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Assessment Report
 on
1989 Trenching, Geological Mapping, and Geophysics
 of the
SBS Property
 near Adams Lake, B.C.

Kamloops Mining Division

NTS 82M/4W

Latitude 51° 15'N

Longitude 119° 46'W

Owner and Operator:

Minnova, Inc.
 3rd Floor - 311 Water Street
 Vancouver, B.C.
 V6B 1B8

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GEOLOGICAL BRANCH
 ASSESSMENT REPORT

20,107

C.J. Clayton

March, 1990

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1.0 INTRODUCTION

1.1 General

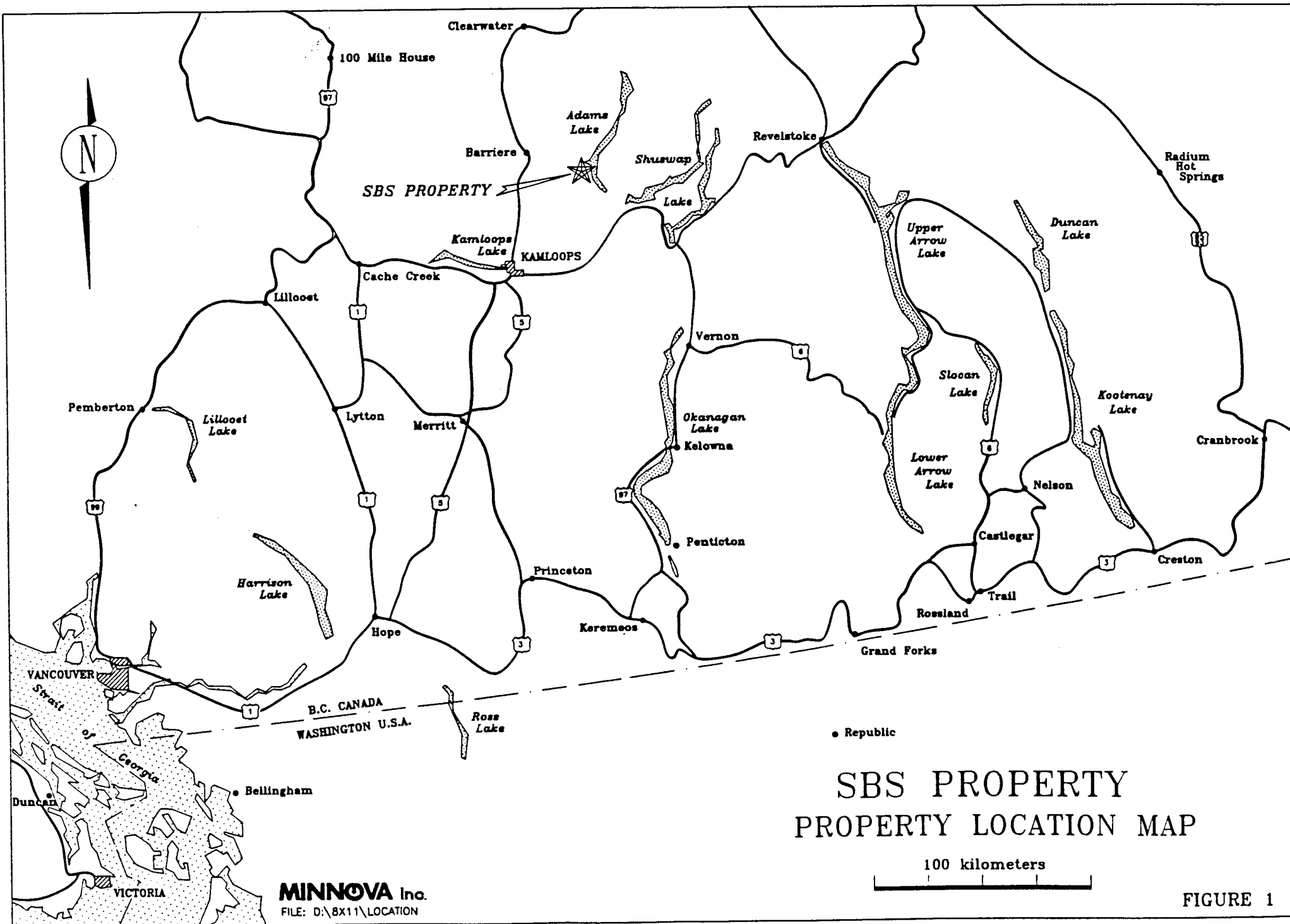
This report describes the results of trenching, geological mapping and lithogeochemical sampling, and Max-Min II geophysics completed on the SBS-1 through SBS-6 claims (Skwaam East and Skwaam West groups) during October and November of 1989. The aim of the trenching was to test a Mag/VLF anomaly delineated during a 1988 exploration program on the SBS-5 grid, and to better expose a skarn zone present in the area. Twenty rock samples were collected from the trench, and analysed for major and trace elements at Min-En Laboratories of North Vancouver. Max-Min II geophysics was conducted by MWH Geo-Surveys Ltd over the SBS 3 grid was for orientation purposes.

1.2 Property Location and Access

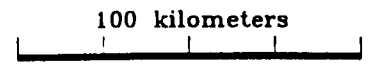
The SBS property is situated within the Kamloops Mining Division at Latitude 51° 15' North, and Longitude 119° 46' West on NTS map sheet 82M/4W. It lies to the south of Skwaam Bay, approximately 30 km east of Louis Creek and 75km northeast of Kamloops (Figure 1). Access to the property area is gained via the Agate Bay road from Highway 5 at Louis Creek, or by the Adams Lake main line from the town of Adams Lake. Access on the claims is by way of existing logging and skidder roads.

1.3 Topography, Vegetation, and Climate

The SBS property lies on the western side of the Adams Plateau; an area of high rolling plateau country with local incised, drift filled valleys. Elevations in the area range from less than 500 metres above sea level at the surface of Adams Lake to over 1500 metres in the uplands. The SBS property for the most



SBS PROPERTY PROPERTY LOCATION MAP



part lies at an elevation of around 1500 metres but drops off steeply to the north and east into Adams Lake.

Vegetation consists primarily of dense cedar and pine forest cover. Parts of the property have been logged in recent years.

Climate is moderate with temperatures ranging from -25°C during winter to +30°C in summer. Precipitation is low to moderate and a snowfree period exists from May to November.

1.4 Property and Ownership

The SBS property consists of 6 contiguous MGS mineral claims that total 108 units, and is wholly owned and operated by Minnova, Inc. Claim configurations and grid locations are shown in Figure 2 and claim data summarized in Table I.

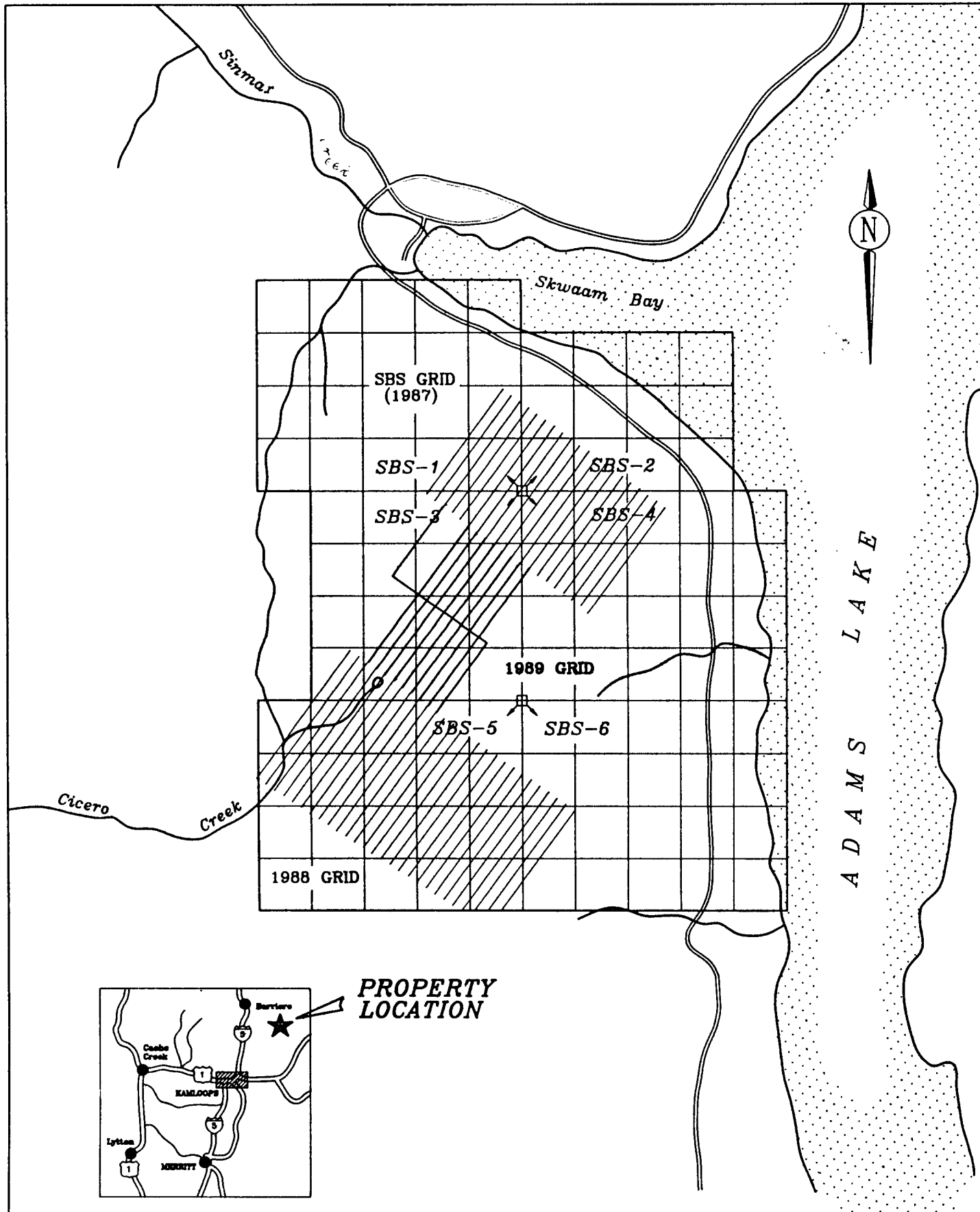
Table I: SUMMARY OF CLAIMS

<u>CLAIM NAME</u>	<u>RECORD #</u>	<u>UNITS</u>	<u>EXPIRY DATE</u>	<u>GROUP</u>
SBS 1	6593	20	04/10/91*	Skwaam West
SBS 2	6594	12	04/10/91	Skwaam East
SBS 3	6595	16	04/10/91*	Skwaam West
SBS 4	6596	20	04/10/91	Skwaam East
SBS 5	6597	20	04/10/91*	Skwaam West
SBS 6	6598	20	04/10/91	Skwaam East

* Assuming acceptance of this report

1.5 Property History

The SBS claims were staked in April of 1986. Prior to Minnova's acquisition of the property, exploration had been restricted to a soil geochemical survey carried out by Craigmont Mines in 1977 (Assessment Report # 6890). In 1986 Minnova carried out reconnaissance mapping and lithochemical sampling along existing roads. In 1987 work continued with grid coverage in the area of the SBS-1, SBS-2, SBS-3, and SBS-4 claims. This was



2000 metres

FIGURE 2
SBS PROPERTY
CLAIM CONFIGURATION
& GRID LOCATIONS

followed up by geological mapping and sampling, and geophysical exploration. Grid coverage in 1988 was expanded to cover SBS 5, and portions of SBS 3 and SBS 6. The presence of a skarn zone that was projected from a neighbouring property was confirmed in the area of 1988 grid coverage.

1.6 Summary of 1989 Assessment Work

Line Cutting (SBS-3 claim)	12.6 line km 1.2 km baseline	
Trenching (SBS-5 claim)	7 man days sampling and mapping	Samples analysed for Cu, Zn, Pb, Sb, Ag, Ba,
	20 lithogeochemical samples	Al ₂ O ₃ , BaT, CaO Fe ₂ O ₃ , K ₂ O, MgO, MnO ₂ , Na ₂ O, P ₂ O ₅ , SiO ₂ , TiO ₂ , S, and LOI.
Geophysics (Max-Min II) (SBS-3 claim)	10.83 line km	Two frequencies, 444 Hz and 1777Hz.

2.0 REGIONAL GEOLOGY

The area is underlain by rocks of the Eagle Bay Assemblage (Schiarizza, 1987), a sequence of lower Paleozoic volcanics and sediments that are exposed along the western flank of the Shuswap Metamorphic complex in the Omineca Belt. The multi-deformed sequence consists of low grade (greenschist facies) meta-sediments and meta-volcanic rocks ranging in age from Cambrian to Mississippian (Schiarizza, 1987). Compositionally, volcanic stratigraphy ranges from felsic to mafic (with derived schists). Minor amounts of interbedded sediments consisting of grey chert, argillite, and limestone are present. Intrusion of the Raft and Baldy batholiths during the Cretaceous caused the development of upright, northwest plunging folds (Schiarizza, 1987).

Regional faulting that developed during the Eocene consists of northeast to northerly trending strike slip faults.

2.1 Property Geology

The property is underlain by intermediate to felsic volcanics and volcanoclastics on the SBS-1 and -2, and the northern quarters of the SBS-3 and -4 claims, and mafic volcanics and volcanoclastics in the southerly portion of the SBS-3 and -4 claims. Orthogneiss most likely derived from felsic to intermediate volcanics is common throughout the northerly claims.

In the immediate vicinity of the 1989 trenching, geology consists primarily of well foliated calcareous phyllites and schists possibly derived from mafic volcanic flows and volcanoclastics, and/or from argillite. Skarnification generally overprints original mineralogies creating difficulties in assigning a protolith to many of the units. A thin unit of limestone is exposed in the trench, as well.

3.0 RESULTS OF 1989 TRENCHING

Trenching was completed along line 93+00N between 99+30E and 100+80E for a total of 150 metres (Figure 3). The purpose of the trenching was to test strong magnetic and VLF-EM anomalies and coincident soil geochemical anomalies forming a spine through the grid area from line 78+00N to line 105+00N between lines 98+00E and 102+00E. The geophysical and geochemical trends are coincident with the 'Skarn Zone', a zone of mafic schists and/or skarnified argillites contained within a thick package of calcareous phyllites.

3.1 Trench Geology and Sample Descriptions

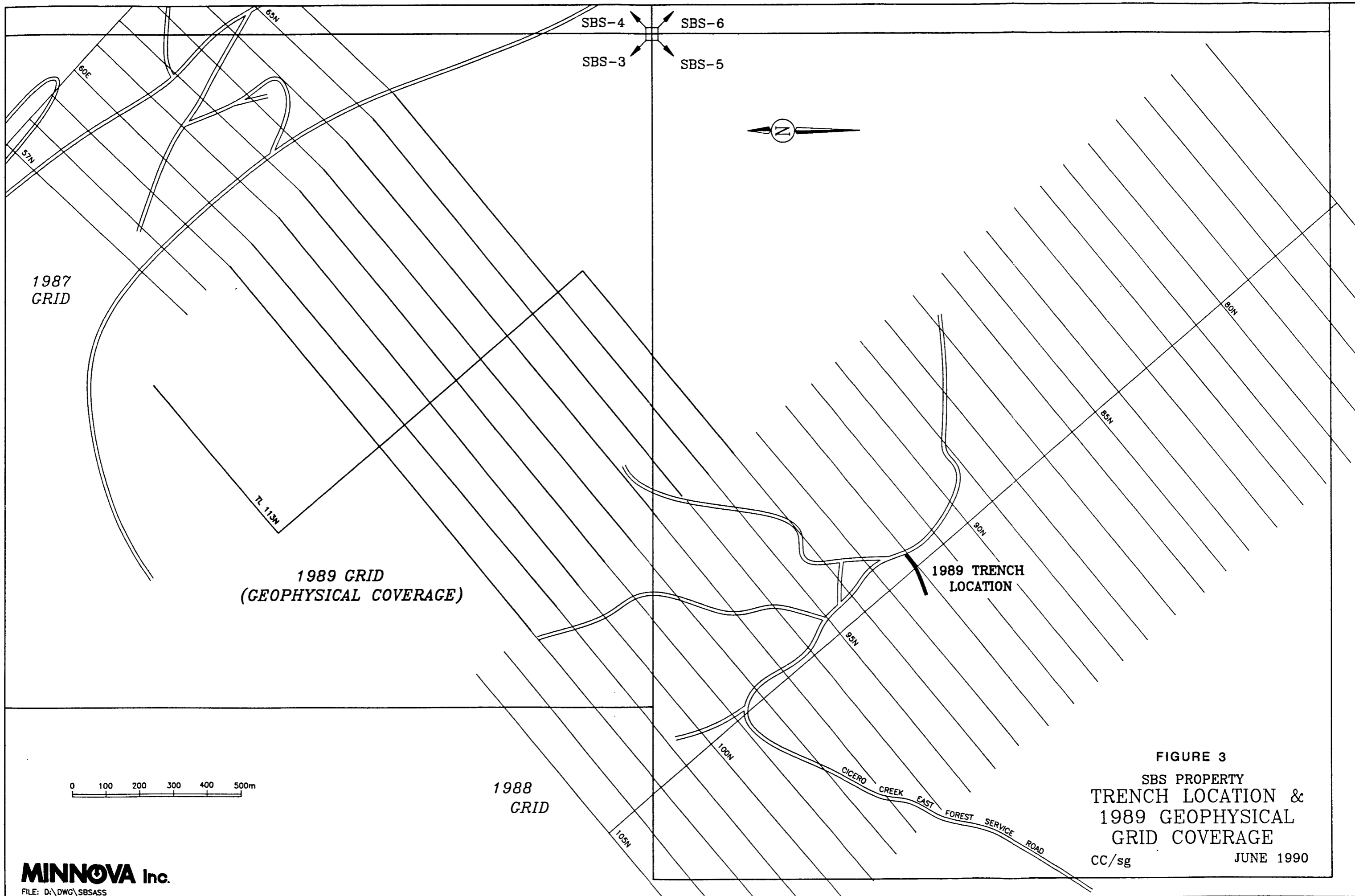
Mapping of the line 93+00N trench geology was completed at a 1:500 scale. Sample locations are shown in Figure 4, and trench geology in Figure 5. Trench geology consists primarily of calcareous phyllites, calcareous chloritic schists, mafic volcanics, limestone, and "Skarn". Mineralisation consists of banded pyrrhotite and traces of chalcopyrite.

Average foliations in the trench area strike 286° . Dips range from 30° to 70° to the north averaging 49.6° .

A soft massive brown mineral originally believed to be sphalerite is now thought to be an iron carbonate. Results of two samples of this material from 99+85W yielded the following results:

	Cu %	Pb %	Zn %	Ag oz/t	Au oz/t
9WSBL004	0.076	0.02	0.01	0.08	0.001
9WSBL005	0.060	0.02	0.01	0.06	0.001

These results are not significant, however two significant bands of massive pyrrhotite were subsequently uncovered in this area (Sample #'s 9WSBL014, 9WSBL017).



1987
GRID

1989 GRID
(GEOPHYSICAL COVERAGE)

1988
GRID

SBS-4 SBS-6
SBS-3 SBS-5



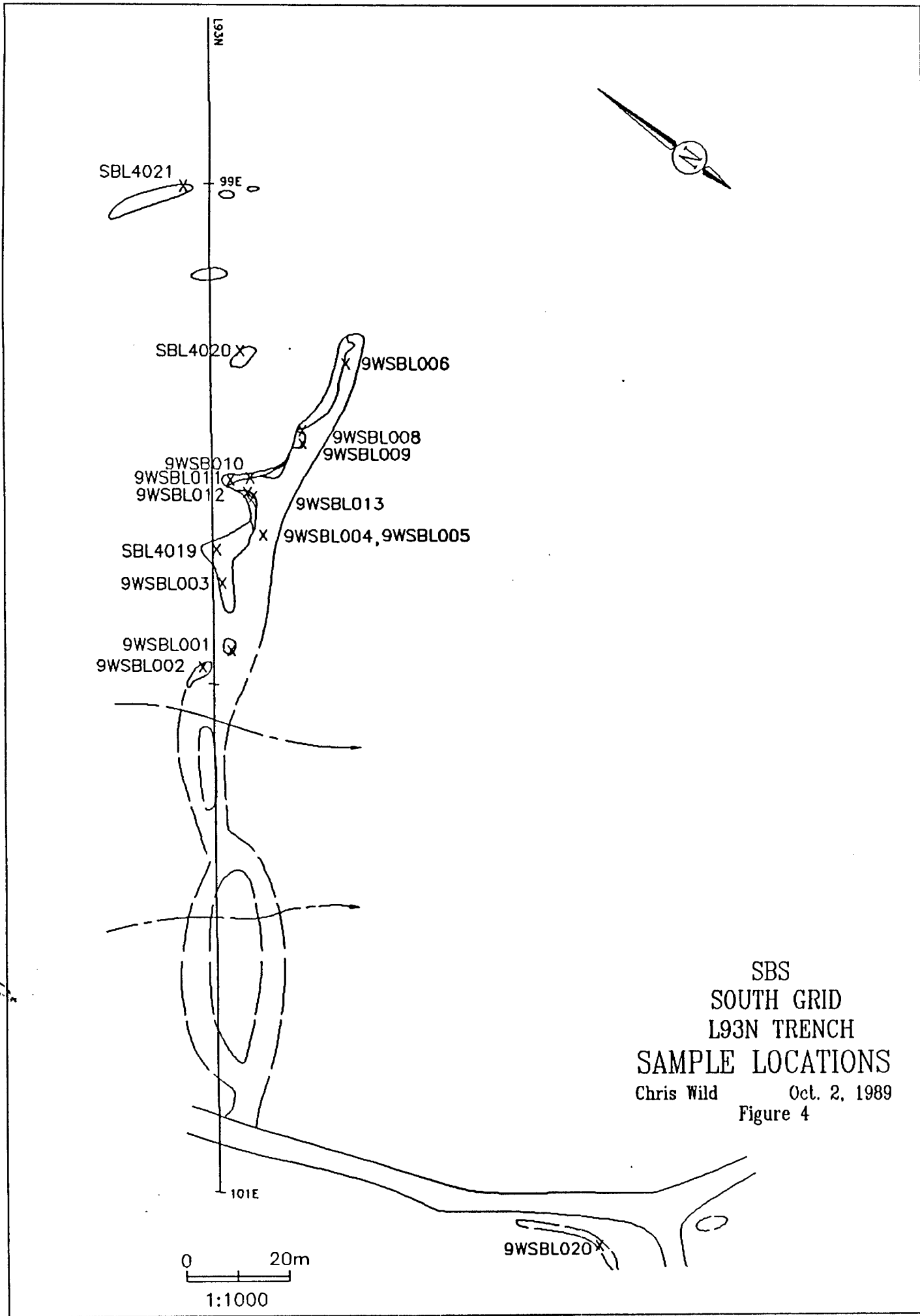
1989 TRENCH
LOCATION

CICERO CREEK EAST
FOREST SERVICE ROAD

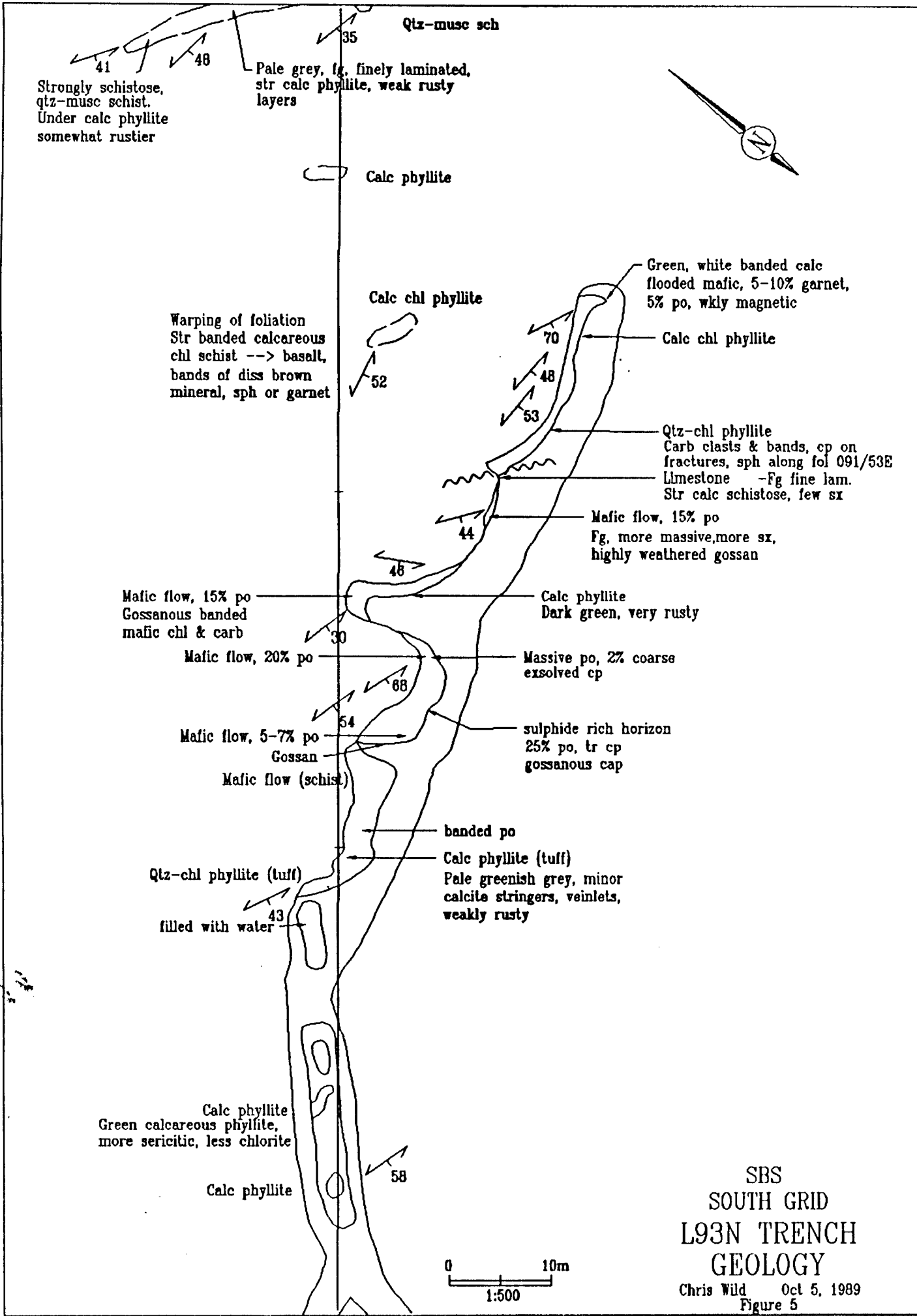
0 100 200 300 400 500m

FIGURE 3
SBS PROPERTY
TRENCH LOCATION &
1989 GEOPHYSICAL
GRID COVERAGE

CC/sg JUNE 1990



SBS
 SOUTH GRID
 L93N TRENCH
 SAMPLE LOCATIONS
 Chris Wild Oct. 2, 1989
 Figure 4



Twenty rock samples were collected for analysis for major oxides and trace elements. The following are field descriptions of the samples sent in.

<u>SAMPLE NO.</u>	<u>DESCRIPTION</u>
9WSBL001	-pale green, rusty, sugary quartzitic texture, strongly calcareous < 1% fine grained disseminated pyrrhotite -calcareous phyllite
9WSBL002	-pale green, rusty, fine grained, non-calcareous, fairly soft, <1% fine grained disseminated pyrrhotite, dense -quartz-chlorite-biotite-sericite phyllite
9WSBL003	-dark green and beige, banded, very rusty, abundant fine grained sulphides (Po, Py, Cp?) (10%), some fine grained massive purple garnet ? (5%) -quartz-chlorite schist
9WSBL004 9WSBL005	-dark green to brown fine grained very rusty (gossanous) up to 40 % sulphides, fine grained brownish, possible Sp +10% 20% sphalerite) +10% pyrrhotite, 2% chalcopryite -banded moderate magnetite -assayed for Cu, Pb, Zn, Ag, Au
9WSBL006	-pale green and white banded, weakly rusty, sugary texture, finely banded, <1% fine grained pyrrhotite -calcareous chloritic phyllite
9WSBL007	-pale green and grey finely banded -1% chalcopryite, 1% fine grained disseminated pyrrhotite -quartz-chlorite-biotite phyllite
9WSBL008	-medium greenish grey, strongly calcareous carbonate weathering to limestone -limestone
9WSBL009	-darker green, strongly rusted (gossanous) -> 10% sulphides, trace chalcopryite, pyrite and pyrrhotite -massive mafic flow

- 9WSBL010 -pale green grey, weakly banded, rusty along fractures, 1-2% pyrrhotite, disseminated and smeared along fractures (with chlorite)
-strongly calcareous phyllite
- 9WSBL011 -darker green, strongly rusted (gossanous), dense, >10% pyrrhotite
-massive mafic flow
- 9WSBL012 -darker green, strongly rusted (gossanous), dense >20% sulphides, strongly magnetic pyrrhotite, -5% chalcopyrite, white hydrozincite ? (semi-massive)
-massive mafic flow
- 9WSBL013 -massive sulphide: mainly pyrrhotite, with lesser chalcopyrite, possible sphalerite
- 9WSBL014 -dark green, rusty, sulphide rich (20-30%)
-white weathering, soft mineral, looks like calcite; possibly hydrozincite
-limestone
- 9WSBL015 -medium to dark green, fine grained, moderately calcareous, weakly to moderately foliated hanging wall
-5 to 7% pyrrhotite
-mafic flow
- 9WSBL016 -extremely weathered gossan; limonite, red, orange, strongly foliated
- 9WSBL017 -rusty, dark green with thin bands of massive pyrrhotite running along foliation, other Sx?
-silvery, massive obtrusion, non-magnetic
-mafic flow
- 9WSBL018 -pale grey, fine grained, slightly rusted, moderately foliated,
-possibly crystal fragments; poss. tuff
-weakly to moderately calcareous phyllite
- 9WSBL019 -pale green grey, fine grained, weakly rusted, weakly calcareous, well banded in places, fairly soft.
-calcareous phyllite

- 9WSBL020**
- dark green, grey; strongly rusted but hard, less pronounced foliation
 - brown sulphide, possibly sphalerite 10-20%
 - pyrrhotite or pyrite - non-magnetic
 - trace to 0.5% chalcopyrite (or tarnished pyrite)
 - very similar to samples 9WSBL004 and 005
 - quartz-chlorite-biotite schist**

3.2 Results of Lithochemical Analysis

Rock samples collected were representative of the outcrop from which they were taken. Samples were sent to Min-En Labs of North Vancouver for analysis for Ag, As, Ba, Cu, Pb, Sb, Zn, Au, Al_2O_3 , BaT, CaO, Fe_2O_3 , K_2O , MgO, MnO_2 , Na_2O , P_2O_5 , SiO_2 , TiO_2 , and S.

Both major and trace elements were analysed by ICP methods using a lithium borate fusion and aqua regia digestion. Au was analysed by fire assay with an AA finish. Results of analyses are in Appendix II.

Lithochemical analyses support field classification of rocks in only a number of instances. Samples 9WSBL-008 and -014, mapped as limestone, compositionally appear as such. SiO_2 values for these are lower than surrounding rock types, and LOI values are high (14.50% and 14.40%, respectively). Samples 9WSBL-001, -002, -018, and -019, mapped as calcareous phyllites, may have been derived from mafic rocks. This is based on comparison of lithochemical analyses with tabulated average chemical compositions of major rock types. Samples -001 and -002 are slightly depleted in SiO_2 , but TiO_2 values and other oxide compositions indicate these to be mafic in origin. Other samples mapped as mafic flows may be skarnified argillites. Again this is based on comparison with published average compositions. Both SiO_2 and TiO_2 values for most of the samples are significantly lower than tabulated compositions for mafic rocks indicating a possible argillite, or sedimentary, protolith that has been subsequently enriched in SiO_2 by the introduction of silicate minerals as replacement. Furthermore, field observations elsewhere in the

area show a gradational variation in the argillites to a more mafic appearing rock type as a result of skarnification. In some cases original bedding has been preserved in the form of banding by preferential replacement of specific minerals during the alteration process. Enrichment of Fe_2O_3 in many of the samples, particularly 9WSBL-012, -014, and -020, is explained by the presence of massive bands of pyrrhotite.

Results of trace element analyses are generally not encouraging in terms of multi-elemental response. Some of the more significant results are summarized in the following table:

Table II: SELECTED LITHOGEOCHEMICAL TRACE RESULTS

SAMPLE #	Ag ppm	As ppm	Ba ppm	Cu ppm	Pb ppm	Sb ppm	Zn ppm	Au ppb
9WSBL001	1.7	1	26	6	2	1	30	5
9WSBL007	0.9	20	6	154	20	1	59	5
9WSBL009	0.9	25	92	338	37	2	64	5
9WSBL010	1.4	28	50	75	37	1	62	5
9WSBL011	0.4	10	83	302	23	1	50	5
9WSBL012	0.4	20	14	1181	16	3	48	5
9WSBL013	0.4	39	14	1423	3	1	57	1
9WSBL014	0.5	26	5	809	6	1	26	5
9WSBL016	0.3	12	142	608	26	1	104	2
9WSBL017	0.8	107	84	474	18	3	76	2
9WSBL018	2.5	26	40	22	56	1	70	5
9WSBL019	1.5	1	60	14	8	1	18	5
9WSBL020	1.2	41	24	1147	12	2	37	5

3.3 Results of Max-Min II Geophysics (Drawings 1 and 2)

A Max-Min II survey was conducted over the SBS-3 grid area by MWH Geophysics Ltd. Two frequencies, 444 Hz and 1777 Hz, were used with measurements recorded at 25 metre intervals. Coil separation was 150 metres. In-phase and out-of-phase values, measured as a percentage of the primary field strength, were recorded for each frequency.

The survey was for orientation purposes only. A total of 10.83 line kilometres of grid was covered by the survey, and the geophysical program was terminated before completion. The survey covered line L 95+00N and L 103+00N from 106+75E to 112+25E, lines L96+00N through L 101+00N from 106+75E to 119+25E, line L 102+00N from 106+75E to 115+50E, and line L 103+00N from 106+75E to 112+25E.

Results from the survey are not encouraging in this area. No true cross overs occur. In-phase response remains positive for both frequencies. Quadrature response for 444 Hz remains negative, and for 1777 Hz oscillates between positive and negative frequencies.

Poor geophysical response may be a result of thick overburden cover, non-ideal grid orientation resulting in inadequate coupling, or from an absence of conductive materials.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Trenching on the SBS-5 grid provided good exposure of the "Skarn Zone" for closer examination by geological mapping and sampling. Lithogeochemical analytical results indicate mafic rocks mapped in the trench area may indeed be skarnified argillite. Several high Cu and Ag values were returned from samples obtained from the trench, and the following observations are noted. Firstly, elevated Ag values appear to be associated with calcareous phyllites mapped in this area. Furthermore, an inverse correlation between elevated Cu and Ag appears to exist. High Cu values appear associated with lower Ag values, and vice-versa.

Max-Min II geophysics over the SBS-3 grid area was not encouraging. Geophysical response was poor.

A program of geological mapping and lithogeochemical sampling at a scale of 1:2500 is suggested over the SBS-3 grid area to obtain details of stratigraphy. In addition, soil sampling is suggested to determine the extent of any anomalous zones in this area. Resampling of several lines on the SBS-5 grid in the area of the Skarn Zone, and analysis for other pathfinder elements more commonly associated with skarn type mineralisation may be useful.

5.0 REFERENCES

Best, Myron G. Igneous and Metamorphic Petrology, W.H. Freeman and Company, New York, 1982.

Schiarizza, P. and V.A. Preto Geology of the Adams Plateau-Clearwater-Vavenby Area, Ministry of Energy, Mines and Petroleum Resources, Mineral Resources Division, Geological Survey Branch, Paper 1987-2, 1987.

APPENDIX I
STATEMENT OF COSTS

STATEMENT OF COSTS

Geology

Chris Wild - geologist	4 days @ \$300/day	\$1200.00
D'arcy Feller - assistant	2 days @ \$150/day	300.00

Geochemistry

Min-En Laboratories, North Vancouver, B.C.		
20 litho samples @ \$25.00/sample		\$625.00
Freight		85.26

Trenching

100.00 metres		\$2950.00
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Max-Min Geophysics

10.83 km @ \$ 231/km		\$2500.00
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Linecutting

13.80 km @ \$ 363/km		\$5009.40
----------------------	--	-----------

Truck Rental

4 days @ \$ 50/day		\$200.00
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Food and Accommodation

5 man days @ \$ 25/man/day		\$125.00
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Drafting

1 day @ \$ 300/day		\$300.00
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Report Preparation

3 days @ \$ 300/day		\$300.00
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Total Expenditures		\$14,194.66
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APPENDIX II
ANALYTICAL RESULTS



**MIN
• EN
LABORATORIES**

SPECIALISTS IN MINERAL ENVIRONMENTS
CHEMISTS • ASSAYERS • ANALYSTS • GEOCHEMISTS

VANCOUVER OFFICE:
705 WEST 15TH STREET
NORTH VANCOUVER, B.C. CANADA V7M 1T2
TELEPHONE (604) 980-5814 OR (604) 988-4524
TELEX: VIA U.S.A. 7601067 • FAX (604) 980-9621

TIMMINS OFFICE:
33 EAST IROQUOIS ROAD
P.O. BOX 867
TIMMINS, ONTARIO CANADA P4N 7G7
TELEPHONE: (705) 264-9996

Assay Certificate 9V-1333-RA1

Company: MINNOVA INC.
Project: SBS 225
Attn: I. PIRIE/D. HEBERLEIN

Date: OCT-25-89
Copy 1. MINNOVA INC., VANCOUVER, B.C.
2. MINNOVA INC., BARRIERE, B.C.

We hereby certify the following Assay of 15 ROCK samples submitted OCT-14-89 by D.FELLER.

Sample Number	LOI %
9WSBL001	3.00
9WSBL002	2.40
9WSBL003	1.80
9WSBL006	3.70
9WSBL007	3.40

9WSBL008	14.50
9WSBL009	7.20
9WSBL010	7.00
9WSBL011	6.75
9WSBL012	7.30

9WSBL014	14.40
9WSBL015	2.15
9WSBL018	4.10
9WSBL019	3.00
9WSBL020	9.80

NOV. 9 1989

Ans'd

Certified by *[Signature]*
MIN-EN LABORATORIES

APPENDIX III
STATEMENT OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

I, Cameron J. Clayton, of 1285 Bracknell Place, North Vancouver, B.C. do hereby certify that:

1. I am a graduate of Queen's University, Kingston, Ontario with a B.Sc. in Geological Engineering.
2. I have practised my profession for four years.
3. I am a contract geologist currently employed by Minnova, Inc.
4. I have personally reviewed all rock samples and analytical results presented in this report.
5. I have personally visited the SBS trench location and reviewed the geology there-in.

Date: JULY 3, 1990

Signature: 

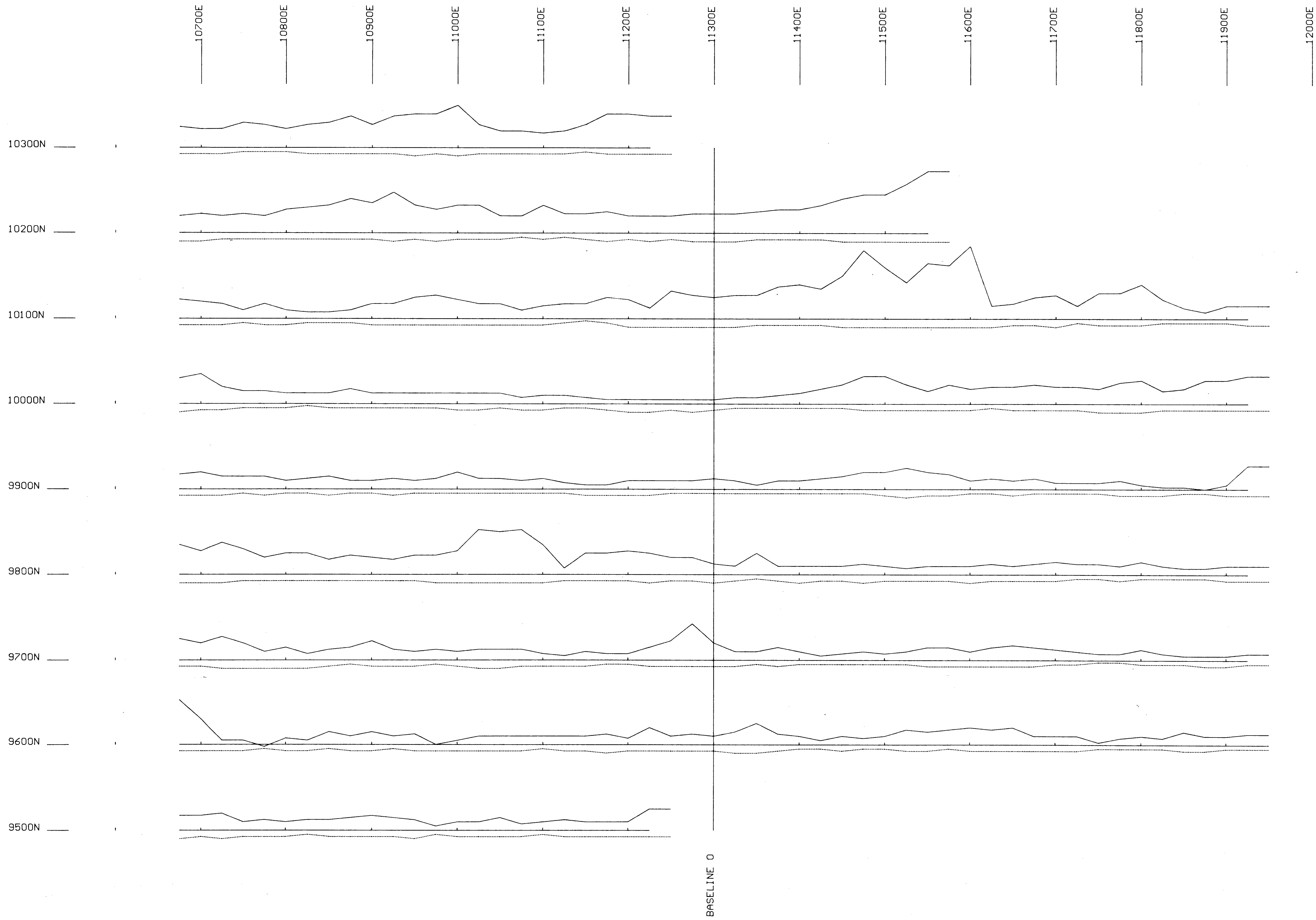
COMP: MINNOVA INC.
PROJ: SBS 225
ATTN: I.PIRIE/D.HEBERLEIN

MIN-EN LABS — ICP REPORT
705 WEST 15TH ST., NORTH VANCOUVER, B.C. V7M 1T2
(604)980-5814 OR (604)988-4524

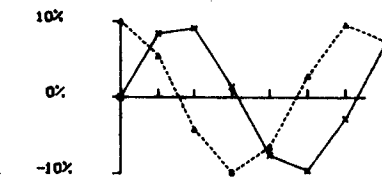
FILE NO: 9V-1333-RJ2
DATE: OCT 22/89
• TYPE ROCK GEOCHEM • (ACT:F31)

SAMPLE NUMBER	AG PPM	AS PPM	BA PPM	CU PPM	PB PPM	SB PPM	ZN PPM	AU PPB
9WSBL013	.4	39	14	1423	3	1	57	1
9WSBL016	.3	12	142	608	26	1	104	2
9WSBL017	.8	107	84	474	18	3	76	2

RECEIVED
NOV 9 1989
Ans'd



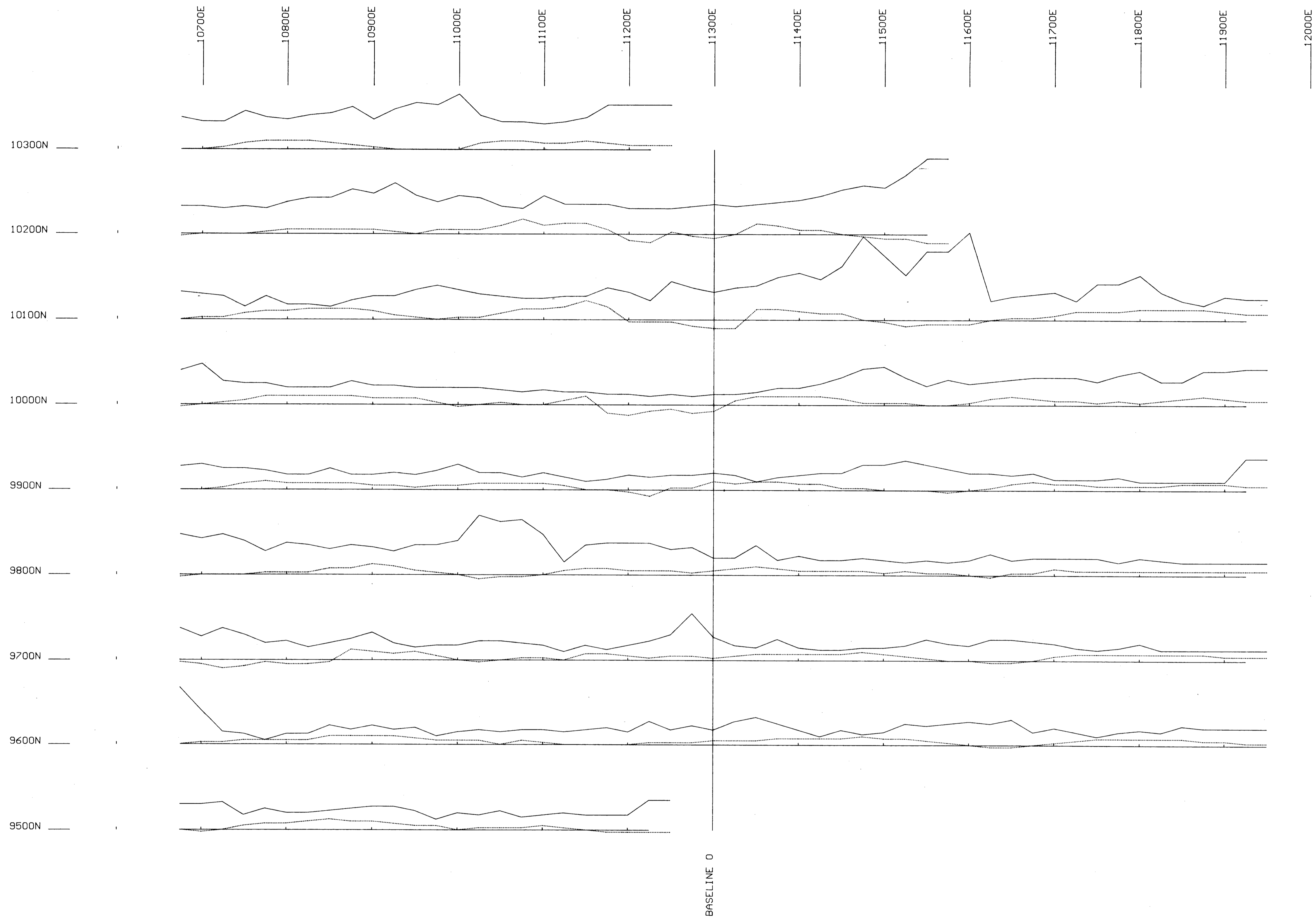
20107



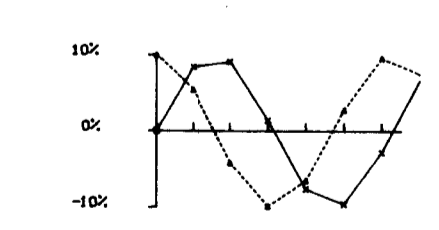
Instrument : MAX-MIN II
 Coil Spacing : 150m
 Vertical Scale : 1 cm = 10%
 Frequency : 444 Hz
 In Phase : _____
 Quadrature : _____



SBS-3
 HLEM SURVEY
 FREQ. 444 HERTZ
 PROJECT: MINNOVA HLEM SURVEY PROJECT # :
 BASELINE AZIMUTH : 0 Deg.
 SCALE = 1: 2500 DATE : 11/23/89
 SURVEY BY : JH NTS :
 FILE: HSBS3
 MINNOVA



20107



Instrument : MAX-MIN II
 Coil Spacing : 150m
 Vertical Scale: 1 cm = 10%
 Frequency : 1777 Hz
 In Phase : ———
 Quadrature : ———

50m 25m 0m 50m 100m

SBS-3

HLEM SURVEY
 FREQ. 1777 HERTZ
 PROJECT: MINNOVA HLEM SURVEY PROJECT # :
 BASELINE AZIMUTH : 0 Deg.

SCALE: 1:2500 DATE : 11/23/89
 SURVEY BY: JH NIS :
 FILE: HSB3
 MINNOVA