 19



LEGEND

As Zn
Pb Ba

KIDD CREEK MINES LTD.

ECSTALL PROPERTY

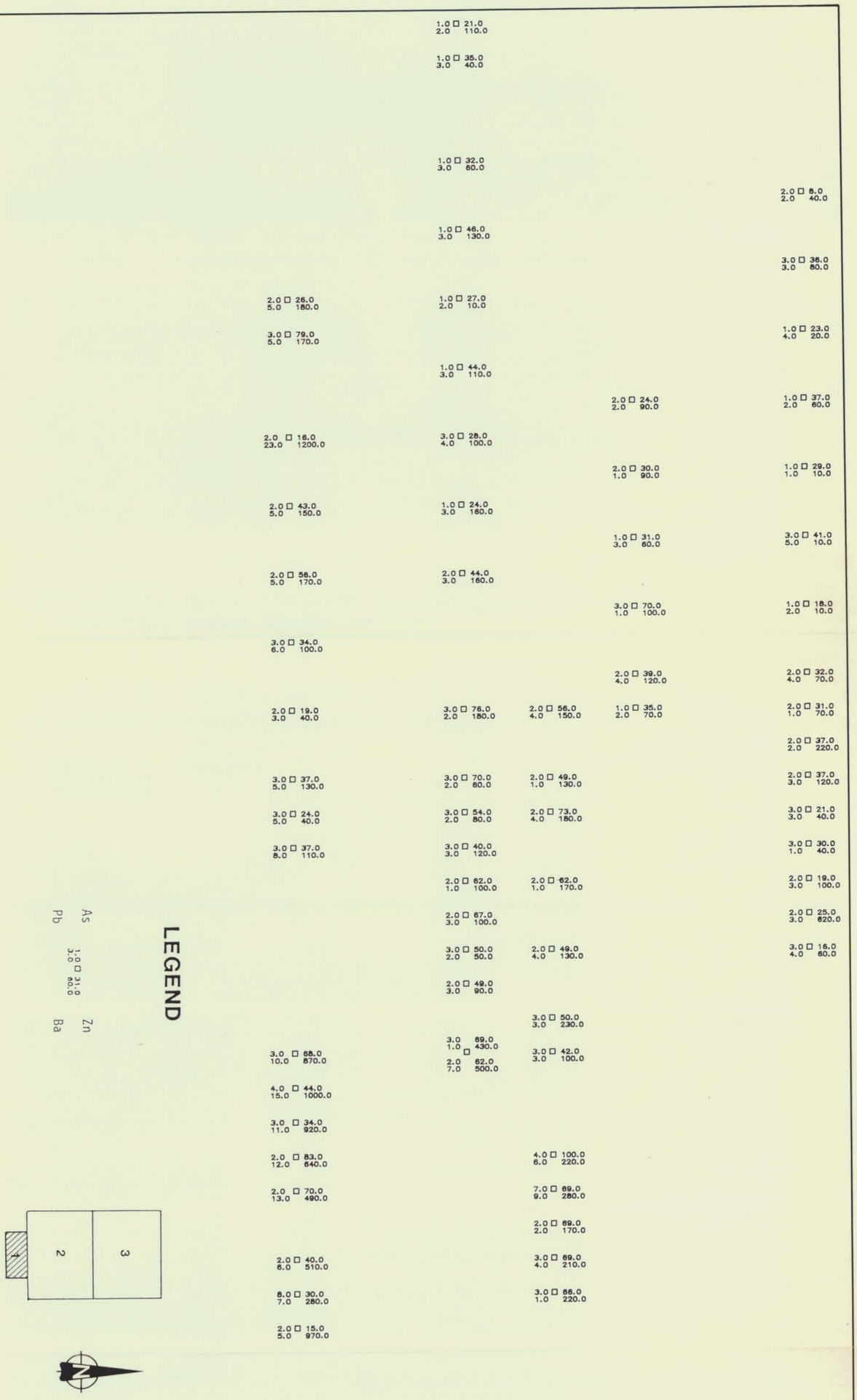
SOIL GEOCHEMISTRY

As, Pb, Zn, Ba values

WORK BY	DRAWN BY	DATE: Nov 1987

50 0 50 100
SCALE IN METRES 1 : 2 000

Figure: 17



KIDD CREEK MINES LTD.

ECSTALL PROPERTY

SOIL GEOCHEMISTRY

As, Pb, Zn, Ba values

PROJ. 114

WORK BY

DRAWN BY

DATE. Nov 1987

SCALE IN METRES 50 0 50

1 : 2000

Figure: 18

GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,711
Part 1 of 2

LEGEND

As Zn
Pb Ba

3
2
1

N

KIDD CREEK MINES LTD.

ECSTALL PROPERTY

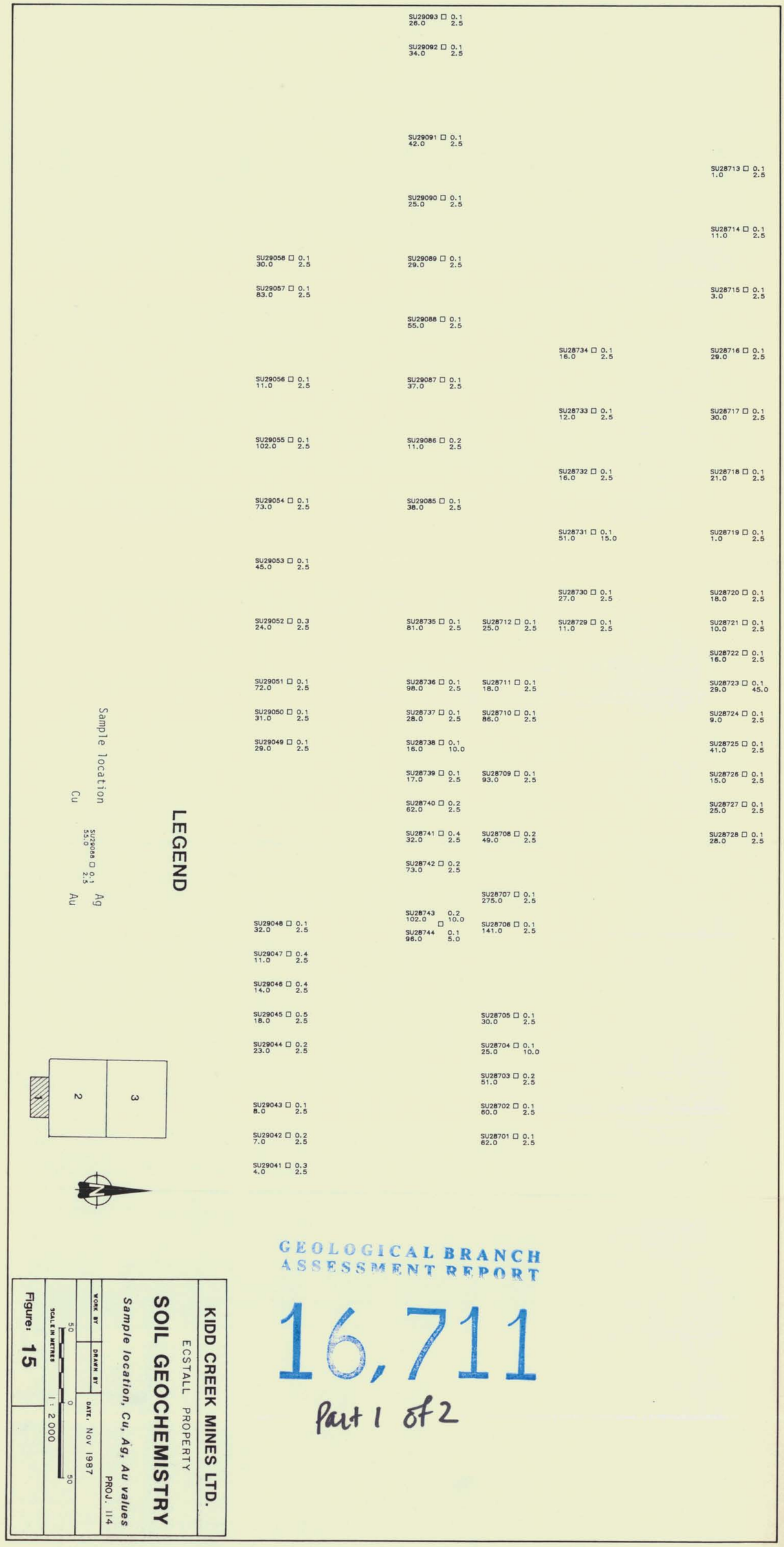
SOIL GEOCHEMISTRY

As, Pb, Zn, Ba values

WORK BY	DRAWN BY	DATE: Nov 1987

50 0 50 100
SCALE IN METRES 1 : 2 000

Figure: 16



KIDD CREEK MINES LTD.

ECSTALL PROPERTY

SOIL GEOCHEMISTRY

Sample location, Cu, Ag, Au values

PROJ. 114

WORK BY

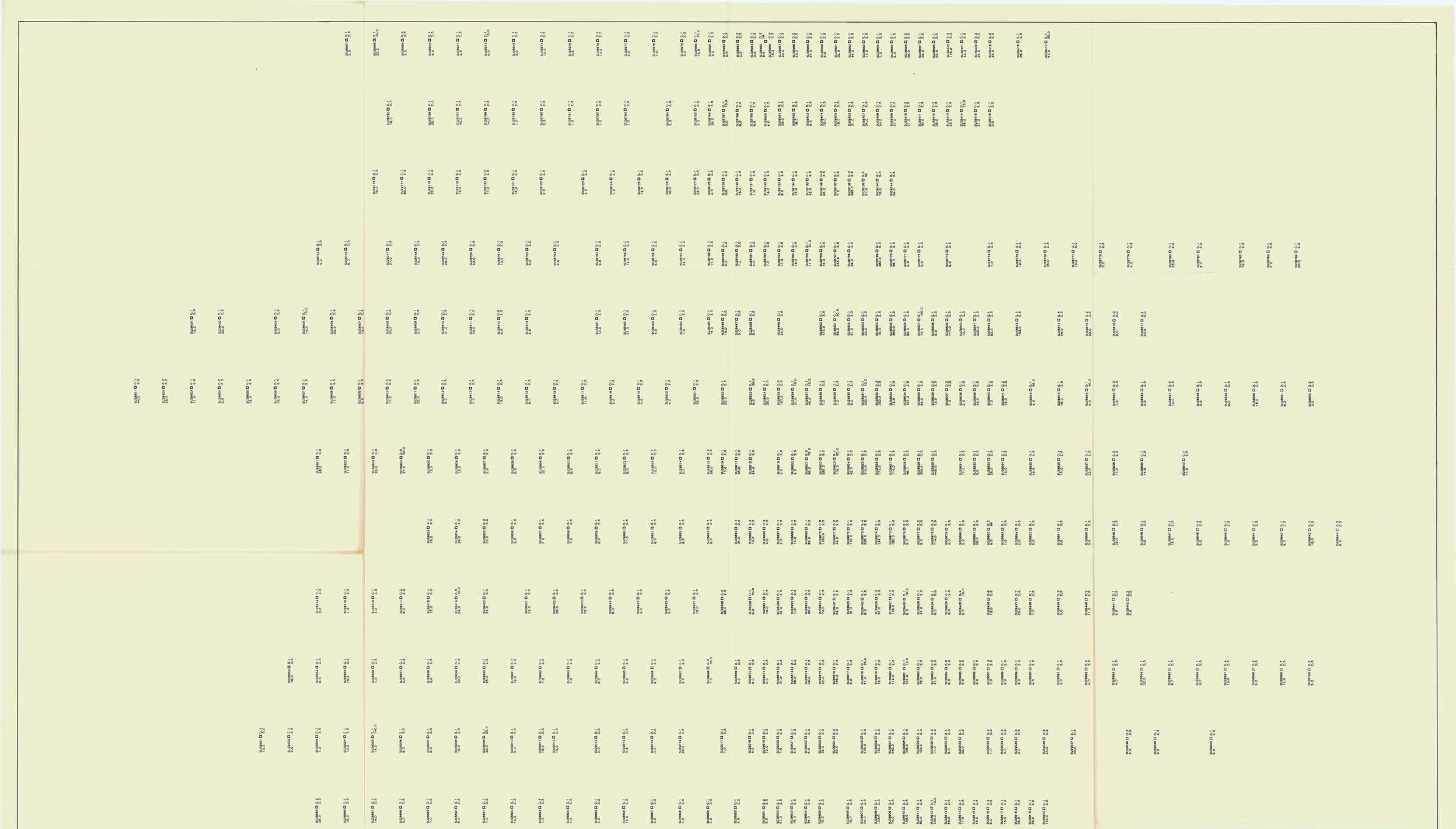
DRAWN BY

DATE: Nov 1987

SCALE IN METRES 50 0 50

1 : 2 000

Figure: 15



GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,711
Part 1 of 2

LEGEND

Sample location
Cu
Ag
Au

3
2
1

N

KIDD CREEK MINES LTD.

ECSTALL PROPERTY

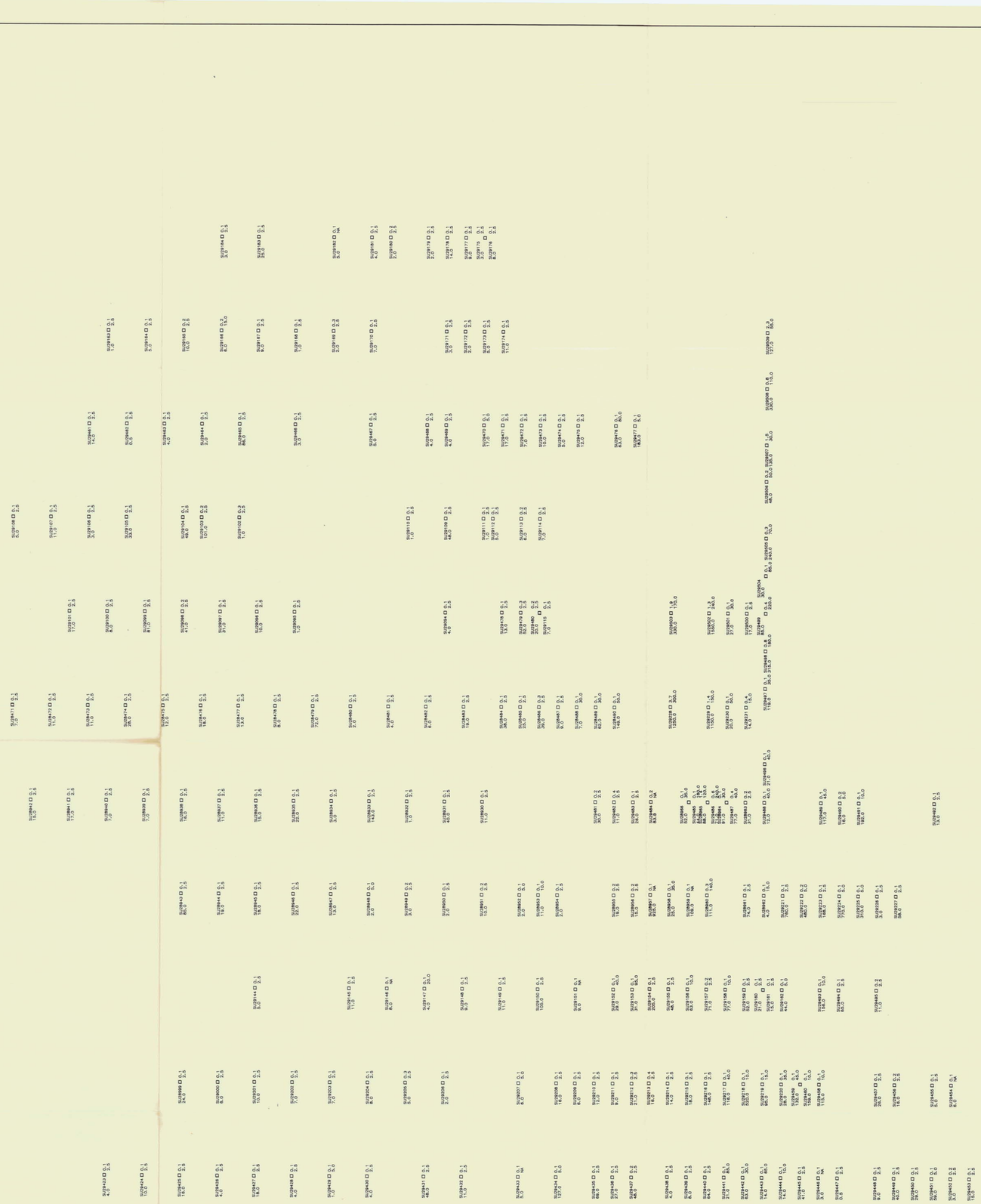
SOIL GEOCHEMISTRY

Sample location, Cu, Ag, Au values

WORK BY	DRAWN BY	DATE: Nov 1987

50 0 50 100
SCALE IN METRES 1 : 2000

Figure: 14



LEGEND

Sample location SU29066 D 0.1 55.0 2.5

Cu Ag Au

3
2
1

N

KIDD CREEK MINES LTD.

ECSTALL PROPERTY

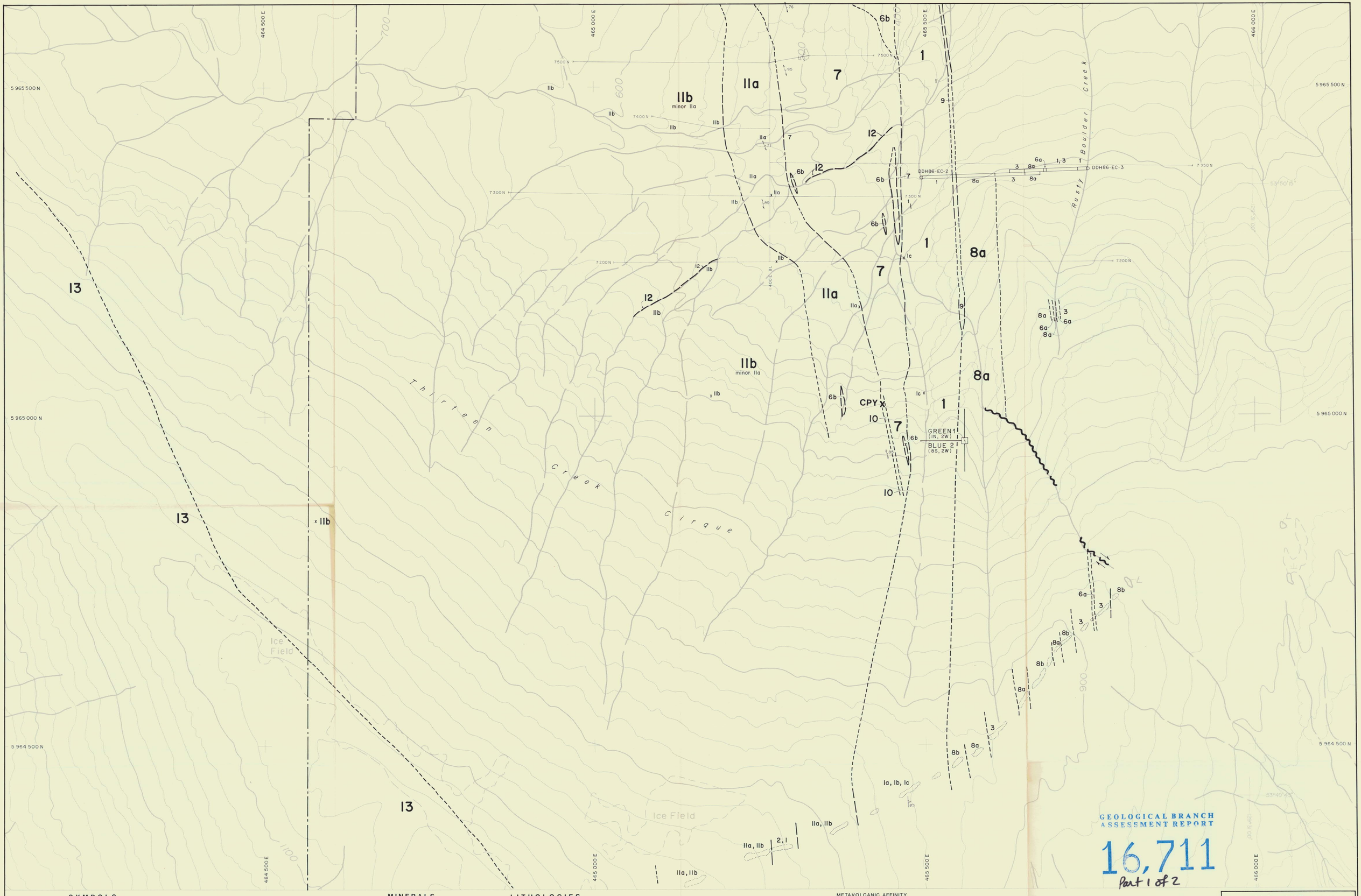
SOIL GEOCHEMISTRY

Sample location, Cu, Ag, Au values

WORK BY	DRAWN BY	DATE: Nov 1987

50 0 50 100
SCALE IN METRES 1 : 2 000

Figure: 13



SYMBOLS

- Outcrop, small outcrop
- Geological contact (approximate, inferred)
- Foliation / gneissosity strike and dip
- Minor fold, fold axis and axial plane indicated
- Pillow facing direction
- Fault (approximate, inferred)
- 1987 grid
- 1986 grid
- Diamond drillhole
- Property boundary
- Legal corner post

MINERALS

- CPY Chalcopyrite
- PY Pyrite
- PO Pyrrhotite
- SP Sphalerite

LITHOLOGIES

COAST RANGE INTRUSIVE COMPLEX

- 13 Granodiorite, Quartz Diorite
- 12 Mafic Dyke

ECSTALL PENDANT METAMORPHIC ROCKS

METAPLUTONIC AFFINITY

- 11 Homogeneous Gneiss
  - a Amphibolite
  - b Quartzofeldspathic Gneiss

METASEDIMENTARY AFFINITY

- 10 Chert
- 9 Marble
- 8 Clastic Metasediments
  - a Aphanitic, dark, locally graphitic- Argillite
  - b Quartz-biotite-chlorite-sericite+/- garnet-Greywacke

METAVOLCANIC AFFINITY

- 7 Mixed Gneiss
- 6 Quartz-White Mica Schist
  - a Quartz-Sericite Schist
  - b Quartz-Sericite-Kyanite Schist
- 5 Felsic Breccia
- 4 Quartz-Biotite Gneiss
- 3 Quartz-Chlorite-Biotite Schist
- 2 Quartz-Chlorite Schist
  - a Massive
  - b Fragmental
- 1 Chlorite Schist
  - a Massive
  - b Pillowed
  - c Fragmental

Sheet 1
Sheet 2
Sheet 3
Sheet 3 of 3

Kidd Creek Mines Ltd.

ECSTALL PROPERTY

GEOLOGY

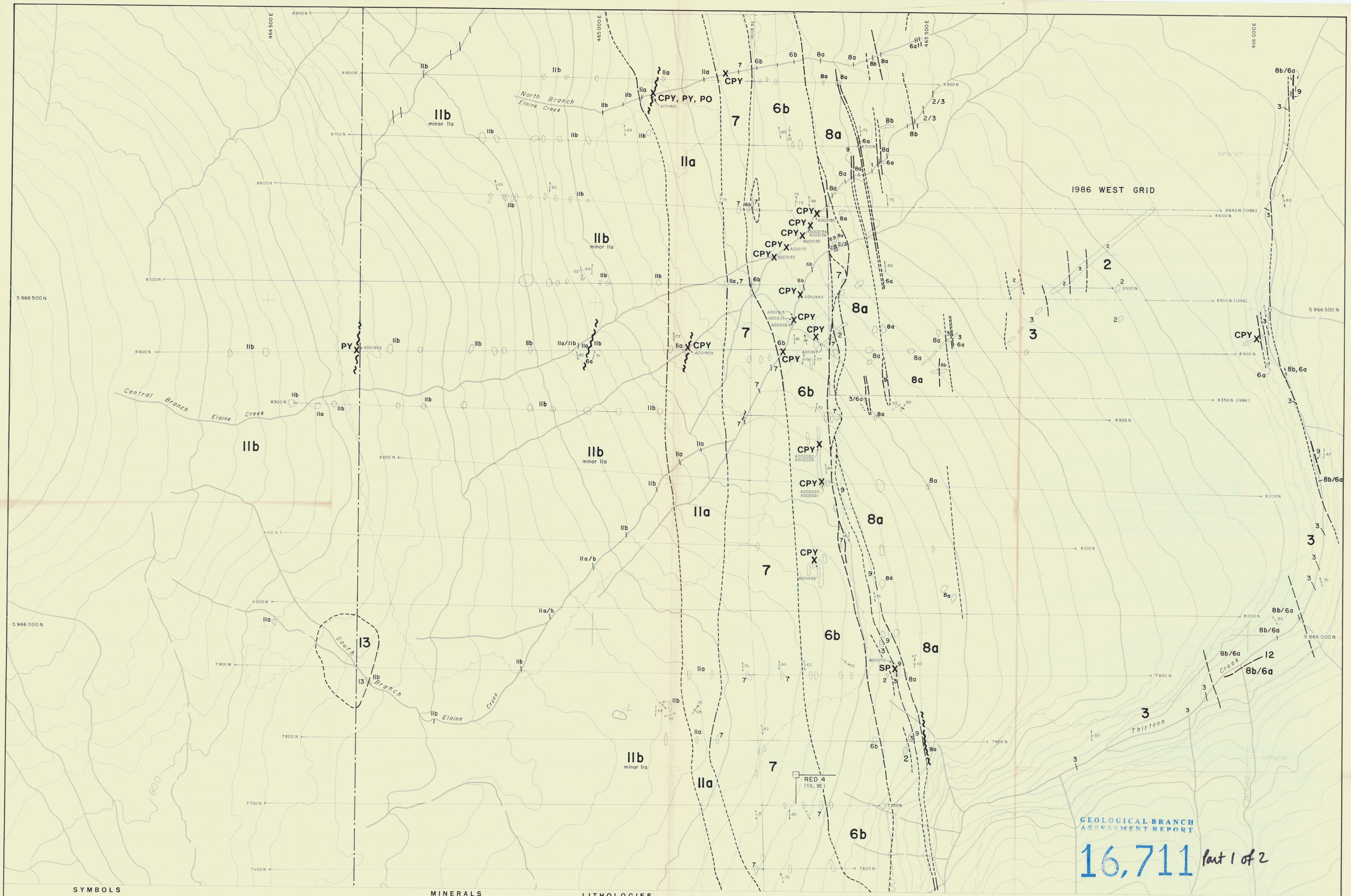
NTS: 103H/13E Project No.: 114

WORK BY	DRAWN BY	DATE: Nov. 1987
	VJG	

50 0 50 100
1: 2000

Figure: 9

kidd



GEOLOGICAL BRANCH
ASSESSMENT REPORT

16,711 part 1 of 2

SYMBOLS

- Outcrop, small outcrop
- Geological contact (approximate, inferred)
- Foliation / gneissosity strike and dip
- Minor fold, fold axis and axial plane indicated
- Pillow facing direction
- Fault (approximate, inferred)
- 1987 grid
- 1986 grid
- Diamond drillhole
- Property boundary
- Legal corner post

MINERALS

- **CPY** Chalcopyrite
- **PY** Pyrite
- **PO** Pyrrhotite
- **SP** Sphalerite

LITHOLOGIES

COAST RANGE INTRUSIVE COMPLEX

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ECSTALL PENDANT METAMORPHIC ROCKS

METAPLUTONIC AFFINITY

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- 9 Marble
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  - a Aphanitic, dark, locally graphitic- Argillite
  - b Quartz-biotite-chlorite-sericite+/- garnet-Greywacke

METAVOLCANIC AFFINITY

- 7 Mixed Gneiss
- 6 Quartz-White Mica Schist
  - a Quartz-Sericite Schist
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- 5 Felsic Breccia
- 4 Quartz-Biotite Gneiss
- 3 Quartz-Chlorite-Biotite Schist
- 2 Quartz-Chlorite Schist
  - a Massive
  - b Pillowed
  - c Fragmental
- 1 Chlorite Schist
  - a Massive
  - b Pillowed
  - c Fragmental

Sheet 1
Sheet 2
Sheet 3

Sheet 2 of 3

Kidd Creek Mines Ltd.

ECSTALL PROPERTY

GEOLOGY

NTS 103H/13E | Project No.: 114

WORK BY | DRAWN BY: VJG | DATE: Nov. 1987

SCALE IN METRES 50 0 50 100 1:2000

Figure: 8

kidd

1987 THIRTEEN CREEK GRID

ECSTALL RIVER

Phoebe Creek

Slide Pond

Elaine Creek

SKINNY FR RED 3 (3S, 3E)

CPY X AD02123 to AD02129

CPY X AD01939

CPY X AD01931

CPY X

CPY X

CPY X

SYMBOLS

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- Pillow facing direction
- Fault (approximate, inferred)
- 1987 grid
- 1986 grid
- Diamond drillhole
- Property boundary
- Legal corner post

MINERALS

- CPY Chalcopyrite
- PY Pyrite
- PO Pyrrhotite
- SP Sphalerite

LITHOLOGIES

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- 3 Quartz-Chlorite-Biotite Schist
- 2 Quartz-Chlorite Schist
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  - b Fragmental
- 1 Chlorite Schist
  - a Massive
  - b Pillowed
  - c Fragmental

GEOLOGICAL BRANCH ASSESSMENT REPORT

16,711

Part 1 of 2

Sheet 1 | Sheet 2 | Sheet 3

Sheet 1 of 3

Kidd Creek Mines Ltd.

ECSTALL PROPERTY

GEOLOGY

NTS: 103H/13E Project No.: 114

WORK BY | DRAWN BY: VJG | DATE: Nov. 1987

SCALE IN METRES 50 0 50 100 1:2000

Figure: 7

kidd

1987 THIRTEEN CREEK GRID

1986 WEST GRID

MARIPOSITE GRID

ECSTALL RIVER

INDIAN RESERVE 68

Phoebe Creek

Slide Pond

Elaine Creek

Thirteen Creek

North Branch

Central Branch

South Branch

Rusty Boulder Creek

Mariposite Lake

Lake

ALLAIRE RIDGE

Ice Field

SKINNY FR. RED 3

RED 4

RED 6 (8S, 1E)

MARIPOSITE 1 (8N, 2E)

MARIPOSITE 2 (8S, 2E)

DDH86-EC-2

DDH86-EC-3

DDH86-MAR-1

DDH86-MAR-2

GREEN 1

BLUE 2

SYMBOLS

- Outcrop, small outcrop
- Geological contact (approximate, inferred)
- Foliation / gneissosity strike and dip
- Minor fold, fold axis and axial plane indicated
- Pillow facing direction
- Fault (approximate, inferred)
- Legal corner post
- 1987 grid
- 1986 grid
- Diamond drillhole
- Property boundary

MINERALS

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- sp Sphalerite

LITHOLOGIES

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- 3 Quartz-Chlorite-Biotite Schist
- 2 Quartz-Chlorite Schist
  - a Massive
  - b Fragmental
- 1 Chlorite Schist
  - a Massive
  - b Pillowed
  - c Fragmental

KIDD CREEK MINES LTD.

ECSTALL PROPERTY

GEOLOGY

NTS 103H/13E, 14W Project No. 114

WORK BY | DRAWN BY VJG | DATE: Nov. 1987

SCALE IN METRES 1: 5000

Figure: 6

BLUE 1

RED 4

IN 2W GREEN 1 L.C.P.

BLUE 2 L.C.P.

(C. Graf)

L.C.P. MARIPOSITE 1 4N 2E

L.C.P. MARIPOSITE 2 4S 2E

(C Graf)

RED 6

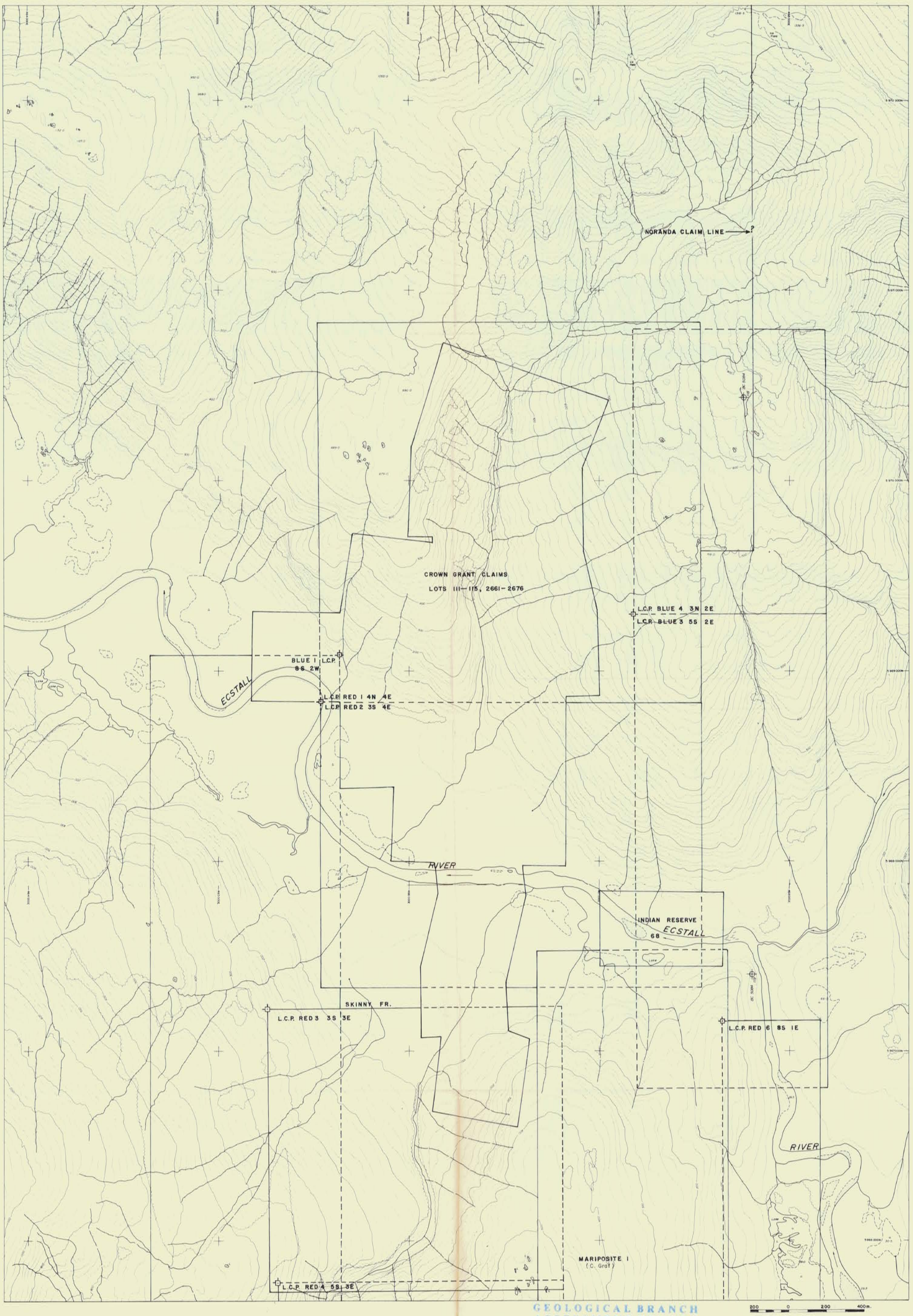
L.C.P. RED 5 4S 5E

NORANDA CLAIM LINE

L.C.P. RED 10 4S 2E

DELTA AERIAL SURVEYS LTD.

FALCONBRIDGE LTD.	
PROPERTY: ECSTALL	PROJECT NO.
LOCATION: ECSTALL RIVER F.C.	
TYPE OF MAP: CLAIMS	
WORKING PLACE:	
BASED ON:	
DATE OF WORK:	MAP REF. NO.: FIG. NO.: 3
DRAWN BY:	
DATE:	N.T.S. NO.: 103-H-13,14



FALCONBRIDGE LTD.	
PROPERTY: ECSTALL	PROJECT NO.:
LOCATION: ECSTALL RIVER B.C.	
TYPE OF MAP: CLAIMS	
WORKING PLACE:	
BASED ON:	
DATE OF WORK:	MAP REF. NO.:
DRAWN BY:	FIG. NO.: 2
DATE:	N.T.S. NO.: 103-H-13, 14