85-1175-14340

Petrographic Report

on the

ECSTALL 8 CLAIM

Situated in the SKEENA Mining Division, B.C.
At Coordinates: 53 deg. 46 min. N, 129 deg. 22 min. W

by: Gordon Maxwell & W. Mercer

OWNER: Chris Graf

OPERATOR: NORANDA EXPLORATION COMPANY, LIMITED
(NO PERSONAL LIABILITY)

N.T.S. 103 H/14W

February 1986

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SUMMARY:

During the 1985 field season a series of samples were collected by Chris Graf from the Horsefly showing, which is covered by the Ecstall 8 claim. The samples were cut and mounted for detailed petrographic analysis. These studies suggest the Horsefly is a volcanogenic massive sulphide deposit, hosted by highly metamorphosed felsic volcanics.

INTRODUCTION:

The Ecstall 8 claim was staked by Chris Graf in December of 1980 to cover a small massive sulphide showing near the Ecstall River. Upon recent examination by the owner, several samples were collected for petrographic studies to determine the environment of deposition for the sulphides. Three samples were sent to Vancouver Petrographics Ltd. for thin section study and three polished sections were prepared for study by W. Mercer, an employee of Noranda Exploration. This report describes the results of petrographic analysis of six samples taken from this sulphide showing.

LOCATION AND ACCESS:

The claim is located approximately 50 air kilometers west-southwest of the town of Kitimat, B.C. The property lies in a subalpine area 2 kilometers east of the large bend in the Ecstall River. Access to the property is via helicopter from Terrace or Prince Rupert.

CLAIM STATISTICS:

The Ecstall 8 claim originally consisted of 20 units staked using the modified grid system. The claim was reduced to six units in December 1984. The claim is located on map 103H/14W in the Skeena Mining Division.

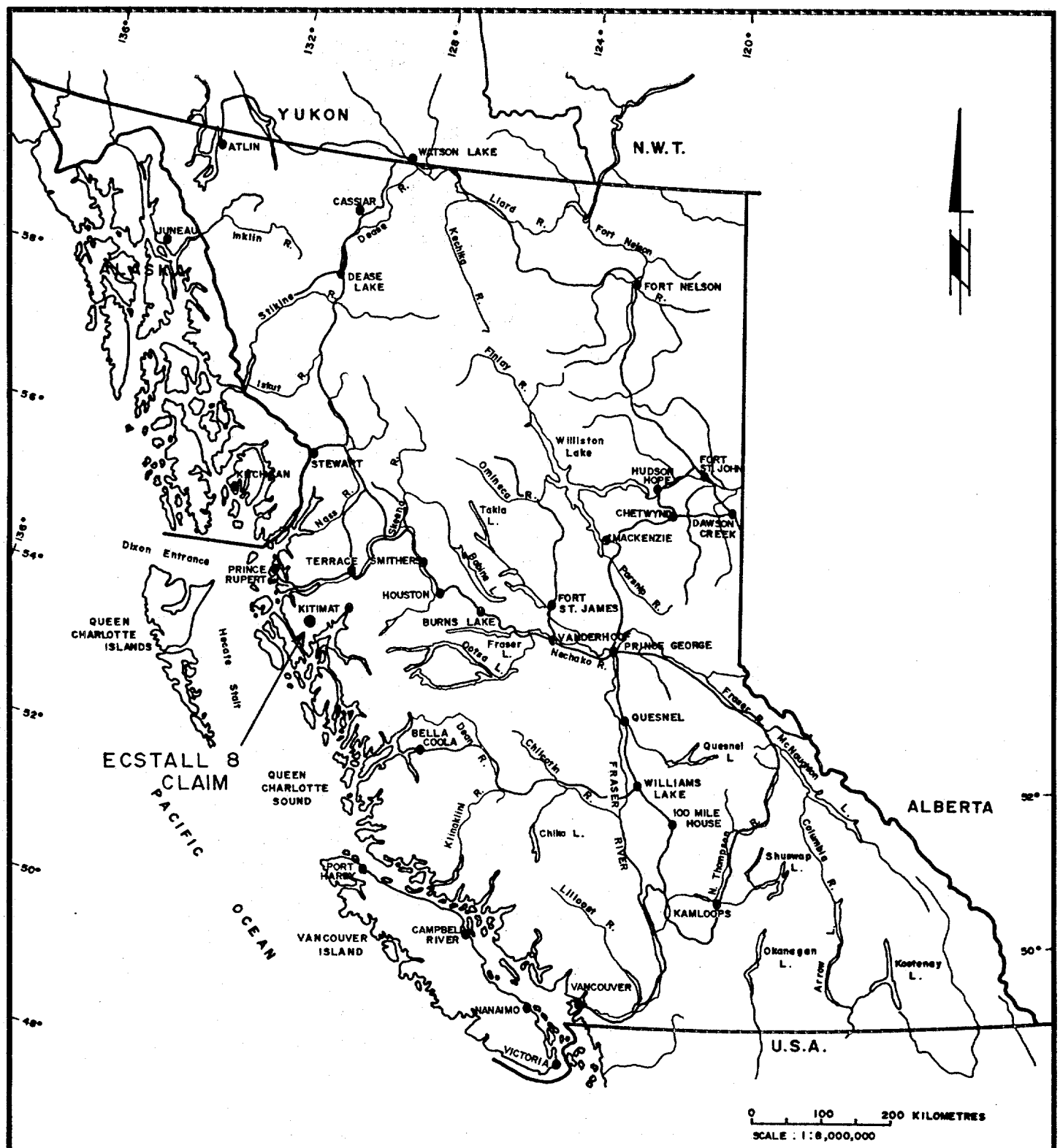
Claim Name	# Units	Record #	Record Date
ECSTALL 8	6	2723	Dec. 17/80

PREVIOUS WORK:

The showing was discovered by prospectors working for Texas Gulf Sulphur in August 1968. A total of 2700 meters of grid line was established to facilitate topographical, geological and geophysical surveys. The claims were later allowed to lapse. The ground was later staked by C. Graf and a joint venture was formed to explore the surrounding area. A helicopter borne EM & Mag survey was flown over the Ecstall 8 claim and other joint venture ground.

REGIONAL GEOLOGY:

The property lies within an Upper Paleozoic group of gneisses and schists which probably represents a highly metamorphosed volcanic/sedimentary belt. These rocks lie within the area known as the Central Gneiss complex which forms a broad northwest trending zone of gneisses, migmatite and intrusive rocks. The rocks of the Ecstall River area have been described in detail by Roddick (1974) and Padgham (1958).



REVISED

ECSTALL 8 CLAIM

Location Map

PROJ. No. _____ SURVEY BY: _____ DATE: Feb. 1986

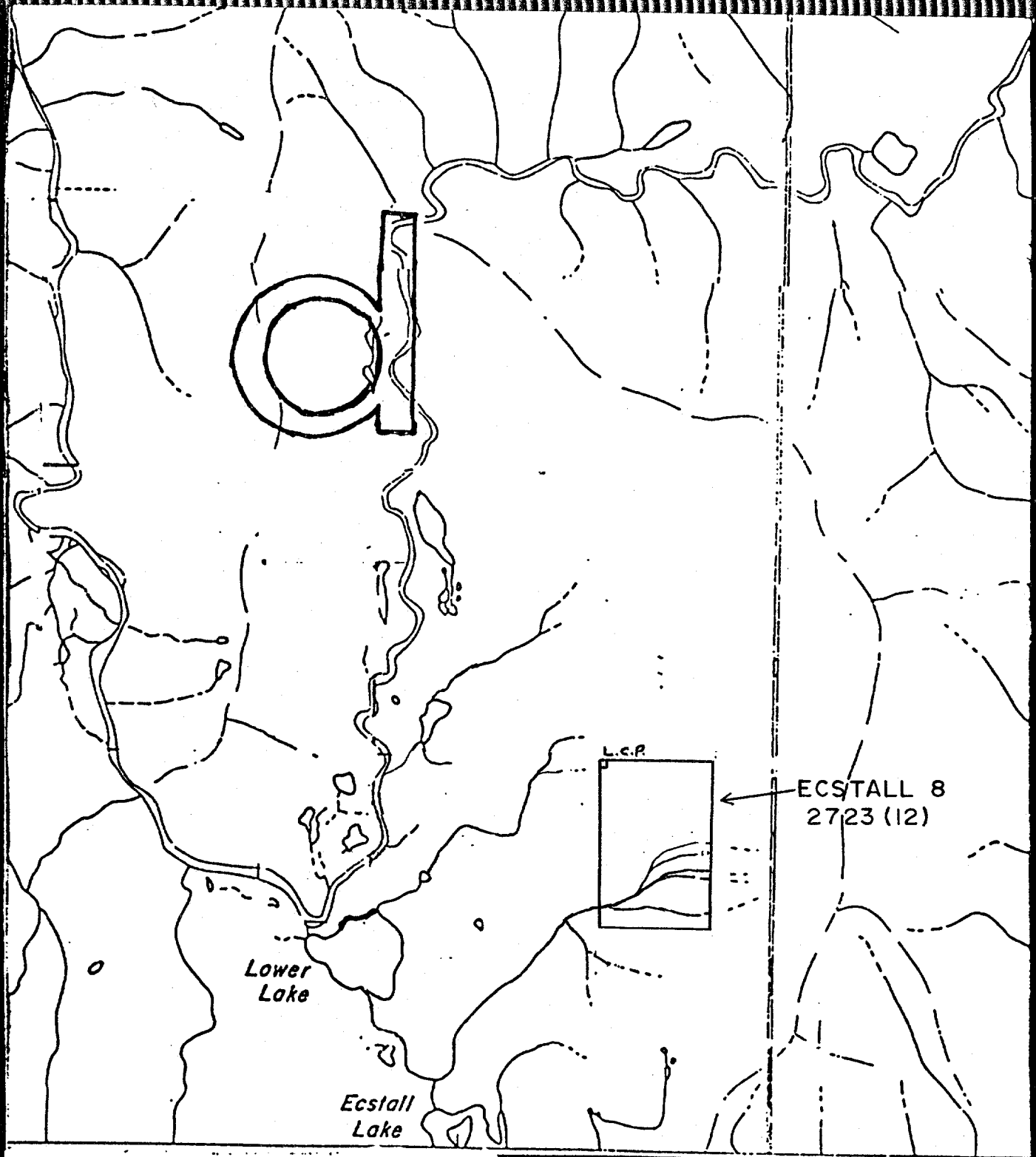
N.T.S. 103H/14 DRAWN BY: S.K.B. SCALE: 1:8,000,000

DWG. No. 1

NORANDA EXPLORATION

OFFICE: PRINCE GEORGE, B.C.

VANCAL 11927



REVISED

ECSTALL 8 CLAIM

CLAIM LOCATION MAP

proposed

PROJ. No.

N.T.S. 103H/1

DWG. No. 2

SURVEY BY:

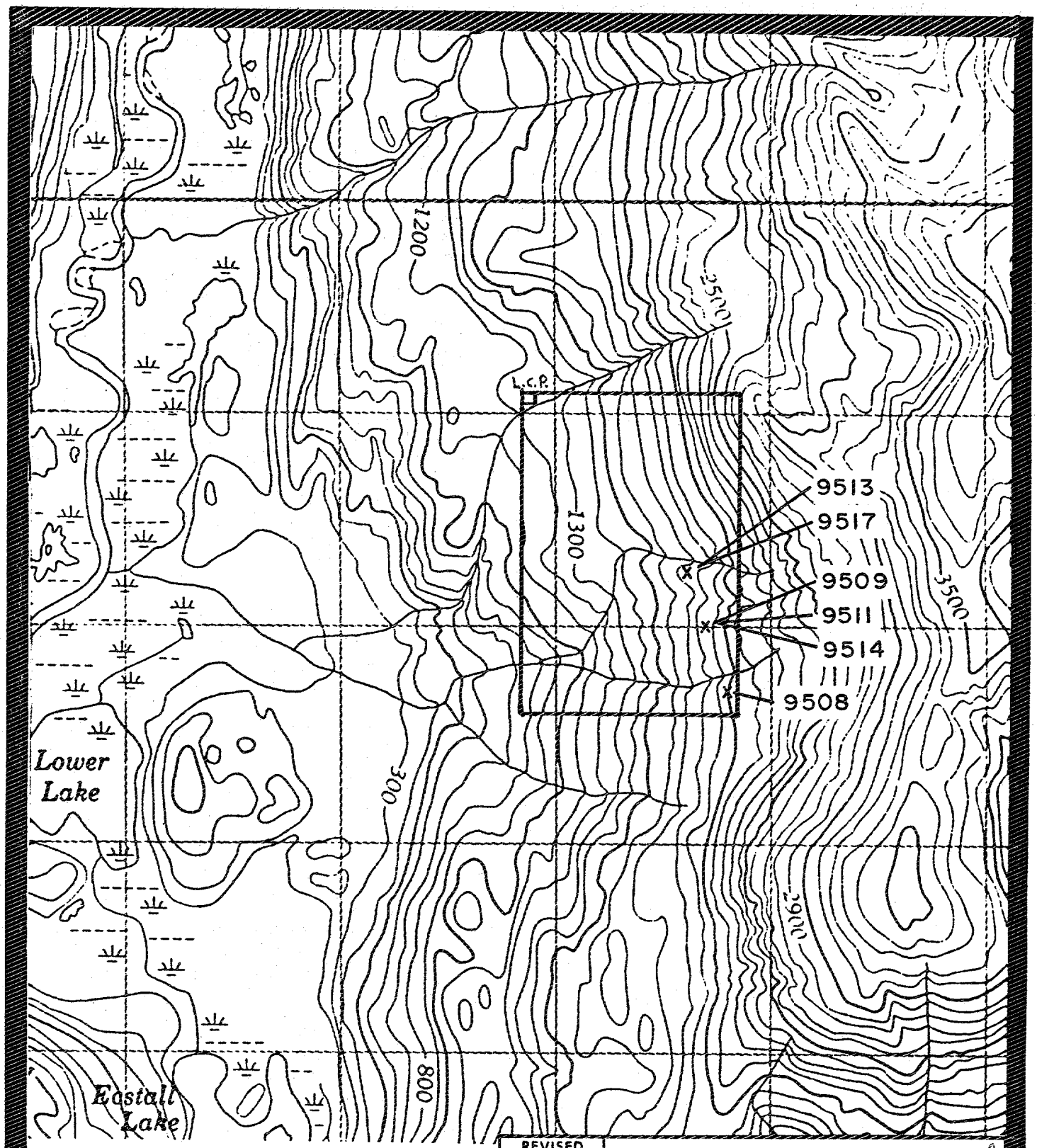
DRAWN BY: G.M.

DATE: Feb. 1986

SCALE: 1:50,000

NORANDA EXPLORATION

OFFICE: Prince George



REVISED

ECSTALL 8 CLAIM

SAMPLE LOCATIONS

PROJ. No. _____

N.T.S. 93H/14

DWG. No. 3

SURVEY BY: G.M. DATE: March 1986

DRAWN BY: G.M. SCALE: 1:25,000

NORANDA EXPLORATION

OFFICE: Prince George, B.C.

PETROGRAPHY:

The Ecstall 8 claim covers the Horsefly showing which is believed to be a volcanogenic massive sulphide deposit. Six samples (9508, 9509, 9511, 9513, 9514, & 9517) were collected from the vicinity of the showing, for petrographic analysis to ascertain the environment of deposition of these sulphides. Three samples (9509, 9513, & 9517) of pyritic quartz-sericite schist were sent to Vancouver Petrographics for thin section analysis (see Appendix III). Descriptions of the samples were summarized by J. Payne as follows:

> "Samples are of felsic schists associated with sulfide-rich lenses and layers; the primary rocks may have been felsic volcanic rocks with associated volcanogenic sulfides.
>
> 9509 J compositionally banded schist/gneiss, muscovite-rich layers and quartz-pyrite-sphalerite-rich layers
>
> 9513 J compositionally banded, with layers dominated by muscovite-ankerite, and others dominated by quartz
>
> 9517 J schist, dominated by plagioclase and muscovite, with moderately abundant epidote, biotite and pyrrhotite
>
> Samples show evidence of moderate to strong deformation followed by recrystallization. Early deformation is best shown in 9513 J by the smeared out nature of quartz-rich seams and layers. Later deformation is shown by recrystallization of muscovite in 9513 J and by development of kink folds and shears in 9509 J.
>
> Chlorite is mainly associated with sulfides; other mafic minerals are scattered through the rock. The Ti-oxide content is moderately high (either Ti-oxide minerals or sphene), suggesting that the original volcanic rocks may have been intermediate in composition, and that if so, the intensity of alteration was high."

Three massive sulphide samples (9508, 9511 & 9514) from the Horsefly showing were mounted for polished section study (see Appendix IV). The descriptions were summarized by W. Mercer of Noranda Exploration as follows:

> "All polished sections exhibit very similar features except as follows:
>
> | | | |
> |---|---|---|
> | 1. | pyrite-sphalerite gangue | 9511 |
> | | pyrite-chalcopyrite-sphalerite | 9508, 9514 |
> | 2. | massive texture | 9514 |
> | | crude banding | 9511 |
> | | banding | 9508 |

The samples are believed to represent recrystallized massive sulphide samples as indicated by:

1. relatively uniform pyrite grain size
2. presence of mosaic textures in pyrite in places
3. apparent absence of internal textures -- overgrowths, etc. - in the pyrite

The lack of intergrowths of the various minerals and coarse grain size are favourable for metallurgy."

CONCLUSIONS:

The sample descriptions suggest the Horsefly is a massive sulphide showing of volcanogenic origin, hosted by highly metamorphosed felsic volcanics. Thin section studies show that rocks in the area have undergone several periods of deformation followed by recrystallization which has destroyed all original depositional textures. Polished section studies on the massive sulphides also confirm these rocks have been recrystallized.

RECOMMENDATIONS:

A grid should be established over the showing to facilitate detailed HLEM, Magnetometer, geology and soil geochemical surveys. A small amount of trenching and detailed sampling should be carried out to establish grades to require drilling.

REFERENCES:

Graf, C., 1981, Ecstall River Joint Venture, Welcome North Mines Ltd., Esperanza Explorations Limited, E & B Explorations Incorporated and Active Minerals Explorations Limited.

Padgham, W.A., 1958, Geology of the Ecstall-Quaal Rivers Area, B.C.; Unpub. M.A.Sc., Thesis, University of British Columbia.

Roddick, J.A., 1970, Douglas Channel-Hecate Strait Map Area, B.C.; Geological Survey of Canada, Paper 70-41.

APPENDIX I

STATEMENT OF COSTS

PROJECT: ECSTALL 8 CLAIM

REPORT TYPE: Petrographic

a)	**WAGES:**	
	Chris Graf, 1 day @ $200.00/day	$ 200.00
	W. Mercer, 1 day @ $200.00/day	$ 200.00
b)	**FOOD & ACCOMMODATION & TRANSPORTATION:**	
	C. Graf	$ 250.00
c)	Petrographic Analyses, Contract Costs	$ 150.00
	Polished Section Mounting	$ 50.00
d)	**COST OF PREPARATION OF REPORT:**	
	Author	$ 150.00
	Typing	$ 110.00
	TOTAL:	**$ 1110.00**

APPENDIX II

STATEMENT OF QUALIFICATIONS

I, Gordon Maxwell of Prince George, Province of British Columbia, do hereby certify that:

1. I am a Geologist residing at 6162 Caledonia Crescent, Prince George, British Columbia.

2. I am a graduate of the University of Manitoba with an Hons. B. Sc. (geology).

3. I am a member in good standing of the Canadian Institute of Mining and the Prospector's and Developer's Association.

4. I presently hold the position of Project Geologist with Noranda Exploration Company, Limited and have been in their employ since 1980.

Gordon Maxwell

G. Maxwell

STATEMENT OF QUALIFICATIONS

I, William Mercer of 9471 Ryan Crescent, City of Richmond, Province of British Columbia, do certify that:

1. I have been Assistant Manager for Noranda Exploration Company, Limited (No Personal Liability) in Vancouver from 1982 to the present.

2. I have practised my profession from 1974 to 1982 as District Geologist and Regional Manager for Mattagami Lake Mines Ltd. in Edmonton, Alberta.

3. I am a graduate of the University of Edinburgh, Scotland, with a B.Sc (Hons) in Geology in 1968 and of McMaster University, Hamilton, Ontario, with a Ph.D. in Geology in 1975.

4. I am a Fellow of the Geological Association of Canada, a Member of the Canadian Institute of Mining and Metallurgy, and an Associate of the Society of Economic Geologists.

W. Mercer
Ass't Manager
Cordillera Division.

APPENDIX III

PETROGRAPHIC ANALYSIS OF THIN SECTIONS

J. Payne
Vancouver Petrographics

9509 J Foliated Schist/Gneiss:
Muscovite-Quartz-Pyrite-Sphalerite-Plagioclase

The rock is strongly compositionally banded, with layers dominated by muscovite and others dominated by quartz-pyrite-sphalerite. Muscovite-rich layers show moderately developed kink folds at a high angle to compositional banding; these folds do not extent into the quartz-sulfide layers.

muscovite	30-35%
quartz	25-30
pyrite	17-20
sphalerite	8-10
plagioclase	4- 5
Ti-oxide/sphene	1½-2
epidote	0.5
biotite	0.2
chlorite	0.2
actinolite	trace

Muscovite-rich layers mainly show a strongly preferred orientation of very fine to fine grained flakes parallel to foliation. Some layers and patches are unoriented or weakly oriented; this may be the result of recrystallization during later deformation. Intergrown with muscovite is moderately abundant Ti-oxide/sphene in extremely fine to very fine grained lenses and patches. Plagioclase forms extremely fine to fine grains and patches intergrown with muscovite; plagioclase locally shows albite twinning, and commonly contains dusty opaque inclusions. Epidote forms disseminated, anhedral to subhedral grains up to 0.1 mm in size. Biotite forms scattered, ragged to subhedral flakes up to 0.1 mmin size; pleochroism is from pale straw to light brown.

Muscovite-rich layers contain moderately abundant lenses and patches of pyrite-sphalerite, commonly rimmed by very fine grained plagioclase, with patches of chlorite and lesser biotite. Chlorite is pale green with grey interference color. Lenses generally parallel foliation.

The muscovite-rich layers show tight to open kink folds and a few shears, with foliation of muscovite sharply to moderately warped about axial planes of this period of folding.

Quartz-sulfide-rich layers are up to a few mm wide, and are dominated by very fine to fine grained quartz, with patches of very fine to fine grained, subhedral to euhedral pyrite surrounded by anhedral grains and aggregates of sphalerite. Sphalerite is medium to deep red-brown in color. Minor minerals include epidote, biotite, plagioclase, chlorite, and actinolite. These generally are disseminated throught quartz, with biotite and chlorite concentrated along borders of sulfides. Actinolite forms one subhedral grain with greyish green color. Minor minerals are mainly very fine to fine grained (up to 0.3 mm).

9513 J Muscovite-Quartz-Carbonate-Chlorite Schist

The sample is dominated by very fine grained muscovite-rich layers and coarser, irregular lenses and layers richer in quartz. Sulfides (mainly pyrite) are concentrated in and near quartz-rich lenses. The rock shows weak evidence of two stages of deformation, with an earlier foliation defined by orientation of sheet silicates cut by a later foliation defined by thin seams rich in muscovite. Some of the quartz rich lenses appear to be tightly folded.

muscovite	45-50%
quartz	25-30
carbonate	12-15
chlorite	7- 8
pyrite	3- 4
biotite	½- 1
apatite	trace
Ti-oxide/sphene	½-1

Muscovite generally is somewhat concentrated in muscovite-rich seams and layers averaging 0.05-0.1 mm in grain length. Intergrown with muscovite in part of the rock are abundant grains and lenses of carbonate averaging 0.1-0.2 mm in length, with grains elongated parallel to foliation. The second foliation is defined by thin seams of muscovite which appear to have formed by recrystallization of earlier-formed muscovite-(chlorite).

Quartz is concentrated in quartz-rich lenses and seams up to a few mm across. Grain size ranges from very fine to fine, with larger lenses commonly also being coarser grained. Grains show uniform to slightly wavy extinction. In muscovite-rich layers, quartz forms scattered grains and lenses with textures similar to those of carbonates.

Carbonate occurs as described above, and also forms irregular to mosaic grains and aggregates within quartz-rich layers. Carbonate appears to be dolomite/ankerite (based on color and moderate relief).

Chlorite occurs with early-formed muscovite as flakes averaging 0.03-0.1 mm in length. It has a pale green color and grey interference color. In coarser grained quartz-rich lenses, chlorite forms flakes and clusters of flakes up to 0.3 mm in size.

Pyrite forms clusters of subhedral, equant grains averaging 0.1-0.5 mm in grain size. It commonly is associated with coarser grained quartz and chlorite.

Biotite forms disseminated flakes averaging 0.1-0.2 mm in size. It is slightly concentrated in some layers with quartz. Pleochroism is from nearly colorless to light brown to orange-brown. Biotite, chlorite, and muscovite appear to be in equilibrium.

Ti-oxide forms irregular spots up to 0.2 mm in size, composed of extremely fine grained aggregates intergrown with silicates. Sphene forms a few irregular grains up to 0.1 mm in size; these occupy the same structural sites as Ti-oxide, and much of the latter may have formed by alteration of the former.

Apatite was seen as one equant, anhedral grain 0.3 mm across in a coarser grained quartz-rich layer.

9517 J Plagioclase-Muscovite-Epidote-Biotite-Pyrrhotite Schist

The rock is a variable extremely fine to fine grained schist dominated by plagioclase and muscovite, with lesser biotite, epidote, and pyrrhotite, and moderately abundant sphene.

plagioclase	30-35%
muscovite	25-30
epidote	15-17
biotite	12-15
pyrrhotite	8-10
sphene	2- 2½
chlorite	minor

Plagioclase forms anhedral, equant grains, which locally show weakly developed albite twins. Grain size varies from 0.05 mm in size in some patches to 0.2-0.5 mm in others, with a few grains up to 0.8 mm in size. Plagioclase is slightly to moderately replaced by very fine grained muscovite; it may be that patches of muscovite-(epidote) are in part secondary after plagioclase.

Muscovite forms very fine grained aggregates of wispy to subhedral flakes averaging 0.05-0.1 mm in size. Locally it shows a moderately preferred orientation, but the overall foliation of the rock is not strong.

Epidote forms subhedral to euhedral porphyroblasts and grains averaging 0.1-0.2 mm in size, with a few coarser grained patches of grains up to 0.6 mm long. Most of the grains show anomalous 1st-order extinction, with several grains showing second and third order colors.

Biotite forms ragged to subhedral flakes and aggregates averaging 0.01 mm in grain size. Pleochroism is from pale straw to light brown to orange-brown. Biotite commonly is associated with muscovite.

Pyrrhotite (opaque) forms irregular patches up to a few mm across intergrown with silicates. Some chalcopyrite may be present as well. The irregular outline of the opaque patches suggests these sulfides rather than pyrite or arsenopyrite.

Sphene forms very irregular patches averaging 0.03-0.1 mm in size of extremely fine grains, and a few coarser grains and patches up to 0.15 mm across.

Chlorite forms scattered flakes averaging 0.1 mm in size associated with pyrrhotite. The mineral is pale green in color with grey interference color.

APPENDIX IV

PETROGRAPHIC ANALYSIS OF POLISHED SECTIONS

W. Mercer
Noranda Exploration Company, Limited

SAMPLE #3508J

Banded Massive Sulphide

Pyrite	85%
Sphalerite	10%
Chalcopyrite	5%
Gangue	Trace

Pyrite occurs as euhedral or subhedral to mosaic of anhedral grains showing triple boundaries in sphalerite-rich and pyrite-rich bands respectively. These bands are 3 to 5 mm thick. Sphalerite and, lesscommonly, chalcopyrite form inclusions within pyrite, though this represents only a small proportion of the sphalerite and chalcopyrite present. Chalcopyrite and Sphalerite are both present largely as interstitial patches of 0.05 to 0.1 mm and 0.1 to 0.2 mm respectively. Very little gangue is present.

SAMPLE #3511J

Massive Sulphide

Pyrite	80%
Sphalerite	10%
Gangue (quartz)	5%

Pyrite forms mosaics of interlocking grains or euhedral to subhedral grains surrounded by interstitial sphalerite. Sphalerite is also present as inclusions in pyrite. Pyrite grain size is 0.1 to 0.3 mm and sphalerite 0.1 mm.

SAMPLE #9514J

Pyrite	70%
Chalcopyrite	20%
Sphalerite	10%
Galena	Trace

Pyrite forms euhedral 0.1 to 0.25 mm grains and mosaics. Chalcopyrite forms continuous patches 0.5 to 1 mm long with grain boundaries indicating 0.2 mm grain size. Sphalerite occurs interstitial to pyrite to chalcopyrite, but contains rounded inclusions of chalcopyrite. Trace galena (?) is present as slivers within fractures in pyrite, generally less than 0.05 mm long.