

GEOCHEMICAL AND GEOPHYSICAL

REPORT

on the

JULIA CLAIMS

STAGE I

in the

FRANCES LAKE AREA

YUKON TERRITORY

on behalf of

ARBOR RESOURCES LTD.

by

G.H. Giroux, P.Eng.

MONTGOMERY CONSULTANTS LTD.

June 1981

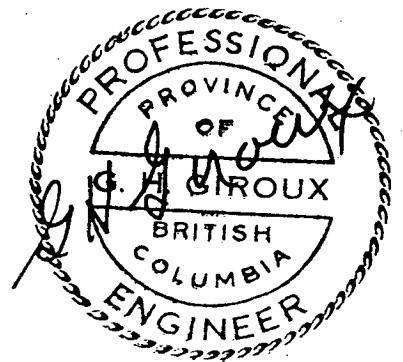


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## 1.0 SUMMARY AND CONCLUSIONS

1.1 Arbor Resources Limited of Vancouver, B.C. holds title to 54 mineral claims (Julia 1-20 and 37-70) near Frances Lake in the Yukon Territory.

1.2 The claims are covered by Mississippian or Devonian greenstones.

1.3 The showing on the Julia claims consists of a leached siliceous iron rich layer within an acidic volcanic pile.

1.4 The strike length of the gossan is approximately 1800 meters.

1.5 285 soil samples were taken and analyzed for copper, lead, zinc, silver and gold.

1.6 The central part of the grid was tested with a V.L.F. EM-16 unit.

1.7 The EM-16 indicated a continuous zone of conductive material about 1200 meters long which appears to be faulted off to the east. The northern extension of this zone was picked up on the most northerly line surveyed. The zone is open to the south.

1.8 Geochemical anomalies for all elements tested indicated this zone to some extent.

1.9 Stage II, previously outlined in a report by this writer in September 1980, consisting of mapping, additional geochemistry, induced polarization and diamond drilling is most certainly warranted.

## 2.0 INTRODUCTION

This report is written for Arbor Resources Limited of Vancouver, British Columbia on STAGE I of an exploration program on their Julia Claims in the Frances Lake area of the Yukon Territory.

The report details work done on the property in August 1980 by Montgomery Consultants Limited.

A preliminary program of linecutting, soil sampling and EM-16 surveying was carried out.

### 3.0 LOCATION AND ACCESS

The Julia Group of mineral claims is located in the Campbell Mountain Range about 150 kilometers southeast of Ross River in the Yukon Territories. The claims cover a ridge above tree line just west of Money Creek and about 20 kilometers west of Frances Lake.

Latitude: 61° 25'      Longitude: 130° 00'

N.T.S. Map Sheets: 105 H/5 and 105 G/8

Access to the property is by helicopter either from Ross River or from the Robert Campbell Highway at Frances Lake, if more than one trip is necessary.

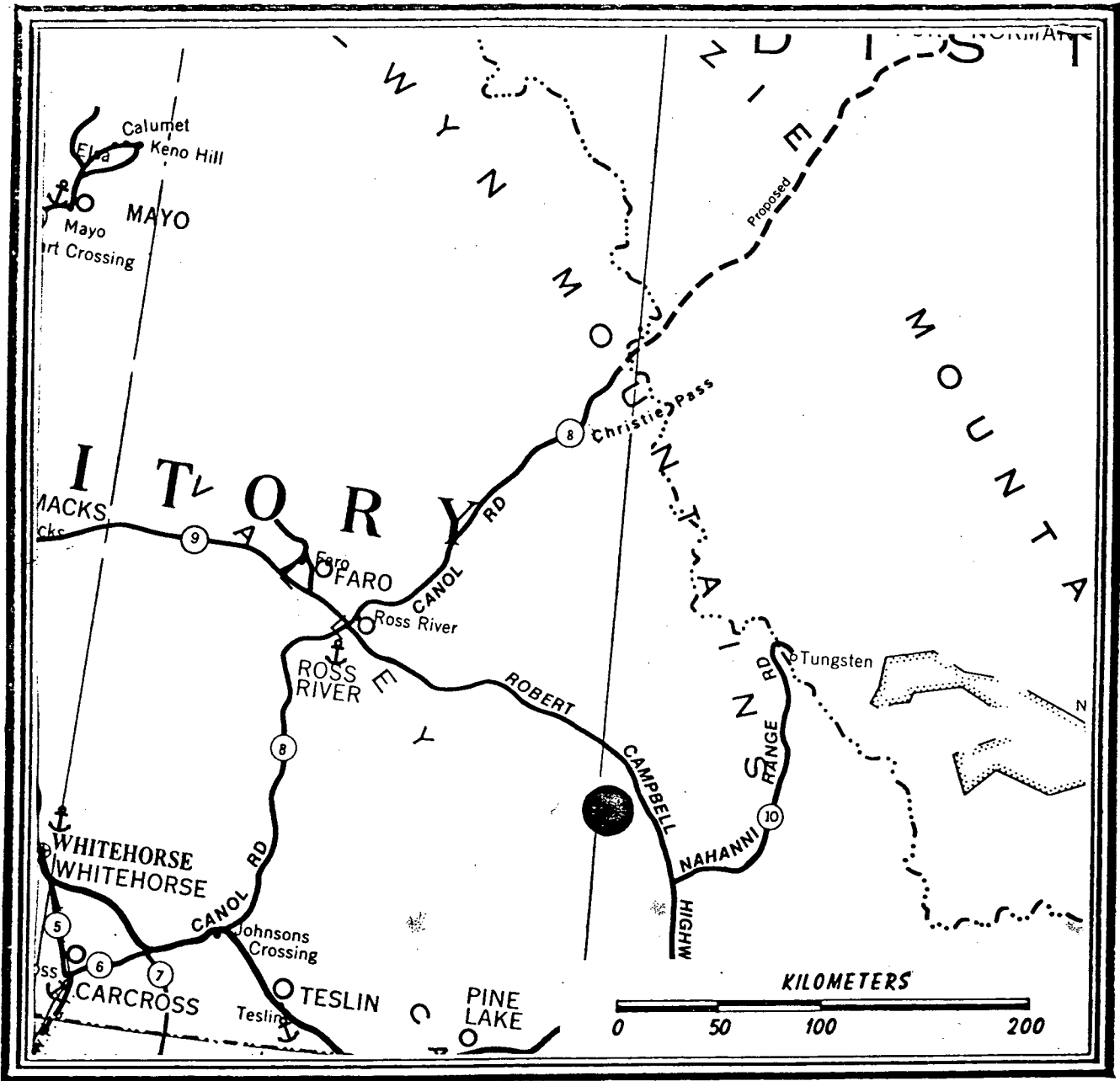


FIGURE 1

LOCATION MAP  
 JULIA CLAIMS  
 ARBOR RESOURCES INC.

#### 4.0 CLAIM INFORMATION

Arbor Resources Incorporated of Vancouver, B.C., holds title through an option agreement with Welcome North Mines Limited to 54 mineral claims in the Frances Lake area of the Yukon Territory. The writer saw several claim posts on the property and they appear to be staked properly in accordance with the Yukon Quartz Mining Act.

The claim information follows in table form.

CLAIM NAME	NO. OF CLAIMS	EXPIRY DATE
Julia 1 - 10	10	August, 1981
Julia 11 - 20	10	August, 1981
Julia 37 - 70	34	August, 1981
Total:	54	

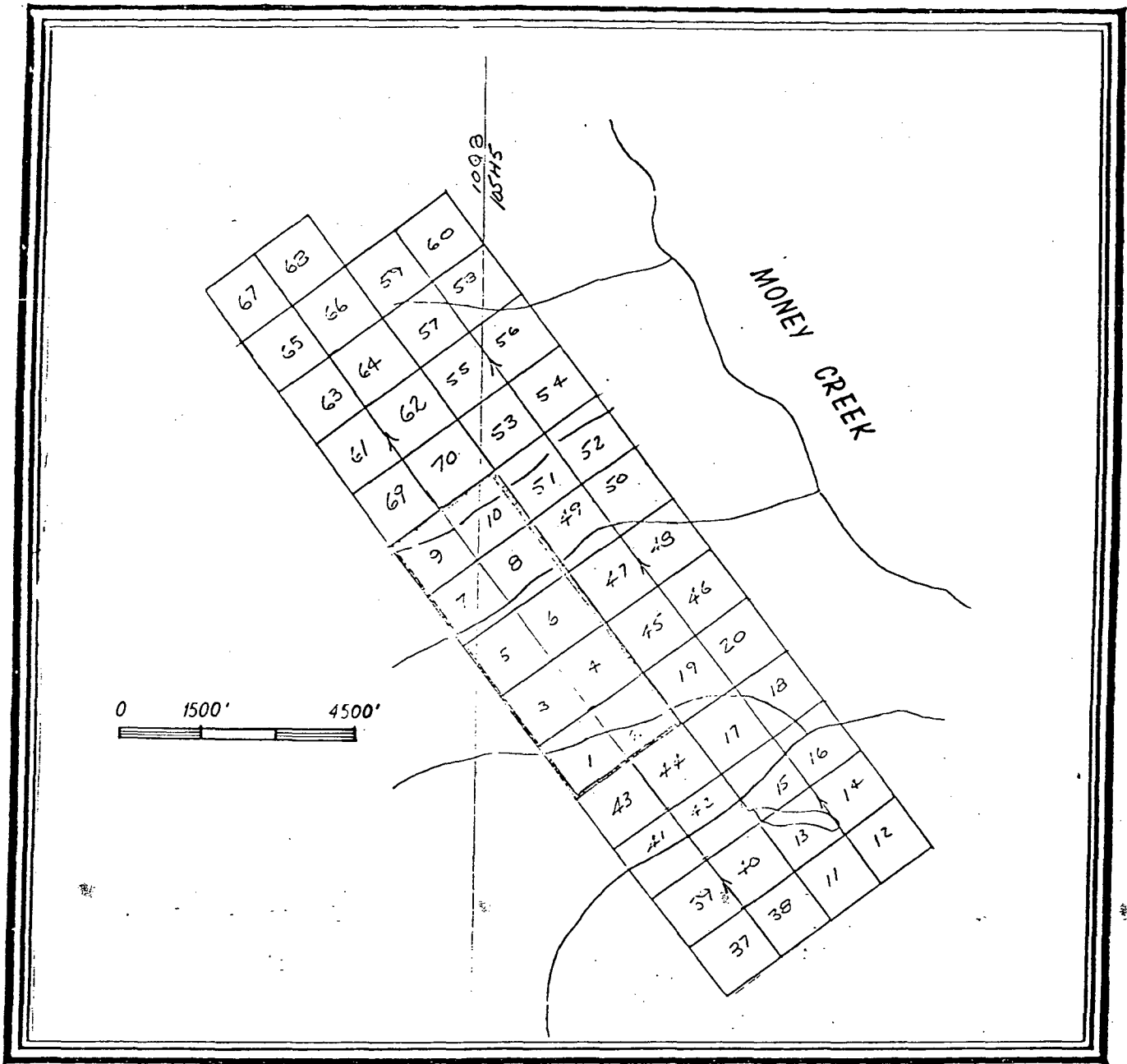
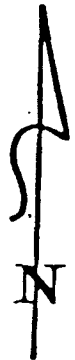


FIGURE 2

# CLAIM MAP

## JULIA CLAIMS

ARBOR RESOURCES INC.



## 5.0 REGIONAL GEOLOGY

The geology of the claim area has been mapped by Roots, Roddick and Blusson on map 6-1966, and by Wheeler, Green and Roddick on the adjoining sheet 8-1960. Both maps describe the rock type of the Julia claims as a Mississippian or Devonian greenstone, or meta-diorite with minor serpentine and amphibolite.

On the claim group, the rocks are foliated, fine grained greenstones, considered by Roots, Green et al to be volcanic in origin.



FIGURE 3

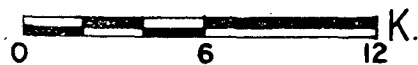
JUNE 1981.

**LEGEND**  
 A - Greenstone  
 B - Quartz biotite  
 & quartz chlorite  
 schist.

**REGIONAL GEOLOGY**

(After Wheeler, Green, Roddick, Roots & Blusson;  
 8-1960 & 6-1966)

**Julia Claims**



**ARBOR RESOURCES INC.**

MONTGOMERY CONSULTANTS LIMITED

## 6.0 DETAILED GEOLOGY AND MINERALIZATION

The showing on the Julia claims consists of a leached siliceous iron rich layer within an acidic, volcanic pile, exposed in three creek beds over approximately 1,800 meters. The zone is highly weathered and shows up as a red gossan. The mineralized layer strikes to the northwest and appears to be dipping about 45 to 60 degrees east. The apparent width of the bed varies up to a maximum of 80 meters. (See Figure 4).

The hostrock is possibly a rhyolite phase of the greenstones that cover the claim area. The rock is highly siliceous with pyrite occurring as disseminations and cavity filling. The majority of the pyrite has been leached out leaving iron stained crystal indentations.

In the creek bed just southeast of the initial posts for Julia number 7 and 8 claims, massive sulphide boulders were found up to one meter square. These fragments appear to be close to their source and consist of banded pyrite with minor chalcopyrite and quartz. A selected piece of this boulder assayed .003 oz/ton Au, .80 oz/ton Ag and .239% Cu. Selected samples from this area taken by Welcome North staff are shown below.

## 7.0 GEOCHEMISTRY

The area immediately adjacent to the showing was covered with a compass and flagging grid. A base line was established along the Julia 1-10 claim line at a bearing of N 141°E. Perpendicular crosslines were flagged every 100 meters where possible.

Soil samples were taken from the B-Horizon every 20 meters along the crosslines for a distance 200 meters west of the baseline and 100 meters east. The samples were placed in kraft bags, dried, and shipped to Min-En Laboratories Ltd. in North Vancouver. Two hundred and eighty-five samples were tested for copper, lead, zinc and silver by nitric, perchloric digestion and then atomic absorption. Gold was tested for using an Aqua Regia digestion and atomic absorption.

The results have been plotted on Figures 5 through 9 and the laboratory analytical report is included in Appendix I.

### 7.1 Statistics

A statistical analysis of the results, including arithmetic histograms, lognormal histograms and cumulative distribution curves was completed and is shown in Appendix II.

The arithmetic and lognormal histograms for copper show a lognormal population ranging in values from 5 to 6000 ppm with a mean value of 177 ppm and a standard deviation of 482 ppm. A lognormal cumulative distribution curve for copper showed there were actually three distinct populations in the data set. An upper or anomalous population had a mean of 2800 ppm, a middle population with a mean 1180 ppm and a lower background population with a mean of 80 ppm. This curve was partitioned and thresholds determined at 1900, 1540, 900, and 540 ppm. These thresholds were contoured on Figure 5.

The arithmetic and lognormal histograms showed lead values formed a normal distribution ranging in values from 1 to 43 ppm with a mean of 12 ppm and a standard deviation of 5.5. An arithmetic cumulative distribution curve was partitioned into two populations. A 22 ppm threshold was used to contour the data.

Histograms for zinc showed a lognormal distribution. Values ranged from 3ppm to 425ppm with a mean fo 62 ppm and a standard deviation of 51. A lognormal cumulative distribution curve was partitioned into 2 populations with a threshold of 270 ppm used to contour the data.

Silver values ranged from a low of .1 ppm to a high of 5.6 ppm with a mean of .9 ppm and a standard deviation of .52. These values formed a lognormal distribution which was partitioned into 2 populations. An upper or anomalous population with a mean of 2.1 ppm and a background population with a mean value of .8. A threshold of 1.4 ppm was used to contour the data and separate these populations.

The gold values on the Julia calims ranged in value from 5 ppb to 1605 ppb. For the purpose of a statistical analysis the obviously anomalous 1650 ppb sample was not used. The remaining 284 samples had a mean value of 10 ppb with a standard deviation of 9.5. A lognormal cumulative distribution curve was constructed and partitioned into two populations. The anomalous values had a mean of 36 ppb while the background values had a mean of 8 ppb. The 2 ppb level was used to separate these two populations.

## 8.0 VLF-EM SURVEY

A Geonics Limited EM-16 or very low frequency EM was used to test the Julia claims for the continuation of the pyrite zone exposed on the surface in the form of a series of covered outcrops.

The specifications and a discription of the instrument are included as Appendix III.

Lines were tested perpendicular to the iron gossan and the submarine station NLK at Seattle, Washington (18.6 KH<sub>2</sub>) was used as a transmitter.

The data from the survey was converted from "zero-crossings" to contourable peaks by a process of simple numerical filtering devised by D.C. Fraser.

The results are shown in Figure 10. The zone is traced very well by the filtered data. The sulphide zone appears to be continuous from at least 1400N to 2600N where it is probably displaced to the east by a fault. This fault is represented by the creek marked number 1 on Figure 4. A second more westerly zone is indicated on lines 2000, 2100, and 2200N between stations 800 and 900E. This zone outcrops on the south side of creek number 2 as a leached silecous gossan. A third zone is hinted at by one reading at the most easterly station on line 1800N.

## 9.0 DISCUSSION OF RESULTS

The EM-16 survey indicated a continuous conductive zone from at least 1400N to 2600N where it is probably faulted off and displaced eastward to where it was detected on line 3000N. This zone, which shall be referred to as the main zone, is anomalous in copper on lines 2100 and 2200N and on line 2850N. Lead geochemistry doesn't delineate the main zone very well but picks up the faulted off portion on line 3000N and indicates a possible continuation of this zone northward. Zinc geochemistry mirrors the main zone between lines 2100N and 2400N, although only 5 samples are considered anomalous. Silver values indicate this zone between lines 2200N and 2850N. The possible fault zone shows up as a large dispersion silver anomaly on line 2850N. The faulted off portion shows up on lines 3000 to 3400N. Anomalous gold values are not continuous enough to trace the main zone well, however, there are scattered small anomalies along its entire length.

A single anomalous gold value of 1650 ppb on line 1000N indicates the need for more thorough prospecting to the south and west.

A secondary zone indicated on line 1800N at its most easterly station was not picked up by geochemistry since the grid did not extend far enough east.

## 10.0 RECOMMENDATIONS

The results of STAGE I on the Julia claims were very encouraging. The mineralized gossan was picked up below surface with electromagnetic methods and the presence of gold, silver and sulfides was confirmed with geochemistry. As a result STAGE II, as recommended in the Report by this writer on September 2, 1980 should be carried out.

This report called for extensive geologic mapping, and additional geochemistry over the entire claim group.

An induced polarization survey to trace the sulfide zone should be used with allowance for several depth probes to indicate the dip of the structure, and hence the best location of drill holes.

The main zone should then be tested by diamond drilling. A preliminary program of 2000 feet was recommended with additional drilling in a third stage if warranted.

11.0 COST STATEMENTSTAGE I


G.H. Giroux	10 days	2,687.50
D. Fonseca	7 days (Aug.16-30/80)	630.00
M. Hayes	7 days (Aug.16-30/80)	420.00
Room & Board		167.58
Helicopter		2,171.40
Truck Rental		463.72
Computer Costs		174.75
Assays & Geochemistry		2,818.08
Drafting		157.50
Report Preparation (typing, reproduction, etc)		300.00
	TOTAL	<u>\$9,990.53</u>



12.0 CERTIFICATE

I, G.H. GIROUX, of 982 Braodview Drive, North Vancouver, British Columbia, do hereby certify that:

1. I am a consulting geological engineer with an office at #203 - 2786 W. 16th Ave., Vancouver, British Columbia.
2. I am a graduate of the Universtiy of British Columbia (1970) with a degree in Geological Engineering (B.A. Sc.).
3. I have practiced my profession continuously since graduation.
4. I am a member in good standing of the Association of Professional Engineers of the Province of British Columbia.
5. I have no interest, either direct or indirect in the properties or securities of Arbor Resources Limited; nor do I expect to receive any such interest.

  
\_\_\_\_\_  
Gary H. Grioux, P.Eng. G. H. GIROUX  
982 Braodview Drive  
North Vancouver, B.C. BRITISH COLUMBIA

June 1981



APPENDIX I  
ANALYTICAL REPORT

# MIN-EN Laboratories Ltd.

705 WEST 15th STREET,  
NORTH VANCOUVER, B.C., CANADA V7M 1T2  
TELEPHONE (604) 980-5814

## ANALYTICAL REPORT

Project 80RR1 Date of report Sept. 15/80.

File No. 0-757 Date samples received Aug. 26/80.

Samples submitted by: G. Giroux

Company: Montgomery Consultants

Report on: 79 soils Geochem samples

Assay samples

Copies sent to:

- Montgomery Consultants, Vancouver, B.C.
- 
- 

Samples: Sieved to mesh -80 Ground to mesh

Prepared samples stored  discarded

rejects stored  discarded

Methods of analysis: Cu, Pb, Zn, Ag-nitric, perchloric digestion. A.A.

Analysis. Au-Aqua Regia. A.A. Analysis.

Remarks: This is the completion of this file number.

# MIN-EN Laboratories Ltd.

705 WEST 15th STREET,  
NORTH VANCOUVER, B.C., CANADA V7M 1T2  
TELEPHONE (604) 980-5814

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rejects stored  discarded

Methods of analysis: Cu, Pb, Zn, Ag-nitric, perchloric digestion. A.A.

Analysis. Au-Aqua Regia. A.A. Analysis.

Remarks: This is the completion of this file number.

# MIN-EN Laboratories Ltd.

705 WEST 15th STREET,  
NORTH VANCOUVER, B.C., CANADA V7M 1T2  
TELEPHONE (604) 980-5814

## ANALYTICAL REPORT

Project 80RR1 Date of report Sept. 12/80.  
File No. 0-757 Date samples received Aug. 26/80.  
Samples submitted by: G. Giroux  
Company: Montgmerly Consultants  
Report on: 210 soils Geochem samples

Assay samples

### Copies sent to:

- Montgmerly Consultants, Vancouver, B.C.
- 
- 

Samples: Sieved to mesh -80 Ground to mesh

Prepared samples stored  discarded

rejects stored  discarded

Methods of analysis: Cu, Pb, Zn, Ag-nitric, perchloric digestion. A.A.

Analysis. Au-Aqua Regia. A.A. Analysis.

Remarks: More samples to follow.

COMPAT

Montgomery Consultants

## GEOCHEMICAL ANALYSIS DATA SHEET

No. 0-757

PROJECT No.: 80RR1

MIN - EN Laboratories Ltd.

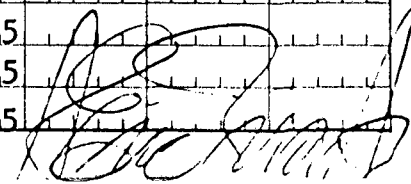
DATE: Sept. 12

ATTENTION: G. Giroux

705 WEST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2  
PHONE (604) 980-5814

1980.

Sample Number	10 Cu ppm	15 Pb ppm	20 Zn ppm	25 Ni ppm	30 Co ppm	35 Ag ppm	40 Fe ppm	45 Hg ppb	50 As ppm	55 Mn ppm	60 Au ppb	65 70	75	80		
81	86	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
900N80	0.E	31	11	72			05					65				
82	0.E	16	3	19			01					5				
84	0.E	7	1	3			01					5				
86	0.E	28	3	19			02					10				
88	0.E	12	3	13			02					20				
90	0.E	18	7	32			03					65				
92	0.E	22	10	52			03					5				
94	0.E	16	6	40			04					10				
96	0.E	18	7	51			05					5				
98	0.E	24	10	181			07					5				
100	0.E	8	2	9			01					10				
102	0.E	22	9	50			04					15				
104	0.E	32	10	53			07					40				
106	0.E	16	4	27			05					5				
108	0.E	24	3	17			04					10				
900N110	0.E	7	1	3			03					65				
1000N800	0.E	23	9	49			05					1650				
82	0.E	28	10	37			05					10				
84	0.E	30	9	47			09					5				
86	0.E	28	8	55			07					65				
88	0.E	30	12	44			07					5				
90	0.E	34	9	46			08					5				
92	0.E	28	6	27			02					10				
94	0.E	27	6	36			03					5				
96	0.E	38	7	48			02					10				
98	0.E	10	2	20			01					5				
100	0.E	64	12	98			07					5				
102	0.E	28	9	41			05					5				
104	0.E	19	7	13			02					5				
1000N1060	0.E	16	9	30			04					5				



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Montgomery Consultants

GEOCHEMICAL ANALYSIS DATA SHEET

No. 0-757

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DATE: Sept. 12

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705 WEST 15TH ST., NORTH VANCOUVER, B.C. V7M 1T2  
PHONE (604) 980-5814

1980.

Sample Number	Ni ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	Ag ppm	Fe ppm	Hg ppb	As ppm	Mn ppm	Au ppb			
6 81	10 86	15 90	20 95	25 100	30 105	35 110	40 115	45 120	50 125	55 130	60 135	65 140	70 145	75 150	80 155
1000N1	080E	18	4	8			04					15			
1000N1	100E	22	9	25			04					15			
1200N8	00E	78	10	51			05					10			
	820E	36	9	25			05					10			
	840E	260	18	158			10					5			
	860E	205	20	225			12					15			
	880E	110	15	64			04					10			
	900E	100	19	43			08					15			
	920E	94	10	48			06					15			
	940E	40	10	83			05					15			
	960E	13	6	11			04					10			
	980E	28	10	32			02					5			
	1000E	34	11	67			06					15			
	1020E	20	12	58			04					20			
	1040E	35	13	64			08					15			
	1060E	26	13	68			06					5			
	1080E	20	13	89			07					5			
1200N1	100E	6	5	11			02					5			
1300N9	00E	60	11	48			05					5			
	920E	53	9	44			08					5			
	940E	175	11	56			09					5			
	960E	5	3	55			01					10			
	980E	28	8	25			03					10			
	1000E	60	12	85			12					5			
	1020E	32	10	37			11					10			
	1040E	34	9	29			05					5			
	1060E	13	3	11			02					15			
	1080E	22	12	49			06					10			
1300N1	100E	52	11	43			07					5			
1400N8	00E	64	9	45			06					10			

COMP:

Montgomery Consultants

## GEOCHEMICAL ANALYSIS DATA SHEET

No. 0-757

PROJECT No.: 80RR1

MIN - EN Laboratories Ltd.

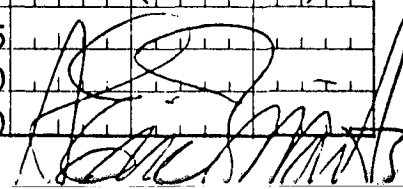
DATE: Sept. 12

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1980.

Sample Number	6 10 81 86 90	15 Cu ppm 95	20 Pb ppm 100	25 Zn ppm 105	30 Ni ppm 110	35 Co ppm 115	40 Ag ppm 120	45 Fe ppm 125	50 Hg ppb 130	55 As ppm 135	60 Mn ppm 140	65 Au ppb 145	70 150	75 155	80 160
1400N8	20E	6.6	1.2	4.6			0.4					<5			
	840E	5.0	1.3	4.4			0.7					5			
	860E	2.8	1.0	5.2			0.4					5			
	880E	2.3	1.0	6.6			0.3					10			
	900E	3.4	1.3	3.5			0.7					<5			
	920E	3.0	9	3.6			0.4					<5			
	940E	3.2	1.1	4.4			0.7					5			
	960E	2.4	1.1	3.9			0.5					10			
	980E	4.4	1.1	10.1			0.6					5			
	1000E	7.2	1.0	5.4			0.6					5			
	1020E	5.2	1.0	4.4			0.6					10			
	1040E	5.0	8	5.3			0.6					10			
	1060E	9.8	1.0	7.6			0.8					5			
	1080E	9.6	9	4.8			0.7					5			
1400N1	100E	9.2	1.5	6.2			0.8					5			
1500N8	800E	3.8	1.5	4.0			0.6					<5			
	820E	3.0	1.6	6.9			0.9					5			
	840E	7.2	1.6	3.5			0.8					<5			
	860E	4.2	1.5	4.1			0.5					10			
	880E	7.6	1.4	6.4			1.2					5			
	900E	2.2	1.1	2.0			0.6					10			
	920E	3.3	1.2	3.9			0.9					5			
	940E	2.4	8	2.8			0.5					5			
	960E	2.8	1.3	4.2			0.9					10			
	980E	1.4	2	1.4			0.5					5			
	1000E	5.3	1.0	3.8			0.6					2.5			
	1020E	3.0	9	3.0			0.4					2.0			(40 mesh)
	1040E	4.4	1.4	4.8			0.4					1.5			
	1060E	4.0	1.5	2.9			0.7					1.0			
1500N1	080E	6.1	1.7	8.3			0.8					1.0			



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Montgomery Consultants

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No. 0-757

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MIN - EN Laboratories Ltd.

DATE: Sept. 12

705 WEST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2  
PHONE (604) 980-5814

ATTENTION: G. Giroux

1980.

Sample Number	% ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	Ag ppm	Fe ppm	Hg ppb	As ppm	Mn ppm	Au ppb				
81	86	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1500N1	100E	29	9	42				0.8					10			
1600N8	00E	27	10	35				0.8					10			
	820E	17	1	14				0.4					5			
	840E	7.9	1.2	5.6				1.5					10			
	860E	5.2	1.2	4.4				0.9					5			
	880E	4.3	1.0	4.5				1.0					10			
	900E	6.0	1.2	3.9				1.2					5			
	920E	4.7	1.1	4.5				0.9					10			
	940E	4.0	1.1	4.7				1.3					10			
	960E	4.5	1.1	3.4				1.0					10			
	980E	5.2	1.2	4.5				1.2					10			
	1000E	3.0	1.0	3.8				1.3					5			
	1020E	5.1	1.0	3.9				0.7					5			
	1040E	4.7	6	2.7				0.9					10			
	1060E	3.7	5	2.0				0.8					5			
	1080E	2.7	2	1.9				0.7					1.5			
1600N1	100E	29	2	23				0.6					10			
1700N8	00E	9.6	1.3	5.5				1.5					5			
	820E	8.3	1.2	5.9				1.2					5			
	840E	4.8	1.2	4.4				1.3					5			
	860E	4.3	4	2.0				0.6					10			
	880E	3.2	1.2	4.7				1.1					5			
	900E	5.0	1.1	4.4				1.1					1.5			
	920E	2.9	5	3.0				0.8					3.5			(20 mesh)
	940E	7.2	1.3	5.4				1.2					5			
	960E	4.5	1.0	5.0				0.9					1.5			
	980E	4.8	1.0	5.4				1.0					5			
	1000E	6.0	1.1	4.6				0.9					1.0			
	1020E	4.8	5	2.9				0.5					5			
1700N1	040E	9.7	1.0	4.7				1.1					1.0			

COMPAT

Montgomery Consultants

## GEOCHEMICAL ANALYSIS DATA SHEET

No. 0-757

PROJECT No. 80RR1

MIN - EN Laboratories Ltd.

DATE: Sept. 12

705 WEST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2

PHONE (604) 980-5814

1980.

ATTENTION: G. Giroux

Sample No.	Mo	Cu	Pb	Zn	Ni	Co	Ag	Fe	Hg	As	Mn	Au				
Number	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb				
81	86	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1700N1	0.60E	8.3	1.6	6.5				1.1					2.5			
	1.080E	4.9	1.0	6.6				0.9					5			
1700N1	1.00E	7.3	1.1	5.4				1.2					5			(40 mesh)
1800N8	0.0E	4.0	9	3.3				0.9					1.0			
	8.20E	1.5	3	1.2				0.5					5			
	8.40E	3.3	1.0	3.0				1.0					5			(40 mesh)
	8.60E	3.8	2.0	6.2				1.4					5			
	8.80E	4.3	1.3	5.7				1.2					1.0			
	9.00E	4.4	1.1	3.6				1.0					1.0			
	9.20E	9.7	2.0	6.4				1.6					5			
	9.40E	9.9	1.2	4.4				1.0					<5			
	9.60E	1.1	2	1.1				0.3					<5			
	9.80E	1.0	2	6				0.3					<5			
	10.00E	4.9	1.4	4.5				0.8					5			
	10.20E	7.9	1.3	8.5				0.9					5			
	10.40E	2.5	6	2.1				0.4					<5			
	10.60E	4.9	9	3.5				0.9					1.0			
	10.80E	1.21	1.1	4.9				1.2					5			(40 mesh)
1800N1	1.00E	1.98	1.3	5.8				1.4					<5			(40 mesh)
1900N8	0.0E	5.3	1.3	4.7				1.3					5			
	8.20E	7.2	1.4	6.1				1.4					1.0			
	8.40E	5.1	1.1	4.5				1.0					<5			
	8.60E	5.8	1.1	4.1				0.9					2.0			
	8.80E	1.24	1.2	5.0				1.1					5			
	9.00E	2.9	9	4.0				0.9					5			(40 mesh)
	9.20E	1.16	1.8	5.9				1.0					5			
	9.40E	1.06	1.1	5.4				1.0					1.5			
	9.60E	4.8	8	3.2				0.5					5			
	9.80E	3.3	8	1.9				0.4					5			
1900N1	10.00E	1.26	1.1	4.7				1.2					5			(40 mesh)

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PROJECT No. 80RR1

MIN - EN Laboratories Ltd.

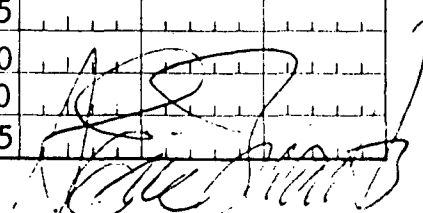
DATE: Sept. 12

705 WEST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2  
PHONE (604) 980-5814

1980.

ATTENTION: G. Giroux

Sample Number	6	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
		<del>80</del>	Cu ppm	Pb ppm	Zn ppm	Ni ppm	<del>90</del>	Co ppm	Ag ppm	Hg ppb	As ppm	Mn ppm	Au ppb			
	81	86	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1900N1	0.20E		1.26	1.9	5.5			1.0					5			
	0.40E		1.90	4.3	8.1			1.0					5			
	0.60E		1.66	1.2	5.1			0.7					15			
	0.80		3.60	1.4	8.6			1.2					20			
1900N1	1.00E		1.40	1.4	4.7			0.8					10			
2000N8	0.0E		7.0	8	2.8			0.5					10			
	8.20E		6.8	1.2	9.8			0.7					15			
	8.40E		8.6	1.0	3.9			0.7					15			
	8.60E		8.4	1.5	4.6			0.7					20			
	8.80E		1.00	1.4	5.2			1.0					5			
	9.00E		1.16	1.1	5.6			0.8					15			
	9.20E		7.2	1.1	4.9			0.8					15			
	9.40E		1.00	1.4	5.0			0.9					15			
	9.60E		9.6	1.2	5.2			0.8					15			
	9.80E		1.62	1.7	6.2			1.4					20			
	10.00E		1.50	1.6	7.3			1.3					15			
	10.20E		1.34	1.1	5.0			0.9					20			
	10.40E		3.00	1.2	6.9			1.1					35			
	10.60E		2.10	6	5.2			0.7					15			
	10.80E		7.8	6	2.7			0.6					25			
2000N1	1.00E		3.80	1.1	1.19			1.3					25			(20 mesh)
2100N8	0.0E		6.6	1.1	3.5			0.8					20			
	8.20		4.8	4	2.1			0.6					20			
	8.40E		6.6	9	3.5			0.6					15			
	8.60E		2.6	8	2.7			0.5					20			
	8.80E		1.04	1.6	6.7			1.2					10			
	9.00E		9.6	1.2	4.7			1.2					25			
	9.20E		2.15	1.3	6.8			0.9					30			
	9.40E		1.40	1.3	4.1			1.1					10			
2100N9	6.0E		2.50	1.2	5.0			0.9					5			



PROJECT No. 80RR1

MIN - EN Laboratories Ltd.

DATE: Sept. 15

705 WEST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2  
PHONE (604) 980-5814

1980.

ATTENTION: G. Giroux

Sample Number	6	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
		Cu	Pb	Zn	Ni	Co	Ag	Fe	Hg	As	Mn	Au				
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppb				
81	86	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
2100N9	80E	88	10	10				02					5			
	1000E	720	9	141				09					25			
	1020E	500	13	228				08					25			
	1040E	2400	15	425				08					5			
	1060E	600	10	216				07					5			
	1080E	700	11	174				08					95			
2100N1	100E	600	12	99				09					5			
2200N8	00E	78	12	46				07					5			
	820E	115	16	206				08					25			
	840E	98	10	49				05					25			
	860E	320	15	108				13					5			
	880E	170	11	64				10					5			
	900E	3200	14	141				18					5			
	920E	210	8	61				11					5			
	940E	750	13	70				14					25			
	960E	1100	19	127				18					10			
	980E	1100	15	71				15					5			
	1000E	1050	21	149				28					20			
	1020E	1200	17	315				18					5			
	1040E	6000	14	292				12					10			
	1060E	2600	12	202				12					15			
	1080E	800	8	109				08					5			40 mesh)
2200N1	100E	1400	7	177				08					5			
2400N8	40E	170	21	286				20					25			
	860E	106	11	53				10					10			
	880E	95	12	60				11					15			
	900E	86	11	65				09					40			
	920E	230	32	112				56					85			
	940E	185	13	106				14					20			
2400N9	60E	35	3	28				04					30			

PROJECT No. **80RR1**

MIN - EN Laboratories Ltd.

DATE: **Sept. 15**

ATTENTION: **G. Giroux**

705 WEST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2  
PHONE (604) 980-5814

**1980.**

Sample Number	6	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	
	81	86	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
		Mg ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	Ag ppm	Fe ppm	Hg ppb	As ppm	Mn ppm	Au ppb				
2400N980E			175	15	55			13					20				
1000E			62	8	33			09					25				
1040E			52	18	46			09					20				
1060E			40	9	46			10					10				
1080E			82	15	60			09					10				
2400N1100E			44	15	49			11					5				(40 mesh)
2600N800E			56	13	33			11					5				
820E			62	18	78			13					15				
840E			44	12	41			09					10				
860E			56	16	65			12					5				
880E			56	18	80			15					5				
900E			35	7	62			08					5				(20 mesh)
920E			50	13	40			10					15				
940E			59	14	35			11					10				
960E			46	15	45			10					5				
980E			22	12	26			06					10				
1000E			60	16	48			12					15				
1020E			50	15	41			09					10				
1040E			16	8	11			04					25				(40 mesh)
1060E			63	14	46			13					5				
1080E			68	18	39			11					15				
2600N1100E			31	10	18			06					5				
2850N800E			61	12	34			09					10				
820E			117	20	50			12					5				
840E			51	14	33			10					5				
860E			149	10	34			10					5				
880E			840	26	126			22					5				
900E			325	20	103			18					5				
920E			590	26	63			25					20				
2850N940E			725	25	92			22					10				

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COMPAL

Montgomery Consultants

GEOCHEMICAL ANALYSIS DATA SHEET

No. 0-757

PROJECT No.:

80RR1

MIN - EN Laboratories Ltd.

DATE: Sept. 12

705 WEST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2

PHONE (604) 980-5814

1980.

ATTENTION: G. Giroux

Sample Number	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	Ag ppm	Fe ppm	Hg ppb	As ppm	Mn ppm	Au ppb
2850N9	6.0E	4.40	1.8	1.16		1.4					10
980E	6.10	2.2	1.82			1.9					10
1000E	5.30	2.1	1.39			1.8					15
1020E	5.80	2.0	1.71			1.2					15
1040E	4.00	2.0	1.23			0.9					10
1060E	1.46	1.7	1.80			1.1					20
1080E	2.60	2.0	1.65			1.4					10
2850N1	10.0E	1.50	2.0	1.82		1.0					5
3000N9	0.0E	1.12	1.5	1.51		0.9					5
920E	1.56	1.9	1.87			1.1					10
960E	7.2	1.4	1.93			1.0					10
980E	9.0	2.1	1.14			1.0					15
1000E	2.20	2.1	1.61			1.2					5
1020E	3.2	1.1	1.40			0.6					15
1040E	1.16	1.6	1.37			0.5					20
1060E	5.03	2.6	1.32			1.9					25
1080E	4.56	2.5	1.60			2.2					15
3000N1	10.0E	1.58	2.4	1.63		1.8					5
3200N8	6.0E	1.87	2.3	1.00		1.8					10
880E	2.37	2.8	1.39			1.8					10
900E	1.12	1.4	1.70			1.8					15
920E	1.53	2.0	1.48			1.3					10
940E	5.7	1.8	1.77			1.5					10
960E	5.1	2.0	1.40			1.2					15
980E	7.8	1.2	1.37			1.2					10
1000E	6.8	1.3	1.24			0.8					15
1020E	9.6	2.3	1.75			1.4					10
1040E	2.0	1.9	1.11			0.5					15
1060E	7.4	1.6	1.33			1.2					5
3200N1	0.80E	8.6	2.2	1.01		1.2					15

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GEOCHEMICAL ANALYSIS DATA SHEET

No. 0-757

PROJECT No. 80RR1

MIN - EN Laboratories Ltd.

DATE: Sept. 15

705 WEST 15th ST., NORTH VANCOUVER, B.C. V7M 1T2  
PHONE (604) 980-5814

1980.

ATTENTION: G. Giroux

Sample Number	As ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	Ag ppm	Fe ppm	Hg ppb	As ppm	Mn ppm	Au ppb			
6 81	10 90	15 95	20 100	25 105	30 110	35 115	40 120	45 125	50 130	55 135	60 140	65 145	70 150	75 155	80 160
3300N8	4.0E	1.96	1.6	5.9			1.4					5			
860E	1.34	1.1	4.3				1.2					5			
880E	1.68	1.4	4.8				1.1					15			
900E	9.5	1.4	6.4				1.0					5			
920E	9.3	1.1	7.0				1.3					10			
940E	1.68	1.5	6.2				1.4					15			
960E	1.81	1.6	7.4				1.4					10			
980E	6.7	1.3	12.3				1.2					10			
1000E	8.1	2.0	7.5				1.2					20			
1020E	6.4	1.8	5.3				1.1					15			
1040E	1.15	1.7	6.3				1.4					25			
1060E	7.3	1.8	6.5				1.1					10		(40 mesh)	
1080E	1.01	2.6	5.7				1.2					5			
3300N11	1.00E	7.5	1.4	6.7			0.9					5		(20 mesh)	
3280N9	2.0E	1.60	1.4	5.4			1.3					10		(20 mesh)	
Silt#2		5.70	1.1	1.10			1.3					10			
Silt#3		1.14	1.5	7.2			1.1					15			
3020N11	1.00E	2.05	1.4	6.3			1.3					2.0			
(Silt#4)		7.4	1.1	6.4			0.8					2.5			
3200N1	1.00E														

*[Handwritten signature]*

APPENDIX II  
STATISTICAL ANALYSIS

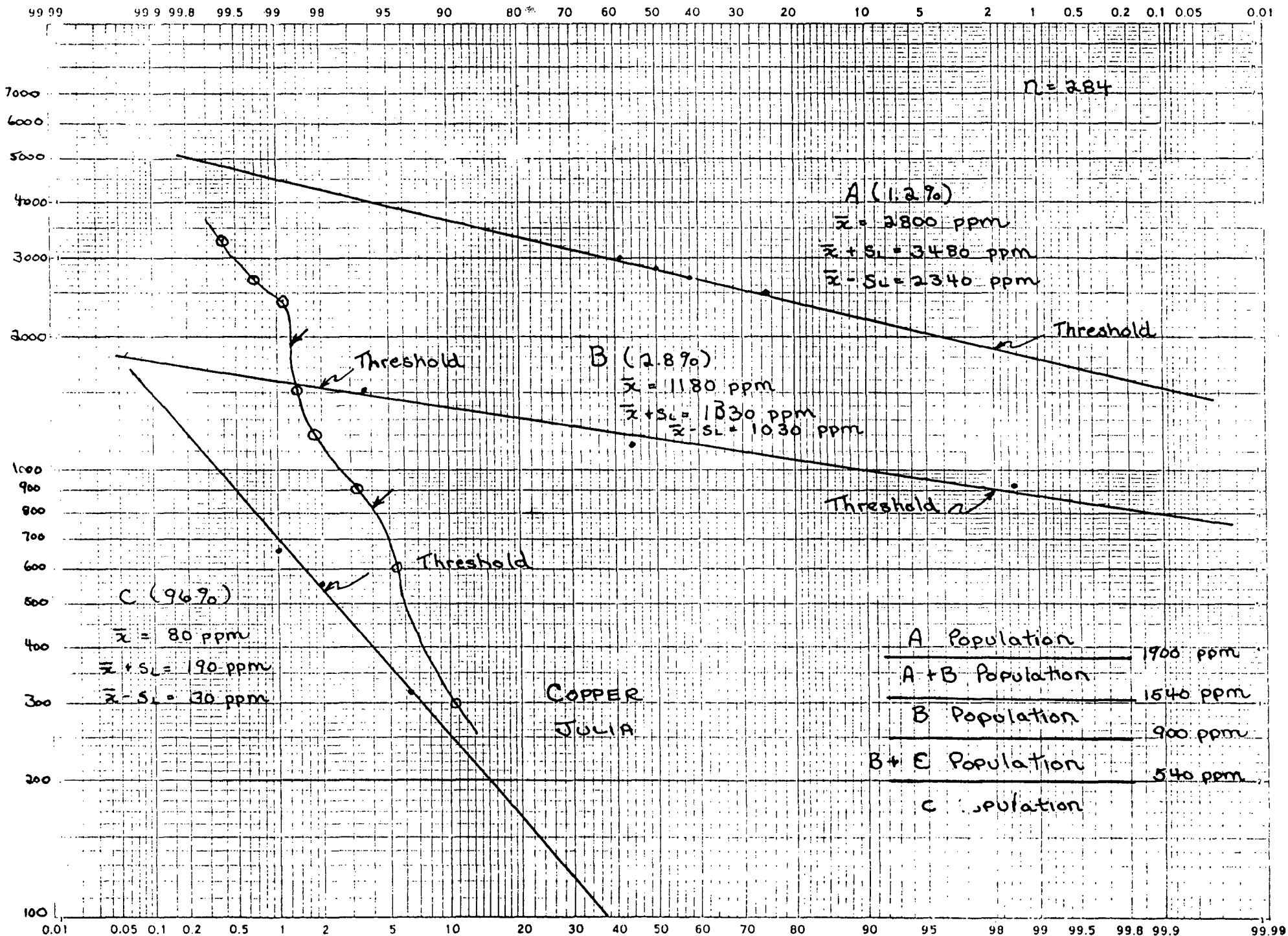
HISTOGRAM OF VARIABLE 1 CU

SYMBOL COUNT MEAN ST. DEV.  
 X 284 177.006 432.844

INTERVAL JAME																	FREQUENCY		PERCENTAGE	
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	INT.	CUM.	INT.	CUM.
* 300.00	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX*																254	254	89.4	89.4
* 600.00	+XXXXXXXXXXXXXXXXXXXX																14	268	4.9	94.4
* 900.00	+XXXXXXXXXX																7	275	2.5	96.8
* 1200.0	+XXXXX																4	279	1.4	98.2
* 1500.0	+X																1	280	0.4	98.6
* 1800.0	+																0	280	0.0	98.6
* 2100.0	+																0	280	0.0	98.6
* 2400.0	+X																1	281	0.4	98.9
* 2700.0	+X																1	282	0.4	99.3
* 3000.0	+																0	282	0.0	99.3
* 3300.0	+X																1	283	0.4	99.6
* 3600.0	+																0	283	0.0	99.6
* 3900.0	+																0	283	0.0	99.6
* 4200.0	+																0	283	0.0	99.6
* 4500.0	+																0	283	0.0	99.6
* 4800.0	+																0	283	0.0	99.6
* 5100.0	+																0	283	0.0	99.6
* 5400.0	+																0	283	0.0	99.6
* 5700.0	+																0	283	0.0	99.6
* 6000.0	+X																1	284	0.4	100.0
* 6300.0	+																0	284	0.0	100.0

HISTOGRAM OF VARIABLE 1 CU

INTERVAL	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	FREQUENCY	PERCENTAGE		
DATE																	INT.	CUM.	INT.	CUM.
* .72000 +X																	1	1	0.4	0.4
* .90000 +XXX																	3	4	1.1	1.4
* 1.08000 +XXXXX																	5	9	1.8	3.2
* 1.26000 +XXXXXXXXXXXXX																	13	22	4.6	7.7
* 1.44000 +XXXXXXXXXXXXXXXXXXXXX																	21	43	7.4	15.1
* 1.62000 +XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																	46	89	16.2	31.3
* 1.80000 +XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																	55	144	19.4	50.7
* 1.98000 +XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																	43	187	15.1	65.8
* 2.16000 +XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																	34	221	12.0	77.8
* 2.34000 +XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																	26	247	9.2	87.0
* 2.52000 +XXXXXXXXXX																	9	256	3.2	90.1
* 2.70000 +XXXXXX																	6	262	2.1	92.3
* 2.88000 +XXXXXXXXXXXXX																	11	273	3.9	96.1
* 3.06000 +XXXXXX																	5	278	1.8	97.9
* 3.24000 +XX																	2	280	0.7	98.6
* 3.42000 +XX																	2	282	0.7	99.3
* 3.60000 +X																	1	283	0.4	99.6
* 3.78000 +X																	1	284	0.4	100.0
* 3.96000 +																	0	284	0.0	100.0
* 4.14000 +																	0	284	0.0	100.0
* 4.32000 +																	0	284	0.0	100.0

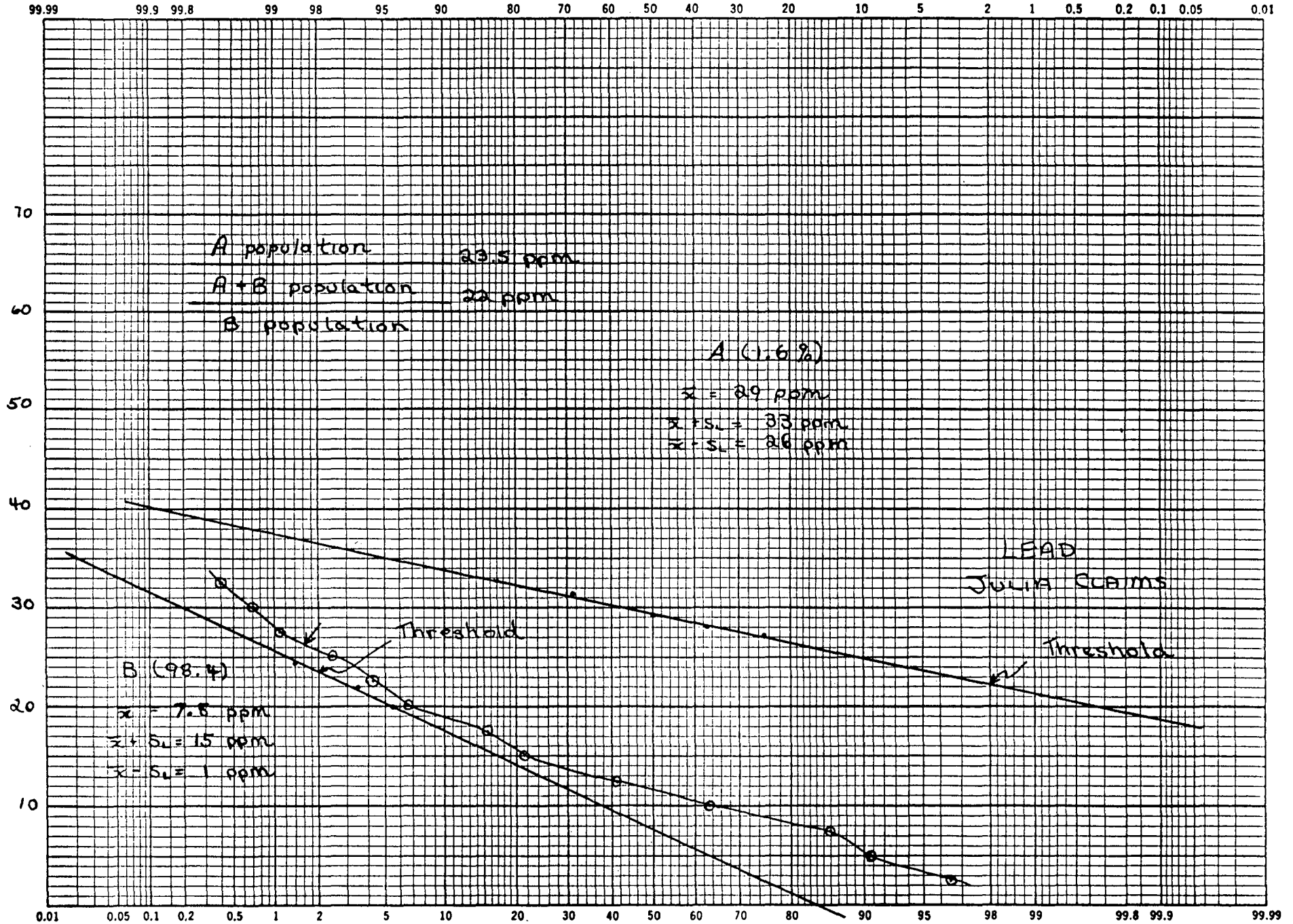


HISTOGRAM OF VARIABLE 2 PB

INTERVAL NAME	SYMBOL	COUNT	MEAN	ST. DEV.	FREQUENCY INT.	PERCENTAGE CUM. INT.
	X	284	12.299	5.545		
* 2.5000	+	10			10	3.5
* 5.0000	+	16			26	9.2
* 7.5000	+	14			40	14.1
* 10.0000	+	64			104	36.6
* 12.5000	+	63			167	58.8
* 15.0000	+	56			223	78.5
* 17.5000	+	17			240	84.5
* 20.0000	+	25			265	93.3
* 22.5000	+	7			272	95.8
* 25.0000	+	5			277	97.5
* 27.5000	+	4			281	98.9
* 30.0000	+	1			282	99.3
* 32.5000	+	1			283	99.6
* 35.0000	+	0			283	99.6
* 37.5000	+	0			283	99.6
* 40.0000	+	0			283	99.6
* 42.5000	+	0			283	99.6
* 45.0000	+	1			284	100.0
* 47.5000	+	0			284	100.0
* 50.0000	+	0			284	100.0
* 52.5000	+	0			284	100.0

HISTOGRAM OF VARIABLE 2 PB

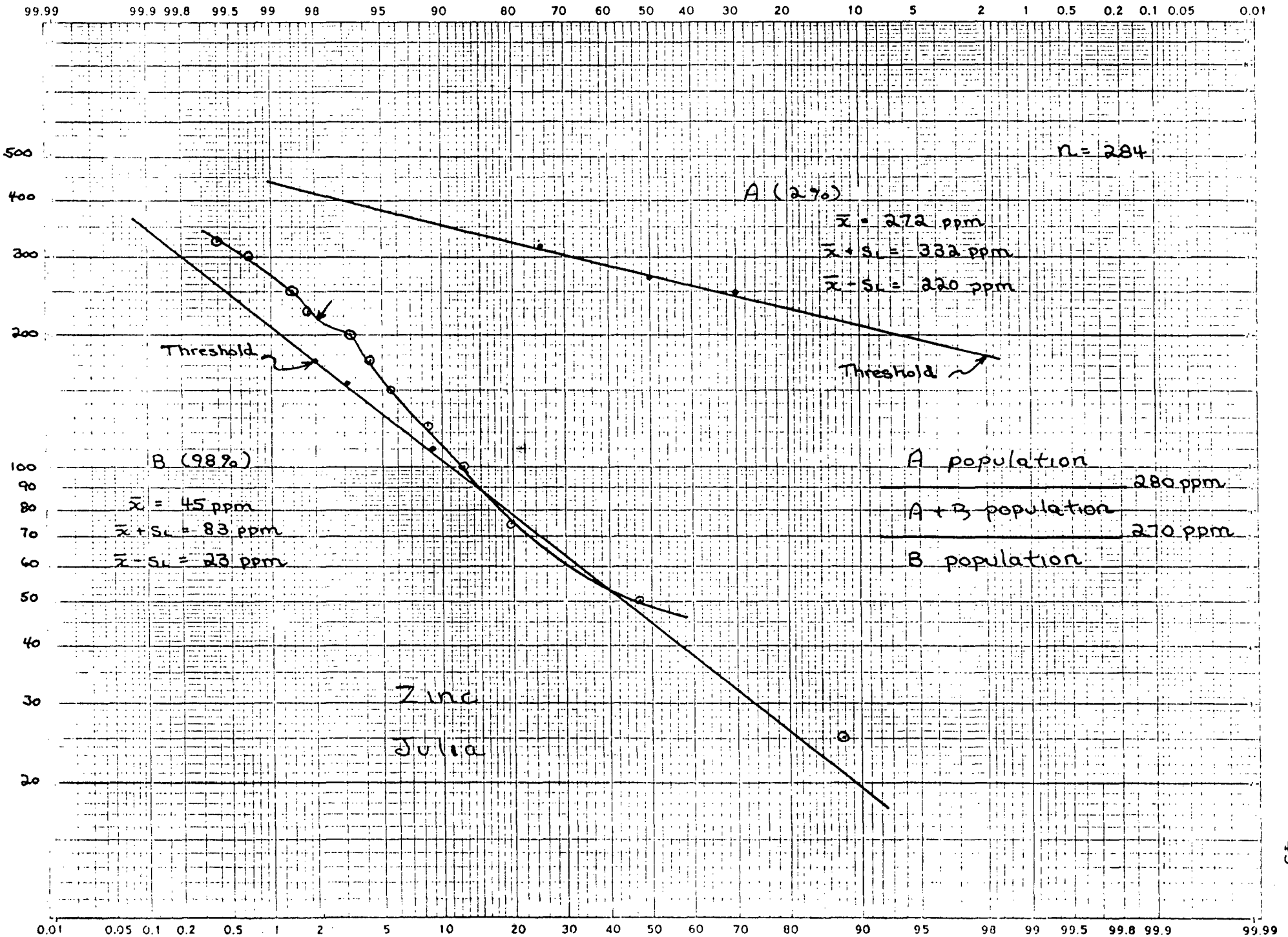
INTERVAL NAME	SYMBOL X	COUNT 284	MEAN 1.035	ST.DEV. 0.246	FREQUENCY INT.	PERCENTAGE INT.	FREQUENCY CUM.	PERCENTAGE CUM.
* .10000	+XXX				3	1.1	3	1.1
* .20000	+				0	0.0	3	1.1
* .30000	+				0	0.0	3	1.1
* .40000	+XXXXXXXX				7	2.5	10	3.5
* .50000	+XXXXXXXXXX				8	2.8	18	6.3
* .60000	+				0	0.0	18	6.3
* .70000	+XXXXXXXXXX				8	2.8	26	9.2
* .80000	+XXXXXXXXXX				8	2.8	34	12.0
* .90000	+XXXXXX				6	2.1	40	14.1
* 1.0000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX				64	22.5	104	36.6
* 1.1000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX				63	22.2	167	58.8
* 1.2000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX				56	19.7	223	78.5
* 1.3000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX				30	10.6	253	89.1
* 1.4000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXX				24	8.5	277	97.5
* 1.5000	+XXXXXX				5	1.8	282	99.3
* 1.6000	+X				1	0.4	283	99.6
* 1.7000	+X				1	0.4	284	100.0
* 1.8000	+				0	0.0	284	100.0
* 1.9000	+				0	0.0	284	100.0
* 2.0000	+				0	0.0	284	100.0
* 2.1000	+				0	0.0	284	100.0



1 JC OF VARIABLE 3 ZN

INTERVAL NAME	SYMBOL COUNT																MEAN	STDEV.	FREQUENCY		PERCENTAGE	
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80			INT.	CUM.	INT.	CUM.
* 25.000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																62.189	50.799	34	34	12.0	12.0
* 50.000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX*																62.189	50.799	118	152	41.5	53.5
* 75.000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																62.189	50.799	76	228	26.8	80.3
* 100.00	+XXXXXXXXXXXXXXXXXXXXXXXXXXXX																62.189	50.799	20	248	7.0	87.3
* 125.00	+XXXXXXXXXXXX																62.189	50.799	12	260	4.2	91.5
* 150.00	+XXXXXXXXXX																62.189	50.799	8	268	2.8	94.4
* 175.00	+XXXX																62.189	50.799	4	272	1.4	95.8
* 200.00	+XXX																62.189	50.799	3	275	1.1	96.8
* 225.00	+XXXX																62.189	50.799	4	279	1.4	98.2
* 250.00	+X																62.189	50.799	1	280	0.4	98.6
* 275.00	+																62.189	50.799	0	280	0.0	98.6
* 300.00	+XX																62.189	50.799	2	282	0.7	99.3
* 325.00	+X																62.189	50.799	1	283	0.4	99.6
* 350.00	+																62.189	50.799	0	283	0.0	99.6
* 375.00	+																62.189	50.799	0	283	0.0	99.6
* 400.00	+																62.189	50.799	0	283	0.0	99.6
* 425.00	+X																62.189	50.799	1	284	0.4	100.0
* 450.00	+																62.189	50.799	0	284	0.0	100.0
* 475.00	+																62.189	50.799	0	284	0.0	100.0
* 500.00	+																62.189	50.799	0	284	0.0	100.0
* 525.00	+																62.189	50.799	0	284	0.0	100.0

HISTOGRAM	VARIABLE	3 ZN	SYMBOL	COUNT	MEAN	ST.DEV.	FREQUENCY		PERCENTAGE											
			X	284	1.692	0.302	INT.	CUM.	INT.	CUM.										
INTERVAL NAME	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80				
* .48000	+	XX															2	2	0.7	0.7
* .60000	+																0	2	0.0	0.7
* .72000	+																0	2	0.0	0.7
* .84000	+	X															1	3	0.4	1.1
* .96000	+	XX															2	5	0.7	1.8
* 1.08000	+	XXXXXXXXXX															8	13	2.8	4.6
* 1.20000	+	XXXXX															4	17	1.4	6.0
* 1.32000	+	XXXXXXXXXXXX															10	27	3.5	9.5
* 1.44000	+	XXXXXXXXXXXXXXXX															13	40	4.6	14.1
* 1.56000	+	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX															31	71	10.9	25.0
* 1.68000	+	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX															61	132	21.5	46.5
* 1.80000	+	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX															67	199	23.6	70.1
* 1.92000	+	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX															38	237	13.4	83.5
* 2.04000	+	XXXXXXXXXXXXXXXXXXXX															17	254	6.0	89.4
* 2.16000	+	XXXXXXXXXXXXXXXXXXXX															13	267	4.6	94.0
* 2.28000	+	XXXXXXXXXX															8	275	2.8	96.8
* 2.40000	+	XXXXXX															5	280	1.8	98.6
* 2.52000	+	XXX															3	283	1.1	99.6
* 2.64000	+	X															1	284	0.4	100.0
* 2.76000	+																0	284	0.0	100.0
* 2.88000	+																0	284	0.0	100.0



HISTOR OF VARIABLE 4 AG

INTERVAL	SYMBOL	COUNT	MEAN	ST.DEV.	FREQUENCY	PERCENTAGE
NAME	X	284	0.923	0.521	INT. CUM.	INT. CUM.
* .30000	+	14			14	4.9
* .60000	+	50			64	22.5
* .90000	+	98			162	57.0
* 1.2000	+	73			235	82.7
* 1.5000	+	30			265	93.3
* 1.8000	+	1			266	93.7
* 2.1000	+	12			278	97.9
* 2.4000	+	3			281	98.9
* 2.7000	+	1			282	99.3
* 3.0000	+	1			283	99.6
* 3.3000	+	0			283	99.6
* 3.6000	+	0			283	99.6
* 3.9000	+	0			283	99.6
* 4.2000	+	0			283	99.6
* 4.5000	+	0			283	99.6
* 4.8000	+	0			283	99.6
* 5.1000	+	0			283	99.6
* 5.4000	+	0			283	99.6
* 5.7000	+	1			284	100.0
* 6.0000	+	0			284	100.0
* 6.3000	+	0			284	100.0

HISTOGRAM OF VARIABLE 4 AG

INTERVAL VALUE	SYMBOL COUNT MEAN ST.DEV.																FREQUENCY		PERCENTAGE	
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	INT.	CUM.	INT.	CUM.
*-1.0000	+XXXXX																5	5	1.8	1.8
*-.90000	+																0	5	0.0	1.8
*-.80000	+																0	5	0.0	1.8
*-.70000	+																0	5	0.0	1.8
*-.60000	+XXXXXXXXXX																9	14	3.2	4.9
*-.50000	+XXXXXXXXXX																9	23	3.2	8.1
*-.40000	+																0	23	0.0	8.1
*-.30000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																41	64	14.4	22.5
*-.20000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXX																20	84	7.0	29.6
*-.10000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXX																21	105	7.4	37.0
* 0.0000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX*																81	186	28.5	65.5
* .10000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																49	235	17.3	82.7
* .20000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																30	265	10.6	93.3
* .30000	+XXXXXXXXXXXX																12	277	4.2	97.5
* .40000	+XXXXX																5	282	1.8	99.3
* .50000	+X																1	283	0.4	99.6
* .60000	+																0	283	0.0	99.6
* .70000	+																0	283	0.0	99.6
* .80000	+X																1	284	0.4	100.0
* .90000	+																0	284	0.0	100.0
* 1.0000	+																0	284	0.0	100.0

99.99 99.9 99.8 99.5 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0.01

$n = 284$

A (6.3%)

$\bar{x} = 2.1 \text{ ppm}$   
 $\bar{x} + 5\sigma = 2.4 \text{ ppm}$   
 $\bar{x} - 5\sigma = 1.7 \text{ ppm}$

Threshold

Threshold

B (93.7%)

$\bar{x} = .88 \text{ ppm}$   
 $\bar{x} + 5\sigma = 1.2 \text{ ppm}$   
 $\bar{x} - 5\sigma = .7 \text{ ppm}$

A population	1.5
A+B population	1.4
B population	

SILVER  
JULIA CLAIMS

0.01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.5 99.8 99.9 99.99

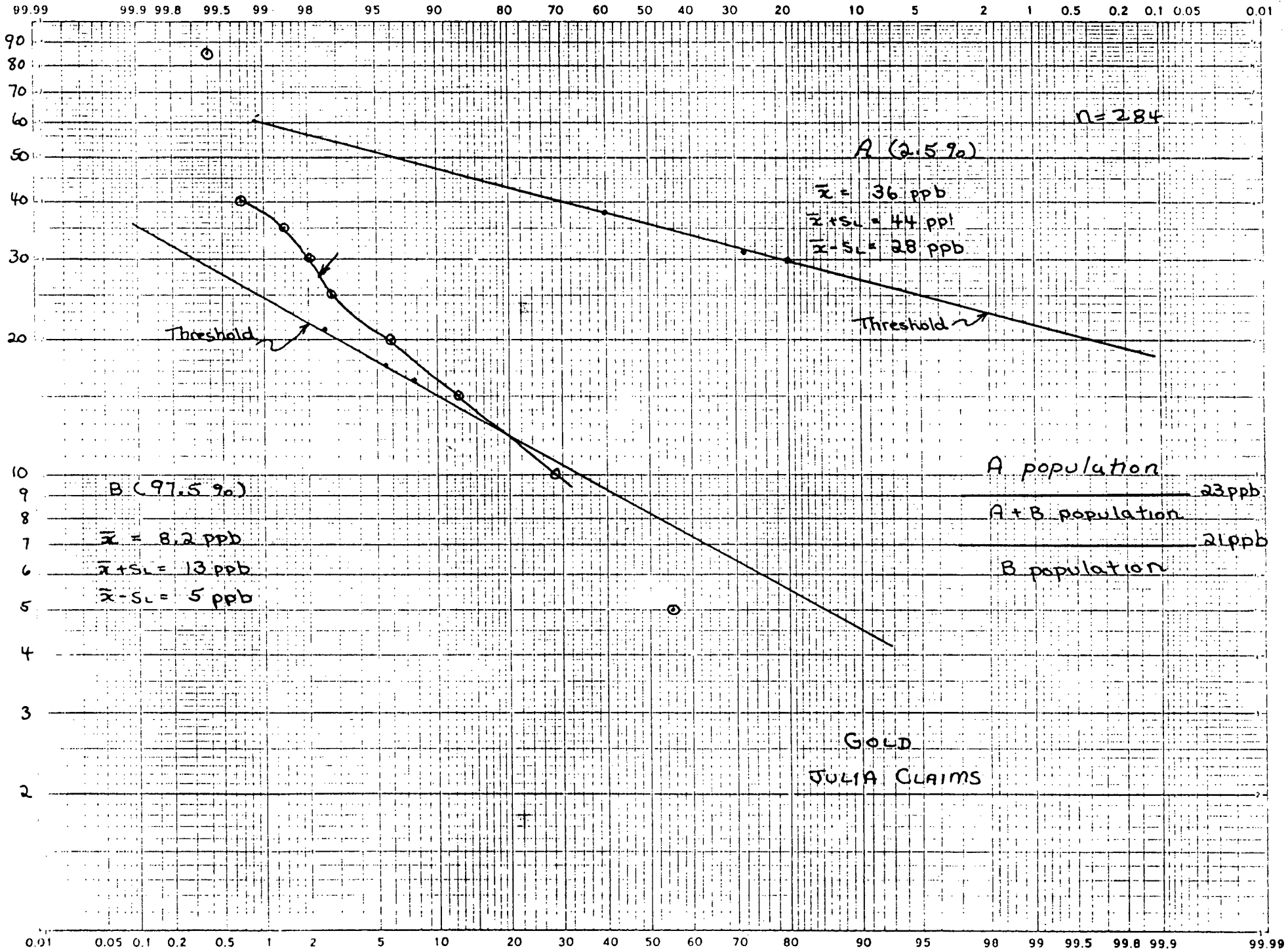
HISTOGRAM VARIABLE 5 AU

SYMBOL COUNT MEAN ST.DEV.  
 X 284 10.507 9.536

INTERVAL NAME	FREQUENCY																PERCENTAGE			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	INT.	CUM.	INT.	CUM.
* 5.0000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX*																129	129	45.4	45.4
* 10.000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																75	204	26.4	71.8
* 15.000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																44	248	15.5	87.3
* 20.000	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																19	267	6.7	94.0
* 25.000	+XXXXXXXXXX																9	276	3.2	97.2
* 30.000	+XX																2	278	0.7	97.9
* 35.000	+XX																2	280	0.7	98.6
* 40.000	+XX																2	282	0.7	99.3
* 45.000	+																0	282	0.0	99.3
* 50.000	+																0	282	0.0	99.3
* 55.000	+																0	282	0.0	99.3
* 60.000	+																0	282	0.0	99.3
* 65.000	+																0	282	0.0	99.3
* 70.000	+																0	282	0.0	99.3
* 75.000	+																0	282	0.0	99.3
* 80.000	+																0	282	0.0	99.3
* 85.000	+X																1	283	0.4	99.6
* 90.000	+																0	283	0.0	99.6
* 95.000	+X																1	284	0.4	100.0
* 100.00	+																0	284	0.0	100.0
* 105.00	+																0	284	0.0	100.0

HISTOGRAM OF VARIABLE 5 AU

INTERVAL NAME	SYMBOL COUNT MEAN ST.DEV.																FREQUENCY PERCENTAGE			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	INT.	CUM.	INT.	CUM.
* .30000 +																	0	0	0.0	0.0
* .40000 +	XXXXXXXXXXXXXXXXXXXXXXXXXX																22	22	7.7	7.7
* .50000 +																	0	22	0.0	7.7
* .60000 +																	0	22	0.0	7.7
* .70000 +	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																107	129	37.7	45.4
* .80000 +																	0	129	0.0	45.4
* .90000 +																	0	129	0.0	45.4
* 1.0000 +	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																75	204	26.4	71.8
* 1.1000 +																	0	204	0.0	71.8
* 1.2000 +	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																44	248	15.5	87.3
* 1.3000 +																	0	248	0.0	87.3
* 1.4000 +	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX																28	276	9.9	97.2
* 1.5000 +	XX																2	278	0.7	97.9
* 1.6000 +	XX																2	280	0.7	98.6
* 1.7000 +	XX																2	282	0.7	99.3
* 1.8000 +																	0	282	0.0	99.3
* 1.9000 +																	0	282	0.0	99.3
* 2.0000 +	XX																2	284	0.7	100.0
* 2.1000 +																	0	284	0.0	100.0
* 2.2000 +																	0	284	0.0	100.0
* 2.3000 +																	0	284	0.0	100.0



APPENDIX III  
EM-16  
SPECIFICATIONS

EM16 SPECIFICATIONS

MEASURED QUANTITY In-phase and quad-phase components of vertical magnetic field as a percentage of horizontal primary field. (i.e. tangent of the tilt angle and ellipticity).

SENSITIVITY In-phase :  $\pm 150\%$   
Quad-phase :  $\pm 40\%$

RESOLUTION  $\pm 1\%$

OUTPUT Nulling by audio tone. In-phase indication from mechanical inclinometer and quad-phase from a graduated dial.

OPERATING FREQUENCY 15-25 kHz VLF Radio Band. Station selection done by means of plug-in units.

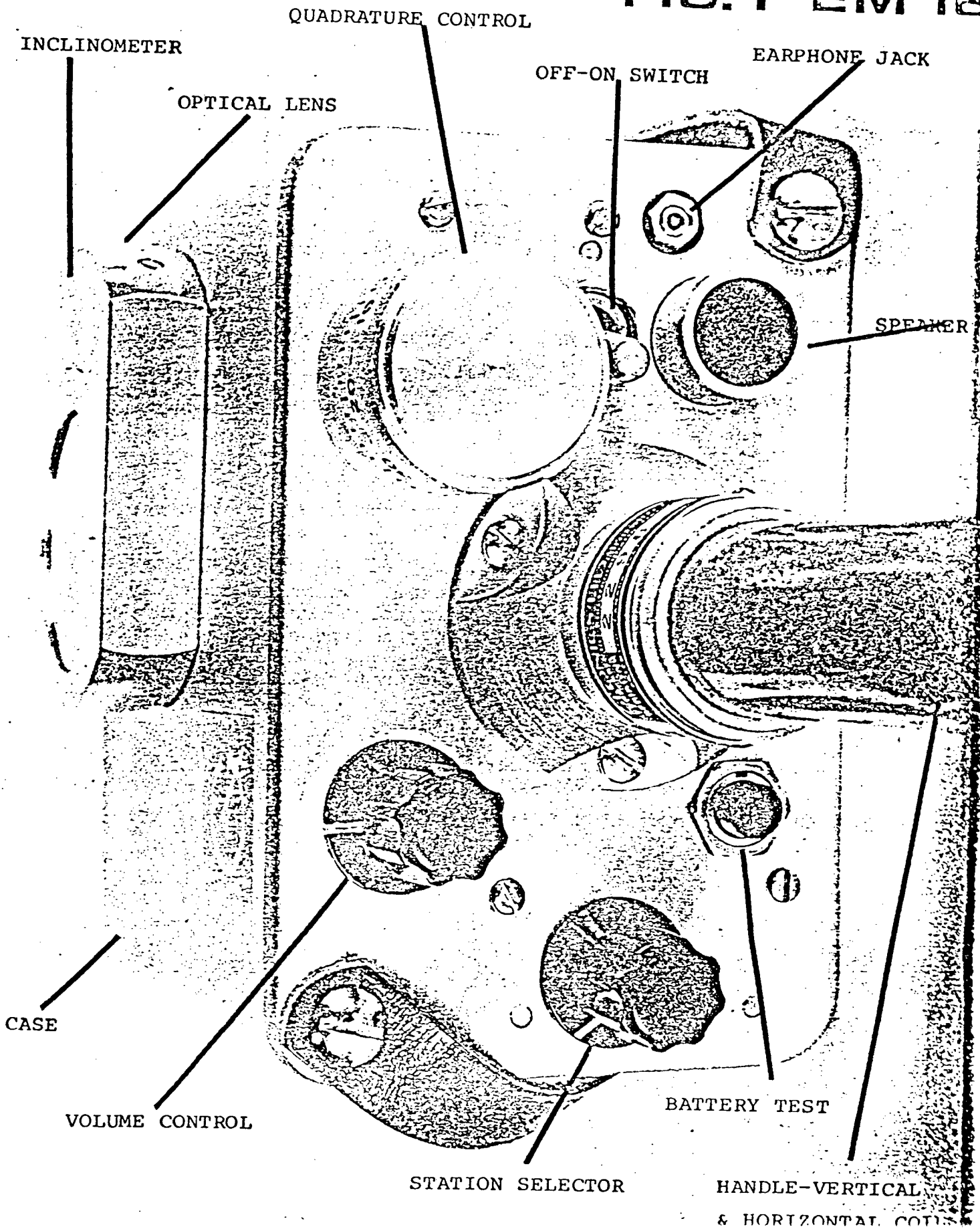
OPERATOR CONTROLS On/Off switch, battery test push button, station selector switch, audio volume control, quadrature dial, inclinometer.

POWER SUPPLY 6 disposable 'AA' cells.

DIMENSIONS 42 x 14 x 9cm

WEIGHT Instrument: 1.6 kg  
Shipping : 4.5 kg

FIG. 1 EM 16



PRINCIPLES OF OPERATION

The VLF-transmitting stations operating for communications with submarines have a vertical antenna. The Antenna current is thus vertical, creating a concentric horizontal magnetic field around them. When these magnetic fields meet conductive bodies in the ground, there will be secondary fields radiating from these bodies. (See Figures 3 & 4). This equipment measures the vertical components of these secondary fields.

The EM16 is simply a sensitive receiver covering the frequency band of the VLF-transmitting stations with means of measuring the vertical field components.

The receiver has two inputs, with two receiving coils built into the instrument. One coil has normally vertical axis and the other is horizontal.

The signal from one of the coils (vertical axis) is first minimized by tilting the instrument. The tilt-angle is calibrated in percentage. The remaining signal in this coil is finally balanced out by a measured percentage of a signal from the other coil, after being shifted by  $90^{\circ}$ . This coil is normally parallel to the primary field, (See instrument Block Diagram - Figure 2).

Thus, if the secondary signals are small compared to the primary horizontal field, the mechanical tilt-angle is an accurate measure of the vertical real-component, and the compensation  $\sqrt{2}$ -signal from the horizontal coil is a measure of the quadrature vertical signal.

Some of the properties of the VLF radio wave in the ground are outlined by Figures 4 thru 9.

ACCOMPANYING NOTES FOR FIGURES 2 - 9

FIGURE 2 is the block diagram of the EM16. The diagram is self-explanatory. Both the coils (reference and signal coil) are housed in the lower part of the handle. The directions of the axis of the coils are as follows: The reference coil axis is basically horizontal and is kept more or less parallel to the primary field during measurement. The signal coil is at right angles to the reference coil and its axis is, of course, vertical.

The signal amplifier has the two inputs, one connected to the signal coil and one to the reference channel. By tilting the coils, the operator minimizes the signal from the signal (vertical axis) coil. Any remaining signal is reduced to zero by the quadrature control in the reference channel. The signal amplifier has zero output

FIGURE 2 Continued...

when both input signals are equal in amplitude and phase. Thus, the setting of the quadrature control for minimum output from the receiver indicates the relative amount of the quadrature signal of the vertical coil. The measured value does not depend on the absolute value of the signal, only the relative values are measured.

FIGURE 3 shows the proper planning of survey, in relation to the direction of strike and primary field, direction of survey lines etc.

FIGURE 4 explains the time delay (phase lag)  $\phi$  of travelling electromagnetic wave above and in the conductive ground. The amplitude of the wave in the ground is also attenuated.

FIGURE 5 shows on the left the physical direction of the primary ( $H_x$ ) and secondary ( $H_z$ ) field vectors in relation to conductive ground and target. The location of secondary current distribution in the target is shown schematically. We see that most current concentration is in the upper edge of the good conductor. The return secondary current is more spread due to the diminishing primary field in the conductive rock. On the right, the time vectors show the retarded phase of  $H_x$  in the target and the phase advance of the secondary field  $H_z$  compared to  $H_x$ . We must remember that the  $H_z$  will have additional phase lag when it penetrates back towards the surface.

This figure shows a positive real component of the  $H_z$  while the quadrature remains negative.

FIGURE 6 This graph shows the primary field attenuation in nepers, relative amplitude and phase lag in radians of the primary field as function of depth and conductivity of the ground. This graph is for 20 kHz.

FIGURE 7 shows the maximum obtainable amplitude  $H_z$  from a sphere or horizontal cylinder as a function of the radius-to-depth ratio. The schematic on the left shows the depth determination for the spherical or cylindrical target.

FIGURE 7 Continued...

The equation for the phase shift and attenuation of the primary field in conductive material, where  $\sigma/\epsilon\omega \gg 1$  is as follows:

$$\alpha = \beta = \sqrt{\frac{\omega\mu\sigma}{2}}$$

where  $\alpha$  = attenuation, nepers/m

$\beta$  = phase lag, radian/m

$\omega$  =  $2\pi f$

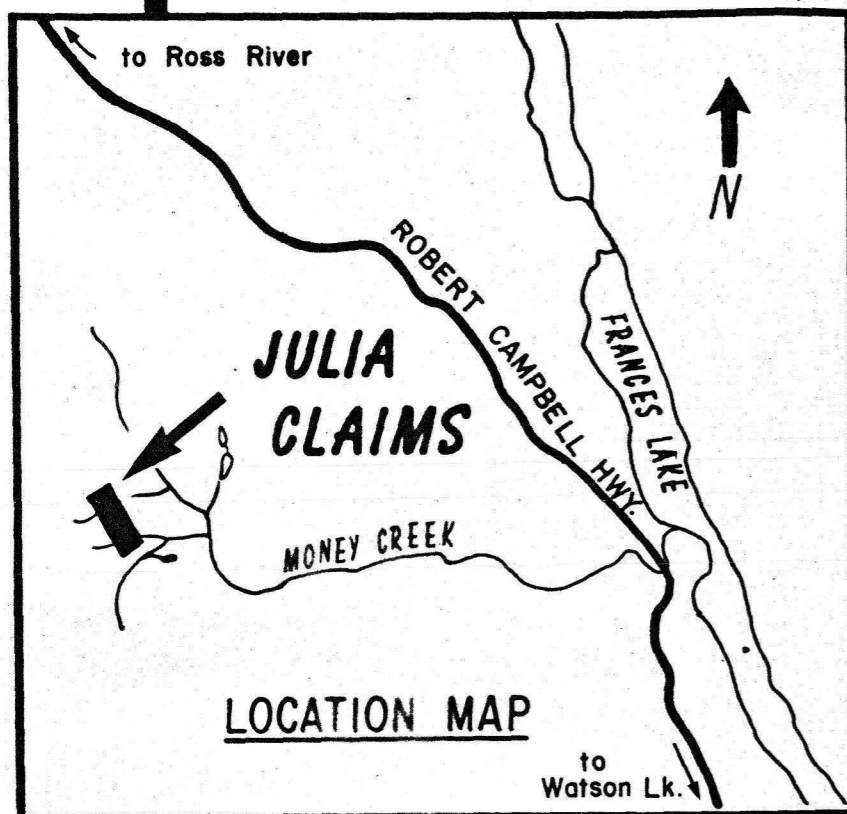
$\mu$  = magn. permeability =  $4\pi \times 10^{-7}$

$\sigma$  = mhos/m

FIGURE 8 This graph gives the amplitude and phase shift of the field (in conductive media) as function of skin depth,  $\delta = 1/\alpha$ .

This equation gives the skin-depth in meters for certain conductivity and frequency. Normalize this to one, and the graph in Figure 8 gives the amplitude and phase shift of the wave at any relative depth.

FIGURE 9 The vertical field from a long wire source is plotted here. A vertical semi-infinite sheet target would be simulated this way. In practice it hardly works accurately due to the spread of the secondary current in the target because of the finite conductivity and the attenuation and phase shift of the primary field as function of depth.



TRACE OF PYRITE-AURIFEROUS ZONE  
IN CONFORMABLE ACIDIC HORIZON ②

Leached siliceous gossan  
appears to be dip slope  
exposure

Prominent pyritic gossan  
(transported)

Massive banded  
sulphides preserved in  
creek bed.  
Angular blocks to one  
metre square composed  
of pyrite & chalcopyrite.

Probable trace of zone  
obscured by talus

NOTE: The mineral zone is enclosed in structureless  
altered green volcanic rocks including flows,  
tuffs & pyroclastic breccias.

**LEGEND**

- MINERAL ZONE (observed, projected)
- CREEK
- CONTOUR
- CLAIM BOUNDARY
- TREE LINE

AFTER J.A.O.C., WELCOME NORTH MINES LTD.

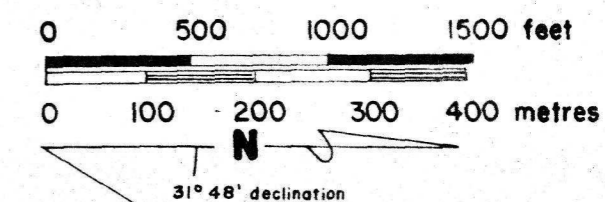
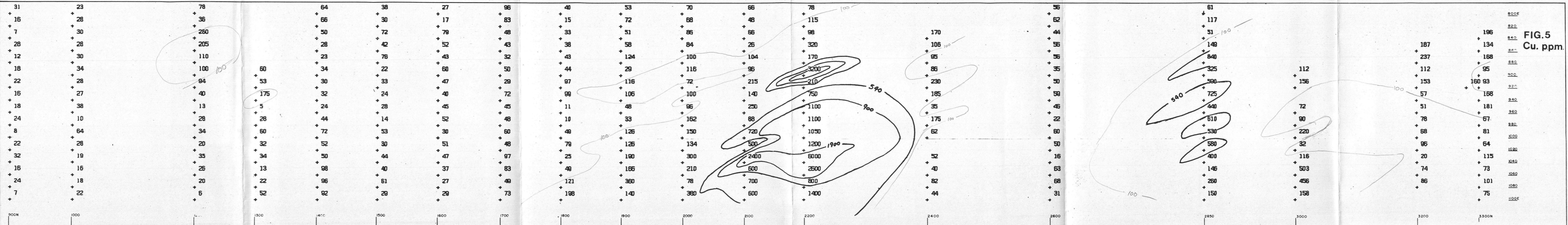


Figure 4  
SAMPLE LOCATIONS

**JULIA CLAIMS**

ARBOR RESOURCES INC.  
MONTGOMERY CONSULTANTS LIMITED  
N.T.S 105 H/5 JUNE 1981.



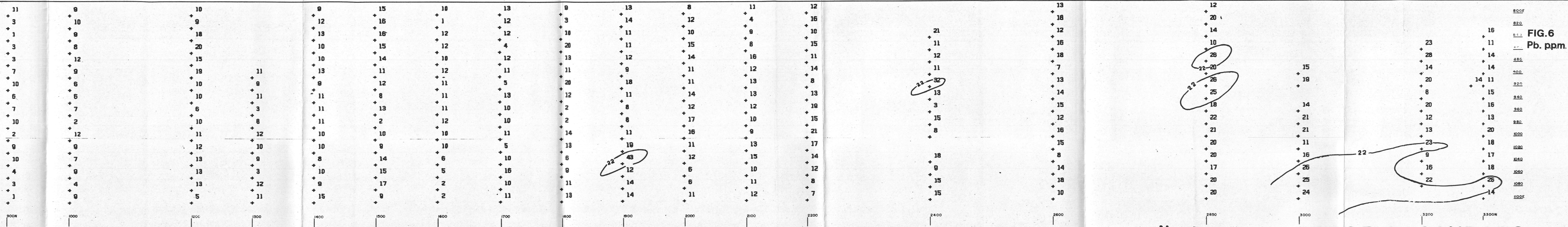
**FIG.5**  
Cu. ppm.

**ARBOR RESOURCES INC.**

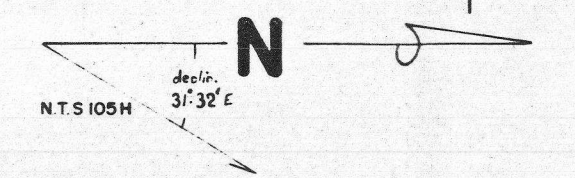
JULIA CLAIMS - Geochemical Survey  
Montgomery Consultants Ltd

SCALE 1:2,500  
0 50 100 150 200 M

June 1981

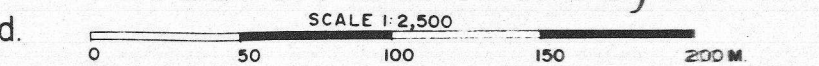


**FIG. 6**  
Pb. ppm.



**ARBOR RESOURCES INC.**

JULIA CLAIMS - Geochemical Survey  
Montgomery Consultants Ltd.



June 1981

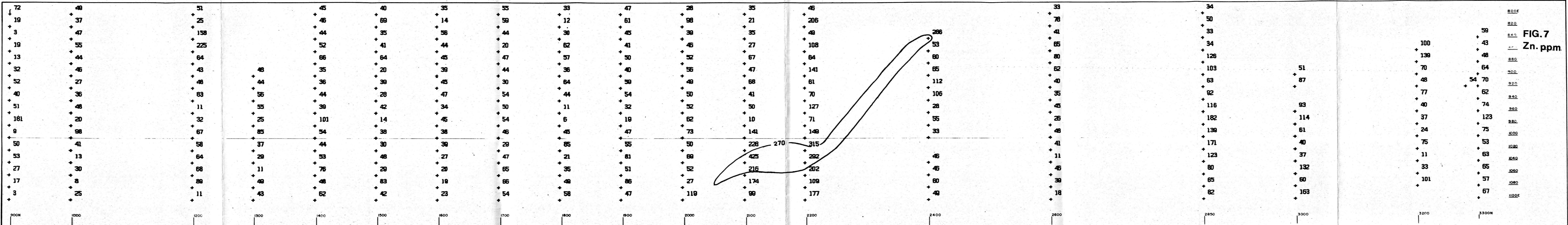
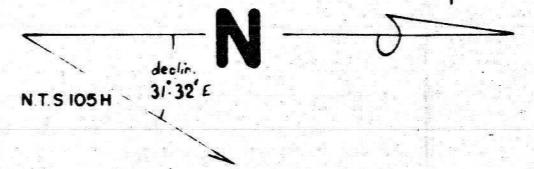


FIG. 7  
Zn. ppm.



**ARBOR RESOURCES INC.**

JULIA CLAIMS - Geochemical Survey  
Montgomery Consultants Ltd.

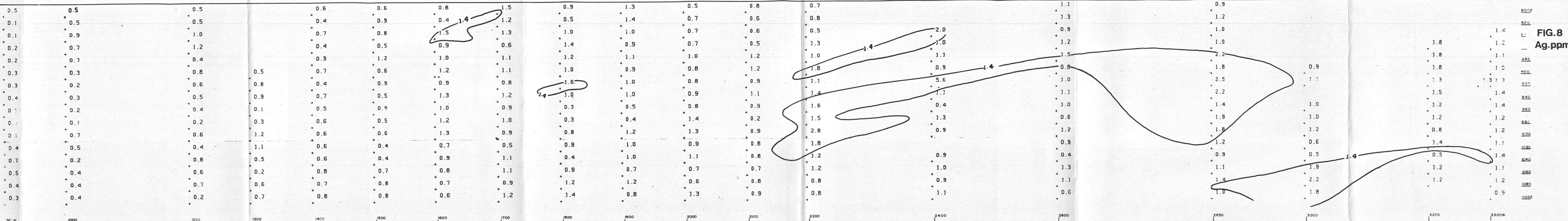
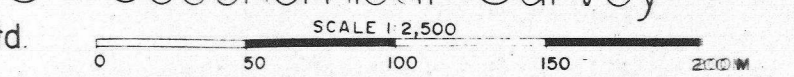


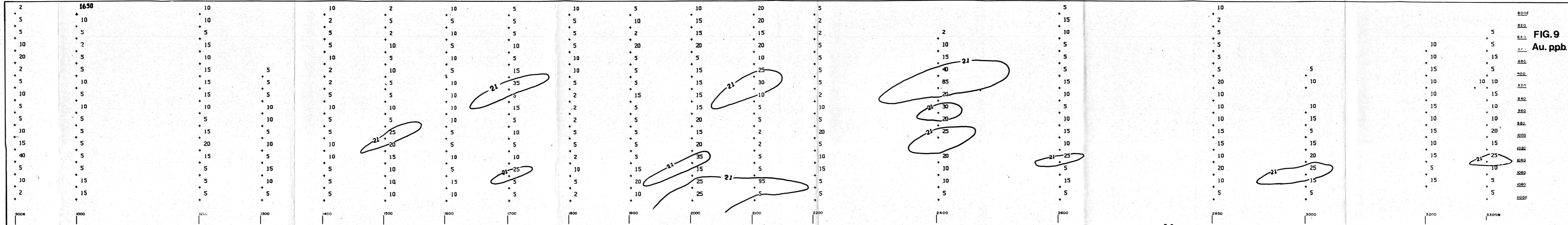
FIG. 8  
Ag.ppm.



**ARBOR RESOURCES INC.**  
JULIA CLAIMS - Geochemical Survey  
Montgomery Consultants Ltd.



June 1981



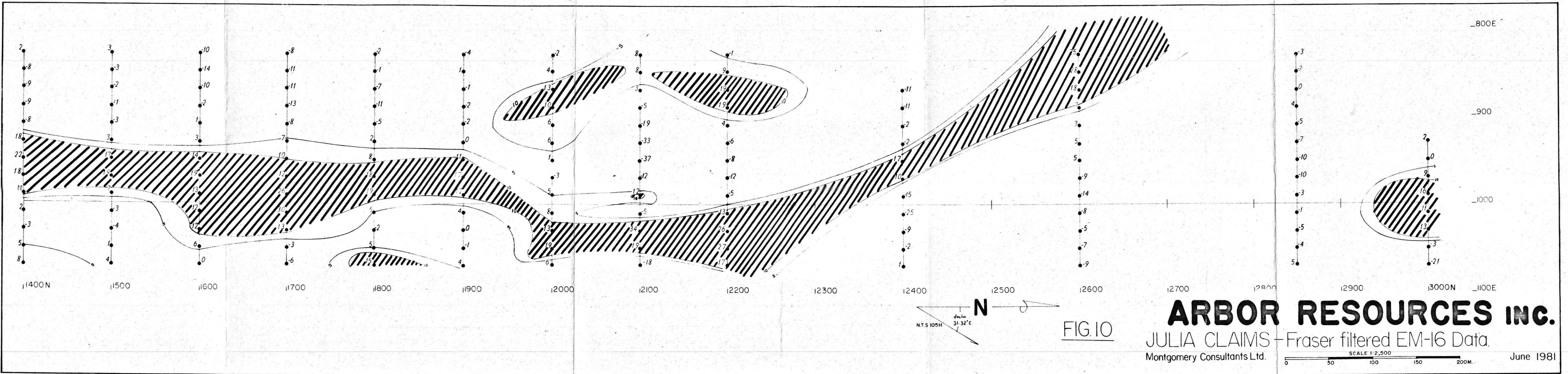


FIG. 10

**ARBOR RESOURCES INC.**  
 JULIA CLAIMS - Fraser filtered EM-16 Data.  
 Montgomery Consultants Ltd.  
 SCALE 1:2,500  
 June 1981