ARIS SUMMARY SHEET

District Geologist, Nelson | Off Confidential: 89.04.15

ASSESSMENT REPORT 17633 | MINING DIVISION: Fort Steele

PROPERTY: Stoney
LOCATION: LAT 49 10 00 LONG 115 55 00
UTM 11 5446329 578974
NTS 082G04W
CLAIM(S): Stone 1-18
OPERATOR(S): Minnova
AUTHOR(S): Pirie, I.D.
REPORT YEAR: 1988, 88 Pages
GEOLOGICAL SUMMARY: The area is underlain by Proterozoic Aldridge Formation which is folded in a gently northeast plunging anticline and is intruded by Moyie sills of gabbrioc composition. There is no known mineralization at the present.

WORK DONE: Geological,Geochemical,Geophysical,Physical
EMGR 12.0 km;CSMT
GEOL 7525.0 ha
Map(s) - 2; Scale(s) - 1:10 000
LINE 15.0 km
ROCK 226 sample(s) ;ME,AU,AG
Map(s) - 12; Scale(s) - 1:10 000

STONEY CREEK PROPERTY

FORT STEELE MINING DIVISION

BRITISH COLUMBIA

REPORT ON THE 1987 GEOLOGICAL,

GEOCHEMICAL and GEOPHYSICAL EXPLORATION PROGRAM

NTS 82G/4

LAT. 49°10' N LONG. 115°55' W

July, 1988

Ian D. Pirie
Minnova Inc.
4th Fl - 311 Water St.
Vancouver, B.C.

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(in pocket)

INTRODUCTION

General

The Stoney Creek porperty consists of 301 claim units in 18 contiguous claims located in the Yahk area of southeastern British Columbia. The claims were staked during 1987 for Minnova following 1986 reconnaissance work in the area. The area is underlain by sediments an intrusions of the Proterozoic Aldridge Formation which hosts the large Sullivan Pb-Zn massive sulphide deposit 65km to the north.

Location and Access

The property is located approximately 40km south of Cranbrook between the towns of Moyie and Yahk. The Moyie River, highway 3 and the Crowsnest railwayline all pass through the northwest corner of the claims (see Figure 1).

Access is available from the south end by way of the Hawkins Creek logging road from Yahk to the Cold Creek road and from the north end by way of the Sundown Creek road from Moyie Lake.

Physiography

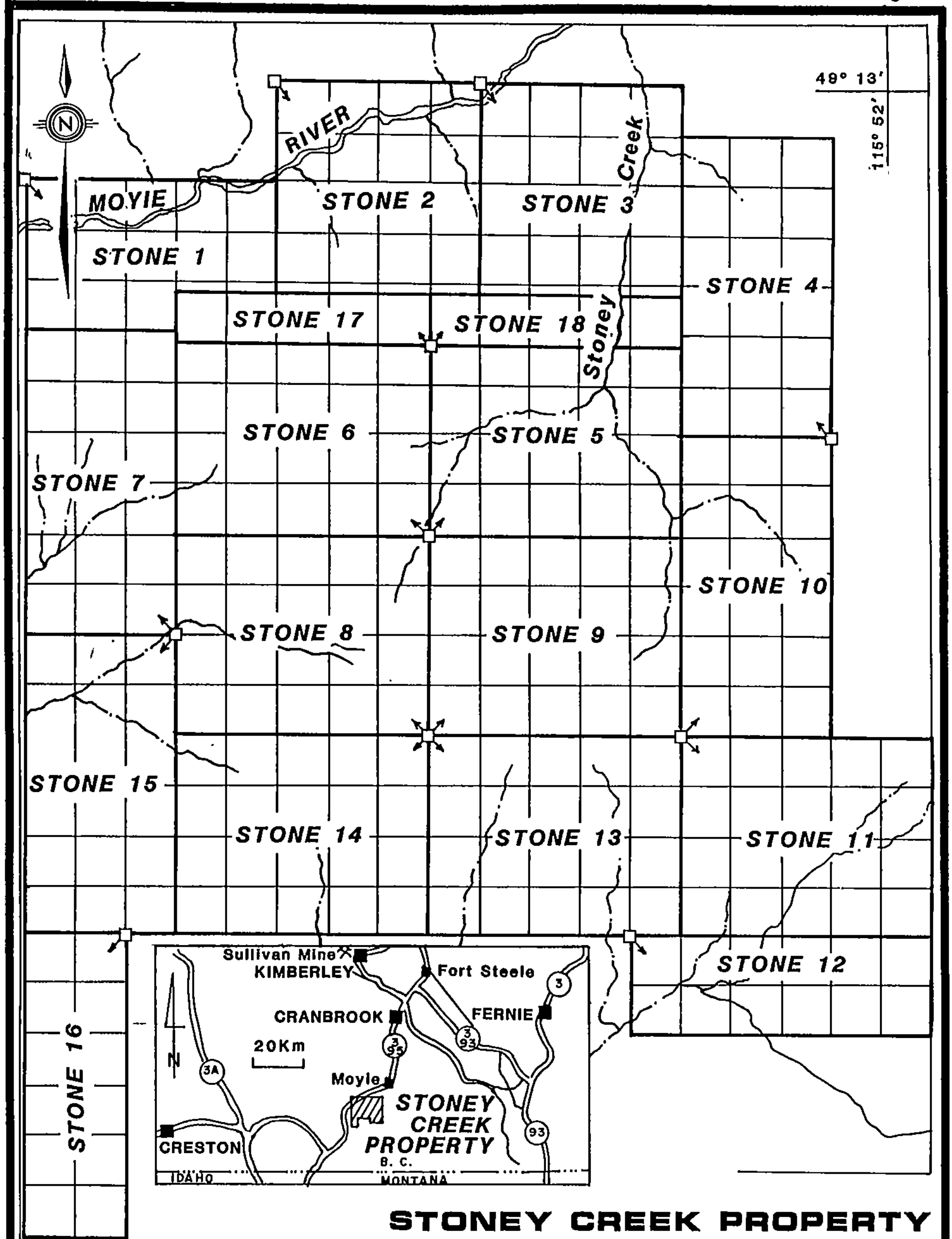
The property lies within the Yahk Range of the Purcell Mountains. Elevations range from 900m in the Moyie River valley to over 1900m in the middle of the property. Relief is generally subdued except for the Moyie River valley itself which is locally very steep.

Fairly dense forest cover common to the area has largely been removed by logging operations over the years. Very little of the logging appears to be recent and many of the roads on the property show over 10 years of scrub growth and water erosion.

The climate is classified as cool and damp with a snow free period on the upper reaches lasting only from June till November.

Property and Ownership

The Stoney Creek Property consists of 18 contiguous claims



STONEY CREEK PROPERTY

CLAIM CONFIGURATION

NTS 82G/4

FIGURE 1

MINNOVA INC.

totalling 301 claim units. All are 100% owned and operated by Minnova Inc. Please see page 2 of Appendix 1 for a listing of claim data.

History

The only recorded previous exploration on the property involved a soil survey carried out for Kennco Exploration in 1966 (AR 813) in the Stoney Creek valley itself. There is no evidence of any follow up having been done.

Chevron Resources Ltd. have been exploring the Mt. Mahon property immediately SW of Stoney for a number of years. They report bedded tourmalinite at or close to the Sullivan-hosting Lower Aldridge/Middle Aldridge contact. Refer to AR 14240 and others for details.

Work Performed in this Program

As the first year of property exploration, the following work was performed by Minnova.

GEOLOGY	25 man-days	property mapped at semi-recce scale (1:10,000)
GEOCHEM	7 assays 219 litho samples 25 man-days	rock chip sampling to supplement geology and establish validity of litho on this property
LINECUTTING	2 x 6km lines connected by 3km tie line	establising control for CSAMT
GEOPHYSICS	12km Controlled Source Audio Magneto Telluric (CSAMT) Survey	

GEOLOGY

Regional

The Proterozioc Aldridge Formation is a thick turbiditic sequence which underlies vast areas of southeastern B.C. and the northern U.S.A. (where it is known as the Belt Purcell).

Breaking the monotonous turbidite sequences are gabbroic sills and dykes known as Moyie Intrusions. Of the known mineralized areas the most significant by far is the Sullivan where over 150,000,000 tonnes of Pb-Zn-Ag bearing sulphide ore has been mined over the years. It is essentially a thick massive sulphide sheet, or series of sheets, underlain by tourmalinization and overlain by an albite-chlorite alteration halo.

In the Moyie-Yahk area the Aldridge forms a broad, shallow NE plunging anticline overlain by Creston Formation and cut by numerous faults in varous directions. The Sullivan time horizon, considered to be near the contact between the Lower and Middle Aldridge formations, is believed to be present on the Mt. Mahon property to the south, extending with shallow dips across the Stoney Property.

PROPERTY GEOLOGY

The rocks exposed on Stoney Creek porperty belong to the Middle Aldridge Formation which consists of siltstones and minor mudstone layers (turbidite sequence). Conformable gabbrioc sills, Moyie sills, occur in the sequence.

Structure

The sediments form a large gently NW plunging anticline. The sequence is cut through by a WSW-ENE trending fault - the Moyie River Fault. The southern block is down thrown in relation to the northern one. The faulting has led to disturbances in dip and strike directions of the beds. Less spectacular faulting can be traced on air photographs but little geological evidence for these was found during the mapping. However, there is evidence for an offset in the main anticlinal axis along Stone Creek.

Lithology

The dominant rock type in the area is siltstone, often argillaceous. Thin interbeds of mudstone occur. The siltstone occurs in up to metre thick beds but is usually a few tens of centimetres thick. Sedimentary textures such as graded bedding, cross bedding, ripple marks and sole marks were found.

The rock is light-medium grey in colour, with dark grey, muddy interbeds. Weathered rock is gry to rusty brown. In some places the weathered surface is very rusty, mostly because of oxidized pyrite.

Two very pyrite-rich beds were found during the mapping (samples YK-87-95 and 180). Pyrite makes up approximately 10-30% of these 10cm thick beds.

The mudstone layers are a few millimetres thick up to a few centimetres. They are normally made up of mm-thick beds. The mudstone is dark grey and often rusty brown when weathered. Mudstone beds can be found throughout the formation (of minor importance).

The gabbroic sills occur more or less conformably with the trubidite beds. The highest peaks are covered by a gently SE-dipping sill, a few tens of metres thick at maximum. The sill probably stretches to the NW corner of the property (S. of Moyie River).

The gabbro is dark grey and medium to coarse grained, sometimes ophitic. In the coarse grained gabbro on the mountain tops on the central-eastern side of the property pale green spots (or blebs) a maximum of 2 metres across occur. These are probably epidote formed because of interaction between wet sediment and the magma. Quartz grains were also found. The weathering of the gabbro is rusty in some places, especially the green parts.

A couple of silicified massive samples of siltstone were found. A certain increase in the amount of sericite is apparent in the siltstone in some places.

Light grey fine-medium grained silica-rich gabbro was found near the base of the sill (one location, sample #YK-87-44).

No tourmaline could be identified during the field work.

The rocks north of Moyie River tend to be more rusty weathering than the rest.

LITHOGEOCHEMISTRY

A total of 219 lithogeochemical samples and 7 assay samples were taken during the program. All were analyzed at Min-En Labs in North Vancouver. Assays were done by standard procedures using fire assay for Au, Ag and wet assay for Cu, Pb and Zn. Litho samples were analyzed for SiO_2, TiO_2, CaO, MgO, Na_2O, K_2O, MnO_2, Fe_2O_3 (total iron), Al_2O_3, Sr, Zr and Ba by ICP analysis of a crushed and digested bead formed by fusion with lithium borate. Ag, Cu Pb, Zn, B, Sb and As were analyzed by standard ICP techniques using an aqua-regia digestion. F and B-Tot were analyzed by fusion methods with, respectively, specific ion electrode and ICP finish.

The purpose of the sampling was to provide orientation data for assessing the use of lithogeochemistry in this type of situation. To date, staff shortages have prevented a detailed analysis being carried out. However, general observations can be made from simple visual inspection of the data.

The Moyie gabbros show surpising variability in both their SiO_2 and TiO_2 contents as well as other major elements. This may in part be due to alteration caused by reaction with wet sediments and in part by primary magma variability. Their most obvious consistent feature is a high Fe_2O_3 and MgO content (>20%) and high Cu and Ag.

The sediments are also quite variable in their major element chemistry although the SiO_2 contents suggest that two distinct populations may be present (<70%, >75%) and that anomalies may be establishable within these. Trace element values are uniformly low with only F and B-tot showing any potentially useful variation.

GEOPHYSICS

A Controlled Source Audio Magneto Telluric survey (CSAMT) was carried out over two 6 kilometre lines, 3 kilometres apart. With this it was hoped to establish the depth to the Lower-Middle

Aldridge contact (Sullivan time horizon) and to show up structures cutting that contact. A complete report on this survey has been prepared by Pacific Geophysical Ltd. and is included herein as Appendix 1.

CONCLUSIONS AND RECOMMENDATIONS

Mapping of the Stoney Property has outlined a broad NE plunging anticlinal structure truncated to the north by the Moyie River fault and possibly disrupted by a fault in the Stone Creek valley. No evidence of significant mineralization has been noted on surface but subtle signs of alteration cannot be ruled out until complete statistical analysis of the available geochemical data has been carried out.

The CSAMT survey has suggested that, at least in the south and central areas of the property, a low resistivity zone is present at fairly shallow depths. This feature is interpreted to be the Lower Aldridge-Middle Aldridge contact on the basis of past experience in the area (P. Cartwright; pers. com.). Distinctly cross cutting structural features disrupt this zone and may represent graben boundaries along which mineralizing solutions may have flowed.

It is recommended that a gravity survey be run along the lines established for CSAMT to see if any of the low resistivity zones could be caused by massive sulphides. In addition, the orientation geochem data should be fully assessed as staff commitments allow.

Finally, the only way to properly test the interpretation of these surveys is to drill. This should be counted on as the next logical step in the exploration of this property.

ITEMIZED COST STATEMENT

GEOLOGY		
G. Forsman, B.Sc Lulea, Finland	25 man days @ $250	6,250
GEOCHEMISTRY		
M. Fulton	25 man days @ 150	3,750
Duncan, B.C.	7 assays @ $35.50	248.50
	219 litho @ $30.00	6,570
LINECUTTING		
Quest Canada Ltd. Vancouver, B.C.	14.98km @ $320	4,792.90
GEOPHYSICS		
Pacific Geophysical Ltd.	direct cost	22,000
Vancouver, B.C.	monitoring & orient. (ID Pirie 2 days @ $400)	800
FIELD EXPENSES (re Geology, geochem)		
Room & board	54 man days @ $50	2,700
Truck	25 days @ $60	1,500
Supervision, Report Prep	ID Pirie 10 days @ $400	4,000
	Total	$52,611,40
	Added from PAC (11%)	5,588.60
		$58,200.00

<u>Apportionment</u>

Stoney Group (19%)	$11,000
Moyie Group (33%)	$19,200
Top Group (14%)	$ 8,000
Yahk Group (34%)	$20,000

CERTIFICATE OF QUALIFICATIONS

I, Ian D. Pirie certify that:

1. I am an Exploration Geologist residing at 4580 - 44B Avenue, Delta, BC.

2. I have a BSc (Hons) in Applied Geology from the University of Strathclyde, Glasgow, Scotland (1977) and a MSc (Geology/Geochemistry) from Queen's University at Kingston, Ontario (1980).

3. I have practised my profession since 1977.

4. I personally carried out or supervised the work reported herein.

Date July 22/88

Ian D. Pirie

GEOLOGICAL ASSOCIATION OF CANADA
IAN D. PIRIE
FELLOW

APPENDIX 1

CSAMT REPORT

PACIFIC GEOPHYSICAL LTD.

REPORT

ON THE

CONTROLLED SOURCE AUDIO MAGNETOTELLURIC SURVEY
(CSAMT)

ON THE

STONEY CREEK PROPERTY

FORT STEELE MINING DIVISION
BRITISH COLUMBIA

FOR

MINNOVA, INC.

LATITUDE: 49°10'N LONGITUDE: 115°55'W

N.T.S. 82G/4

CLAIMS: STONE 1 - STONE 18

OWNER: MINNOVA INC.

OPERATOR: MINNOVA INC.

BY

PAUL A. CARTWRIGHT, P.Geoph.
GEOPHYSICIST

DATED: December 16, 1987

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PART A REPORT

1) Introduction

A Controlled Source Audio Magnetotelluric (CSAMT) survey has been completed on the Stoney Creek Property on behalf of Minnova, Inc. in the Fort Steele Mining Division, British Columbia.

The property is located approximately 40 km south of Cranbrook, B.C. Access is by wheeled vehicle over a system of good logging roads leading south from the Crowsnest Highway at Yahk, B.C.

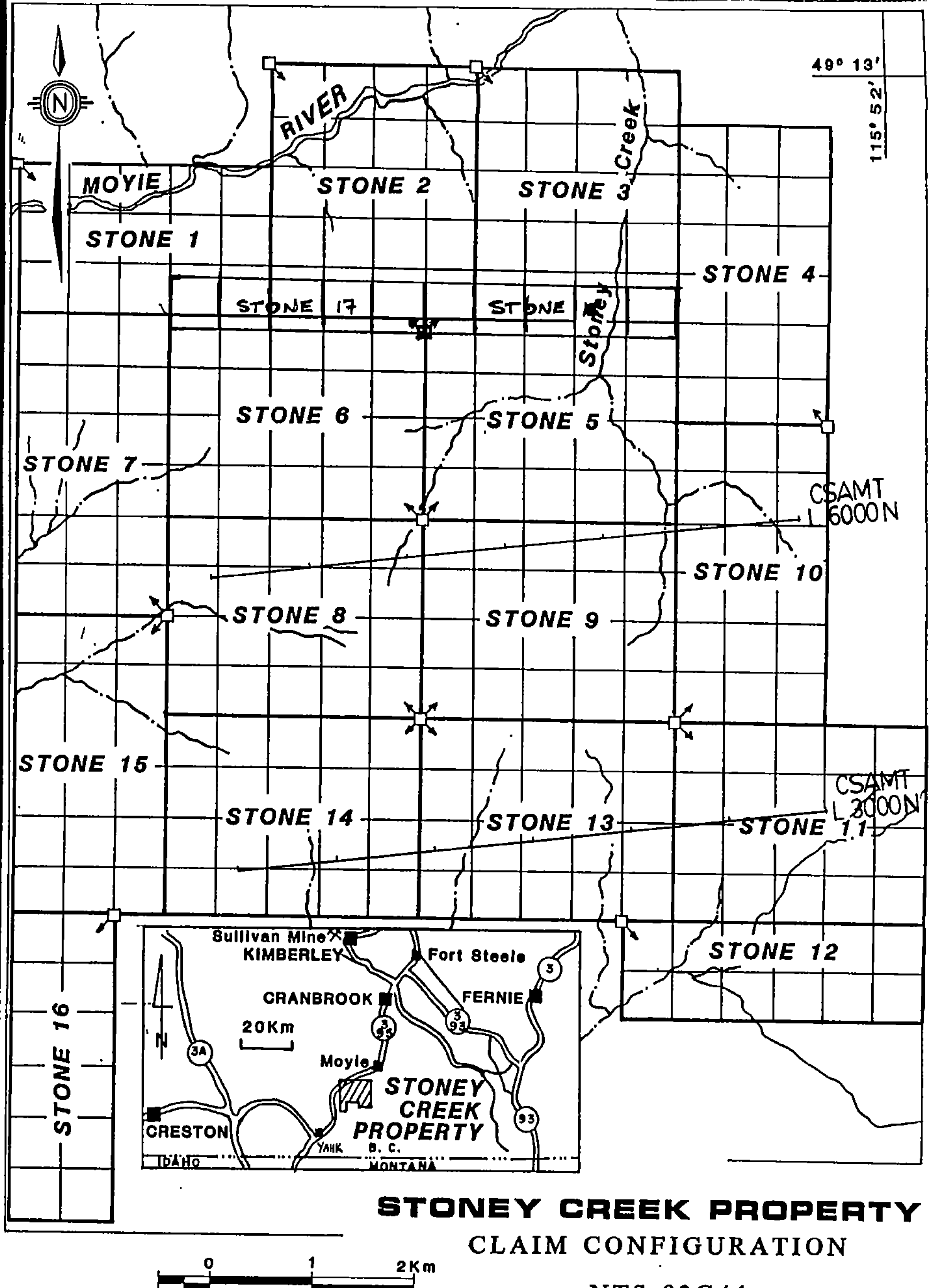
The CSAMT technique is a relatively new method used to map the resistivity configuration of the earth. Part C of this report describes the method in some detail and also provides some case histories.

The objective of the CSAMT survey was to evaluate the property for zones of low resistivity which could be indicative of the presence of conductive sulphide mineralization similar to the lead-zinc ore of the Sullivan Mine located 65 km north at Kimberley, B.C.

A Phoenix Model V-3 CSAMT receiver unit was used to make the geophysical measurements in conjunction with a Phoenix IPT-1/AC3004 transmitter powered by a 3 kw motor generator. A copper wire approximately 4 km in length and grounded at both ends was used as the transmitter dipole, as illustrated on Figure 2, a 1:50,000 location map showing the survey lines and the transmitter wire.

Six electric field measurements and one magnetic field measurement were made simulataneously at each setup. The electric field measurements used an interelectrode spacing of 200 meters along the survey lines, while a horizontal magnetic measurement was made perpendicular to the line at 1200 meter intervals. Data was recorded at 15 frequencies ranging in binary steps from 4096 Hz to 0.25 Hz.

Field work took place during July 1987, initially under the supervision of Paul A. Cartwright, P.Geoph., and then under the direction of Michael J. Cormier, B.Sc. Certificates of qualification are included in this report.



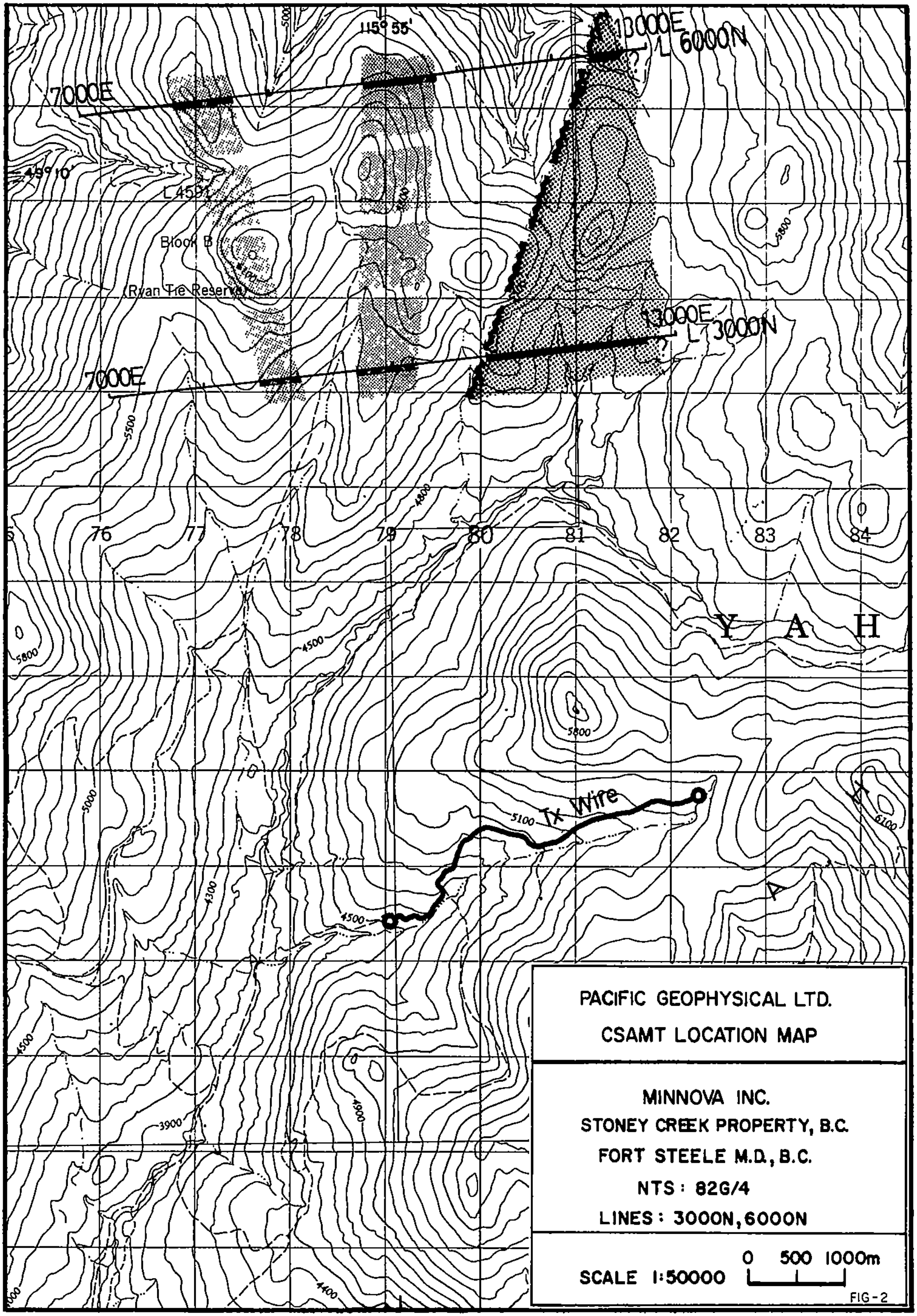
STONEY CREEK PROPERTY

CLAIM CONFIGURATION

NTS. 82G/4

MINNOVA INC.

FIG. 1



PACIFIC GEOPHYSICAL LTD.

CSAMT LOCATION MAP

MINNOVA INC.

STONEY CREEK PROPERTY, B.C.

FORT STEELE M.D., B.C.

NTS : 82G/4

LINES : 3000N, 6000N

SCALE 1:50000 0 500 1000m

FIG - 2

2) Description of Claims

The Stoney Creek Property consists of 18 contiguous claims totalling 301 units as follows:

Claim No.	Record No.	Units	Expiry Date
Stone 1	2880	15	1 May 1988
Stone 2	2881	20	1 May 1988
Stone 3	2882	20	1 May 1988
Stone 4	2883	18	1 May 1988
Stone 5	2884	20	1 May 1988
Stone 6	2885	20	1 May 1988
Stone 7	2886	18	1 May 1988
Stone 8	2887	20	1 May 1988
Stone 9	2888	20	1 May 1988
Stone 10	2889	18	1 May 1988
Stone 11	2890	20	1 May 1988
Stone 12	2891	12	1 May 1988
Stone 13	2892	20	1 May 1988
Stone 14	2893	20	1 May 1988
Stone 15	2894	18	1 May 1988
Stone 16	2895	12	1 May 1988
Stone 17	2985	5	16 September 1988
Stone 18	2986	5	16 September 1988

3) Description of Geology

The geology of the Stoney Creek Property is illustrated on GSC Map 11-1960.

The property is underlain by the Aldridge Formation which is a Precambrian massive grey quartzite and siltstone with thinly laminated argillites and siltstones dominating the upper part.

The property is part of a major domal structure. To the north, the eastern side is monoclinal and dips moderately. The northwestern side is bounded by the northeasterly striking Moyie reverse fault. In the south, towards the International boundary, the dome's eastern side is bounded by a series of folds whose limbs dip more steeply to the east.

The sulphide potential of the Aldridge Formation is illustrated 65 km to the north at Kimberley where the Sullivan Mine ore is mined at the Middle-Lower Aldridge horizon.

4) Presentation of Data

The CSAMT resistivity results are displayed on the data plots as apparent resistivity vs frequency pseudo-sections. It should be made clear that this presentation cannot be viewed as a true section of earth resistivity, particularly in the vertical direction, i.e., top of section to bottom of section, as the depth of penetration is dependent upon the resistivities encountered as well as the frequency employed to make the measurement.

Drawing No. 5886-1 shows the CSAMT resistivity data that has been corrected for the position of the transmitter wire relative to the survey lines (near field correction), in addition to being smoothed with a 3-point moving average filter. Dwg. No. 5886-2 illustrates the CSAMT resistivity data which has only been near field corrected, while Dwg. No. 5886-3 displays the raw CSAMT data.

Also enclosed with this report is Dwg. No. A.M.T.-2010, a plan map of the Stoney Creek Property CSAMT grid at a scale of 1:25,000. The definite, probable, and possible CSAMT conductivity anomalies are indicated by bars, in the manner shown in the legends, on this plan map as well as on the corrected and filtered CSAMT pseudo-section, Dwg. No. 5886-1. These bars represent the interpreted surface projection of the anomalous zones.

5) Discussion of Results

Three separate zones of anomalously high conductivity are interpreted to be present in the area evaluated by the present Controlled Source Audio Magnetotelluric (CSAMT) survey. These features are marked in plan form on Dwg. No. A.M.T. 2010, and in pseudo-section form on Dwg. No. 5886-1. Each trend is discussed separately below.

Zone A

A major north-northeasterly striking fault structure appears to mark the western boundary of CSAMT Zone A, which is itself interpreted to be made up of 3 subzones.

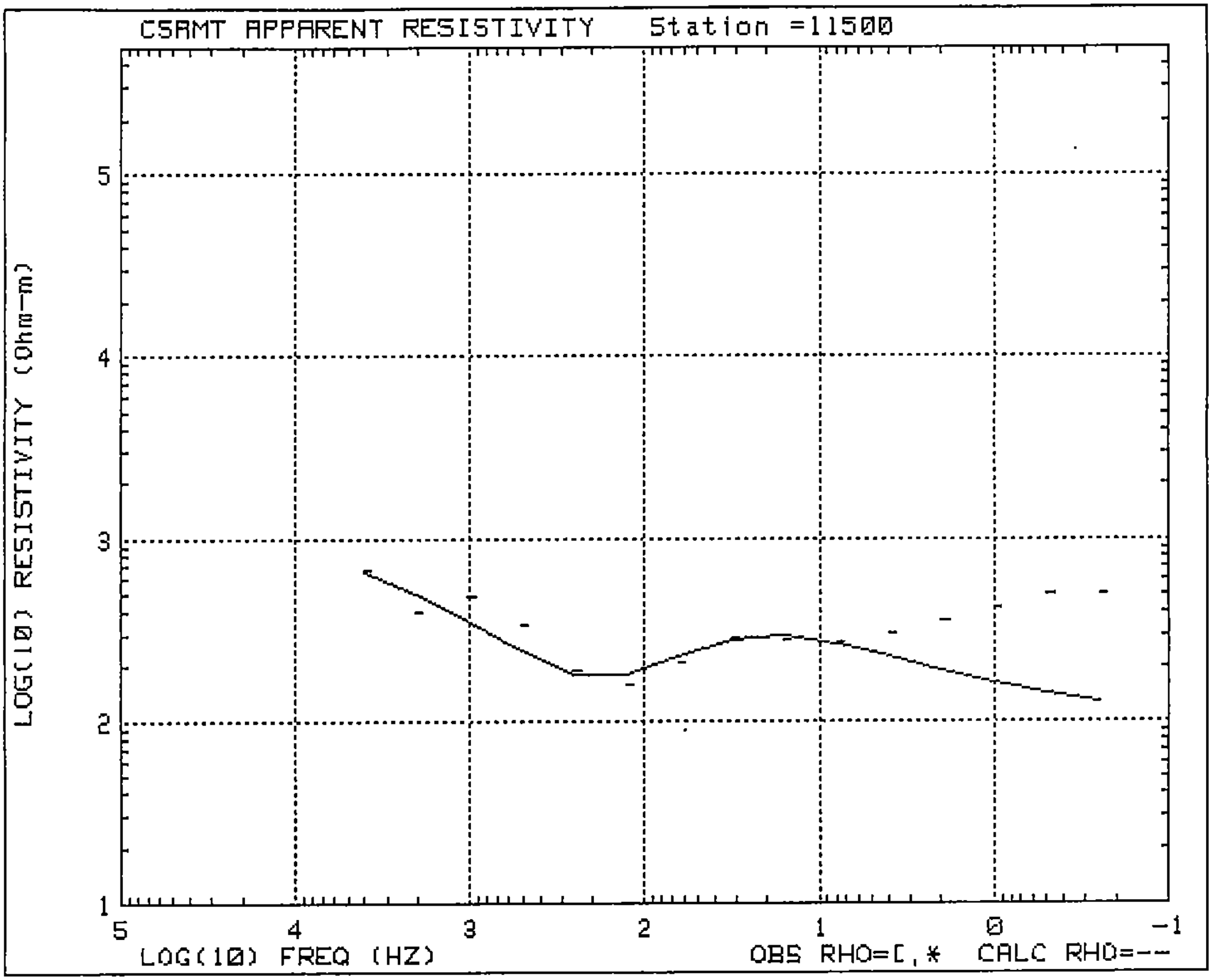
Terminating against this lineament is the primary source of Zone A, a buried conductive horizon, Subzone A1, that seems to be dipping gently towards the west. At the present time, the northern, eastern, and southern boundaries of this conductor are undefined. One dimensional computer inversions have been calculated using the corrected and filtered data obtained at Station 11500E (Figure 3) and Station 12500E (Figure 4) on Line 3000N, in order to better estimate the depth to the top of the conductor. The inversion from the former location suggests that the target is buried approximately 170 meters sub-surface, while the more easterly, i.e., updip, inversion returned a burial depth of approximately 135 meters below the surface. In spite of its greater apparent depth, the western part of the conductor may represent a better exploration target because the thickenss and/or conductivity of the source appears to be greatest in this area.

Subzone A2 may indicate the presence of another near horizontal conductor located at some depth below the western edge of Subzone A1. However, the depth to such an event would be at least 1500 meters below the surface.

MINNOVA, INC. STONEY CREEK CSAMT Line 3000N

FINAL RESULTS FROM INVERSION

Rho1	Rho2	Rho3	Rho4	Rho5	Rho6	Thk1	Thk2	Thk3	Thk4	Thk5
2000.0	100.0	2000.0	100.0	2000.0	100.0	26.8	10.0	133.0	328.6	1200.0



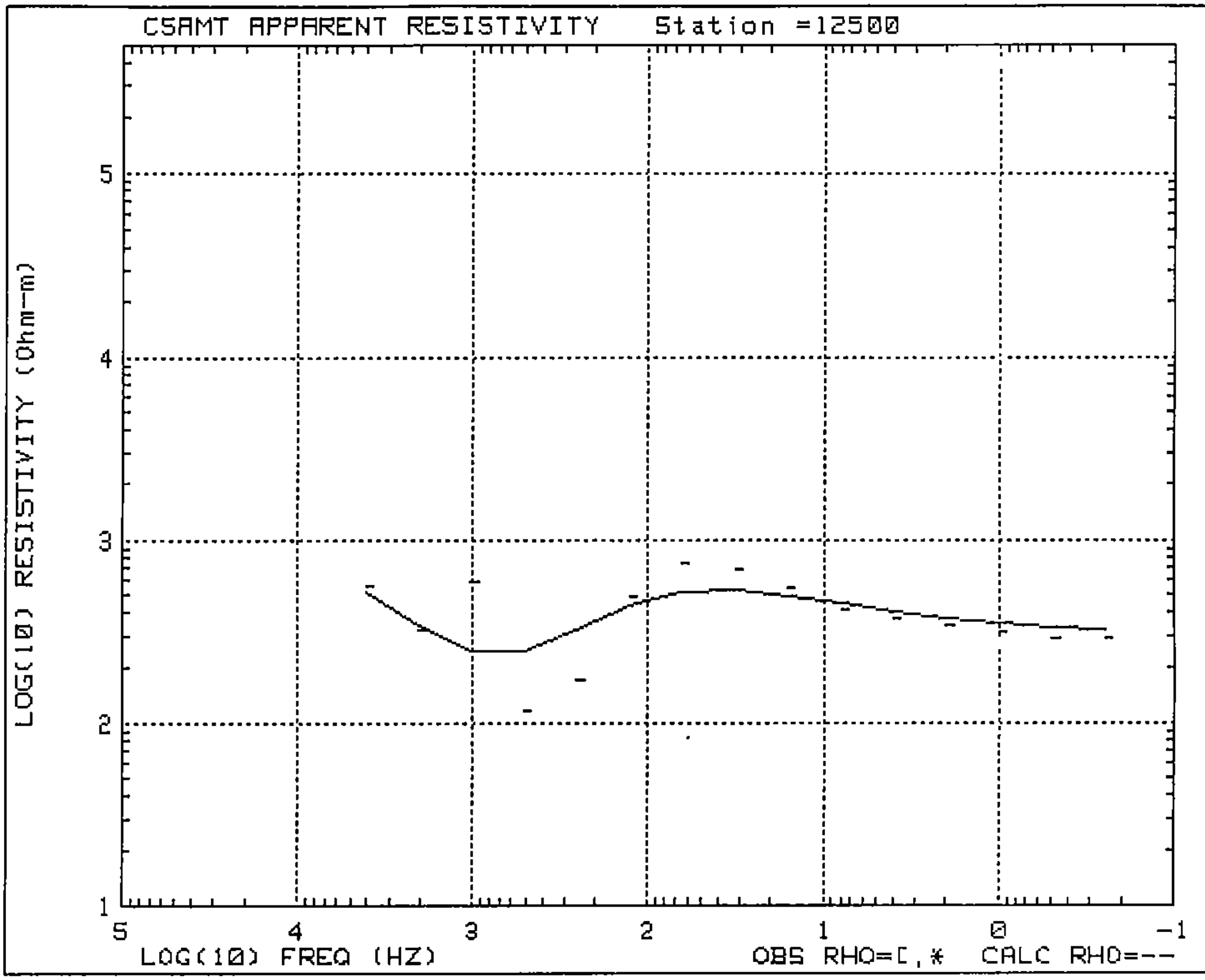
CSAMT SOUNDING DATA

F(Hz)	Obs Rho	Cal Rho	Pctdif	Wts	Obs Pha	Cal Pha	Phadif	Wts
4096.000	675.9	709.4	-5.0	1	0.0	55.0	-55.0	0
2048.000	398.1	558.5	-40.3	1	0.0	59.9	-59.9	0
1024.000	488.4	408.8	16.3	1	0.0	62.4	-62.4	0
512.000	347.1	280.7	19.1	1	0.0	62.2	-62.2	0
256.000	190.6	197.7	-3.7	1	0.0	56.1	-56.1	0
128.000	157.7	179.5	-13.8	1	0.0	45.9	-45.9	0
64.000	210.5	216.3	-2.7	1	0.0	39.4	-39.4	0
32.000	289.2	272.3	5.9	1	0.0	40.5	-40.5	0
16.000	286.3	294.6	-2.9	1	0.0	46.0	-46.0	0
8.000	278.6	269.9	3.1	1	0.0	51.0	-51.0	0
4.000	306.2	227.3	25.8	1	0.0	53.7	-53.7	0
2.000	362.4	189.1	47.8	1	0.0	54.2	-54.2	0
1.000	426.8	160.9	62.3	1	0.0	53.4	-53.4	0
.500	494.0	141.5	71.4	1	0.0	52.0	-52.0	0
.250	500.7	128.4	74.4	1	0.0	50.6	-50.6	0

FIG 3

MINNOVA, INC. STONEY CREEK CSAMT Line 3000N
FINAL RESULTS FROM INVERSION

Rho1	Rho2	Rho3	Rho4	Rho5	Rho6	Thk1	Thk2	Thk3	Thk4	Thk5
2000.0	100.0	2000.0	50.0	2000.0	300.0	25.0	7.7	100.0	61.3	1357.1



CSAMT SOUNDING DATA

F(Hz)	Obs Rho	Cal Rho	Pctdif	Wts	Obs Pha	Cal Pha	Phadif	Wts
4096.000	553.5	537.3	2.9	1	0.0	60.2	-60.2	0
2048.000	328.8	349.2	-6.2	1	0.0	61.9	-61.9	0
1024.000	588.3	238.5	59.5	1	0.0	55.5	-55.5	0
512.000	118.9	212.3	-78.6	1	0.0	44.0	-44.0	0
256.000	170.6	261.7	-53.4	1	0.0	34.5	-34.5	0
128.000	483.6	371.7	23.1	1	0.0	32.1	-32.1	0
64.000	746.0	491.7	34.1	1	0.0	35.8	-35.8	0
32.000	695.1	550.3	20.8	1	0.0	41.8	-41.8	0
16.000	538.1	534.6	.7	1	0.0	46.6	-46.6	0
8.000	415.3	485.4	-16.9	1	0.0	49.2	-49.2	0
4.000	367.8	435.5	-18.4	1	0.0	50.0	-50.0	0
2.000	341.5	395.7	-15.9	1	0.0	49.7	-49.7	0
1.000	318.3	366.9	-15.3	1	0.0	49.0	-49.0	0
.500	293.9	346.6	-17.9	1	0.0	48.2	-48.2	0
.250	293.1	332.5	-13.5	1	0.0	47.5	-47.5	0

FIG. 4

There is also a third, much less conductive horizon, Subzone A3, overlying Subzone A1 at a much shallower depth sub-surface.

Zone B and Zone C

These only possibly significant zones are presently shown to strike across both grid lines in a northerly direction. However, it should be noted that this interpretation is uncertain due to both the relatively large distance between the survey lines and the nature of the individual anomalies.

A one dimensional inversion was completed using the corrected and filtered data from Station 10500E (Figure 5) on Line 6000N. This calculation suggests a depth of around 230 meters to the top of the causative source.

In general terms, the data recorded over Zone B indicate that a more conductive and/or thicker target may be present here than is the case of CSAMT Zone C.

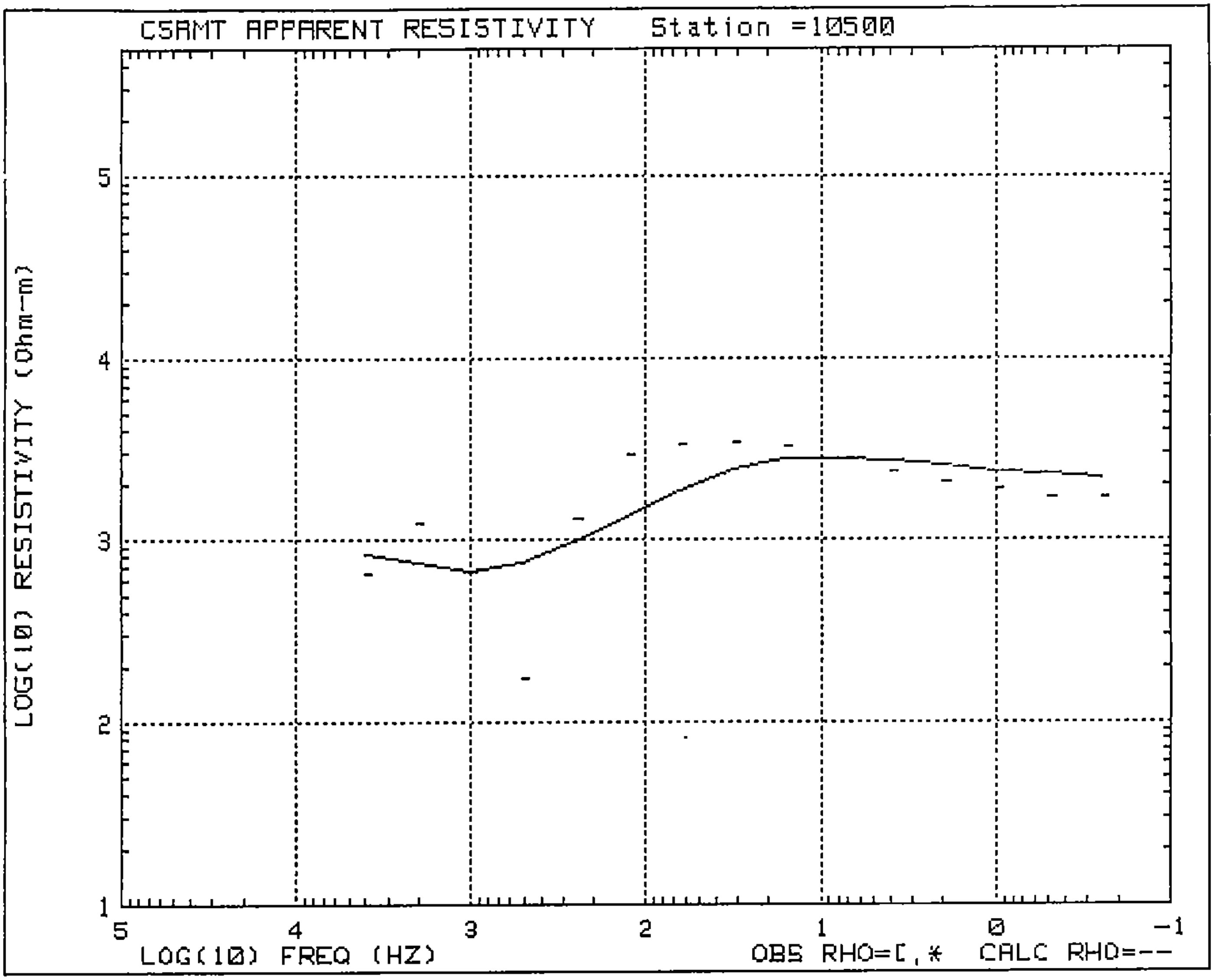
6) Summary and Recommendations

A Controlled Source Audio Magnetotelluric (CSAMT) survey has been carried out on the Stoney Creek Property, Ft. Steele Mining Division, British Columbia, on behalf of Minnova, Inc.

One well defined, definitely anomalous zone of higher conductivity is interpreted in the data (Zone A). The primary cause of this zone is a westerly dipping conductor (Subzone A1) which appears to be thickening and/or becoming more conductive towards its western margin. Drill testing is definitely recommended. A vertical drill hole collared in the vicinity of Station 11400E, Line 3000N, and drilled to at least 200 meters sub-surface should be considered.

MINNOVA, INC. STONEY CREEK CSAMT Line 6000N
FINAL RESULTS FROM INVERSION

Rho1	Rho2	Rho3	Rho4	Rho5	Thk1	Thk2	Thk3	Thk4
50.0	3000.0	50.0	5000.0	2000.0	5.0	227.2	17.4	5000.0



CSAMT SOUNDING DATA

F(Hz)	Obs Rho	Cal Rho	Pctdif	Wts	Obs Pha	Cal Pha	Phadif	Wts
4096.000	655.8	762.4	-16.3	1	0.0	38.2	-38.2	0
2048.000	1234.9	684.0	44.6	1	0.0	41.4	-41.4	0
1024.000	676.5	665.9	1.6	1	0.0	37.3	-37.3	0
512.000	176.1	791.3	-349.3	1	0.0	31.7	-31.7	0
256.000	1314.5	1060.4	19.3	1	0.0	28.3	-28.3	0
128.000	2896.4	1480.7	48.9	1	0.0	27.7	-27.7	0
64.000	3344.4	2048.0	38.8	1	0.0	29.9	-29.9	0
32.000	3399.8	2598.2	23.6	1	0.0	34.8	-34.8	0
16.000	3220.3	2891.7	10.2	1	0.0	40.3	-40.3	0
8.000	2781.6	2890.9	-3.9	1	0.0	44.5	-44.5	0
4.000	2363.2	2737.4	-15.8	1	0.0	46.9	-46.9	0
2.000	2084.4	2557.1	-22.7	1	0.0	47.8	-47.8	0
1.000	1901.4	2403.1	-26.4	1	0.0	47.9	-47.9	0
.500	1706.6	2286.3	-34.0	1	0.0	47.6	-47.6	0
.250	1696.9	2201.7	-29.7	1	0.0	47.1	-47.1	0

FIG. 5

There is evidence of two other near horizontal subzones of possibly anomalous conductivity contained within the area marked as Zone A. The source of Subzone A3 overlies that of Subzone A1, while Subzone A2 is indicated to be the deepest event by far, with a depth to source estimated to be in excess of 1,500 meters.

Two additional, possibly anomalous zones, are also outlined by the CSAMT data (Zone B, Zone C). Neither of these features have the large lateral extent exhibited by the source of Zone A. Drilling to test the sources of these less definite zones should only be carried out as a second priority in the case of Zone B, and as a third priority in the case of Zone C.

PACIFIC GEOPHYSICAL LTD.

Paul A. Cartwright

Paul A. Cartwright, P.Geoph.,
Geophysicist.

Dated: December 16, 1987.

7) Assessment Details

Property: Stoney Creek

Mining Division: Fort Steele, B.C.

Sponsor: Minnova, Inc.

Location: 40 km south of Cranbrook, B.C.

Type of Survey: Controlled Source Audio Magnetotelluric

Operating Days: 9 1/2

Date Started: 13 July 1987

Consulting Person Days: 56

Date Finished: 26 July 1987

Consulting Man Days: 7

Number of Stations: 60

Drafting Man Days: 3

Number of Readings: 900

Total Man Days: 67

Km of Line Surveyed: 12.0

Consultant:

P.A. Cartwright, 4238 West 11th Avenue, Vancouver, B.C.

Field Technicians:

M.J. Cormier, 2242 Stephens Street, Vancouver, B.C.
G.D. Lockhart, 19372 Hammond Road, Pitt Meadows, B.C.
K. Corman, 5711 No. 2 Road, Richmond, B.C.
P. Mullan, 1440 Sundhurst Place, West Vancouver, B.C.
C. Corman, 5711 No. 2 Road, Richmond, B.C.

Draughtsman:

G.D. Lockhart, 19372 Hammond Road, Pitt Meadows, B.C.

PACIFIC GEOPHYSICAL LIMITED

Paul A. Cartwright

Paul A. Cartwright, P.Geoph.
Geophysicist.

Dated: 16 December 1987.

8) Statement of Costs

Minnova, Inc.

Controlled Source Audio Magnetotelluric Survey - Stoney Creek Property, Yahk, British Columbia

Period: July 13-14, 1987
Crew: M. Cormier, G. Lockhart, P. Cartwright

Period: July 15-18, 1987
Crew: M. Cormier, G. Lockhart, P. Cartwright, K. Corman, P. Mullan, C. Corman

Period: July 19-26, 1987
Crew: M. Cormier, G. Lockhart, K. Corman, P. Mullan, C. Corman.

9 1/2 Operating Days @ $1,550.00	$ 14,725.00
2 Bad Weather Days $ $ 950.00	1,900.00
Mobilization-Demobilization	3,000.00
Report Preparation, 9 1/2 days @ $250.00	2,375.00
	$ 22,000.00

PACIFIC GEOPHYSICAL LTD.

Paul A. Cartwright

Paul A. Cartwright, P.Geoph.
Geophysicist.

Dated: 16 December 1987

9) Certificate

I, Paul A. Cartwright, of the City of Vancouver, Province of British Columbia, do hereby certify:

1. I am a geophysicist residing at 4238 W. 11th Avenue, Vancouver, B.C.

2. I am a graduate of the University of British Columbia, with a B.Sc. Degree (1970)

3. I am a member of the Society of Exploration Geophysicists, the European Association of Exploration Geophysicists and the Canadian Society of Exploration Geophysicists.

4. I have been practising my profession for 17 years.

5. I am a Professional Geophysicist licensed in the Province of Alberta.

6. I have no direct or indirect interest, nor do I expect to receive any interest, directly or indirectly, in the property or securities of Minnova, Inc., or any affiliates.

8. Permission is granted to use in whole or in part for assessment and qualification requirements but not for advertising purposes.

DATED AT VANCOUVER, BRITISH COLUMBIA this 16th day of December 1987.

Paul A. Cartwright

Paul A. Cartwright, P.Geoph.

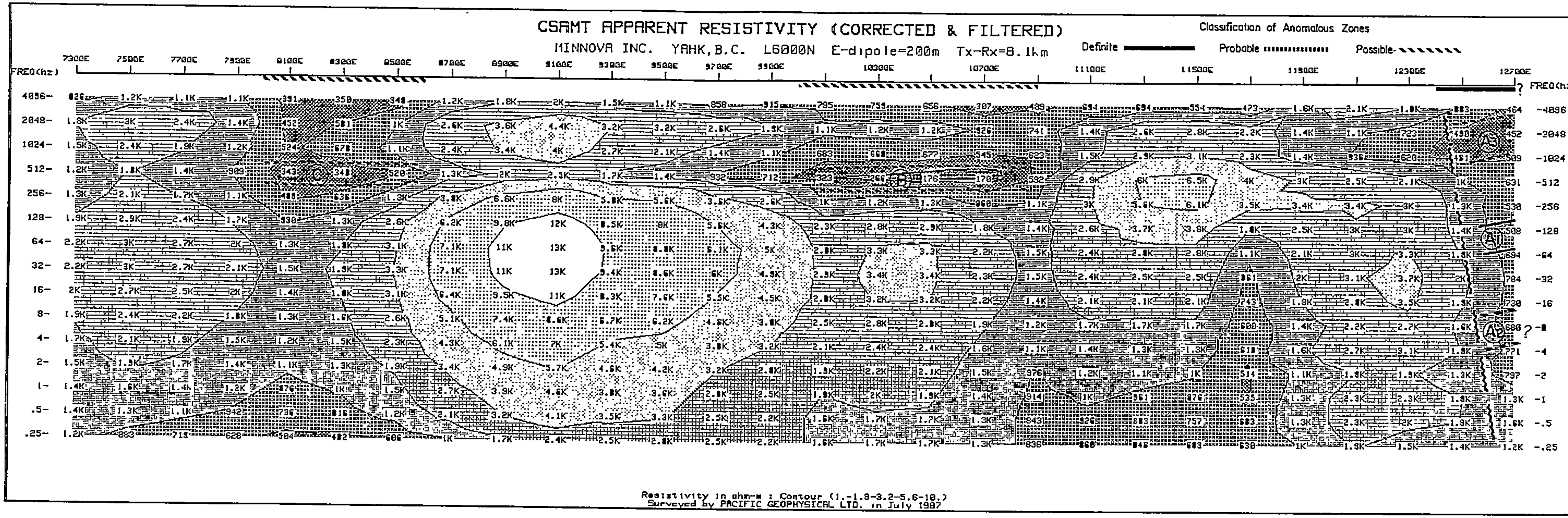
10) Certificate

I, Michael J. Cormier, of the City of Vancouver, Province of British Columbia, do hereby certify:

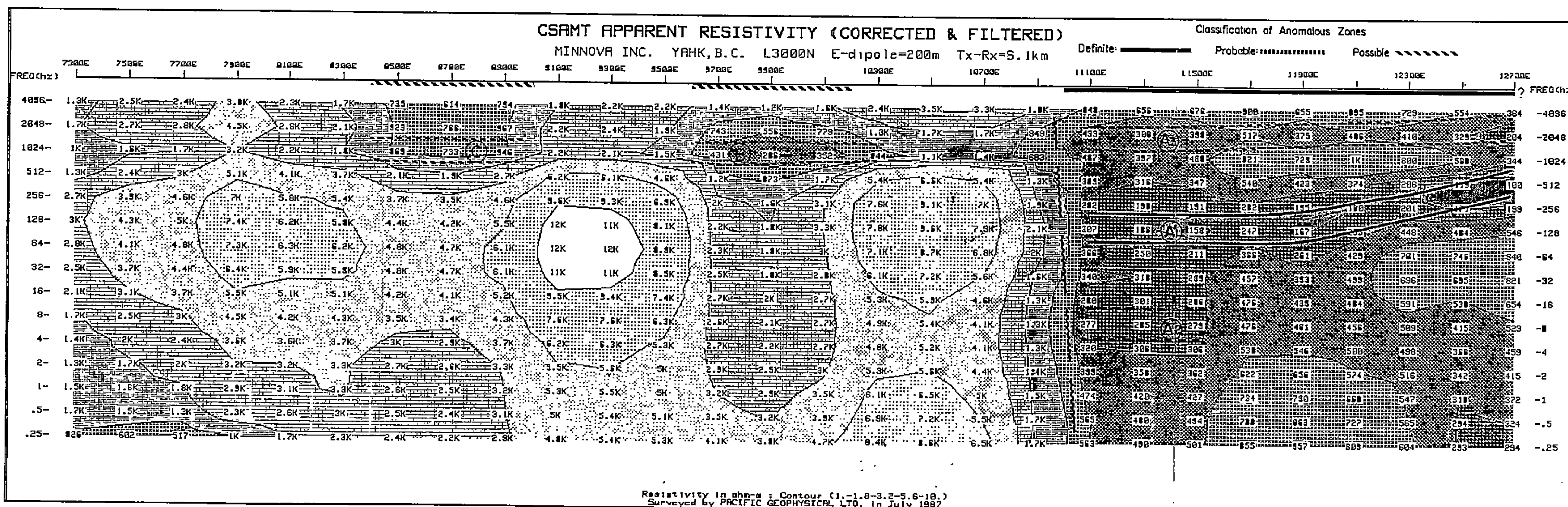
1. I am a geophysicist residing at 2242 Stephens Street, Vancouver, British Columbia.
2. I am a graduate of McGill University, Montreal, Quebec with a B.Sc. Degree (1981).
3. I have been practising my profession for 6 years.
4. I have no direct or indirect interest, nor do I expect to receive any interest, directly or indirectly, in the property or securities of Minnova, Inc.
5. The statements made in this report are based on a study of published geological literature and unpublished private reports.
6. Permission is granted to use in whole or in part for assessment and qualification requirements but not for advertising purposes.

DATED AT VANCOUVER, B.C. this 16th day of December 1987.

Michael J. Cormier, B.Sc.



CSAMT APPARENT RESISTIVITY (CORRECTED & FILTERED)
MINNOVA INC. YAHK, B.C. L6000N E-dipole=200m Tx-Rx=8.1km
Classification of Anomalous Zones
Definite
Probable
Possible
FREQ(hz)
Resistivity in ohm-m : Contour (1.-1.8-3.2-5.6-10.)
Surveyed by PACIFIC GEOPHYSICAL LTD. in July 1987

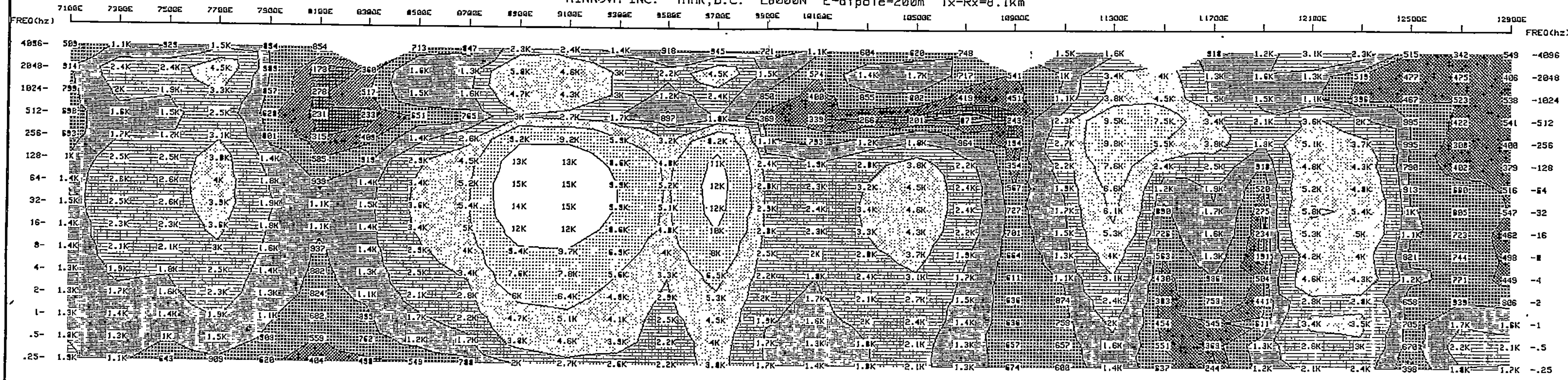


CSAMT APPARENT RESISTIVITY (CORRECTED & FILTERED)
MINNOVA INC. YAHK, B.C. L3000N E-dipole=200m Tx-Rx=5.1km
Classification of Anomalous Zones
Definite
Probable
Possible
FREQ(hz)
Resistivity in ohm-m : Contour (1.-1.8-3.2-5.6-10.)
Surveyed by PACIFIC GEOPHYSICAL LTD. in July 1987

Dwg No 5886-1

CSAMT APPARENT RESISTIVITY (CORRECTED)

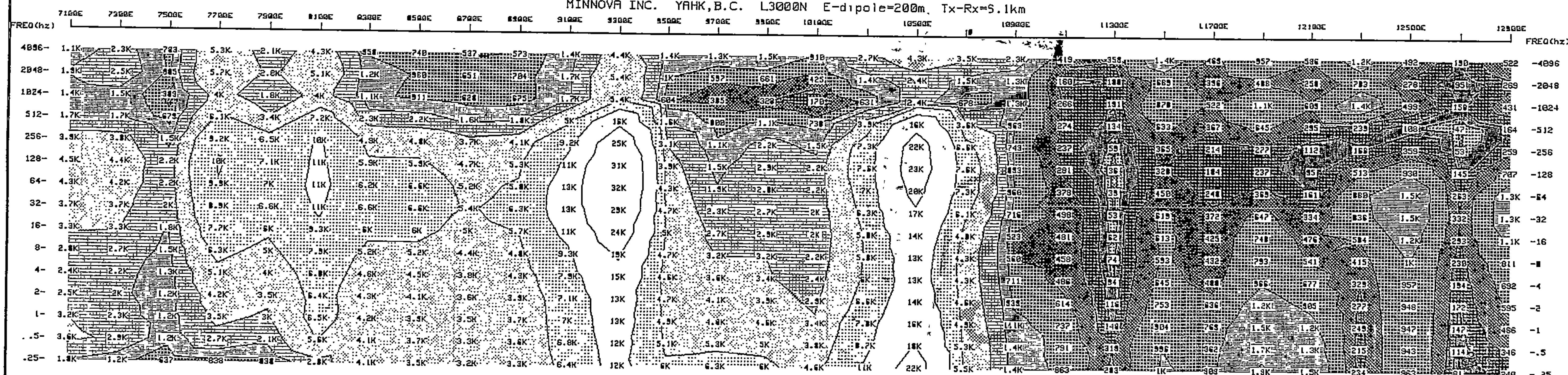
MINNOVA INC. YAHK, B.C. L6000N E-dipole=200m Tx-Rx=8.1km



Resistivity in ohm-m : Contour (1.-1.8-3.2-5.6-10.)
Surveyed by PACIFIC GEOPHYSICAL LTD. in July 1987

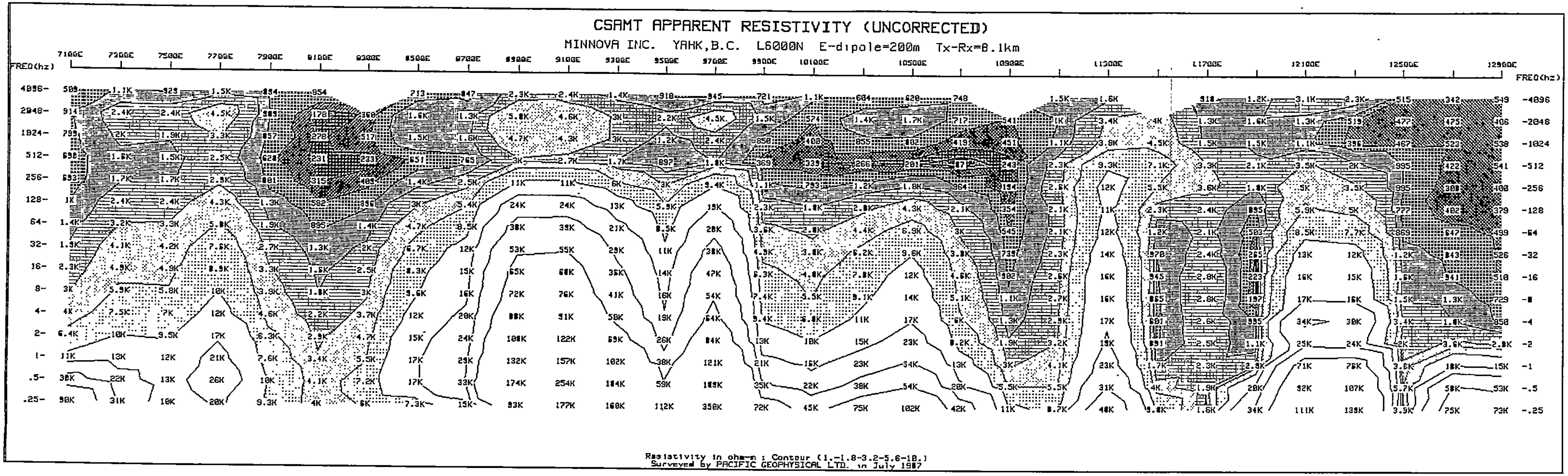
CSAMT APPARENT RESISTIVITY (CORRECTED)

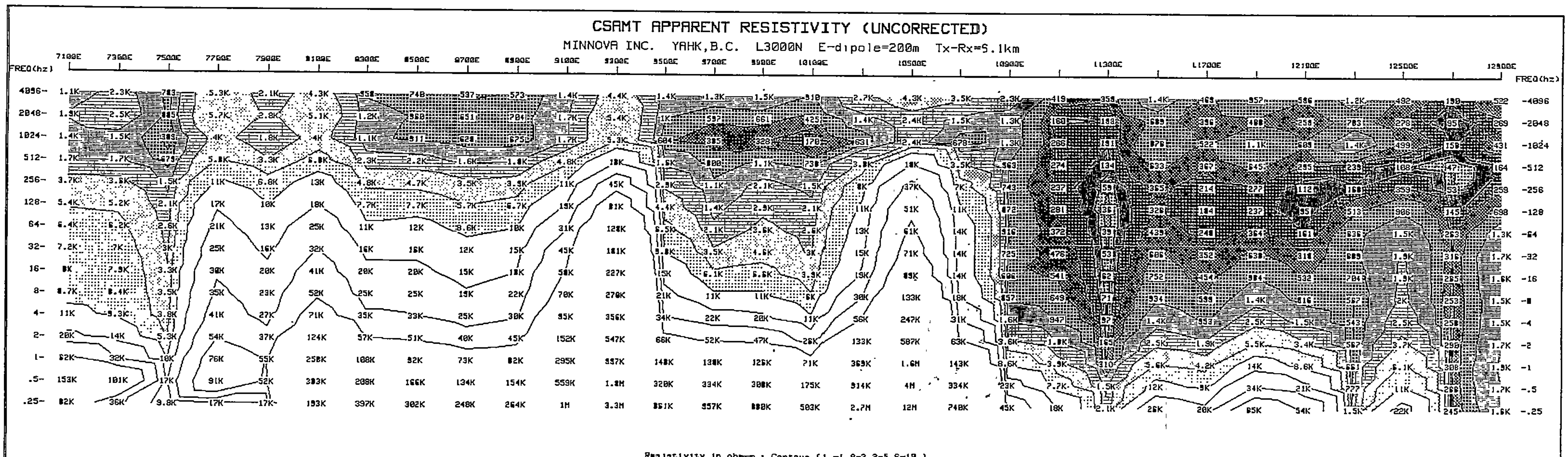
MINNOVA INC. YAHK, B.C. L3000N E-dipole=200m Tx-Rx=5.1km



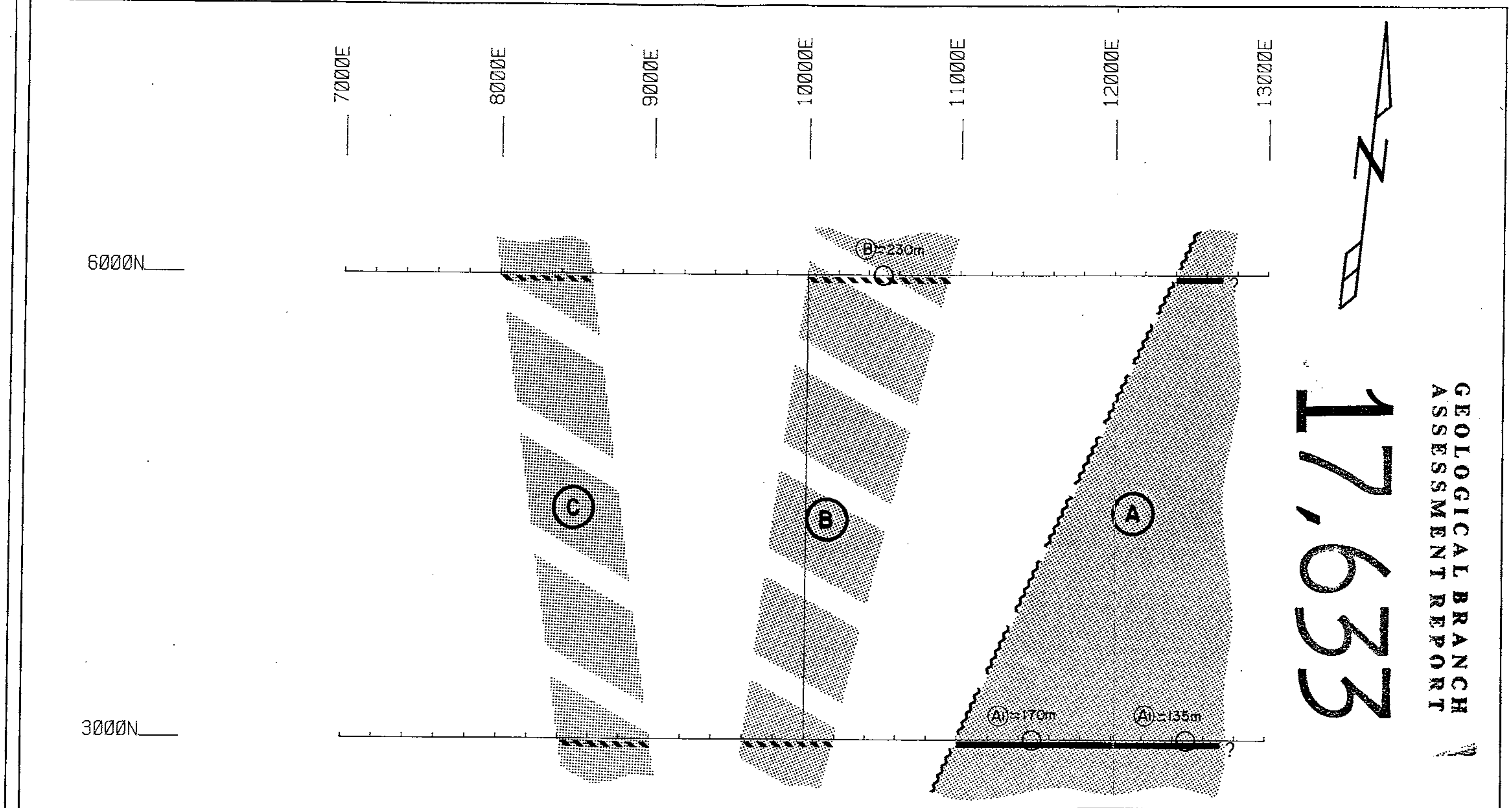
Resistivity in ohm-m : Contour (1.-1.8-3.2-5.6-10.)
Surveyed by PACIFIC GEOPHYSICAL LTD. in July 1987

Dwg No 5886-2


CSAMT APPARENT RESISTIVITY (UNCORRECTED)
MINNOVA INC. YAHK,B.C. L6000N E-dipole=200m Tx-Rx=8.1km
Resistivity in ohm-m : Contour (1.-1.8-3.2-5.6-10.)
Surveyed by PACIFIC GEOPHYSICAL LTD. in July 1987


CSAMT APPARENT RESISTIVITY (UNCORRECTED)
MINNOVA INC. YAHK,B.C. L3000N E-dipole=200m Tx-Rx=5.1km
Resistivity in ohm-m : Contour (1.-1.8-3.2-5.6-10.)
Surveyed by PACIFIC GEOPHYSICAL LTD. in July 1987

Dwg.No 5886-3



To Accompany Report By P.A.CARTWRIGHT, P.Geoph.

INSTRUMENT : V-3

ANOMALY CLASS : Definite
: Probable
: Possible

OUTLINE OF ANOMALOUS ZONES

1D INVERSION

Approved: PAC
Dec 15/87

MINNOVA, INC.

CONTROLLED SOURCE AUDIO MAGNETOTELLURIC SURVEY
STONEY CREEK PROPERTY, FORT STEELE M.D., B.C.
BASELINE AZIMUTH : 174 Deg.

SCALE = 1:25000
DATE : 12/15/87
SURVEY BY : MJC
NTS : 82G/4
FILE: MSTO
Dwg.No.: AMT-2010

Pacific Geophysical Ltd.

PART C

CSAMT CASE HISTORIES WITH A MULTI-CHANNEL CSAMT SYSTEM AND DISCUSSION OF NEAR-FIELD DATA CORRECTION

by

Mitsuru Yamashita, M.Sc.,

and

Philip G. Hallof, Ph.D.,

Paper presented at the
55th SEG Annual Convention
Washington, D.C.
October 1985

INTRODUCTION

The CSAMT method was introduced by Goldstein (1971) and Goldstein and Strangway (1975) to overcome problems encountered by the Audio Magnetotelluric (AMT) and Magnetotelluric (MT) methods.

The MT method is a well known exploration technique, used widely in hydrocarbon and geothermal exploration. MT measures fluctuations in the earth's natural electric and magnetic fields, in a broad range of frequencies between about .0001 Hz and 100 Hz. When the measurements are made in the audio-frequency range (10 Hz to 20 kHz) the method is known as Audio-frequency Magnetotellurics (AMT). Neither MT nor AMT requires a man-made power source. However, these advantages are often negated by the low magnitude and high variability of the natural signals.

The advantages of the controlled source method are several:

1. Signals are stronger, therefore the sensing equipment does not need to be as sensitive as that for MT or AMT.

2. Because of the coherent signal, the usual signal processing and enhancement technique are far more effective.

3. Thus CSAMT surveys can be much faster than AMT surveys.

One disadvantage with respect to the natural field mode is the nearness of the signal source. In the natural field methods, the signal source is, in effect, infinitely distant. This "plane wave" assumption simplifies both the mathematics of the technique and the interpretation of AMT/MT data. When a controlled source is used, the "plane wave" assumption is no longer true (at least not close to the transmitter), and the calculated apparent resistivity must be corrected for the "near-field" effect.

This system, fully utilizing the multi-channel, multi-frequency, microprocessor controlled instrumentation technology developed by Phoenix, results in rapid data acquisition as well as producing a CSAMT system that has improved further on the above CSAMT advantages.

SYSTEM CONCEPTS

i) . CSAMT Parameters Measured and Calculated

Both the electric field (E-field) and the magnetic field (H-field) are measured, at the frequency transmitted from the remote transmitter bipole source. The magnitudes of both the E-field and H-field are determined, as well as their relative phase. The measured data are digitally stacked, filtered and processed in real-time; the apparent resistivity is also calculated at each frequency. This calculation is made using the following Cagniard equation and the phase difference.

$$\rho_a \approx \frac{1}{5f} \left| \frac{E_x}{H_y} \right|^2 \quad ; \quad \phi = \phi_E - \phi_H \qquad (1)$$

The transmitter system is portable. Furthermore the transmitter system can be situated at one location to cover a large survey area. There are more powerful transmitter systems available from Phoenix for applications where portability is not the most important factor. Depending upon the frequency range required these systems can have a power output of 30 kva, up to 100 kva.

iv) Survey Configuration and Grid

Figure 1 illustrates the survey configuration and grid. The standard configuration performs Six (or Seven) Ex-field and One Hy-field measurements at each of 16 frequencies, (0.25 to 8192 Hz). As illustrated, the E-fields are measured with a dipole using non-polarizable electrodes, in the same way as for IP measurements. The survey traverse line, for the series of equally spaced E-dipoles, is parallel to the transmitter bipole. The measurement dipole length is determined by the desired scale of the survey; this may also be influenced by the E-field signal strength, which is in turn determined by the transmitter-receiver distance, the transmitter bipole current and the earth resistivity. The receiver dipole length may be in the range from 10 meters to 200 meters.

A horizontal magnetic sensor coil is placed on the ground, approximately at the centre of the series of E-dipoles. It must be placed several meters away from the E-dipole line and the receiver console, to avoid interference, as well as to reduce inductive coupling due to operator movement. Only one H-field measurement is required for each group of six E-field measurements; the justification for this will be discussed later.

The transmitter (powered by a suitable motor generator) sends current into a long wire, grounded bipole. The length of the bipole may be varied from several hundred meters to several km, depending upon signal strength requirement. This will also be discussed later, as will be the transmitter-receiver distance and the survey area to be covered with one transmitter bipole location.

CSAMT SIGNALS AND PARAMETERS

i) Field Strength

At a given receiver location, the field strength depends upon various factors: location of measuring point (relative to Tx bipole), transmitter bipole length, current in the bipole, earth resistivity and measuring frequency. It is important to know the approximate field strength to be expected, in order to plan the survey grid and to locate the transmitter properly, to give the optimum survey results.

Figure 2(a) and Figure 2(b) show examples of contours of the Hy-field strength and Ex-field strength at 1024 Hz, over a homogeneous earth of 1000 ohm-m, based on the parameters indicated in the diagram. The heavy dashed contours indicate the region beyond which the field strength becomes minimal in magnitude.

ii) Apparent Resistivity

Figure 4(a) shows Hy-field vs frequency over a homogeneous earth, for various resistivity and transmitter-receiver distance. The Hy-field can be expressed by the following equations:

$$\text{in "far-field"; } Hy \simeq \frac{1}{\sqrt{\sigma f} \cdot r^3} \qquad (2)$$

$$\text{in "near-field"; } Hy \simeq \frac{1}{r^2} \qquad (3)$$

where $\sigma = 1/\rho$ is conductivity in mhos/m.

Figure 4(b) shows Ex-field vs frequency in the same manner. The Ex-field can be expressed by the following equations:

$$\text{in "far-field"; } Ex \simeq \frac{1}{\sigma r^3} \qquad (4)$$

$$\text{in "near-field; } Ex \simeq \frac{1}{\sigma r^3} \qquad (5)$$

For "far-field", from the equation (2) and the equation (4);

$$\frac{Ex}{Hy} \approx \frac{\frac{1}{\sigma r^3}}{\frac{1}{\sqrt{\sigma f} \cdot r^3}} \approx \sqrt{\frac{f}{\sigma}}$$

therefore,

$$\rho_a \approx \frac{1}{f} \left| \frac{Ex}{Hy} \right|^2$$

introducing factor, $K_f/5$

$$\rho_a = \frac{K_f}{5 \cdot f} \left| \frac{Ex}{Hy} \right|^2 \qquad (6)$$

For "near-field", from the equation (3) and the equation (5),

$$\frac{Ex}{Hy} \sim \frac{\frac{1}{\sigma r^3}}{\frac{1}{r^2}} \approx \frac{1}{\sigma r}$$

therefore,

$$\rho_a \approx r \left| \frac{Ex}{Hy} \right|$$

geometries and several separations between the transmitter dipole and the measurement point. In these examples, the upper layer is more resistive than the lower layer.

In both examples the calculated Cagniard apparent resistivity for a measurement at a distance of 4.0 km has been corrected using the "near-field" correction program outlined above. In both examples, the corrected curve agrees exactly with the "plane-curve" or true Cagniard example.

The first order, "near- field" correction outlined above is not as perfect for the case in which the surface layer is more conductive than the lower layer. The theoretical results shown in Figure 4(g) are the near-field corrected data for one example. The corrected results are much closer in magnititude to the plane-wave data than the magnitudes that would be measured at four kilometers from the transmitter bipole. This type of data can be used by the geophysicist to give some feeling for the errors to be expected from the "near-field" corrected results.

DATA PROCESSING AND PRESENTATION

Survey data are measured, the parameters are calculated, stored in the RAM of the receiver unit and tranferred into permanent mass storage media (such as a cassette tape) at the end of each day, in the field base camp. The data can then be immediately processed by micro-computer. The field presentation of the results is in the form of a contoured apparent resistivity pseudosection plot or profile plot. Other parameters such as phase, or E and H field magnitude, can also be presented in the same form.

This immediate data processing and presentation permits the geophysicist to modify the survey plan and also to VERIFY DATA IN THE FIELD. A 1-D inversion program has also been developed for a micro-computer to use in the field base camp or in the office. Some examples will be shown in the discussions of specific case histories.

ADVANTAGES OF CSAMT AND PHOENIX SYSTEM

There is no geophysical exploration method and/or system that can be said to be superior to any other system and method, in respect of all situations. However, the following list describes some advantages of CSAMT in general, and of the Phoenix V-4 CSAMT system in particular.

1. Depth of detection.
   - The depth of detection in geophysical exploration is not easy to express in simple terms. It is related to many factors, such as earth resistivity, frequency, size of target, resistivity contrast, background electrical noise, geological noise and system sensitivity. The effective depth of penetration in CSAMT is a function of frequency and earth resistivity, and not the length of the receiver dipole or the distance between transmitter and receiver. The frequency range of 0.25Hz to 8192 Hz permits sounding depths that vary from very shallow to very deep. The effective depth of detection of CSAMT, therefore, may be several

line cutting beyond a survey area. This is not the case for CSAMT, because each station is essentially a point sounding. Fewer receiver dipole measurements are required to represent an anomaly and no extra line cutting is required.

8. Apparent resistivity measurements in real-time.
   With other EM techniques, it is generally necessary to do data processing and interpretation after a survey is completed, in order to calculate the resistivity of the conductor and the host media. CSAMT provides real-time calculation of apparent resistivity, which helps the geophysicist to understand the situation immediately, and permits him to re-configure the survey, if needed.

9. High productivity through simultaneous multi-station measurements.
   Six (or optionally seven) E-field measurements and one H-field measurement are made simultaneously. Resistivity changes are predominantly reflected by changes in the E-field magnitude. Only one H-field measurement, per group of E-measurements, is needed because the H-field is essentially constant over significant distances along a line parallel to the transmitter dipole, even in the vicinity of very strong conductive features. Although survey progress will be dependent upon the topography of an area, seven receiver set-ups can be easily performed in a field day. This produces data from forty two stations, with sixteen frequencies, from 0.25 Hz to 8192 Hz, at each station.

10. Wide frequency range.
    The wide frequency range from 0.25 Hz to 8192 Hz, in binary steps, provides very shallow to very deep soundings, thus making the interpretations, especially with inversion, more effective.

EXAMPLES OF FIELD RESULTS

The CSAMT Method has been found to be very useful for the mapping of subsurface resistivities. As we shall see, the method is particularly useful in locating, and mapping, relatively small zones, at considerable depth. However, the scale of any particular survey is determined solely by the length of the E-field dipole employed. In our work, this distance has ranged from 25 meters to 200 meters.

The "near-field" and "transition-field" correction procedures described above have been used in all of the examples to be discussed. Our impression is that this simple "first-order" correction to the data does, in fact, produce results that approximate those that would be measured in the true "plane-wave" situation.

i) Nighthawk Lake Grid, Timmins, Ontario, Canada

The Nighthawk Lake Grid is located near Timmins, Ontario, in a region where the surface is covered by approximately 100 meters of glacial, lake-bed sediments. The deposit, itself, is an approximately horizontal source of sulphide and graphite.

However, the more complex geometry has resulted in greater differences between the CSAMT inversions and the MT inversion.

iv) Abuta Mine, Hokkaido, Japan.

The Test Line at the Abuta Mine passed directly over the Kuruko-type ore deposit. The massive sulphide zone lies at a depth of 50 to 75 meters, the host rocks are relatively conductive, relatively young volcanics. The position of the sulphide zone, and the corrected CSAMT apparent resistivity pseudosection are shown in Figure 8. Even within the environment of the low resistivity host rocks, the position of the deep conductor is clearly defined. The lateral resolution of the CSAMT measurement is excellent.

v) McLean Lake Deposit. Athabaska Area, Saskatchewan.

The uranium deposits at McLean Lake lie beneath approximately 550 feet of the younger, Athabaska sandstones. The specific geologic situation for these uranium deposits is well known, due to the considerable amount of drilling that has taken place. The uranium and sulphide orebodies are concentrated in zones of intense fracturing and alteration that modify the porous regolith that lies at the top of the pre-Cambrian unconformity.

The regolith itself might be expected to have a higher conductivity than the overlying Athabaska sandstones, or the pre-Cambrian basement. The overbodies have a relatively small cross-section; however, they are conductive enough to have caused electromagnetic anomalies in some previous surveys. The corrected CSAMT results shown in Figure 9(a) were measured using an E-field dipole of 200 feet, at a distance of 7.2 km from the transmitter current bipole.

The apparent resistivity pseudosection indicates a subsurface structure that agrees very well with the known geology. A discontinuous, poorly defined conductor extends across the entire one mile length of the line surveyed; this almost certainly represents the conductive regolith. The McLean North Zone, Pod #1 is centered at 13+00N to 14+00N. The McLean South Zone, East Pod is centered at 8+00S to 7+00S.

The positions of the uranium ore bodies both correlate with moderate magnitude, definite, resistivity lows, on the pseudosection on Figure 9(a). The results shown on Figure 9(b) were measured using a 100 foot E-field dipole. The resistivity lows from the orebodies are still clearly defined, even at a depth of more than 500 feet.

In addition, there are several narrow, shallow, local zones of low apparent resistivity that were not clearly evident in the measurements with the 200 ft E-Field dipole.

The measurements on Line 12E, 100 foot E-field dipole, are shown in Figure 9(c). At this location four hundred feet to the east, the orebodies are poorly developed. The two zones are centered at 12+50N and 9+50S to 8+50S. The apparent resistivity anomalies that correlate

ACKNOWLEDGEMENT

The development of the Phoenix V-4, CSAMT System was funded, in part, by an Exploration Technology Development Fund Grant from the Ministry of Natural Resources of Ontario in 1984 and 1985. The authors thank the personnel of the Ontario Geological Survey for various advice and assistance. The survey data included is shown with the permission of Kyushu Electric Power Co., Nittetsu Mining Co., Minatco Limited and Ram Petroleum Ltd. We appreciate their assistance.

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Phoenix V4 - CSAMT System

Survey Configuration and Grid

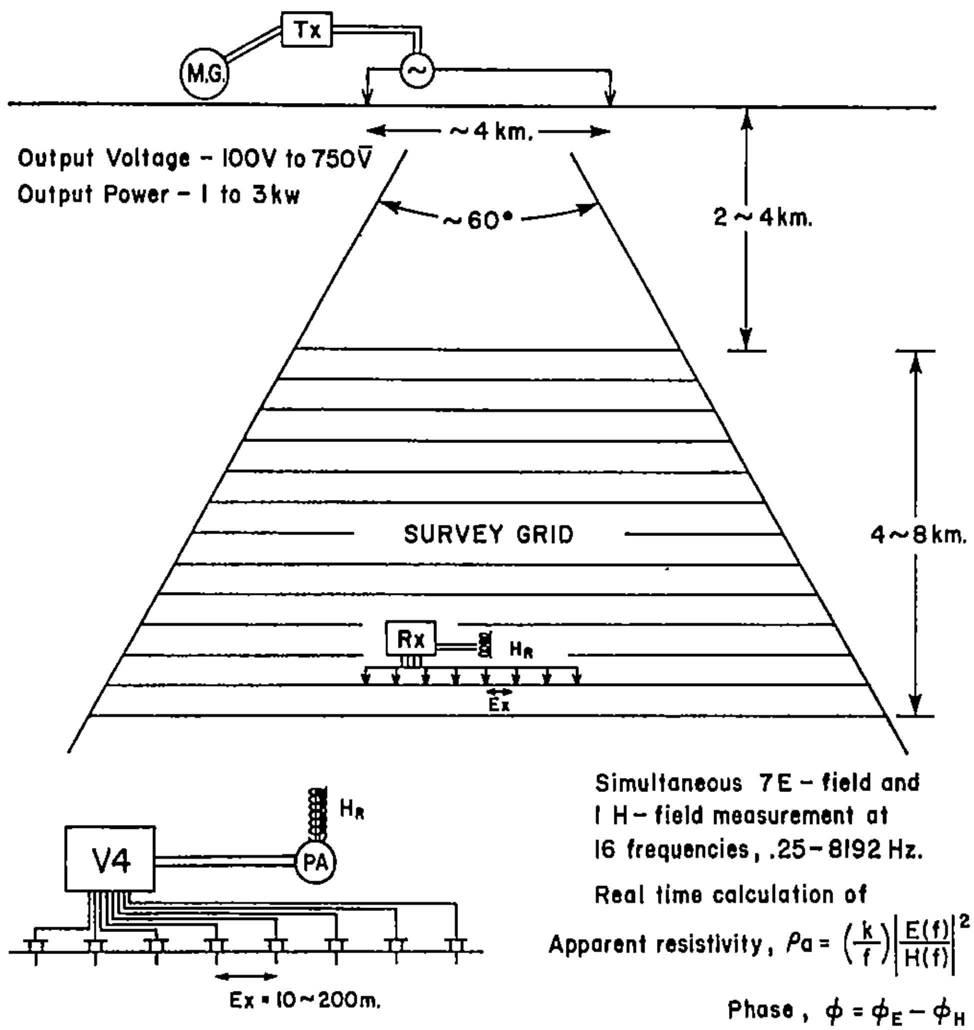
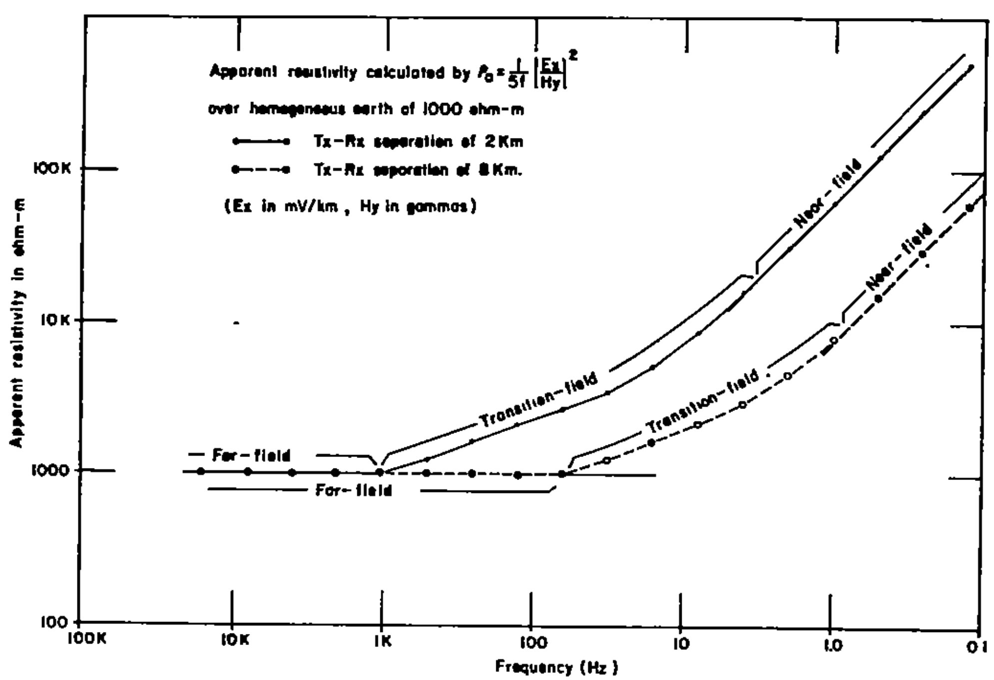


FIGURE 1

PROFILES FOR APPARENT RESISTIVITIES CALCULATED for UNIFORM EARTH EXAMPLES

(a) Apparent resistivity vs frequency calculated by Cagniard equation over homogeneous earth of 1000 ohm.



(b) Apparent resistivity vs frequency calculated using "near-field" equation over homogeneous earth of 1000 ohm.

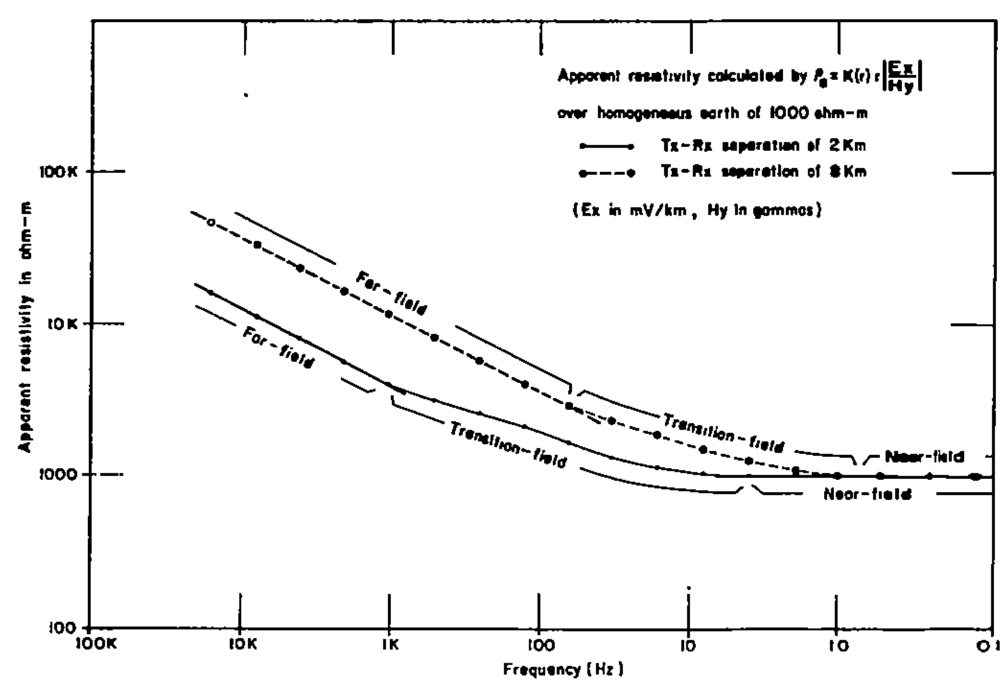
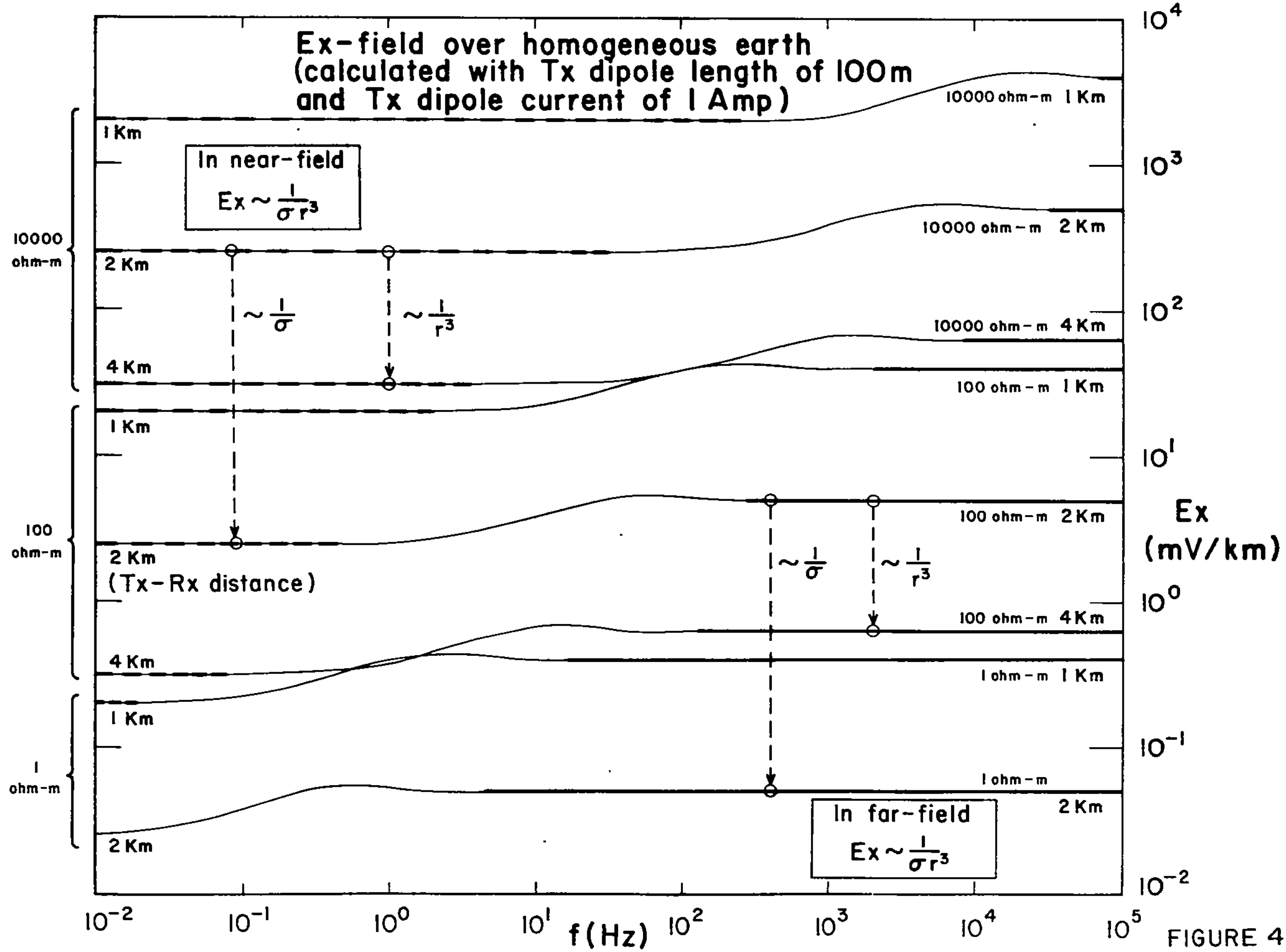
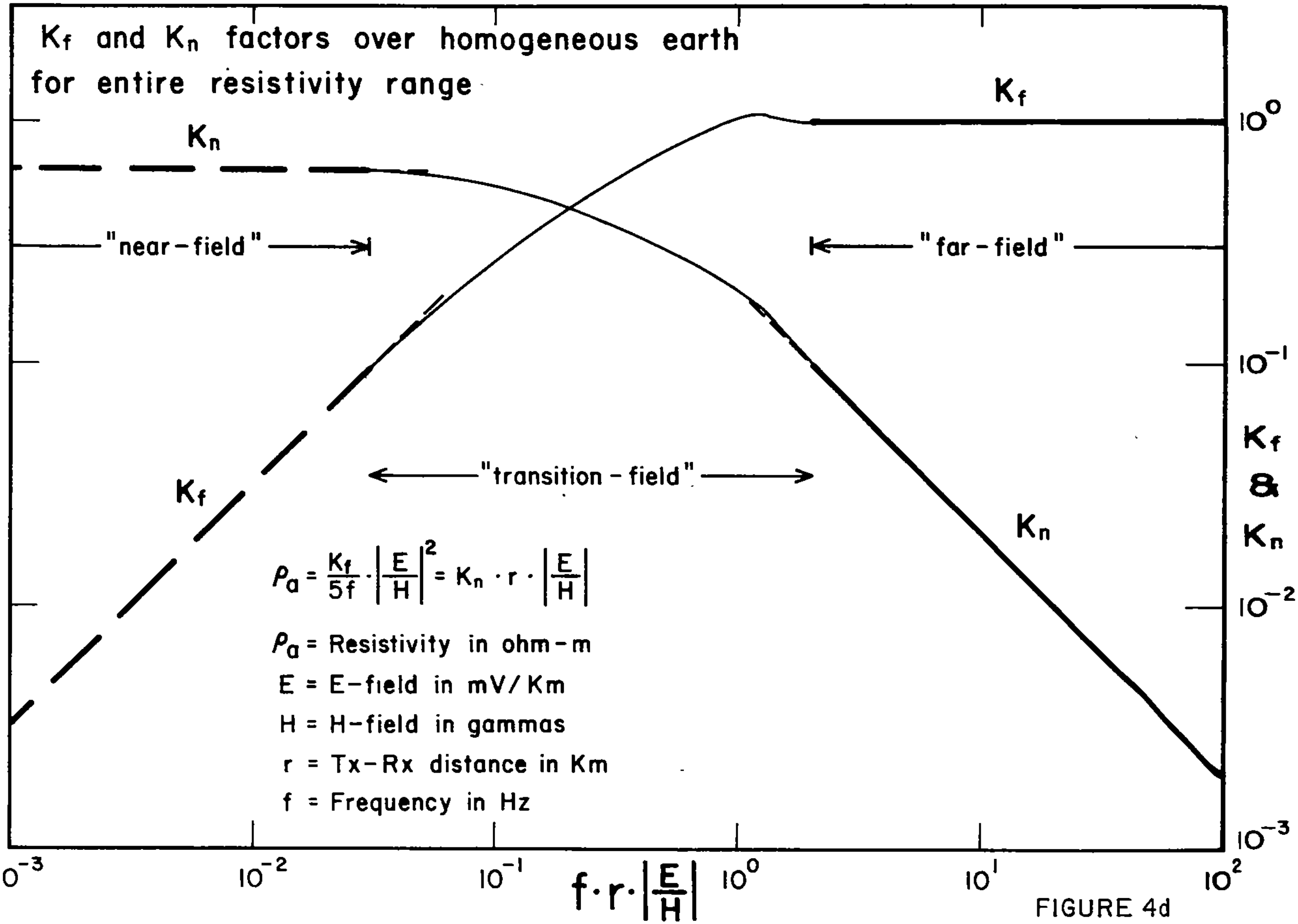


FIGURE 3



Ex-field over homogeneous earth
(calculated with Tx dipole length of 100m
and Tx dipole current of 1 Amp)
In near-field
$Ex \sim \frac{1}{\sigma r^3}$
In far-field
$Ex \sim \frac{1}{\sigma r^3}$
$\sim \frac{1}{\sigma}$
$\sim \frac{1}{r^3}$
10000 ohm-m 1 Km
10000 ohm-m 2 Km
10000 ohm-m 4 Km
100 ohm-m 1 Km
100 ohm-m 2 Km
100 ohm-m 4 Km
1 ohm-m 1 Km
1 ohm-m
2 Km
1 Km
2 Km
4 Km
(Tx-Rx distance)
10000 ohm-m
100 ohm-m
1 ohm-m
Ex (mV/km)
f (Hz)

FIGURE 4b



K_f and K_n factors over homogeneous earth for entire resistivity range
K_f
K_n
"near-field"
"far-field"
"transition-field"
K_f
K_n
$\rho_a = \frac{K_f}{5f} \cdot \left|\frac{E}{H}\right|^2 = K_n \cdot r \cdot \left|\frac{E}{H}\right|$
ρ_a = Resistivity in ohm-m
E = E-field in mV/Km
H = H-field in gammas
r = Tx-Rx distance in Km
f = Frequency in Hz
10^0
10^{-1}
10^{-2}
10^{-3}
K_f & K_n
10^{-3}
10^{-2}
10^{-1}
10^0
10^1
10^2
$f \cdot r \cdot \left|\frac{E}{H}\right|$

FIGURE 4d

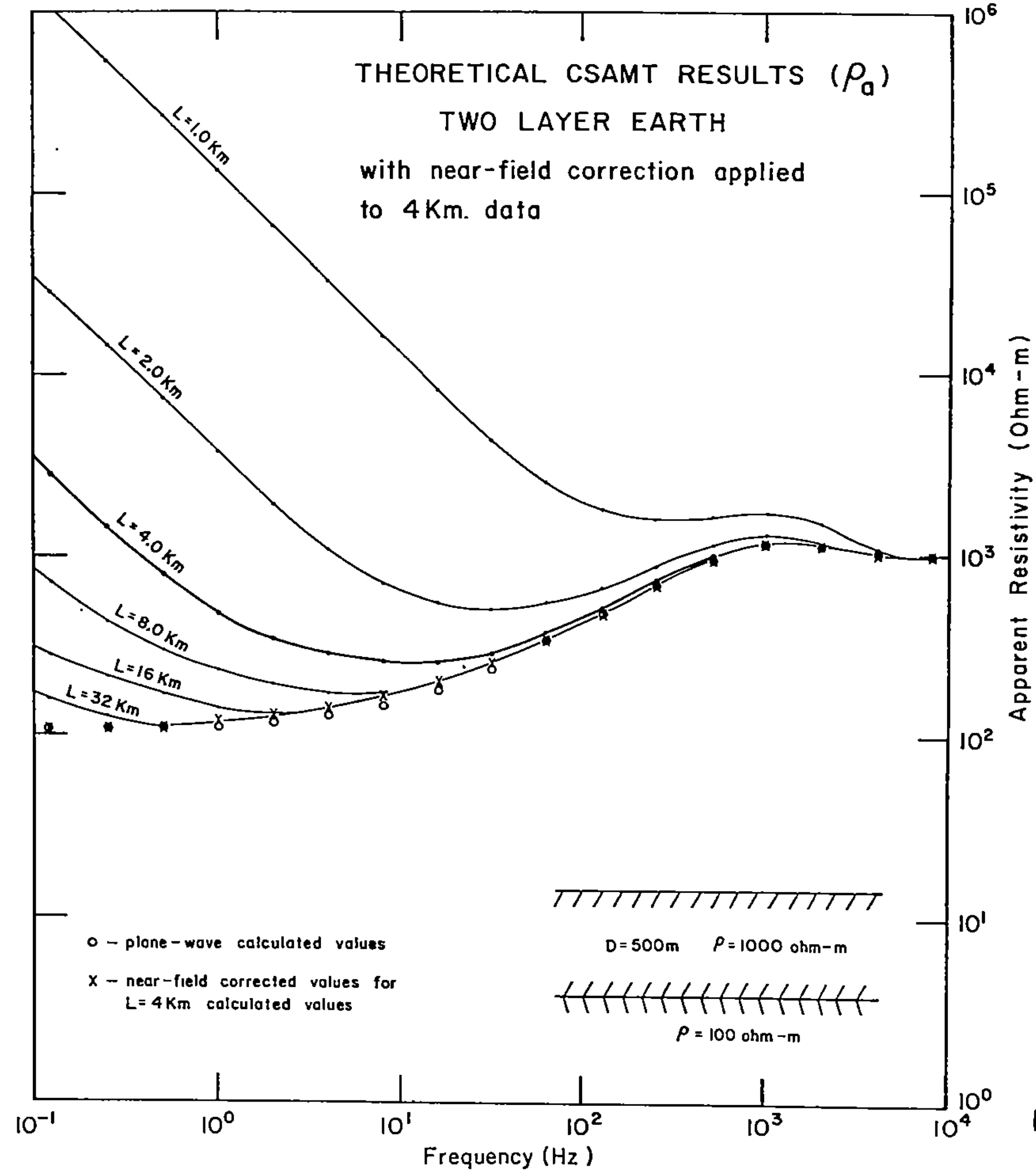

THEORETICAL CSAMT RESULTS (ρ_a)
TWO LAYER EARTH
with near-field correction applied
to 4 Km. data
L=1.0 Km
L=2.0 Km
L=4.0 Km
L=8.0 Km
L=16 Km
L=32 Km
o – plane-wave calculated values
X – near-field corrected values for
L=4 Km calculated values
D=500m
ρ=1000 ohm-m
ρ=100 ohm-m
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
Frequency (Hz)
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
10^{6}
Apparent Resistivity (Ohm-m)

FIGURE 4f

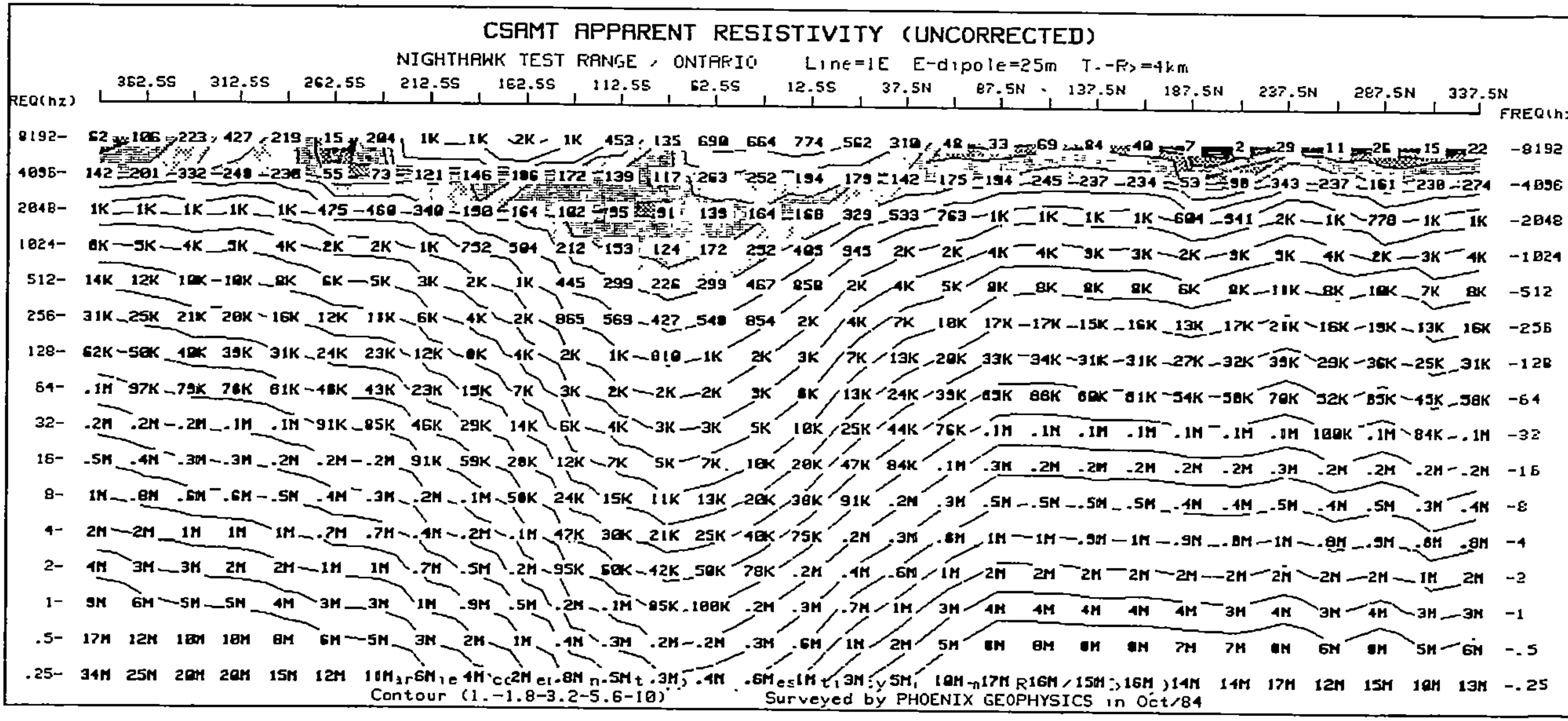
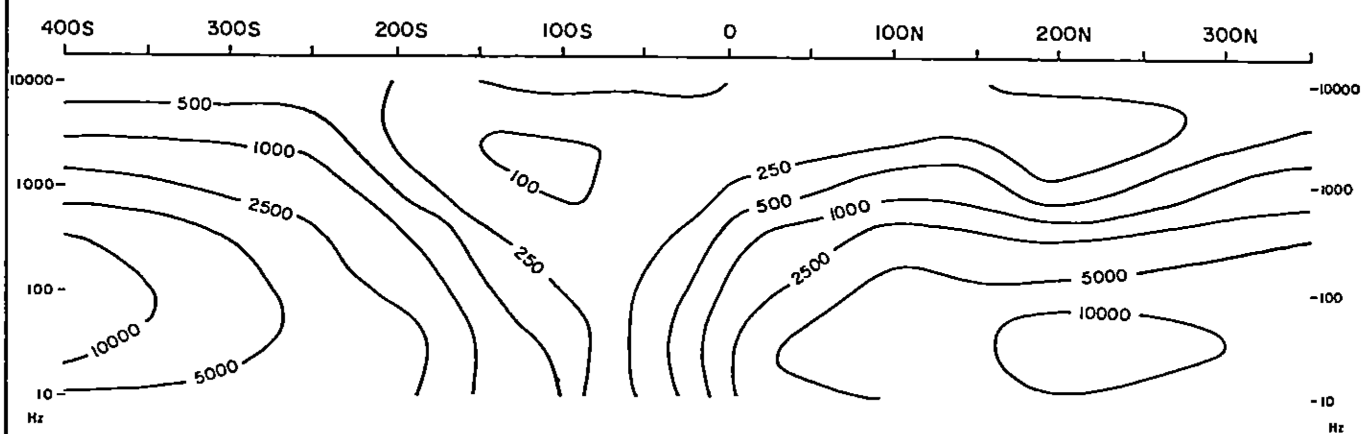

CSAMT APPARENT RESISTIVITY (UNCORRECTED)
NIGHTHAWK TEST RANGE , ONTARIO   Line=1E E-dipole=25m T.-R>=4km
362.5S 312.5S 262.5S 212.5S 162.5S 112.5S 62.5S 12.5S 37.5N 87.5N 137.5N 187.5N 237.5N 287.5N 337.5N
FREQ(hz)
8192 4096 2048 1024 512 256 128 64 32 16 8 4 2 1 .5 .25
Contour (1.-1.8-3.2-5.6-10)
Surveyed by PHOENIX GEOPHYSICS in Oct/84

FIGURE 5a

SCALAR AMT APPARENT RESISTIVITY RESULTS

NIGHTHAWK LAKE GRID LINE - 1E



taken from Strangway et al (1982-83)

FIGURE 5c

TRUE RESISTIVITY SECTION INTERPRETED
from CORRECTED CSAMT APPARENT RESISTIVITIES

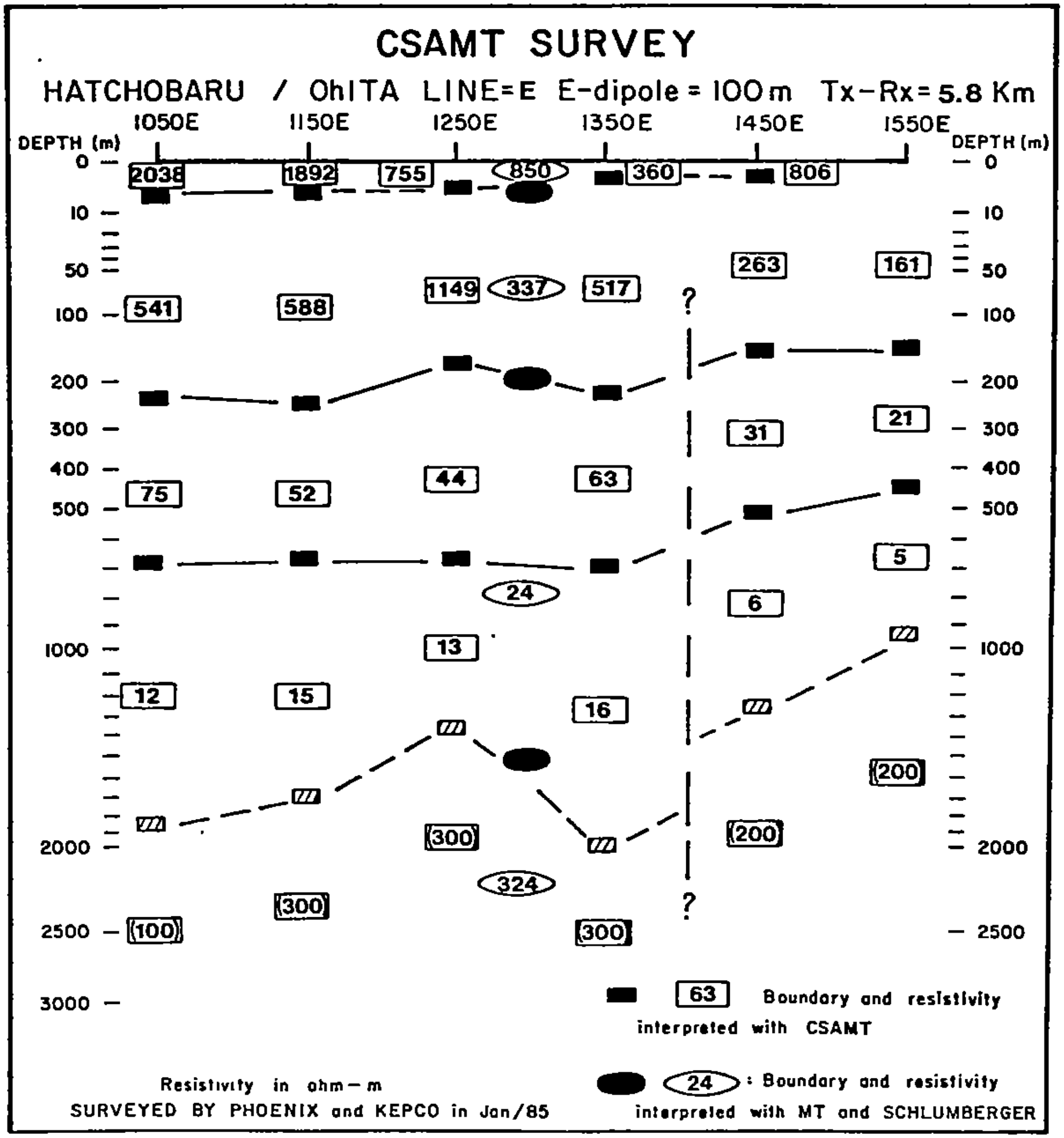


FIGURE 6b

TRUE RESISTIVITY SECTION INTERPRETED
from CORRECTED CSAMT APPARENT RESISTIVITIES

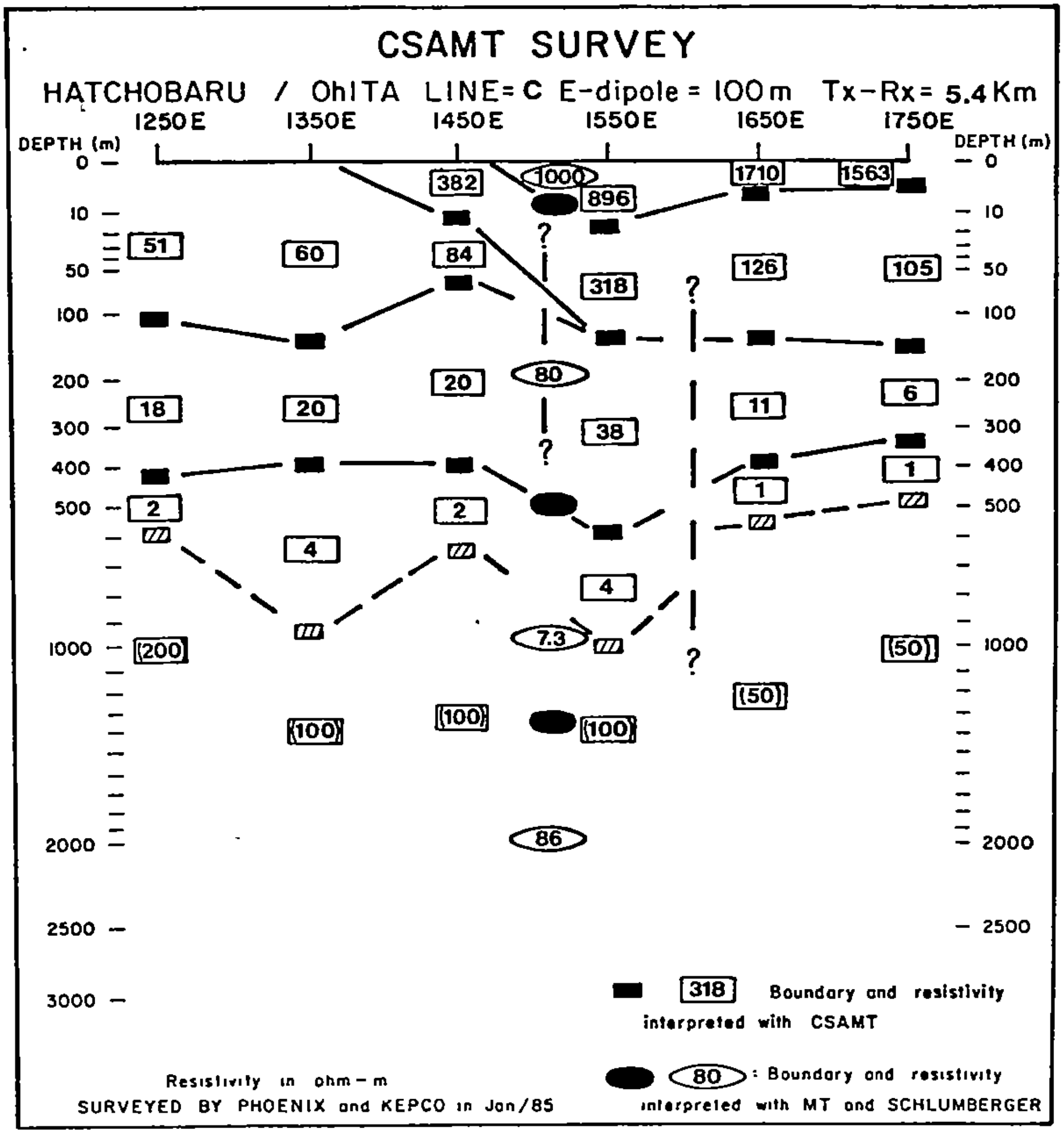
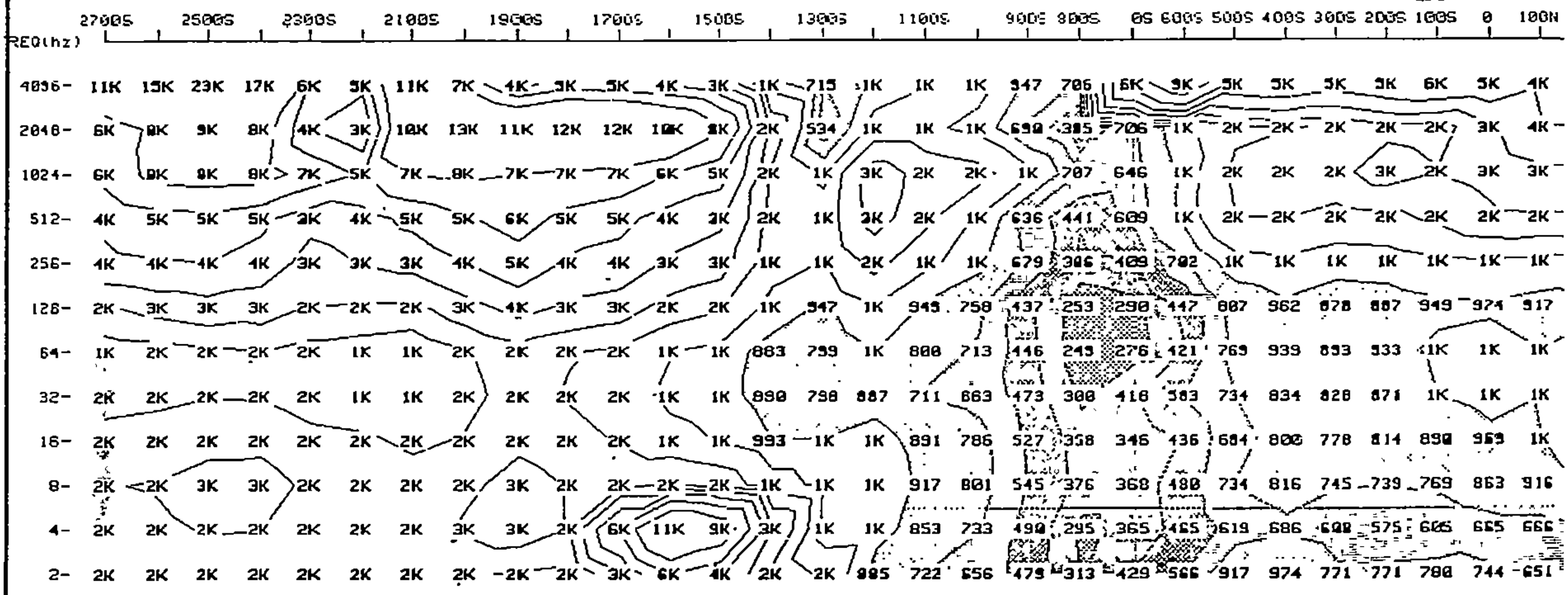


FIGURE 7b

CSAMT APPARENT RESISTIVITY (NEAR-FIELD CORRECTED)

WOLLASTON PROJECT LINE-108E E-dipole=200ft Tx-Rx=7.2km



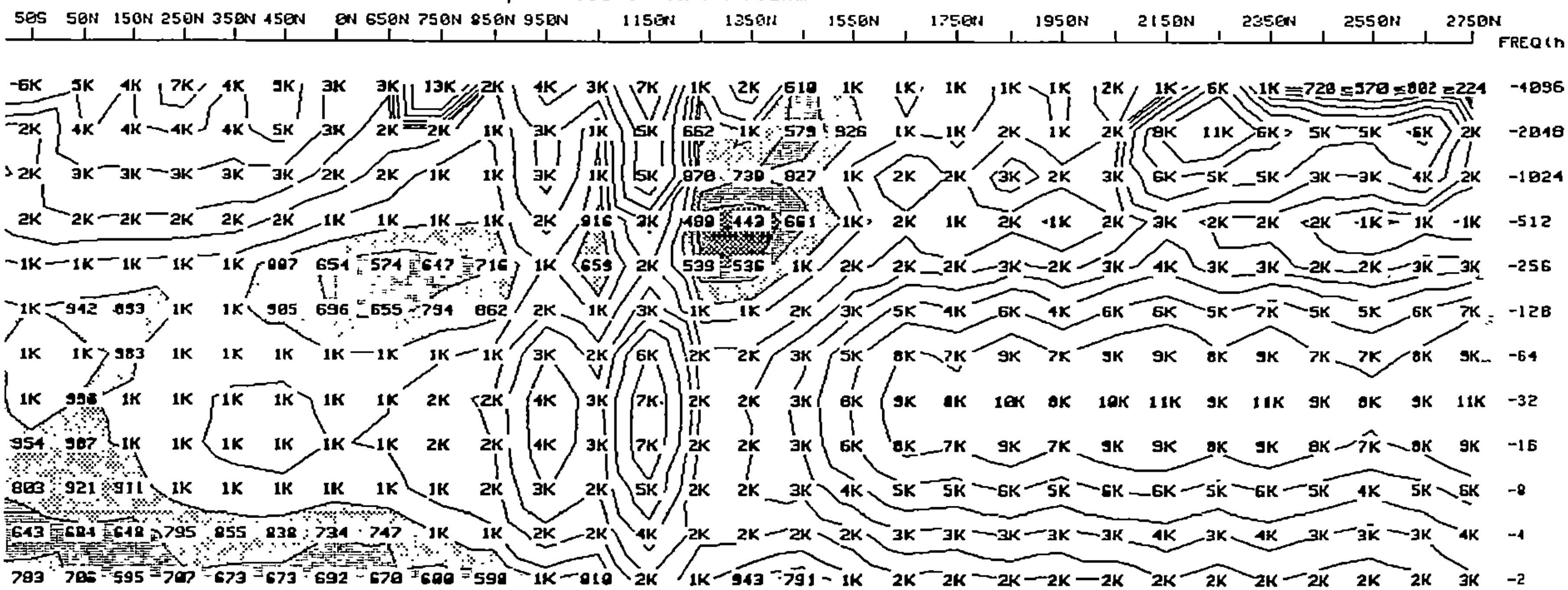
LINE - 108E SOUTH PORTION

Resistivity in ohm-m : Contour (1.-1.3-I
Surveyed by PHOENIX GEOPHYSICS and

FIGURE 9a-S

CSAMT APPARENT RESISTIVITY (NEAR-FIELD CORRECTED)

WOLLASTON PROJECT LINE-108E E-dipole=100ft Tx-Rx=7.2km



LINE - 108E NORTH PORTION

r (1.-1.3-1.8-2.4-3.2-4.2-5.6-7.3-10.)
HYSICS and MINATCO in July / 1985

FIGURE 9b-N

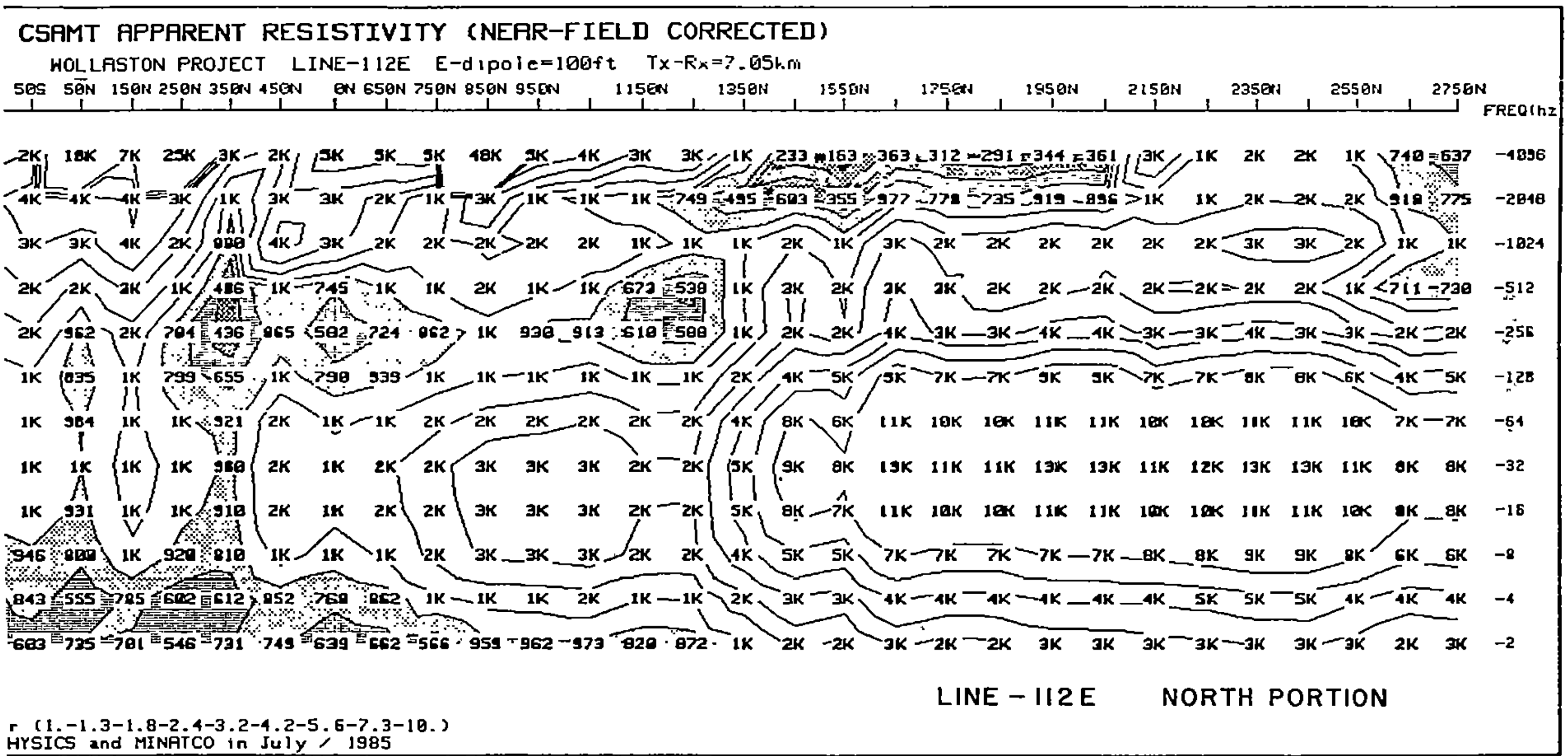
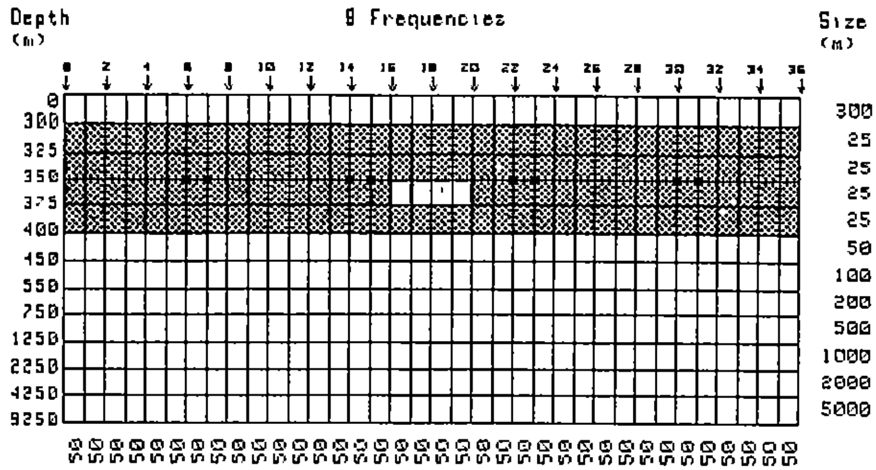

CSAMT APPARENT RESISTIVITY (NEAR-FIELD CORRECTED)
WOLLASTON PROJECT LINE-112E E-dipole=100ft Tx-Rx=7.05km
50S 50N 150N 250N 350N 450N 0N 650N 750N 850N 950N 1150N 1350N 1550N 1750N 1950N 2150N 2350N 2550N 2750N
FREQ(hz)
-4096 -2048 -1024 -512 -256 -128 -64 -32 -16 -8 -4 -2
LINE - 112E NORTH PORTION
r (1.-1.3-1.8-2.4-3.2-4.2-5.6-7.3-10.)
HYSICS and MINATCO in July / 1985

FIGURE 9c-N

PHOENIX GEOPHYSICS
2D FINITE ELEMENT
CSAMT MODELING



36 X 12 Mesh

ohm-m:	1000	300	20					
	0	1	2	3	4	5	6	7

Execution Time = 609 sec on HP9000-520 (one CPU) desktop computer

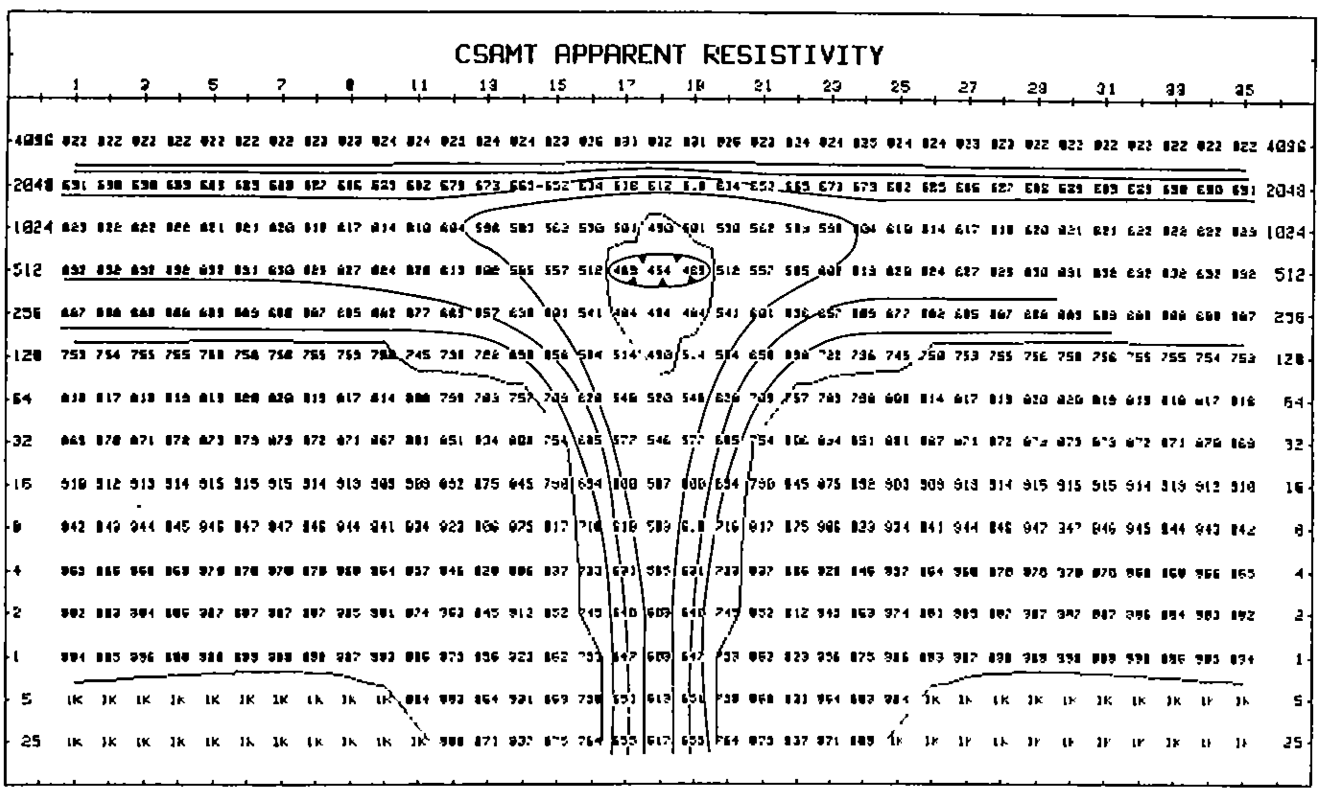


FIGURE 9d

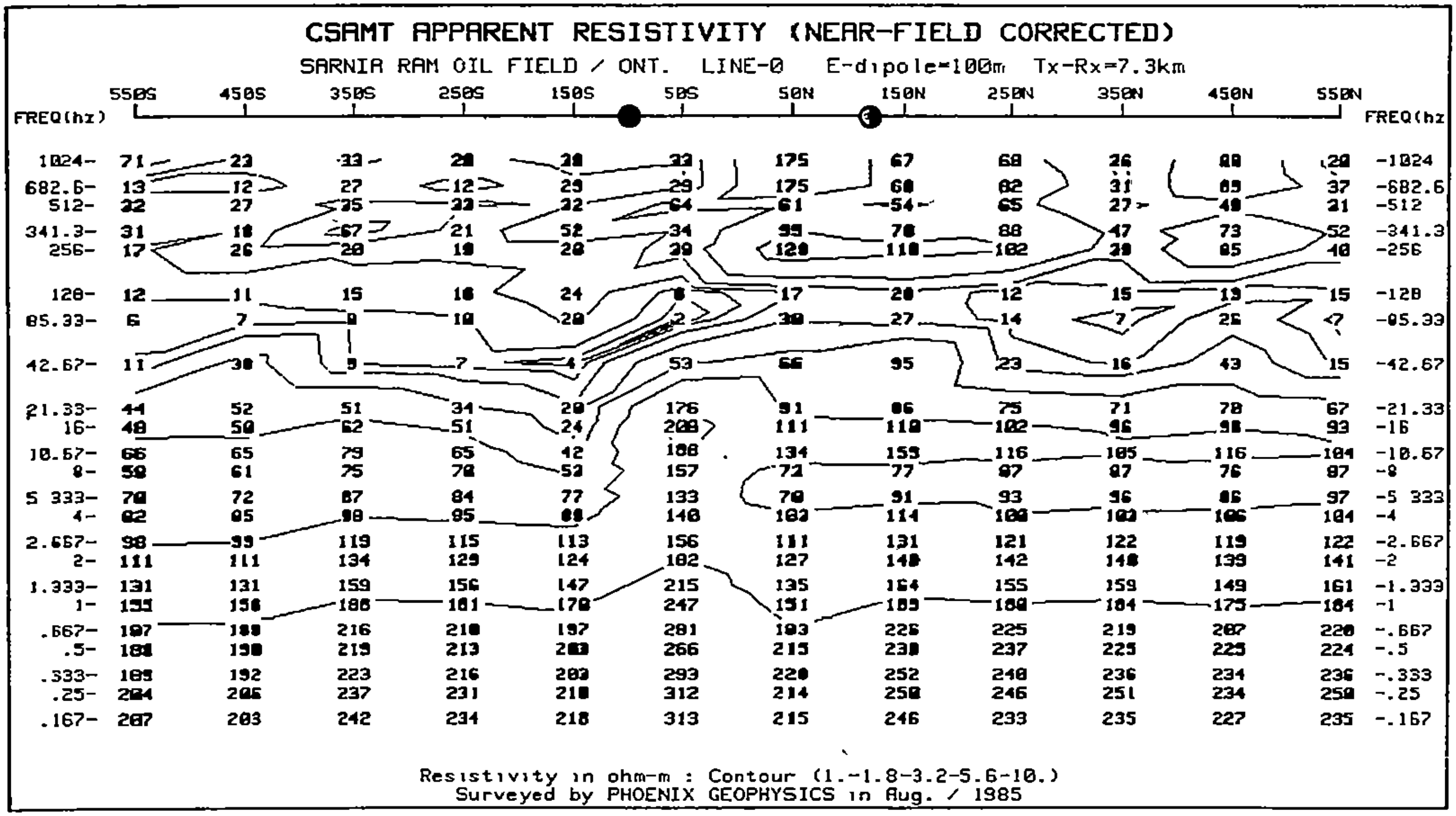

CSAMT APPARENT RESISTIVITY (NEAR-FIELD CORRECTED)
SARNIA RAM OIL FIELD / ONT. LINE-0 E-dipole=100m Tx-Rx=7.3km
550S
450S
350S
250S
150S
50S
50N
150N
250N
350N
450N
550N
FREQ(hz)
Resistivity in ohm-m : Contour (1.-1.8-3.2-5.6-10.)
Surveyed by PHOENIX GEOPHYSICS in Aug. / 1985

FIGURE 10b

APPENDIX 2

Lithogeochem & Assay Results

(VALUES IN PPM)	AG	AS	B	CU	PB	SB	ZN	AU-PPB	F	B-TOT
YK-87-000	1.0	8	3	227	11	1	40	5	200	36.7
YK-87-001	.7	6	1	4	4	1	17	10	230	28.6
YK-87-002	.8	1	2	8	3	1	30	5	300	45.8
YK-87-003	.7	1	4	11	6	1	19	5	625	108.3
YK-87-004	.7	1	4	7	8	1	31	5	450	30.6
YK-87-005	1.0	1	4	36	6	2	26	5	650	129.6
YK-87-006	.8	7	1	7	4	1	20	5	340	44.7
YK-87-007	1.0	2	5	19	6	1	40	5	925	40.3
YK-87-008	1.0	4	2	158	4	2	20	5	430	41.4
YK-87-009	.8	7	1	8	4	1	22	10	250	30.1
YK-87-010	1.3	11	8	21	10	1	61	5	610	85.6
YK-87-011	1.2	14	7	24	9	1	81	5	815	36.4
YK-87-012	1.1	24	15	75	3	1	33	5	145	41.3
YK-87-013	1.2	14	13	9	14	2	45	5	115	36.4
YK-87-014	1.6	1	14	47	4	1	43	5	350	48.4
YK-87-015	1.0	13	7	69	9	1	35	10	175	46.6
YK-87-016	.8	7	4	53	6	1	23	10	375	45.8
YK-87-017	.8	5	5	11	11	2	45	5	450	48.5
YK-87-018	1.3	11	9	118	6	1	27	10	515	33.6
YK-87-019	.7	1	1	4	5	1	23	5	220	25.5
YK-87-020	.9	3	4	27	9	1	40	10	240	32.6
YK-87-021	1.4	2	15	77	10	1	34	5	350	38.6
YK-87-022	1.3	19	15	6	18	2	53	5	230	35.2
YK-87-023	1.0	1	17	10	12	1	48	5	190	36.1
YK-87-024	.7	4	1	10	6	1	25	5	185	28.1
YK-87-025	1.1	13	14	76	10	2	35	5	190	27.3
YK-87-026	.9	2	12	100	4	1	32	10	190	38.0
YK-87-027	.8	6	9	68	5	2	22	5	235	46.4
YK-87-028	1.0	2	11	57	6	2	32	10	230	36.6
YK-87-040	1.2	15	12	28	12	2	86	5	1300	80.6
YK-87-041	.8	3	8	48	5	2	57	5	750	76.4
YK-87-042	.8	14	8	16	4	1	68	5	1250	95.5
YK-87-043	.8	9	8	13	4	2	62	10	865	113.8
YK-87-044	.5	4	1	110	4	2	8	5	280	32.4
YK-87-045	1.2	27	19	19	7	1	52	5	270	42.9
YK-87-046	1.0	11	4	78	5	2	29	5	355	48.8
YK-87-047	.7	5	2	7	7	1	21	5	210	39.7
YK-87-048	.8	6	7	10	5	1	72	5	840	86.5
YK-87-049	.8	4	6	13	4	2	56	10	800	70.9
YK-87-050	1.1	16	3	36	9	2	85	5	540	66.4
YK-87-051	.5	23	2	5	3	1	26	5	1390	168.7
YK-87-052	.8	7	3	18	8	1	53	5	785	62.2
YK-87-053	.9	11	5	34	9	1	58	5	725	57.4
YK-87-054	.8	4	3	15	7	1	49	5	590	41.0
YK-87-055	1.2	12	6	25	9	1	64	10	925	77.7
YK-87-056	.4	7	1	13	5	1	29	5	425	36.2
YK-87-057	.6	2	2	7	4	1	25	5	200	28.9
YK-87-058	.9	5	5	16	7	1	55	5	695	43.6
YK-87-059	.6	6	1	8	4	1	29	5	305	31.8
YK-87-060	.8	6	5	126	9	2	36	5	740	45.4
YK-87-061	.9	1	5	8	7	1	34	5	560	80.5
YK-87-062	1.0	14	7	20	4	1	46	10	560	49.1
YK-87-063	.6	1	2	11	5	1	17	5	390	57.3
YK-87-065	.8	4	3	7	5	1	21	5	450	46.1
YK-87-066	.8	9	2	11	6	1	26	5	480	44.4
YK-87-067	.9	1	4	9	8	1	164	5	470	38.0
YK-87-068	.8	5	3	5	8	1	29	10	385	50.0
YK-87-069	1.0	11	7	21	4	2	56	5	675	36.6
YK-87-070	.8	193	6	9	3	1	37	5	460	35.3
YK-87-071	1.0	2	6	13	8	1	52	5	700	32.9

COMPANY: MINNOVA INC. | MIN-EN LABS ICP REPORT | (ACT:616) PAGE 1 OF 1
PROJECT NO: 322 | 705 WEST 15TH ST., NORTH VANCOUVER, B.C. V7M 1T2 | FILE NO: 7-646R/P3+4
ATTENTION: | (604)980-5814 OR (604)988-4524 | * TYPE ROCK GEOCHEM * | DATE:JULY 13, 1987

(VALUES IN PPM)	AG	AS	B	CU	PB	SB	ZN	AU-PPB	F	B-TOT
YK-87-072	.4	6	2	8	5	1	42	5	500	43.7
YK-87-073	.7	3	1	3	5	1	24	5	260	80.0
YK-87-074	1.1	13	3	31	7	1	98	5	825	66.1
YK-87-075	1.1	7	8	7	12	1	114	5	900	43.6
YK-87-076	.8	15	2	7	8	1	83	10	470	47.9
YK-87-077	1.3	3	6	46	5	2	65	5	140	48.8
YK-87-078	1.1	3	6	62	11	2	39	10	180	46.7
YK-87-079	1.1	17	7	29	8	1	52	5	180	49.2
YK-87-080	.8	3	1	5	7	1	40	5	270	41.1
YK-87-081	1.0	20	6	22	7	1	60	5	810	95.6
YK-87-082	.7	5	1	35	9	1	55	5	1075	78.7
YK-87-083	.8	7	1	12	5	1	34	5	590	39.4
YK-87-084	.8	4	4	5	5	1	55	5	690	89.1
YK-87-085	1.5	2	6	167	4	1	22	5	300	38.7
YK-87-086	1.4	28	14	11	23	2	144	10	1850	90.1
YK-87-087	.9	4	2	4	10	1	54	5	600	51.9
YK-87-088	.6	8	1	5	5	1	43	5	590	51.2
YK-87-089	.6	4	1	7	6	1	33	5	265	33.6
YK-87-090	.6	4	1	4	5	1	58	5	495	49.2
YK-87-091	1.2	9	5	58	10	1	25	10	280	76.5
YK-87-092	1.6	5	7	106	6	2	21	5	235	50.9
YK-87-093	.8	7	7	8	7	2	36	10	575	146.4
YK-87-094	.8	12	6	15	11	2	48	5	900	118.7
YK-87-095	1.2	14	7	13	15	2	63	5	1365	127.4
YK-87-096	1.0	8	4	31	5	1	66	5	1250	91.2
YK-87-097	.9	1	5	24	9	1	73	5	790	47.6
YK-87-098	1.9	11	8	35	17	3	34	5	1475	44.0
YK-87-099	1.1	14	25	12	9	1	83	5	840	38.8
YK-87-100	.6	4	1	17	10	1	65	5	590	36.4
YK-87-101	.5	3	1	2	5	1	17	5	665	108.2
YK-87-102	.7	2	1	2	4	1	19	5	725	130.4

COMPANY: MINNOVA INC. MIN-EN LABS ICP REPORT (ACT:G16) PAGE 1 OF 1
PROJECT NO: 322 705 WEST 15TH ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE NO: 7-685R/P1+2
ATTENTION: (604)980-5814 OR (604)988-4524 * TYPE ROCK GEOCHEM * DATE:JULY 13, 1987

(VALUES IN PPM)	AG	AS	B	CU	PB	SB	ZN	AU-PPB	F	B-TOT
YK87-103	.3	7	3	24	11	1	83	5	475	31.2
YK87-104	.3	2	3	6	7	1	29	5	500	124.9
YK87-105	.6	7	3	22	11	2	70	5	500	54.0
YK87-106	.8	7	3	37	14	3	88	5	475	29.0
YK87-107	.3	10	3	10	11	1	21	10	175	24.0
YK87-108	.6	8	3	18	9	1	57	5	425	48.1
YK87-109	.9	8	3	13	5	2	63	5	500	61.2
YK87-110	.7	7	3	15	9	1	39	5	355	25.8
YK87-111	.6	5	3	12	5	1	41	5	550	53.4
YK87-112	1.0	9	3	22	12	1	69	5	375	41.1
YK87-113	.7	5	3	7	11	1	47	5	400	30.6
YK87-114	1.1	11	3	18	15	1	73	10	550	50.0
YK87-115	.5	9	4	4	7	1	28	5	410	72.0
YK87-116	.7	56	8	8	4	1	51	45	350	21.6
YK87-117	.7	9	3	16	7	2	62	5	430	40.1
YK87-118	.7	7	3	9	5	2	56	10	575	75.1
YK87-119	.8	9	3	8	9	1	73	5	525	29.9
YK87-120	.5	9	3	9	11	1	46	5	330	31.0
YK87-121	.8	11	3	5	27	1	48	5	350	38.0
YK87-122	.5	10	3	4	12	1	47	5	460	27.9
YK87-123	1.1	18	8	7	19	1	37	5	450	75.8
YK87-124	.9	10	7	7	8	1	12	10	725	110.7
YK87-125	.5	4	3	13	4	1	18	15	650	357.7
YK87-126	.7	10	3	8	8	1	9	5	420	44.2
YK87-127	.7	9	3	5	6	1	34	5	425	38.7
YK87-128	.4	8	3	12	12	1	24	5	415	32.2
YK87-129	.9	10	3	5	4	1	60	10	625	83.4
YK87-130	.8	10	7	9	19	1	41	5	675	45.2
YK87-131	.7	9	3	9	17	1	37	5	400	28.4
YK87-132	.5	7	3	6	18	1	36	5	355	35.0
YK87-133	.2	10	2	9	11	1	86	5	440	42.2
YK87-134	.3	7	2	162	10	1	25	10	350	39.3
YK87-135	1.1	8	2	70	11	2	35	5	280	40.6
YK87-136	1.4	11	2	43	8	2	45	5	295	36.2
YK87-137	.3	7	2	6	7	1	21	10	230	29.2
YK87-138	.2	8	2	14	6	1	29	5	375	34.8
YK87-139	.5	9	2	19	9	2	49	5	480	48.9
YK87-140	1.3	14	2	107	13	3	55	10	430	38.3
YK87-141	1.9	14	3	135	7	4	46	15	285	39.9
YK87-142	2.7	6	2	143	5	2	13	5	175	36.0
YK87-143	1.5	11	2	96	9	2	37	5	185	41.2
YK87-144	2.2	13	5	239	10	3	55	5	350	44.5
YK87-145	1.9	18	5	240	15	4	62	10	335	34.4
YK87-146	2.0	16	6	64	17	4	61	5	310	34.8
YK87-147	1.9	11	4	87	12	3	59	5	200	36.0
YK87-148	1.5	13	7	307	8	3	48	5	400	56.7
YK87-149	.9	13	4	95	5	2	51	5	180	44.6
YK87-150	.9	10	2	116	10	1	37	5	235	47.9
YK87-151	1.6	10	2	108	11	3	40	10	250	50.1

(VALUES IN PPM)	AG	AS	B	CU	PB	SB	ZN	AU-PPB	F	B-TOT
YK87-029	.5	9	11	3	6	1	57	5	800	82.0
YK87-030	.3	3	9	2	20	1	28	5	550	1291.0
)-031	.3	5	5	3	3	1	9	10	320	421.9
YK87-032	.9	8	10	6	3	1	46	5	375	261.8
YK87-033	.6	5	9	4	6	1	61	5	420	62.7
YK87-034	.3	4	2	5	19	1	29	10	325	36.8
YK87-035	1.0	11	12	98	8	2	59	5	560	57.3
YK87-036	.5	5	4	3	3	1	6	5	700	316.9
YK87-037	.4	4	1	4	4	1	9	5	425	31.0
YK87-038	.7	8	4	8	4	1	28	5	425	33.8
YK87-039	1.8	11	13	108	9	2	34	5	480	49.2
YK87-152	.7	7	5	16	7	1	29	5	375	32.5
YK87-153	.7	6	6	7	28	1	37	10	600	48.2
YK87-154	1.4	13	14	51	12	3	114	5	1450	75.6
YK87-155	1.0	13	15	14	8	3	76	5	1425	90.6
YK87-156	.5	9	8	9	8	1	52	5	675	65.4
YK87-157	.8	8	11	13	10	2	58	5	775	91.3
YK87-158	1.1	10	19	4	5	1	67	5	1350	58.4
YK87-159	1.1	15	17	29	11	2	88	5	1650	47.5
YK87-160	1.0	14	13	16	6	2	66	10	1850	78.7
YK87-161	.8	12	10	13	6	2	42	5	700	62.4
YK87-162	.7	8	6	12	8	1	35	5	850	50.1
YK87-163	.9	8	9	13	7	2	48	5	625	70.9
YK87-164	.5	6	5	7	7	1	24	10	850	68.5
YK87-165	.7	9	5	7	6	1	29	5	725	54.0
YK87-166	.8	10	3	5	20	1	38	5	625	34.6
YK87-167	.6	8	3	7	6	1	31	10	675	35.6
)-168	.6	8	2	3	15	1	40	5	465	32.2
YK87-169	.7	8	3	4	33	1	82	5	625	40.2
YK87-170	.9	12	8	17	6	1	75	5	1000	73.9
YK87-171	.4	8	4	11	13	1	44	5	500	26.0
YK87-172	1.0	6	6	109	6	1	28	5	300	37.3
YK87-173	1.6	12	9	104	8	3	38	5	375	46.2
YK87-174	1.7	6	6	109	5	1	9	5	365	37.2
YK87-175	1.8	12	10	141	7	2	38	10	295	43.3
YK87-176	1.6	10	9	143	6	1	41	5	315	32.0
YK87-177	1.6	13	8	105	8	2	37	5	325	42.5
YK87-178	1.6	11	11	199	12	3	47	5	220	38.0
YK87-179	1.8	13	13	153	13	2	51	5	375	20.5

COMPANY: MINNOVA INC. MIN-EN LABS ICP REPORT (ACT:616) PAGE 1 OF 1
PROJECT NO: 322 705 WEST 15TH ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE NO: 7-756/P1+2
ATTENTION: (604)980-5814 OR (604)988-4524 * TYPE ROCK GEOCHEM * DATE:JULY 20, 1987

(VALUES IN PPM)	AG	AS	B	CU	PB	SB	ZN	AU-PPB	F	B-TOT
YK87-180	.2	5	9	10	8	1	31	5	525	102.1
YK87-181	.3	8	2	3	28	1	43	5	215	34.0
YK87-182	1.0	8	13	16	12	4	89	10	310	44.5
YK87-183	1.6	9	14	48	10	4	104	5	315	38.1
YK87-184	1.2	6	11	15	9	4	77	5	185	35.0
YK87-185	1.1	11	7	60	9	1	41	10	195	44.0
YK87-186	1.1	8	7	153	6	2	38	5	185	43.1
YK87-187	1.5	7	13	6	11	4	83	5	250	33.5
YK87-188	.6	8	11	14	5	2	50	5	1050	91.0
YK87-189	.3	4	5	3	5	1	21	5	465	68.0
YK87-190	.6	8	6	3	3	1	26	5	625	109.4
YK87-191	.5	5	5	4	6	1	28	5	460	52.9
YK87-192	.2	7	2	7	4	1	13	5	265	35.2
YK87-193	.2	7	3	5	4	1	15	10	350	49.2
YK87-194	.6	9	6	11	8	1	34	5	360	32.3
YK87-195	.5	7	6	9	6	1	37	5	480	25.8
YK87-196	.6	8	9	9	4	2	50	5	550	31.8
YK87-197	.7	9	7	10	4	1	26	5	275	17.3
YK87-198	1.7	10	10	69	11	2	44	5	320	41.9
YK87-199	.4	7	3	5	20	1	17	5	190	27.9
YK87-200	.1	5	1	3	9	1	15	5	165	31.8
YK87-201	.6	9	9	6	9	1	60	5	600	89.4
YK87-202	.3	5	2	4	5	1	21	10	270	27.5
YK87-203	.3	6	6	6	7	2	48	5	415	41.8
YK87-204	.5	5	5	7	5	1	41	5	385	38.8
YK87-205	.4	6	1	5	6	1	17	5	200	18.6
YK87-206	.6	8	7	7	7	1	54	5	415	71.4
YK87-207	.4	8	3	5	7	1	27	10	265	23.3
YK87-208	.5	8	3	5	6	1	29	10	285	38.1
YK87-209	.5	19	20	65	8	3	29	5	200	42.3
YK87-210	.4	9	4	100	8	1	27	5	310	43.7
YK87-211	.8	9	8	11	10	2	36	5	245	37.5
YK87-212	.8	11	17	105	10	3	23	5	165	49.5
YK87-213	.2	7	5	10	3	1	31	5	310	48.4
YK87-214	.6	11	5	12	10	2	62	5	550	41.0
YK87-215	.7	8	7	8	11	2	60	10	575	60.1
YK87-216	.5	6	6	10	18	1	64	5	460	50.0
YK87-217	.6	7	7	5	9	2	34	5	625	93.1
YK87-218	.6	6	5	12	9	2	33	5	625	63.0
YK87-219	.2	3	2	4	15	1	34	5	300	26.4

COMPANY: MINNOVA INC. | MIN-EN LABS ICP REPORT | (ACT:L126) PAGE 1 OF 1

PROJECT NO: 322 | 705 WEST 15TH ST., NORTH VANCOUVER, B.C. V7M 1T2 | FILE NO: 7-646/P1+2

ATTENTION: | (604)980-5814 OR (604)988-4524 | * TYPE ROCK GEOCHEM * | DATE: JULY 3, 1987

(VALUES IN %)	AL2O3	BA	CAO	FE2O3	K2O	MGO	MNO2	NA2O	SIO2	SR	TIO2	ZR	TOT(%)
YK-87-000	12.63	.027	9.23	18.39	.55	5.11	.38	2.00	46.98	.02	1.95	.005	97.28
YK-87-001	5.18	.009	.04	1.80	.60	.27	.04	1.75	87.94	.01	.25	.030	97.91
YK-87-002	9.38	.027	.26	2.75	1.45	.48	.06	2.78	80.57	.01	.34	.032	98.14
YK-87-003	20.10	.101	.18	3.75	5.80	.85	.07	1.59	64.81	.02	.78	.028	98.08
YK-87-004	8.09	.012	.56	2.96	1.11	.62	.08	2.36	81.91	.02	.34	.024	98.08
YK-87-005	17.01	.080	.11	4.28	5.24	.86	.06	.72	69.09	.01	.67	.023	98.14
YK-87-006	11.42	.038	.04	2.25	2.27	.49	.04	2.33	78.64	.01	.44	.020	97.98
YK-87-007	11.13	.025	1.58	3.08	1.54	1.08	.10	2.61	76.22	.03	.43	.018	97.84
YK-87-008	10.56	.041	.05	3.16	2.48	.55	.04	1.69	78.59	.01	.40	.017	98.00
YK-87-009	7.95	.024	.05	1.95	1.22	.43	.05	1.81	84.16	.01	.35	.020	98.02
YK-87-010	17.74	.065	.05	5.60	4.47	1.47	.07	1.44	66.50	.01	.70	.017	98.14
YK-87-011	10.34	.020	.69	5.17	1.92	1.44	.08	2.13	75.87	.02	.37	.014	98.07
YK-87-012	15.74	.006	11.67	9.62	.32	8.09	.24	1.37	49.98	.02	.71	.005	97.77
YK-87-013	14.13	.005	10.66	9.81	.26	7.46	.26	1.32	53.28	.02	.61	.005	97.81
YK-87-014	15.91	.014	10.94	9.34	.89	9.44	.25	1.45	48.95	.01	.59	.005	97.80
YK-87-015	14.79	.011	10.54	10.72	.77	8.12	.27	1.45	50.36	.02	.73	.005	97.77
YK-87-016	15.55	.036	9.10	10.26	2.63	7.99	.28	1.34	50.00	.02	.70	.005	97.91
YK-87-017	11.49	.038	1.08	3.74	2.16	.87	.09	2.40	75.77	.02	.46	.033	98.16
YK-87-018	14.48	.017	10.55	11.39	.43	7.95	.27	1.74	50.06	.02	.86	.005	97.79
YK-87-019	7.60	.023	.11	1.82	.98	.42	.05	2.36	84.44	.01	.33	.029	98.18
YK-87-020	11.53	.033	.17	2.49	1.29	.71	.05	3.68	77.69	.01	.44	.017	98.21
YK-87-021	14.92	.014	11.40	10.45	.44	8.04	.25	1.44	50.12	.02	.76	.005	97.86
YK-87-022	16.81	.020	9.44	11.81	.80	8.59	.28	1.46	47.95	.02	.68	.005	97.86
YK-87-023	15.83	.017	10.92	10.06	.67	8.41	.25	1.27	49.72	.02	.66	.005	97.83
YK-87-024	10.16	.076	.67	2.65	2.25	.72	.04	1.52	79.56	.01	.42	.018	98.10
YK-87-025	14.77	.009	11.44	10.30	.35	8.06	.26	1.27	50.59	.01	.72	.005	97.79
YK-87-026	14.86	.006	11.53	10.52	.26	7.87	.26	1.43	50.26	.02	.77	.005	97.79
YK-87-027	15.56	.019	9.32	10.36	1.26	8.05	.27	2.00	50.27	.02	.75	.005	97.89
YK-87-028	15.02	.009	11.05	9.51	.40	8.68	.24	1.47	50.73	.02	.66	.005	97.78
YK-87-040	15.12	.072	2.43	3.95	3.92	4.02	.10	1.92	65.96	.02	.55	.022	98.07
YK-87-041	15.81	.078	.83	5.48	3.90	1.88	.06	2.20	67.21	.03	.60	.018	98.09
YK-87-042	17.84	.081	.04	5.73	5.96	2.31	.07	.56	64.81	.01	.71	.019	98.14
YK-87-043	16.02	.063	.07	5.58	5.05	1.90	.06	1.05	67.64	.01	.63	.019	98.09
YK-87-044	7.87	.029	.20	1.81	1.27	.26	.03	1.74	84.36	.01	.33	.019	97.93
YK-87-045	15.39	.005	11.47	9.35	.13	9.08	.25	1.32	49.47	.02	.60	.005	97.70
YK-87-046	14.30	.009	9.16	11.94	.43	6.92	.30	2.51	51.12	.02	1.02	.005	97.72
YK-87-047	7.66	.041	.26	2.06	1.47	.62	.03	2.29	83.15	.01	.30	.026	97.92
YK-87-048	18.65	.073	.05	5.51	5.44	1.54	.07	.84	65.12	.01	.69	.019	98.01
YK-87-049	16.21	.062	.09	4.77	4.40	1.44	.07	.94	70.32	.01	.62	.020	98.98
YK-87-050	16.14	.073	1.23	4.70	4.76	2.40	.14	.96	67.14	.02	.59	.025	98.18
YK-87-051	29.48	.162	.06	3.24	8.18	.93	.08	2.37	51.96	.02	1.22	.040	97.74
YK-87-052	14.77	.065	.07	4.21	4.18	1.01	.06	1.43	71.72	.01	.56	.023	98.11
YK-87-053	12.49	.047	.04	4.60	3.23	1.04	.05	1.70	74.35	.01	.48	.016	98.05
YK-87-054	10.38	.031	.36	3.31	2.09	.83	.05	2.07	78.35	.02	.45	.029	97.98
YK-87-055	16.87	.078	.05	4.87	4.78	1.07	.05	1.39	69.23	.01	.65	.022	98.08
YK-87-056	9.78	.032	.29	2.31	1.63	.58	.07	2.18	80.82	.02	.34	.024	98.09
YK-87-057	6.53	.013	.03	1.86	.69	.37	.04	1.74	86.16	.01	.43	.072	97.94
YK-87-058	10.49	.027	.43	4.41	2.22	1.02	.06	2.21	76.87	.02	.40	.017	98.18
YK-87-059	8.09	.044	.13	2.34	1.20	.52	.06	2.05	83.05	.01	.33	.027	97.85
YK-87-060	9.44	.044	.03	4.75	3.07	.74	.05	.19	79.29	.01	.35	.013	97.97
YK-87-061	10.49	.046	.01	4.03	3.26	.65	.01	.13	78.96	.01	.46	.031	98.07
YK-87-062	10.61	.035	1.47	4.01	2.58	.71	.17	.46	77.50	.01	.40	.018	97.98
YK-87-063	10.71	.057	.24	2.03	3.73	.49	.06	.17	79.95	.01	.52	.040	98.01
YK-87-065	10.68	.050	.67	2.25	3.11	.62	.07	1.14	78.78	.01	.45	.022	98.05
YK-87-066	11.39	.040	.54	2.97	3.03	.70	.08	1.34	77.19	.01	.47	.021	98.01
YK-87-067	9.62	.017	1.06	3.03	1.23	.62	.11	2.75	78.96	.02	.41	.044	98.07
YK-87-068	9.59	.023	.39	2.55	1.48	.67	.08	2.90	79.33	.02	.52	.047	97.99
YK-87-069	10.07	.017	1.82	4.18	1.71	1.36	.15	2.15	76.11	.02	.43	.029	98.07
YK-87-070	6.59	.012	.55	3.11	1.17	.80	.05	2.73	80.61	.03	.32	.020	97.98

COMPANY: MINNOVA INC. MIN-EN LABS ICP REPORT (ACT:LI26) PAGE 1 OF 1
PROJECT NO: 322 705 WEST 15TH ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE NO: 7-646/P3+4
ATTENTION: (604)980-5814 OR (604)988-4524 * TYPE ROCK GEOCHEM * DATE:JULY 3, 1987

(VALUES IN %)	AL2O3	BA	CAO	FE2O3	K2O	MGO	MNO2	NA2O	SIO2	SR	TIO2	ZR	TOT(%)
YK-87-072	10.16	.026	.44	3.00	1.76	.71	.07	2.72	78.78	.02	.42	.023	98.13
YK-87-073	13.12	.055	.24	2.59	3.76	.74	.05	1.20	75.82	.01	.46	.016	98.06
YK-87-074	12.47	.037	.47	4.75	2.80	1.24	.08	2.67	73.15	.02	.45	.017	98.15
YK-87-075	11.17	.025	.52	6.06	2.42	1.75	.10	2.04	73.57	.02	.42	.019	98.10
YK-87-076	10.06	.019	.71	4.91	1.92	1.17	.07	2.14	76.60	.02	.39	.020	98.02
YK-87-077	14.50	.006	8.81	10.95	.50	8.13	.25	2.11	51.61	.02	.81	.005	97.71
YK-87-078	15.22	.009	10.32	9.91	.54	7.98	.26	1.96	50.73	.01	.78	.005	97.74
YK-87-079	14.94	.016	8.21	10.62	.83	8.58	.27	1.83	51.72	.01	.73	.005	97.76
YK-87-080	10.15	.015	1.42	2.96	.91	.61	.16	2.66	78.79	.02	.42	.020	98.14
YK-87-081	19.88	.089	.06	5.87	5.96	1.58	.07	1.72	62.06	.02	.76	.020	98.08
YK-87-082	14.84	.069	.12	3.04	4.40	1.24	.04	1.21	72.49	.01	.61	.022	98.08
YK-87-083	10.50	.031	.60	3.07	2.01	.90	.05	1.88	78.54	.02	.40	.008	98.00
YK-87-084	18.76	.083	.09	4.98	5.60	1.38	.07	1.68	64.70	.01	.74	.024	98.15
YK-87-085	13.87	.019	9.48	12.74	.56	5.99	.26	1.98	51.46	.02	1.30	.007	97.69
YK-87-086	16.00	.060	.73	7.45	4.60	4.25	.19	1.81	62.24	.02	.61	.029	97.97
YK-87-087	11.35	.042	.10	3.39	2.89	.86	.05	1.57	77.44	.01	.43	.019	98.15
YK-87-088	13.31	.048	.31	3.37	3.06	.84	.06	1.92	74.64	.01	.49	.021	98.09
YK-87-089	9.93	.021	.57	2.58	1.09	.63	.11	2.46	80.21	.02	.36	.018	97.98
YK-87-090	11.47	.058	.19	2.72	3.25	.86	.07	.88	78.09	.01	.46	.025	98.09
YK-87-091	14.45	.008	10.21	10.83	.35	7.75	.27	2.16	50.78	.02	.82	.005	97.66
YK-87-092	14.90	.007	10.29	11.57	.43	6.05	.25	2.22	50.84	.02	1.07	.005	97.64
YK-87-093	20.78	.108	.09	5.73	6.85	1.54	.11	.57	61.52	.01	.81	.020	98.13
YK-87-094	19.87	.097	.10	5.44	6.41	1.44	.09	.94	62.95	.01	.78	.021	98.15
YK-87-095	15.37	.042	.84	5.80	3.67	1.77	.11	2.93	66.94	.02	.61	.022	98.12
YK-87-096	13.43	.041	.99	4.17	2.87	1.40	.09	2.57	71.84	.02	.50	.018	97.95
YK-87-097	10.77	.021	.92	5.24	1.91	1.09	.10	2.67	74.84	.02	.42	.012	98.00
YK-87-098	13.77	.145	9.22	14.64	1.26	5.24	.39	2.99	44.99	.06	3.57	.011	96.28
YK-87-099	9.70	.014	.91	5.31	1.87	1.44	.10	2.25	76.15	.02	.35	.010	98.12
YK-87-100	9.00	.018	.94	3.73	1.46	.97	.10	2.44	79.09	.02	.32	.009	98.09
YK-87-101	18.77	.091	.11	2.51	5.11	.75	.07	2.16	67.83	.01	.70	.036	98.14
YK-87-102	19.39	.108	.19	2.17	5.31	.71	.08	1.28	68.16	.01	.68	.022	98.10

COMPANY: MINNOVA INC. | MIN-EN LABS ICP REPORT | (ACT:L126) PAGE 1 OF 1
PROJECT NO: 322 | 705 WEST 15TH ST., NORTH VANCOUVER, B.C. V7M 1T2 | FILE NO: 7-685/P1+2
ATTENTION: | (604)980-5814 OR (604)988-4524 | * TYPE ROCK GEOCHEM * | DATE:JULY 14, 1987

(VALUES IN %)	AL2O3	BA	CAO	FE2O3	K2O	MGO	MNO2	NA2O	SIO2	SR	TIO2	ZR	TOT(%)
YK87-103	8.82	.024	.93	5.15	1.78	1.29	.14	1.64	77.72	.02	.34	.019	97.86
7-104	21.07	.101	.10	3.62	5.73	.92	.07	2.11	63.27	.01	.87	.037	97.91
-105	11.19	.045	.36	4.48	2.64	.97	.06	1.98	75.84	.02	.44	.024	98.05
YK87-106	8.66	.017	.96	4.56	1.59	1.18	.09	1.94	78.52	.02	.33	.022	97.89
YK87-107	5.65	.010	.01	2.11	.73	.42	.04	1.65	86.95	.01	.35	.060	97.98
YK87-108	10.66	.032	.47	3.63	1.99	.83	.06	2.59	77.25	.02	.39	.021	97.93
YK87-109	12.76	.048	.47	4.18	2.90	.97	.07	2.43	73.54	.02	.49	.020	97.90
YK87-110	6.60	.017	.22	2.79	1.14	.66	.09	1.76	84.13	.01	.46	.077	97.96
YK87-111	11.88	.050	.09	3.96	2.99	.86	.04	1.98	75.54	.01	.43	.015	97.85
YK87-112	10.32	.030	.82	4.52	1.89	1.08	.09	2.48	76.28	.02	.39	.014	97.95
YK87-113	9.20	.023	.59	3.06	1.35	.79	.10	2.38	79.96	.02	.34	.014	97.82
YK87-114	12.07	.045	.79	4.70	2.68	1.15	.09	2.10	73.79	.02	.47	.019	97.92
YK87-115	15.32	.062	.28	3.08	3.47	.73	.08	2.53	71.66	.01	.63	.027	97.88
YK87-116	7.03	.011	.78	3.34	1.15	.84	.07	1.60	82.76	.02	.28	.018	97.91
YK87-117	11.04	.027	.61	3.86	1.62	.93	.09	3.37	75.96	.02	.37	.014	97.92
YK87-118	16.19	.080	.43	4.52	4.20	1.03	.08	1.77	68.94	.02	.59	.016	97.86
YK87-119	8.71	.017	.82	3.12	1.22	.88	.08	2.09	80.55	.02	.33	.016	97.86
YK87-120	8.46	.016	.66	2.65	1.15	.64	.06	2.40	81.45	.02	.36	.034	97.89
YK87-121	9.33	.022	.27	2.80	1.22	.62	.08	3.12	80.04	.02	.43	.037	98.00
YK87-122	8.82	.016	.71	2.88	1.17	1.02	.07	2.69	80.18	.02	.32	.016	97.92
YK87-123	13.41	.050	.54	3.75	3.56	1.07	.07	1.38	73.44	.02	.54	.019	97.85
YK87-124	16.23	.080	.40	2.42	4.88	.74	.05	1.09	71.35	.02	.64	.030	97.94
YK87-125	16.10	.070	.45	3.31	3.75	1.22	.06	1.80	70.46	.02	.64	.020	97.91
YK87-126	10.94	.045	.16	1.49	1.97	.34	.02	2.39	80.06	.02	.35	.022	97.81
YK87-127	9.37	.022	.65	2.90	1.56	.64	.06	2.14	80.21	.02	.36	.025	97.95
YK87-128	9.84	.032	.41	2.30	1.81	.59	.08	2.22	80.02	.02	.49	.045	97.84
7-129	15.24	.065	.11	4.27	4.34	1.14	.08	1.33	70.69	.01	.58	.020	97.87
7-130	11.95	.035	.90	3.46	2.04	.94	.09	2.66	75.18	.02	.49	.026	97.79
YK87-131	8.66	.018	.75	2.70	1.10	.72	.09	2.60	80.86	.02	.32	.016	97.87
YK87-132	9.65	.025	.46	2.73	1.52	.69	.08	2.79	79.52	.02	.38	.017	97.88
YK87-133	10.04	.026	1.08	3.45	1.79	.93	.11	2.15	77.77	.02	.38	.021	97.76
YK87-134	13.68	.014	8.78	13.05	.35	6.50	.31	2.34	50.26	.03	1.23	.005	96.55
YK87-135	13.21	.006	9.63	14.83	.20	5.54	.32	1.85	49.18	.02	1.57	.006	96.36
YK87-136	13.47	.009	8.73	15.06	.23	5.01	.31	2.76	48.90	.02	1.65	.007	96.16
YK87-137	8.06	.044	.19	1.67	1.81	.28	.03	2.48	82.99	.01	.35	.026	97.95
YK87-138	9.45	.044	.19	2.38	2.27	.68	.04	1.39	81.04	.01	.41	.023	97.93
YK87-139	13.37	.034	1.13	3.90	2.67	1.11	.07	2.01	72.90	.01	.52	.017	97.74
YK87-140	13.38	.009	8.01	15.33	.37	4.84	.32	2.82	49.20	.02	1.70	.006	95.99
YK87-141	15.70	.007	9.10	13.30	.22	4.56	.29	3.06	49.55	.02	1.40	.005	97.20
YK87-142	11.57	.005	16.33	13.28	.01	3.28	.29	.07	48.22	.08	1.23	.006	94.35
YK87-143	13.40	.005	9.05	14.03	.10	5.14	.31	2.57	49.88	.02	1.34	.007	95.85
YK87-144	11.90	.017	8.66	17.82	.76	4.67	.33	1.83	46.56	.02	2.02	.007	94.60
YK87-145	11.91	.020	8.14	17.78	.75	4.73	.32	1.86	47.02	.02	2.07	.007	94.64
YK87-146	11.84	.008	7.91	17.14	.33	3.87	.34	1.84	48.96	.02	2.07	.008	94.33
YK87-147	11.94	.010	8.23	17.06	.42	4.15	.35	2.08	48.14	.02	2.03	.008	94.43
YK87-148	12.66	.005	8.85	16.74	.21	4.97	.31	1.90	46.89	.02	1.75	.007	94.31
YK87-149	14.25	.010	7.44	13.65	.34	4.98	.29	2.73	48.86	.02	1.33	.007	94.12
YK87-150	14.49	.005	8.00	11.78	.14	4.01	.26	2.93	53.53	.03	1.21	.007	96.39
YK87-151	14.16	.010	9.55	14.26	.19	4.88	.30	2.34	48.71	.02	1.46	.005	95.88

COMPANY: MINNOVA INC.
PROJECT NO: 322
ATTENTION:

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

FILE NO: 7-701/P1+2
* TYPE ROCK GEOCHEM *
DATE:JULY 14, 1987

(VALUES IN %)	AL2O3	BA	CAO	FE2O3	K2O	MGO	MNO2	NA2O	SIO2	SR	TIO2	ZR	TOT(%)
YK87-029	18.82	.095	.45	6.08	5.50	1.62	.07	1.70	62.61	.01	.73	.011	97.69
YK87-030	10.90	.033	.20	2.92	1.52	.93	.04	3.40	77.65	.01	.33	.015	97.93
[illegible]7-031	6.74	.029	.06	1.32	.88	.35	.02	1.81	86.50	.01	.29	.009	98.02
YK87-032	17.35	.109	.70	4.20	4.14	1.61	.08	1.79	66.84	.01	.86	.037	97.75
YK87-033	13.21	.048	.24	2.29	2.25	.74	.04	3.58	74.97	.01	.46	.009	97.85
YK87-034	8.40	.017	.07	1.87	.74	.43	.03	3.00	83.03	.01	.32	.011	97.92
YK87-035	14.17	.059	.58	5.85	4.14	1.71	.07	1.23	69.31	.01	.59	.010	97.74
YK87-036	9.88	.055	.14	1.02	2.95	.52	.01	.38	82.26	.01	.46	.030	97.70
YK87-037	5.50	.011	.03	.91	.55	.22	.02	1.94	88.36	.01	.26	.007	97.81
YK87-038	9.79	.111	.13	2.57	2.40	.70	.06	1.90	79.76	.01	.46	.020	97.91
YK87-039	14.16	.016	10.43	11.36	.82	6.69	.26	1.84	51.01	.02	.91	.005	97.52
YK87-152	8.22	.143	.21	2.39	3.84	.62	.05	.16	81.66	.01	.35	.012	97.67
YK87-153	12.19	.063	.09	2.84	2.59	.93	.04	2.93	75.58	.01	.51	.025	97.81
YK87-154	13.63	.022	2.38	4.88	3.10	3.54	.09	1.88	67.67	.02	.55	.017	97.77
YK87-155	18.43	.077	1.54	4.66	4.65	3.22	.07	2.18	62.29	.02	.68	.010	97.83
YK87-156	13.23	.041	.36	4.20	3.29	1.48	.06	1.70	72.95	.02	.53	.005	97.87
YK87-157	16.15	.068	.03	5.24	4.15	1.99	.05	2.38	67.17	.01	.58	.008	97.83
YK87-158	12.07	.042	7.27	3.79	1.79	2.10	.20	1.73	65.96	.02	.44	.016	95.41
YK87-159	12.96	.043	2.82	4.73	2.83	3.23	.14	1.44	68.89	.02	.55	.009	97.68
YK87-160	14.93	.057	1.82	3.79	4.15	3.86	.11	1.65	66.72	.02	.58	.012	97.70
YK87-161	15.51	.062	.06	4.61	4.37	1.25	.07	1.18	70.03	.01	.59	.013	97.76
YK87-162	10.57	.030	.27	3.38	2.33	.91	.04	1.68	78.41	.01	.38	.005	98.00
YK87-163	14.00	.053	.04	4.43	3.83	1.22	.06	1.46	72.30	.01	.48	.005	97.91
YK87-164	13.00	.053	.32	3.03	3.92	.77	.06	.97	75.38	.01	.45	.007	97.95
YK87-165	9.82	.036	.04	3.69	2.64	.72	.06	1.17	79.18	.01	.40	.013	97.78
YK87-166	9.92	.015	.69	2.08	.88	.46	.06	3.05	80.28	.03	.41	.021	97.90
YK87-167	8.46	.025	.04	2.59	1.42	.61	.07	2.30	81.76	.02	.30	.008	97.60
[illegible]7-168	8.71	.015	.42	1.69	.96	.44	.06	2.59	82.39	.02	.43	.033	97.76
YK87-169	10.53	.024	.82	3.11	1.61	.79	.09	2.72	77.75	.02	.34	.006	97.82
YK87-170	19.01	.084	.04	5.16	6.28	1.26	.14	.32	64.72	.01	.74	.015	97.77
YK87-171	6.96	.029	.90	2.24	1.31	.41	.10	.93	84.43	.01	.36	.056	97.73
YK87-172	13.25	.009	9.07	14.80	.35	4.90	.32	2.40	48.41	.02	1.60	.007	95.13
YK87-173	14.13	.008	9.82	13.70	.27	4.62	.30	2.18	48.35	.02	1.45	.006	94.86
YK87-174	11.26	.005	12.83	10.41	.09	1.77	.18	.10	56.09	.04	.99	.018	93.77
YK87-175	14.36	.008	9.73	13.69	.30	4.68	.30	2.24	48.42	.03	1.44	.006	95.19
YK87-176	14.48	.007	9.10	13.79	.24	4.78	.31	2.74	48.67	.02	1.44	.006	95.59
YK87-177	13.20	.005	9.00	14.05	.22	4.95	.31	2.46	49.68	.02	1.53	.008	95.44
YK87-178	13.66	.005	8.48	14.60	.20	5.06	.32	2.82	49.13	.02	1.51	.007	95.80
YK87-179	13.26	.006	8.56	14.46	.25	5.00	.32	2.51	49.69	.02	1.54	.006	95.62

PROJECT NO: 322 705 WEST 15TH ST., NORTH VANCOUVER, B.C. V7M 1T2 FILE NO: 7-756/P1+2
ATTENTION: (604)980-5814 OR (604)988-4524 * TYPE ROCK GEOCHEM * DATE:JULY 20, 1987

(VALUES IN %)	AL2O3	BA	CAO	FE2O3	K2O	MGO	MNO2	NA2O	SIO2	SR	TIO2	ZR	TOT(%)
YK87-180	20.52	.097	.01	5.16	6.45	1.34	.08	.73	62.82	.01	.78	.017	98.00
YK87-181	7.96	.022	.01	1.94	.97	.37	.09	2.29	83.94	.02	.38	.036	98.02
YK87-182	12.01	.007	5.35	16.01	.27	1.16	.37	2.64	57.97	.01	1.64	.020	97.47
YK87-183	11.94	.112	2.53	11.73	1.46	.89	.23	3.06	64.76	.01	1.01	.032	97.75
YK87-184	12.10	.012	2.67	11.11	.28	.44	.23	4.48	65.35	.02	1.00	.038	97.73
YK87-185	15.00	.009	7.26	14.62	.57	4.36	.32	4.23	49.69	.02	1.60	.005	97.69
YK87-186	15.03	.014	7.68	13.59	.64	3.94	.31	4.30	49.44	.04	1.61	.005	96.59
YK87-187	11.68	.007	6.34	15.56	.25	1.03	.41	2.06	58.68	.03	1.42	.027	97.50
YK87-188	18.83	.110	1.46	3.16	6.41	3.18	.07	1.34	62.53	.02	.76	.018	97.88
YK87-189	12.53	.065	.47	2.54	3.27	.73	.07	1.37	76.42	.02	.46	.021	97.95
YK87-190	16.55	.085	.19	3.96	4.80	1.05	.07	1.72	68.78	.01	.65	.015	97.88
YK87-191	12.41	.035	1.00	3.16	1.99	.80	.08	3.05	74.93	.02	.45	.011	97.94
YK87-192	8.50	.026	.01	1.81	1.39	.37	.05	2.57	82.80	.01	.38	.023	97.93
YK87-193	12.39	.050	.01	2.19	2.78	.49	.05	2.39	76.98	.01	.50	.015	97.85
YK87-194	11.47	.021	1.49	3.10	1.30	1.00	.09	3.20	75.84	.02	.38	.007	97.91
YK87-195	8.30	.017	1.12	3.39	1.27	.86	.08	1.73	80.75	.01	.35	.028	97.92
YK87-196	10.35	.024	1.39	5.00	1.80	1.39	.13	2.26	75.29	.02	.39	.011	98.05
YK87-197	6.01	.013	1.82	3.09	.90	.73	.09	.70	84.22	.01	.32	.037	97.93
YK87-198	15.70	.011	7.57	12.94	.60	3.92	.27	4.12	51.28	.03	1.46	.006	97.91
YK87-199	9.80	.034	1.41	1.34	.52	.34	.06	2.80	80.99	.02	.53	.043	97.89
YK87-200	7.46	.017	1.41	1.10	.35	.32	.06	2.49	84.31	.02	.30	.013	97.85
YK87-201	17.98	.084	.13	4.75	4.98	1.32	.08	1.41	66.45	.01	.69	.018	97.91
YK87-202	8.01	.026	.36	1.82	1.51	.43	.04	1.48	83.98	.02	.31	.013	98.00
YK87-203	10.55	.028	.34	4.00	2.15	.95	.05	2.47	77.02	.02	.41	.012	97.99
YK87-204	9.04	.025	.66	2.80	1.83	.78	.05	1.54	80.77	.02	.33	.009	97.87
YK87-205	6.52	.014	.39	1.41	.62	.35	.06	2.01	86.00	.02	.35	.030	97.76
YK87-206	13.12	.040	.30	4.14	3.11	1.11	.06	1.93	73.44	.02	.50	.008	97.78
YK87-207	10.16	.021	1.11	2.61	.94	.68	.09	2.76	79.07	.02	.41	.011	97.88
YK87-208	10.30	.030	.63	2.32	1.63	.58	.06	2.59	79.22	.02	.44	.011	97.82
YK87-209	14.48	.016	9.37	10.99	.66	10.66	.27	1.17	49.43	.01	.72	.005	97.78
YK87-210	14.40	.005	9.37	11.82	.31	6.67	.27	2.56	51.52	.02	.99	.005	97.92
YK87-211	13.79	.016	9.45	12.70	.66	7.24	.30	2.19	50.46	.02	1.04	.005	97.87
YK87-212	14.69	.015	10.35	11.04	.51	9.34	.25	1.27	49.57	.01	.77	.005	97.81
YK87-213	13.98	.056	.27	4.16	3.90	1.21	.05	1.53	72.18	.01	.56	.020	97.93
YK87-214	9.26	.024	.57	4.03	1.78	1.17	.10	2.18	78.52	.02	.33	.014	97.99
YK87-215	14.22	.061	.50	5.01	3.80	1.33	.08	1.71	70.78	.02	.54	.016	98.06
YK87-216	11.02	.027	.86	4.48	2.20	1.28	.08	2.20	75.37	.02	.40	.010	97.96
YK87-217	18.75	.085	.01	5.01	5.45	1.25	.08	1.93	64.60	.01	.68	.016	97.87
YK87-218	13.04	.051	.01	4.51	3.34	1.04	.05	2.33	73.14	.01	.48	.009	97.99
YK87-219	8.21	.031	.13	2.33	1.46	.61	.03	2.14	82.81	.01	.28	.006	98.05

MIN-EN LABORATORIES LTD.

Specialists in Mineral Environments

705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524

TELEX:VIA USA 7601067 UC

Certificate of ASSAY

Company:MINNOVA INC.
Project:322
Attention:

File:[illegible]
Date:JUL[illegible]
Type:ROCK ASSAY

We hereby certify the following results for samples submitted.

Sample Number	CU %	PB %	ZN %	AG G/TONNE	AG OZ/TON	AU G/TONNE	AU OZ/TON
BCS 4951	.008	.01	.01	0.2	0.01	.01	0.001
BCS 4952	.013	.01	.01	1.5	0.04	.01	0.001
BCS 4953	.008	.01	.02	0.3	0.01	.01	0.001
BCS 4954	.004	.01	.01	0.4	0.01	.01	0.001
BCS 4956	.005	.01	.01	0.3	0.01	.01	0.001
BCS 4957	.008	.01	.01	0.3	0.01	.01	0.001
BCS 4958	.014	.01	.01	0.2	0.01	.01	0.001

Certified by

MIN EN LABORATORIES LTD.