REPORT ON THE

IP-SURVEY

COTTONBELT Pb/Zn OCCURRENCES

40 MILES N OF REVELSTOKE, B.C.

NTS 82 M 7

CLAIMS: T, SNAKE EYES, COTTON, BLACK JACK
NEVADA, VEGAS

KAMLOOPS MINING DIVISION

BY JOHN W. KIELEY
METALLGESELLSCHAFT CANADA LIMITED

TABLE OF CONTENTS

1. INTRODUCTION

Work for which assessment credit is requested on mineral claims T, Snake Eyes, Cotton and Black Jack of United Mineral Services Ltd. and Nevada and Vegas of the Adams Brothers consisted of line cutting and a program of geophysical surveys. These surveys were undertaken during September and October 1977 on behalf of Metallgesellschaft Canada Ltd. (Vancouver) which, together with its partner Cyprus Anvil Mining Corporation, holds the above-mentioned claims under option.

This report is a compilation of these surveys.

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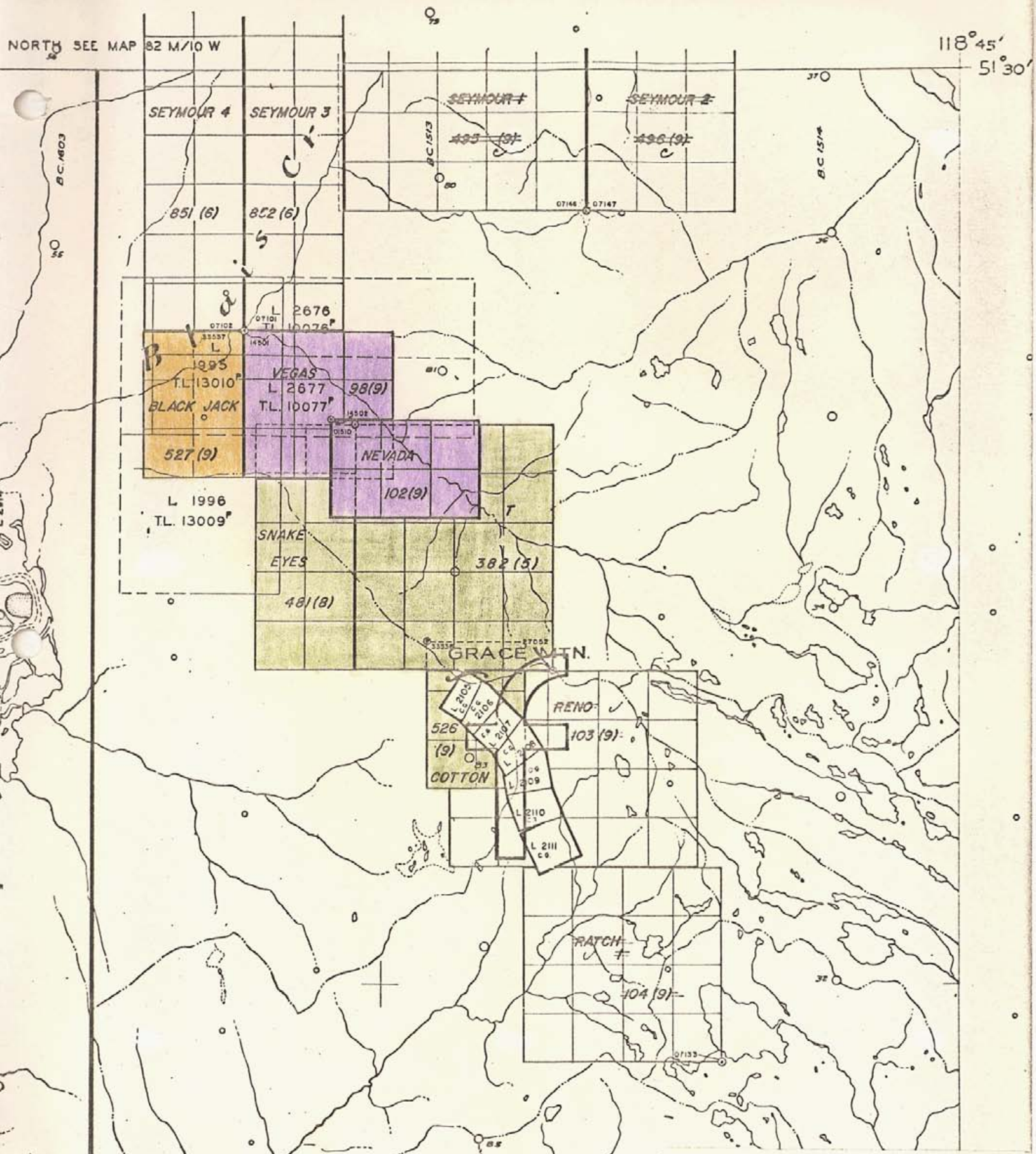

Part of Claim Map M 82M/7W
Scale 1 : 50,000
of January 26, 1978

2. LOCATION AND ACCESS

The Grace Mountain/Cottonbelt area is located approximately 65 kilometers northwest of Revelstoke in the Kamloops Mining Division, NTS 82 M 6.

Access to the property is primarily by helicopter from Revelstoke although remains of the old haulage trail of the early 1900's could be followed from Seymour Arm.

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GENERAL LOCATION MAP

Scale: appr. 1:2,400,000

Source: B.C. Ministry of Tourism

3. LINE CUTTING

As preparation for the IP survey 29.3 km of lines were cut.

The baseline had a strike of 145°. Crosslines were cut every 250 m. The grid is shown on the attached map.

4. ABSTRACT OF METHOD

The principle of induced polarization method can be demonstrated by causing a direct current to flow through the ground for a short period of time and then interrupting it. Polarization charges are built up at metallic interfaces while this current is flowing. After the current is turned off the charges cause a decay current to flow, the presence of which may be indicative of a metallic deposit. The decay currents can be measured and observed through potential electrodes connected to a meter display. Diagnostic apparent resistivity in ohm-meters, apparent chargeability in milliseconds, and metal factor may be obtained from field data.

5. METHOD AND PROCEDURE

Measurements of the decay of voltage were made in the time domain, also referred to as pulse transient measurements. The pole-dipole array, with values of N from 1 - 4, where N = 100 meters, and with electrode spacing "a" of 100 meters, was used.

The system consists of three units: receiver, transmitter and motor generator. The transmitter, which obtains its power from a 7.5 kw, 400 cycle generator driven by a gasoline engine, injects current into the ground at current electrode C_1 , a non-polarizing metal stake. C_2 , located effectively at "infinity", was earthed some 3 km distant. The receiver makes measurements of observed voltages across potential electrodes P_1 and P_2 .

In practice, the equipment is set up at a particular station along the line to be surveyed: current electrode C_1 is earthed and connected by cable to the immovable power source; the receiving dipoles, consisting of porous pots filled with $CuSO_4$ (an electrolyte copper sulphate solution) are laid out a pre-arranged "a" meters apart.

Salt water solutions at C_1 and freshwater wettings at P_1 and P_2 help to assure good electrical contact. Two passes were required over each line to obtain values of N from 1 - 4. Measurements were made by nulling a meter with a calibrated compensator circuit. Any self-potential existing between potential electrodes is bucked out semi-automatically.

6. DATA PRESENTATION

The survey results are presented in contoured plan and illustrate the apparent chargeability in milliseconds, the apparent resistivity in ohm-meters, and the metal factor as a function of chargeability and resistivity.

Maximum apparent chargeability values for N = 1 to 4 have been transferred into geologic sections to represent the expected anomaly axis location.

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7. RESULTS

Test lines over the known mineralization on lines 50 S, 600 N, and 1100 N showed that the known galena-sphalerite-pyrite horizon can be picked up with IP measurements. Obviously, the thin mineralized horizon has a halo of disseminated pyrite rendering IP detection possible.

Between line 1100 N and line 1600 N a distinct IP anomaly occurs at depth of four times background chargeability values connected with a resistivity low. This anomalous zone could project onto the continuation of the extrapolated ore horizon. Two ddh are proposed to test this anomaly.

APPENDIX I

INSTRUMENTATION & SPECIFICATIONS

INSTRUMENTATION AND SPECIFICATIONS

HUNTEC 7.5 kw Transmitter System

I.	Console	- Dimensions	:	53 x 43 x 43 cm
		Weight	:	34 kg
		Output	:	375 to 5000 Volts DC 8 amps maximum
		Input	:	400 cps, 120/208 volts, 7.5 KVA
		Timing cycle	:	"ON" time - 2 seconds "Off" time - 2 seconds
II.	Generator set	- Dimensions	:	106 x 43 x 66 cm
		Weight	:	102 kg
		Engine	:	1LO Model, 2 stroke
		Output	:	13.5 HP @ 3600 RPM
		Alternator	:	3 phase, 120/208 Volt, 400 cps
		Output	:	7.5 KVA, 20.8 amps/phase
III.	Dummy Load	- Dimensions	:	23 x 25 x 51 cm
		Weight	:	10 kg

CRONE-NEWMONT N-1V Receiver System

I.	Console	- Dimensions	:	31 x 27 x 16 cm
		Weight	:	4 kg
		Power source	:	5 of "C" cells, 1.5 volts each 1 of 9 Volt transistor
		Current Cycle:		"ON" time - 2 seconds "Off" time - 2 seconds

Unit of measurement: chargeability in milliseconds

APPENDIX II

STATEMENT OF QUALIFICATION

STATEMENT OF QUALIFICATION

I, John W. Kieley, with residence at P.O. Box 611, Kaslo, B.C., declare:

1. that I graduated from Cambrian College of Applied Arts and Technology, Sudbury (Ontario) with a diploma in geology in 1974.

2. that since graduation I have been employed as exploration geophysical technician in 7 provinces and both territories.

3. that at the time of surveys I was employed as geophysical technician for Metallgesellschaft Canada Ltd. of 324-602 West Hastings Street, Vancouver, B.C.

4. that I have no interest whatsoever in the mineral claims under consideration.

5. that I performed the geophysical surveys in conjunction with Peter E. Walcott & Associates, geophysical consultants, as part of a program of Metallgesellschaft Canada Ltd. and Cyprus Anvil Mining Corporation in the Grace Mountain/Cotton-belt area in September and October 1977 and collected data on which this report is based.

John W. Kieley

Vancouver, B.C.
May 31st, 1978

APPENDIX III

STATEMENT OF COSTS

STATEMENT OF COSTS

1. Salaries and wages

Mr. John Kieley, geophysical technician concerned with IP measurements and supervising line cutting		
August 27 to September 7, field days	12 days	
August 25, 26 and September 8, travel days	3 days	
September 24 to October 6, field days	13 days	
September 23, October 7, travel days	2 days	
Report writing & map preparation	2 days	
	32 days @ $ 80 =	$ 2,560.00
Helgard Wellmer 0.5 day for typing		$ 25.00

2. Contractors

a) Peter E. Walcott & Assoc. with 4 helpers for IP measurements and initial line cutting August 25 to September 8, September 27 to October 6	$ 13,364.40
b) Scope Exploration Services Ltd. line cutting, September 21 to September 28	$ 4,750.00

3. Other

Truck transportation Vancouver - Revelstoke - Downie Creek - Vancouver, 2 round trips 1760 miles @ 20 ¢/mile	$ 352
Helicopter service	6,592.61
Field supplies	1,352.40
Field equipment	723.17
Maps, prints, air photos	61.05
	$ 9,081.23
total cost:	$ 29,780.63

APPENDIX IV

STATEMENT OF WORK &

DISTRIBUTION OF COSTS

STATEMENT OF WORK AND DISTRIBUTION OF COSTS

The geophysical work on the Cottonbelt property took place in two stages. In the first campaign from August 27 to September 7 1977 test measurements over the known mineralization and along the baseline were carried out to see if the mineralization could be picked up by IP measurements.

After successful results were obtained a larger grid was cut and the IP survey then completed between September 27 and October 6 1977.

The line cutting and the IP survey cover claims of the Grace group (T, Cotton, Snake Eyes) of United Mineral Services Ltd. and of the McLeod group (Nevada and Vegas) of the Adams Brothers. The baseline, however, extends into the Black Jack claims of United Mineral Services. Part of the IP survey and line cutting work had to be done outside of the claim groups.

	Grace Group	McLeod Group	Black Jack	Outside
Line Cutting	55 %	11 %	1 %	33 %
IP Survey	80 %	6 %	0 %	14 %

The direct costs of the IP survey and the line cutting have been applied accordingly to the relevant claim groups.

The supporting costs (such as helicopter services, travel expenses, camp equipment etc.) have been allocated to all 3 claim groups in a way so as to reflect the actual amount of work and expenditure as originated by topographical difficulties on the following basis:

Grace Group 60%
McLeod Group 35%
Black Jack Claims 5%

Costs for Grace Group

1. Salaries and wages 70% of $ 2,585	$ 1,809.50
2. Contractors a) IP Survey 80% of $ 13,364.40	10,691.52

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b) Line cutting	
55% of $ 4,750	$ 2,612.50
3. Other supporting costs	
60% of $ 9,081.23	5,448.74
	$ 20,561.76

20,563.26

Costs for McLeod Group (Mountain Drams / Adams Bros)

1. Salaries and wages	
9% of $ 2,585	$ 232.65
2. Contractors	
a) IP Survey	
6% of $ 13,364.40	801.86
b) Line cutting	
11% of 4,750.00	522.50
3. Other supporting costs	
35% of $ 9,081.23	3,178.43
	$ 4,735.44

Costs for Black Jack Claims (UM 5)

1. Salaries and wages	
1% of $ 2,585	$ 25.85
2. Contractor	
- Line cutting	
1% of $ 4,750.00	47.50
3. Other supporting costs	
5% of $ 9,081.23	454.06
	$ 527.41

F. W. Wellmer

Dr. F.-W. Wellmer
Exploration Manager - Western Canada
Metallgesellschaft Canada Ltd.

UTM (m)

5704000 NORTH

5703000

5702000

5701000

5700000

5699000 NORTH

5714000

5713000

5712000

5711000 EAST

5710000

5709000

5708000

5707000

5706000

5705000

5704000 NORTH

UTM (m)

T-CLAIM

GRACE MT.

CROWN GRANTED CLAIMS

COTTON

NEVADA

VEGAS

SNAKE EYES

BLACK JACK

INGA CREEK

BASE LINE

BLACK CREEK

METALLGESELLSCHAFT CANADA LTD

SHUSWAP JOINT VENTURE
COTTONBELT CLAIMS

AUTHOR:	SCALE: 1:5,000	DATE: NOV. 1977
NTS MAP SHEETS: 1:250,000 82 M	1:50,000 7 W	
COORDINATES:		
DRAFTED:	APPROVED:	

F.W. Walker

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT

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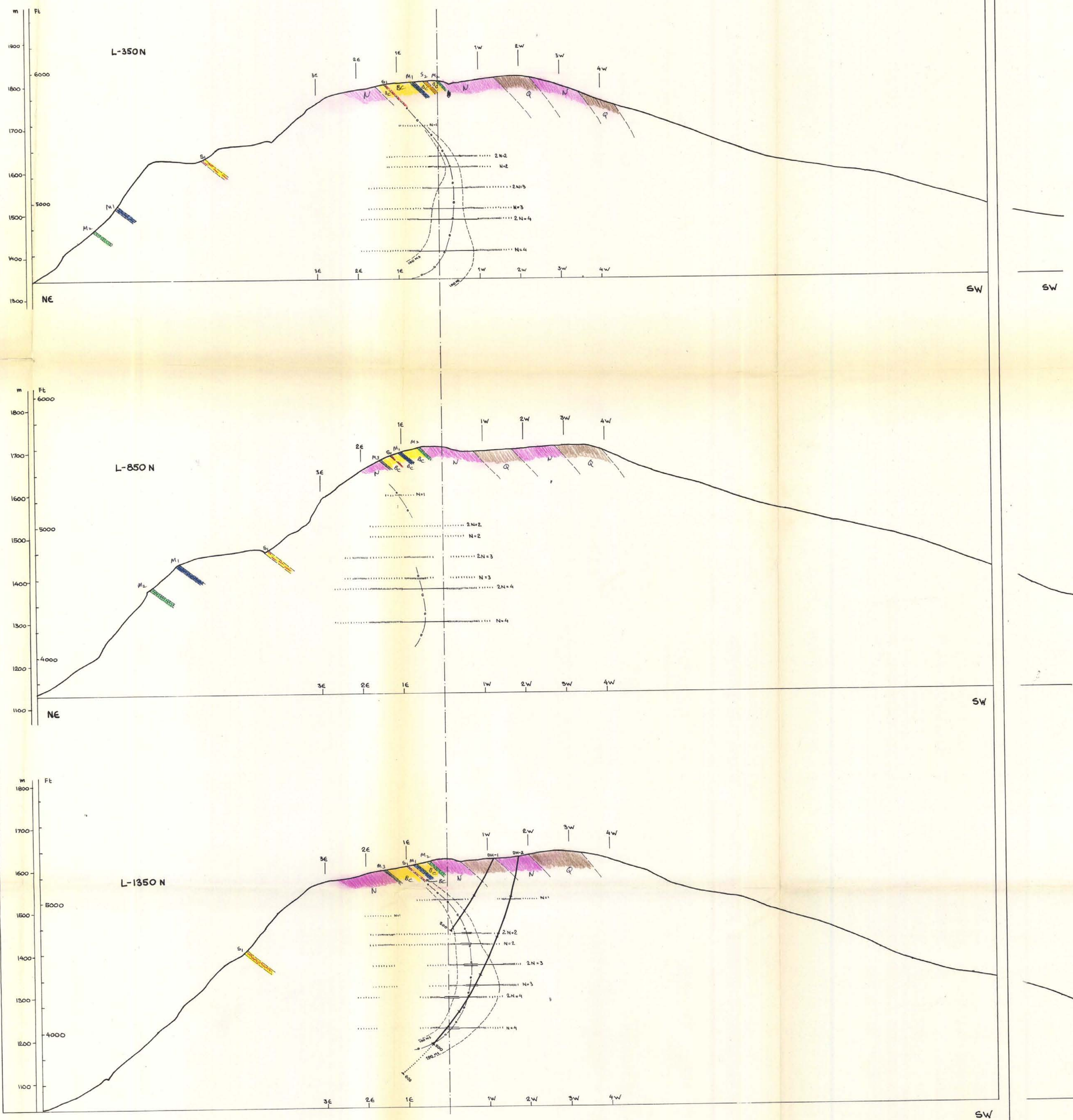


IP CHARGEABILITY: (MILLISECONDS)

- 120 AND OVER
- 100 - 119
- 90 - 99
- 80 - 89
- (N) AXIS OF ANOMALY FOR N=1 TO N=4 LEVELS AT 100m DEPTH INTERVAL
- (2N) N=1 TO N=4 AT 75m DEPT INTERVAL

ORE HOST SEQUENCE:

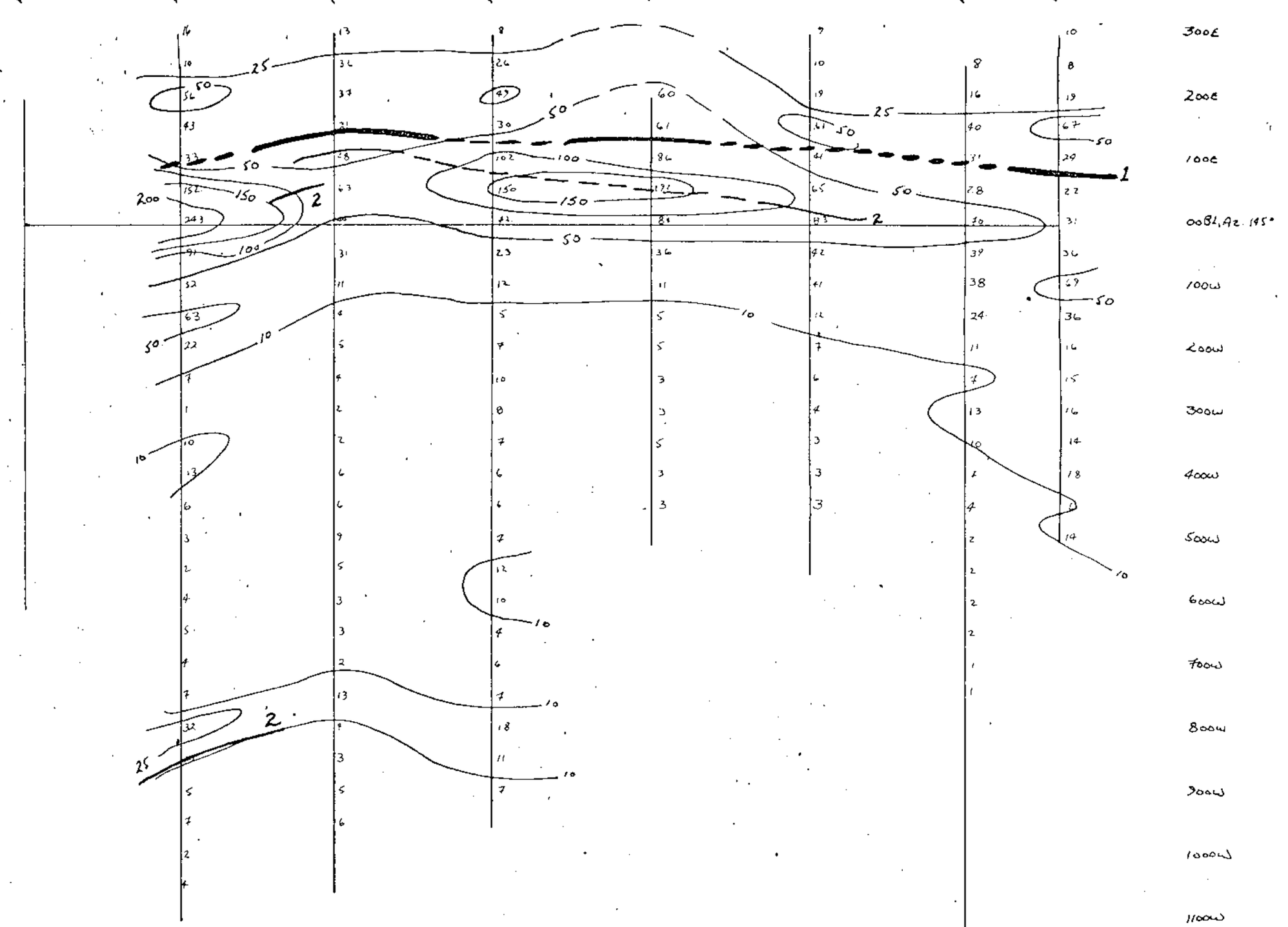
- S_1 ORE-BEARING SULPHIDE HORIZON (FeS, FeS_2, PbS, ZnS)
- S_2 PREDOMINANTLY FE SULPHIDES
- M_1 WHITE MARBLE WITH ANDALUSITE
- M_2 RUSTY MARBLE
- M_3 GREY MARBLE,
- BC BIOTITE-CARBONATE GNEISS

MAIN SEQUENCE:

- N BIOTITE GNEISS
- Q QUARTZITE
- A AMPHIBOLITE

METALLGESELLSCHAFT CANADA LTD		
SHUSWAP JOINT VENTURE COTTONBELT CLAIMS		
AUTHOR: D.C. KOVACIK	SCALE: 1:5,000	DATE: NOV. 1977
NTS MAP SHEET: 1:250,000 82 M	1:50,000 7 W	

T. W. Willmer



MF - METAL FACTOR $\frac{N_2}{P_2}$

$N = 1$

CONDUCTOR AXIS : OBSERVED —

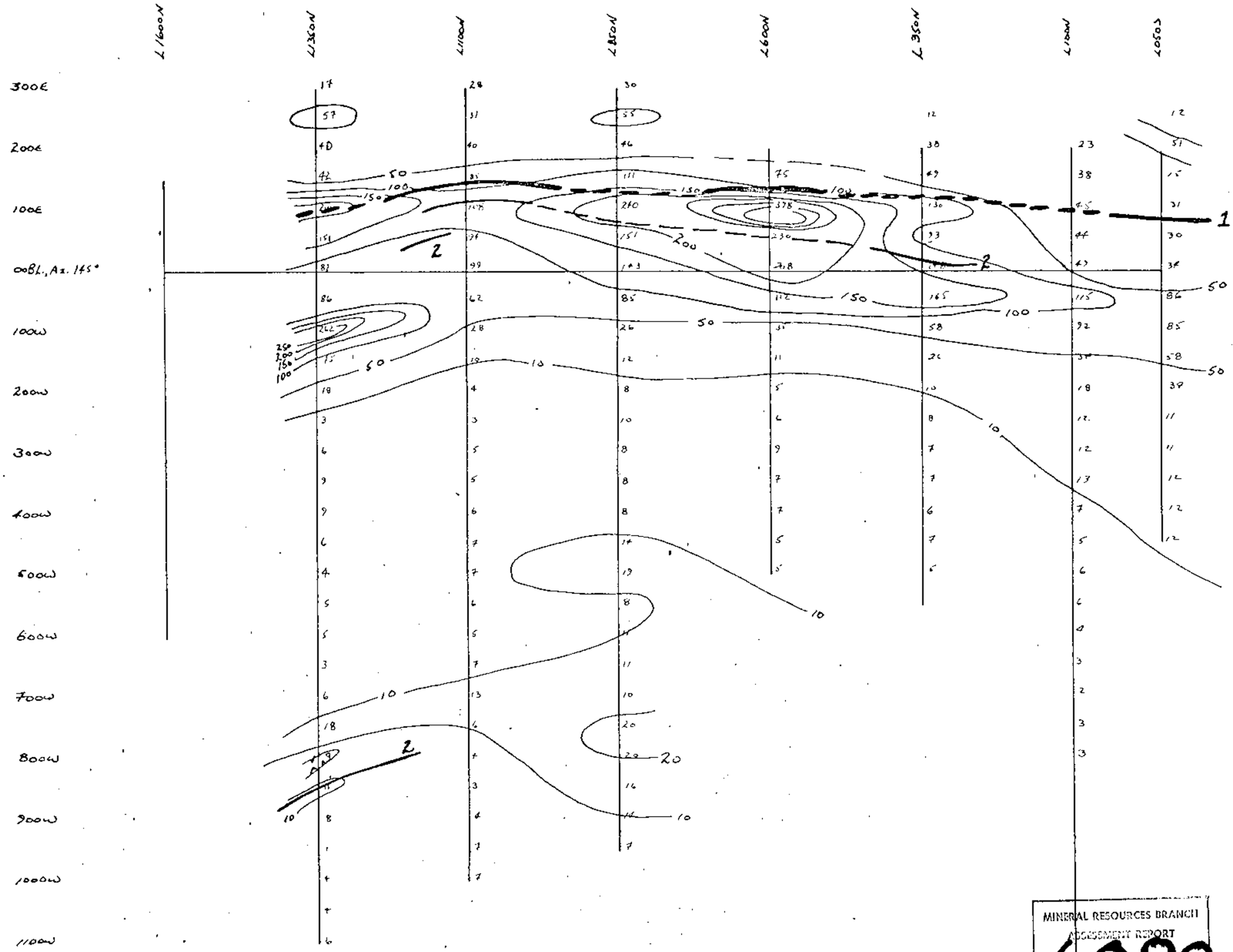
ASSUMED - —

MAIN HORIZON : 2

MINOR SULPHIDES : 2

Contours : 10, 25, 50, 100, 150, 200

F. W. Williams



MF - METAL FACTOR - $\frac{N_2}{P_2}$

$N = 2$

CONDUCTOR AXIS : OBSERVED - ——

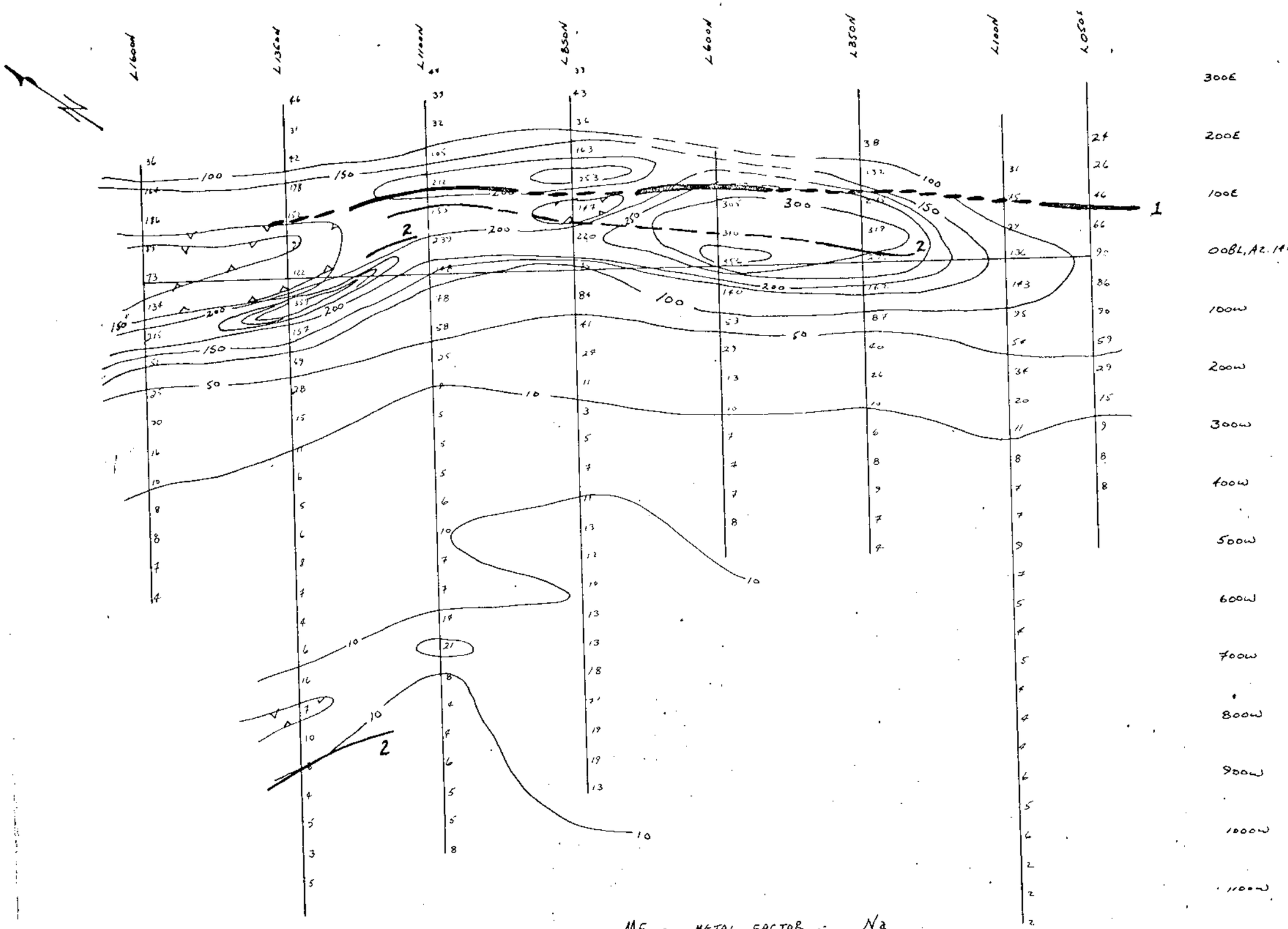
ASSUMED - — —

MAIN HORIZON : 1

MINOR SULPHIDES : 2

Contours : 10, 20, 50, 100, 150, 200, 250, 300, 350

F.W. Wellins



MF - METAL FACTOR - $\frac{Na}{Pa}$

CONDUCTOR AXIS : OBSERVED -

ASSUMED -

MAIN HORIZON : 1

MINOR SULPHIDES : 2

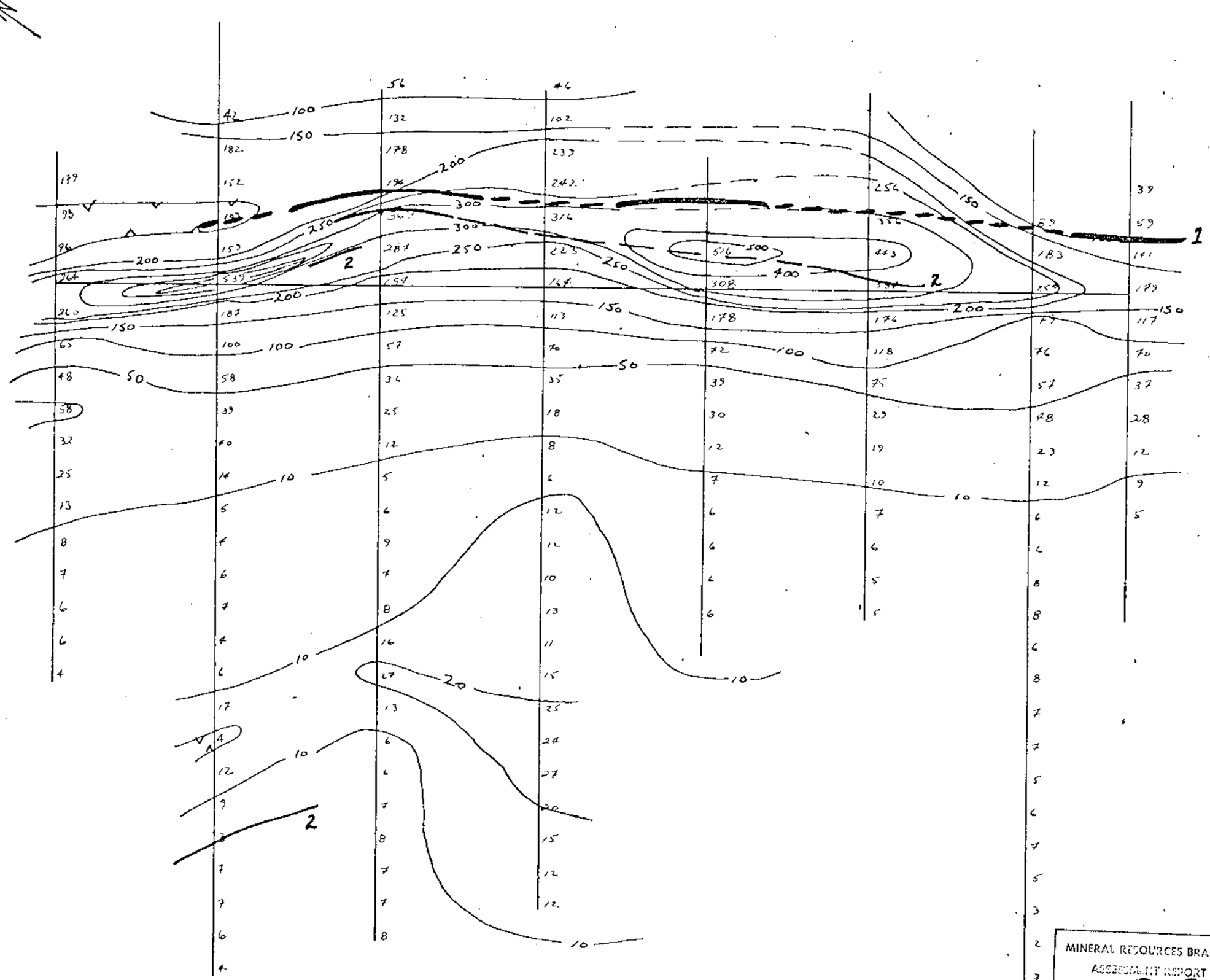
N = 3

Contours : 10, 20, 50, 100, 150, 200, 250, 300, 350

F.W. Williams

L1600N L1350N L1100N L850N L600N L350N L100N L050S

400E 300E 200E 100E 0084, Az. 44° 100W 200W 300W 400W 500W 600W 700W 800W 900W 1000W 1100W 1200W



MF - METAL FACTOR - $\frac{N_2}{R_2}$

CONDUCTOR AXIS : OBSERVED -

ASSUMED - - -

MAIN HORIZON : 1

MINOR SULPHIDES : 2

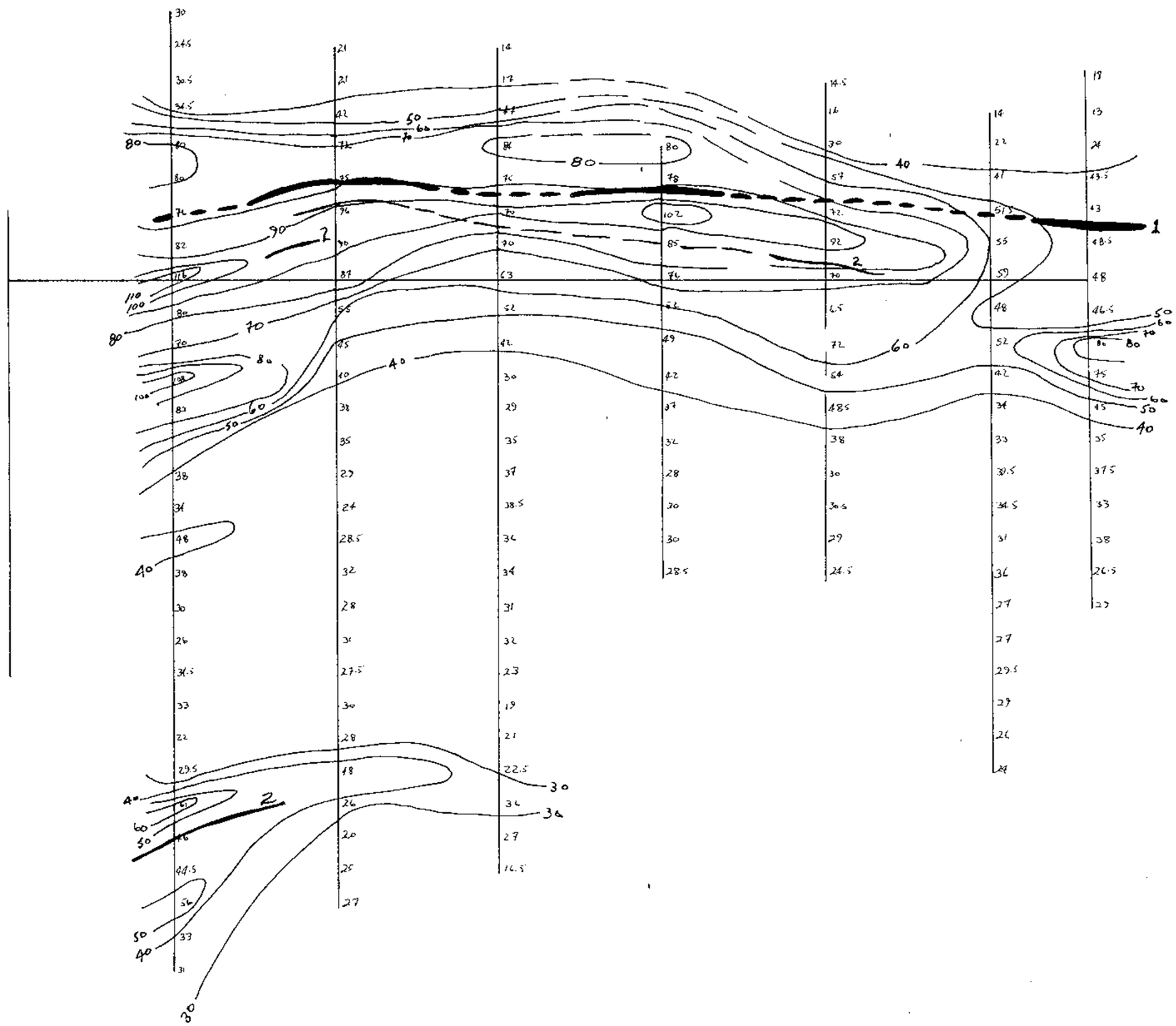
N = 4

Contours : 10, 20, 50, 100, 150, 200, 250, 300, 400, 500

F W, Willms

L1600N L1350N L1100N L850N L600N L350N L100N L050S

400E
300E
200E
100E
00BL, AZ. 145°
100W
200W
300W
400W
500W
600W
700W
800W
900W
1000W
1100W
1200W



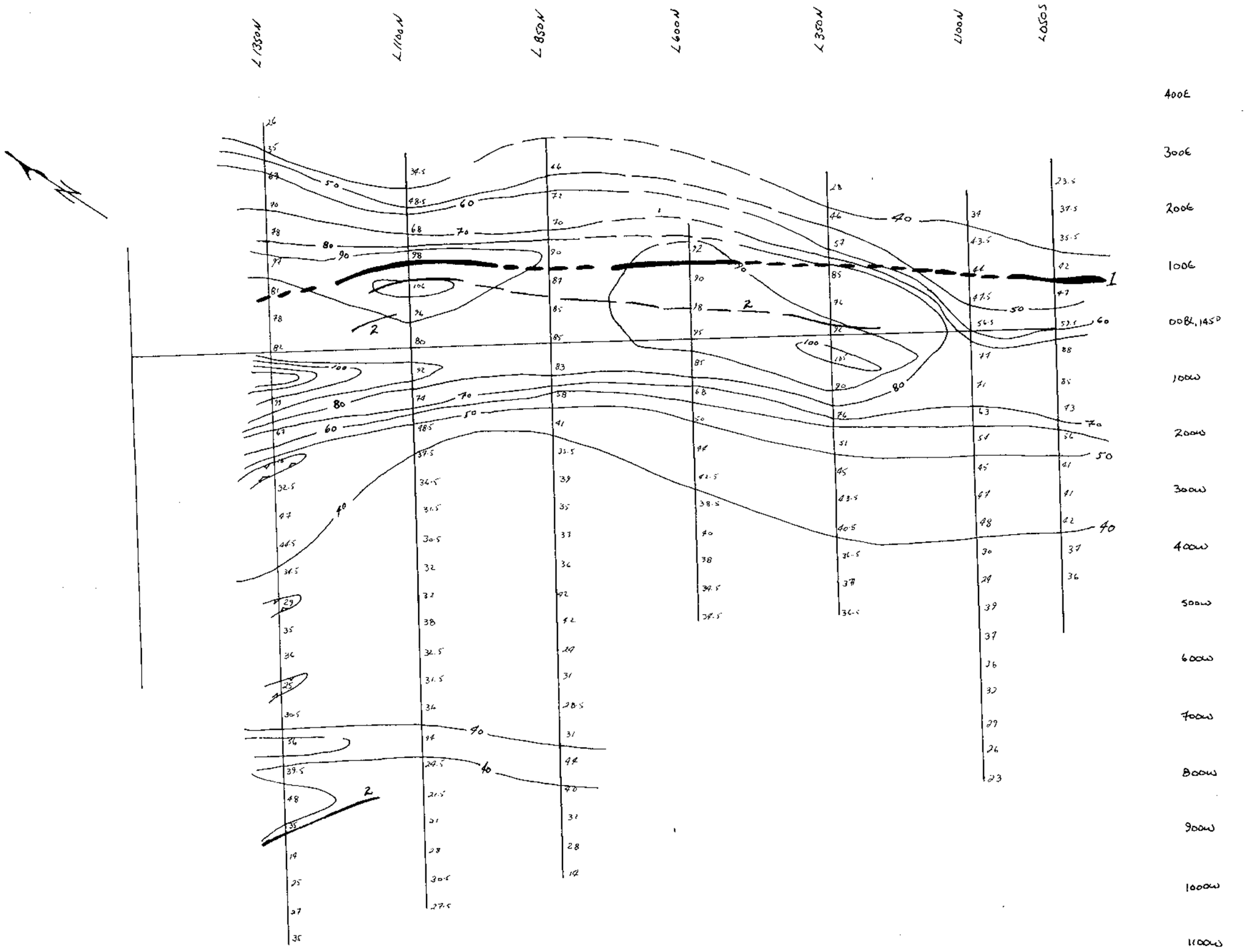
N_2 - CHARGEABILITY - milliseconds

$N = 1$

1 : MAJOR HORIZON
2 : MINOR SULPHIDES
CONDUCTOR AXIS : ~ OBSERVED ~~ ASSUMED

Contour Interval : 10 msec.
Contours : 30 + 110
SCALE : 1:5000

F W. Willmer



CONDUCTOR AXIS: OBSERVED ——
ASSUMED — —

MAIN HORIZON : 1

MINOR SULPHIDES : 2

N_2 - CHARGEABILITY - milliseconds

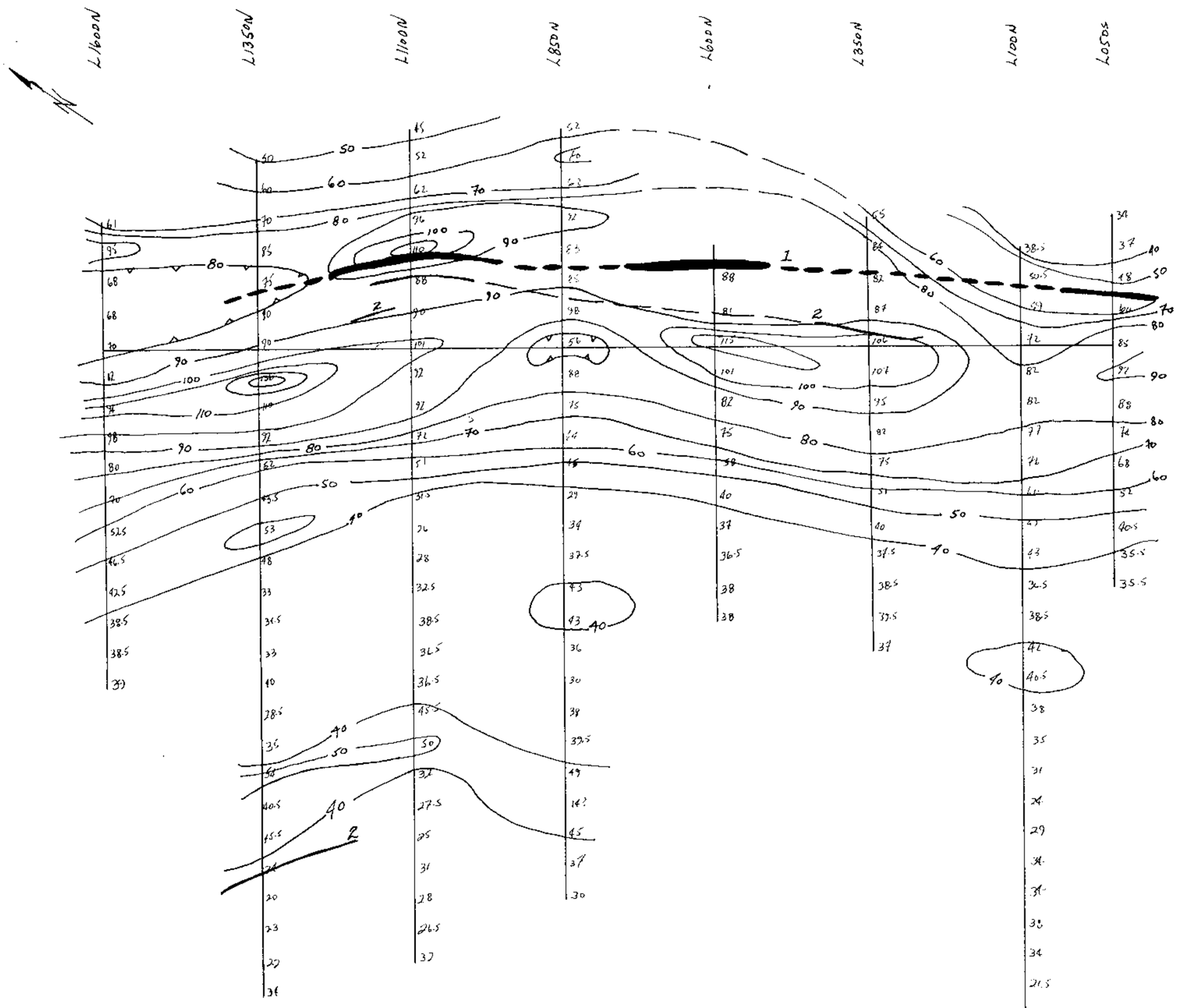
N=2

Contour Interval : 10 msec.

Contours : 40 → 130

SCALE : 1:5000

F. W. Willms



Na - CHARGEABILITY - milliseconds

N = 3

CONDUCTOR AXIS : OBSERVED : ——
ASSUMED : — —

MAIN HORIZON : 1

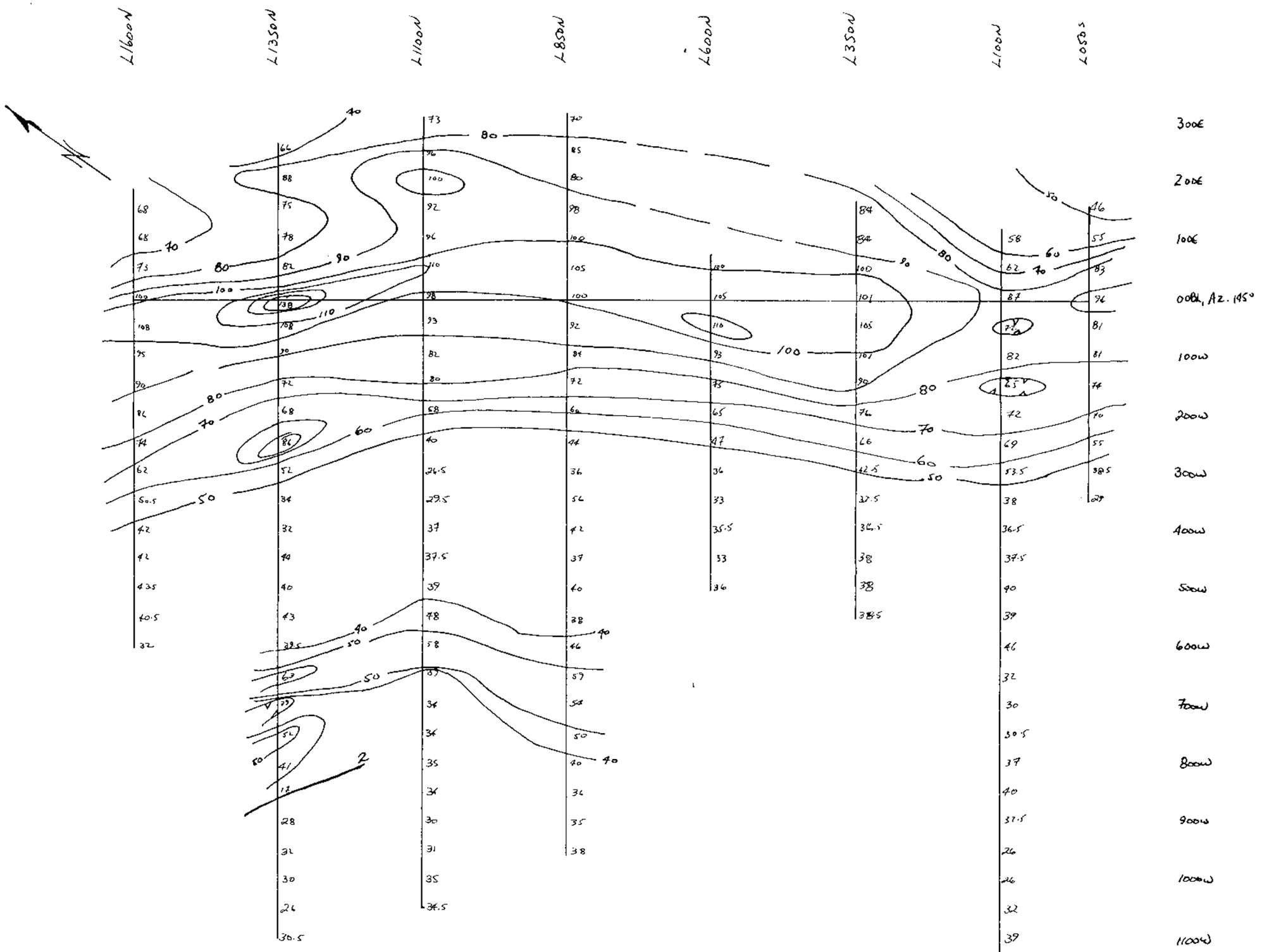
MINOR SULPHIDES : 2

CONTOUR INTERVAL : 10 msec.

CONTOURS : 40 → 130

SCALE : 1:5000

F. W. Williams



N2 - CHARGEABILITY - milliseconds

N = 4

CONDUCTOR AXIS : OBSERVED : ——
ASSUMED : — —

MAIN HORIZON : 1

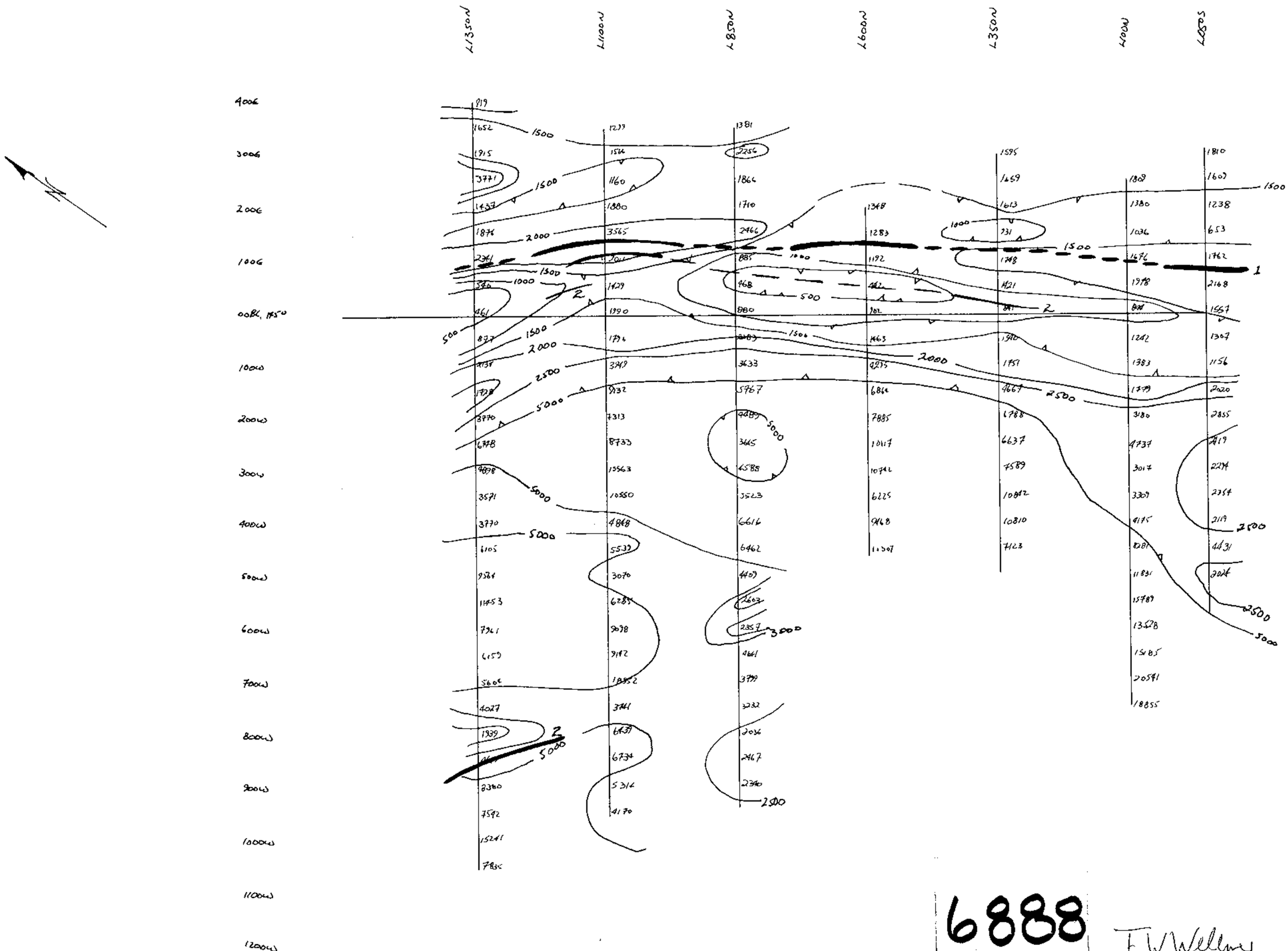
MINOR SULPHIDES : 2

Contour Interval : 10 MSec.

Contours : 40 → 130

SCALE 1:5000

T. W. Willmer



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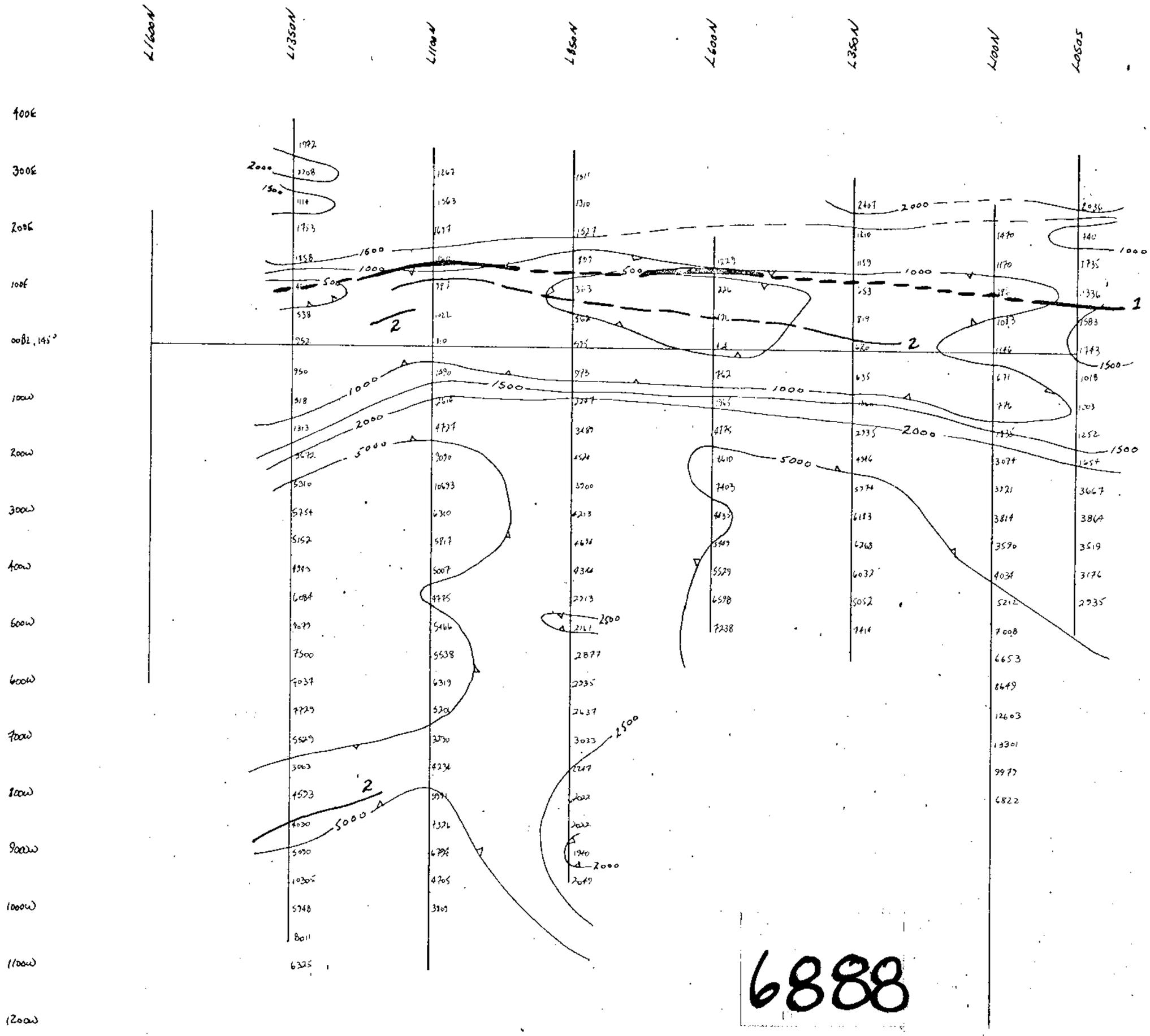
F.W. Wellings



Pa - RESISTIVITY - OHM-METERS

N = 2

CONDUCTOR AXIS : OBSERVED, ASSUMED

MAIN HORIZON : 1

MINOR SULPHIDES : 2

Contour Interval : 500 ohm-meters

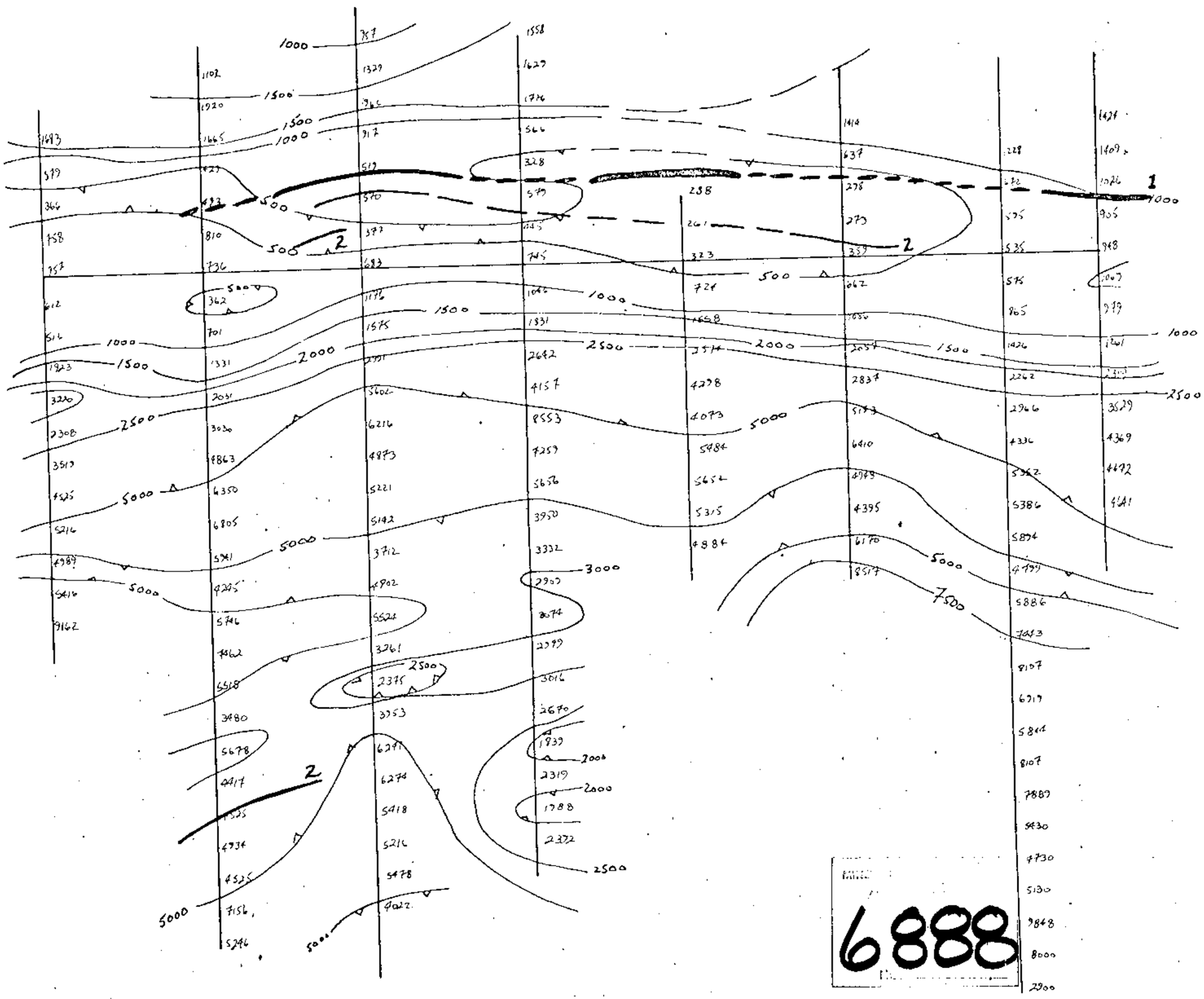
CONTOURS : 500, 1000, 1500, 2000, 2500, 5000

6888

F.W. Willms

L1600N L1350N L1100N L850N L600N L350N L100N L050S

400E
300E
200E
100E
00BL, Az. 145°
100W
200W
300W
400W
500W
600W
700W
800W
900W
1000W
1100W
1200W



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ρ_a = RESISTIVITY - OHM METERS

N = 3

F W, Wellman

CONDUCTOR AXIS : OBSERVED, ASSUMED

MAW HORIZON : 1

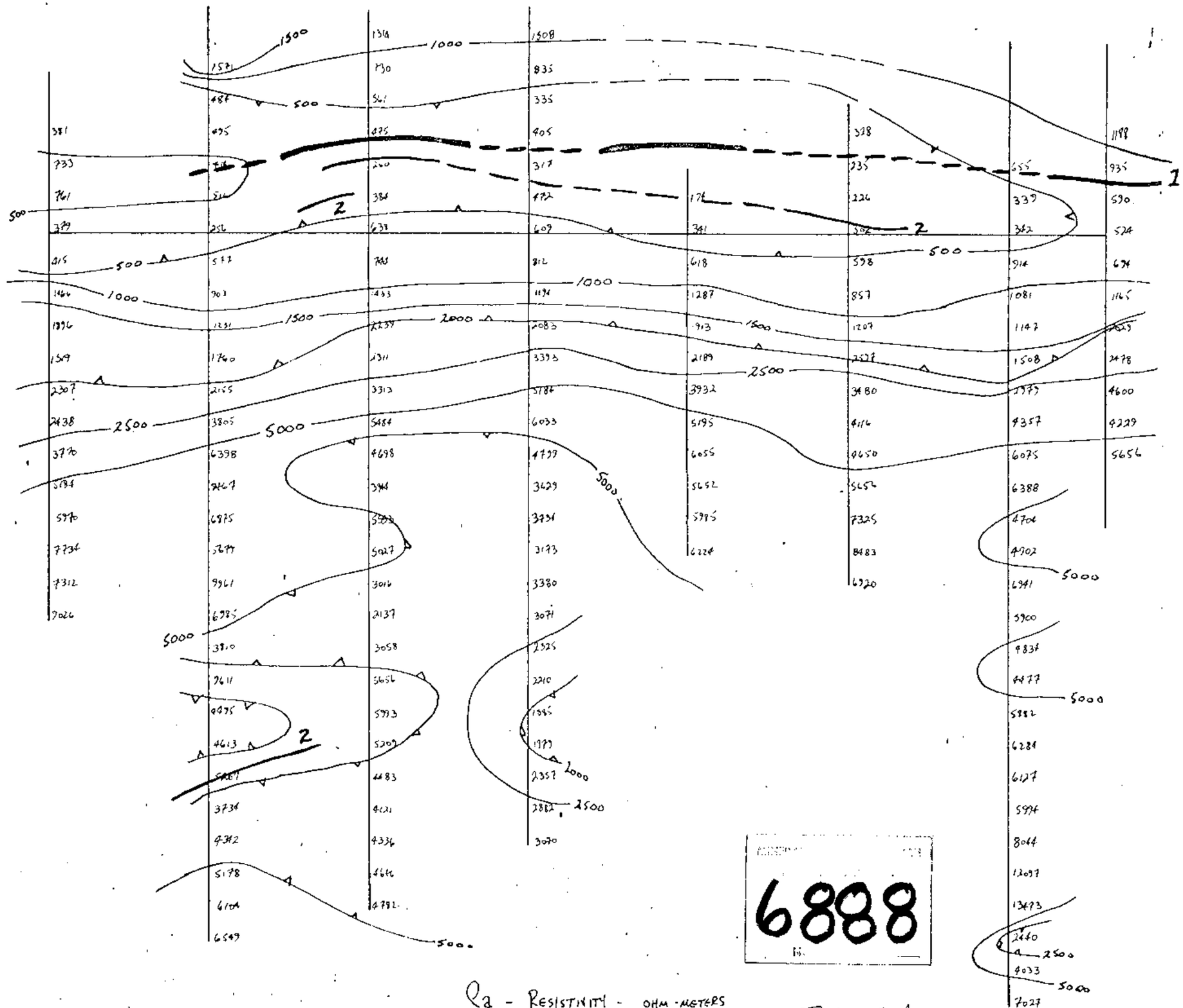
MINOR SULPHIDES : 2

Contour Interval : 500 ohm meters

Contours : 500, 1000, 1500, 2000, 2500, 5000, 7500

L1600N L1350N L1100N L850N L600N L350N L100N L050S

400E
300E
200E
100E
00BL, AZ. 145°
100W
200W
300W
400W
500W
600W
700W
800W
900W
1000W
1100W
1200W



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Qa - RESISTIVITY - OHM-METERS

N = 4

CONDUCTOR AXIS: OBSERVED —
ASSUMED - - -

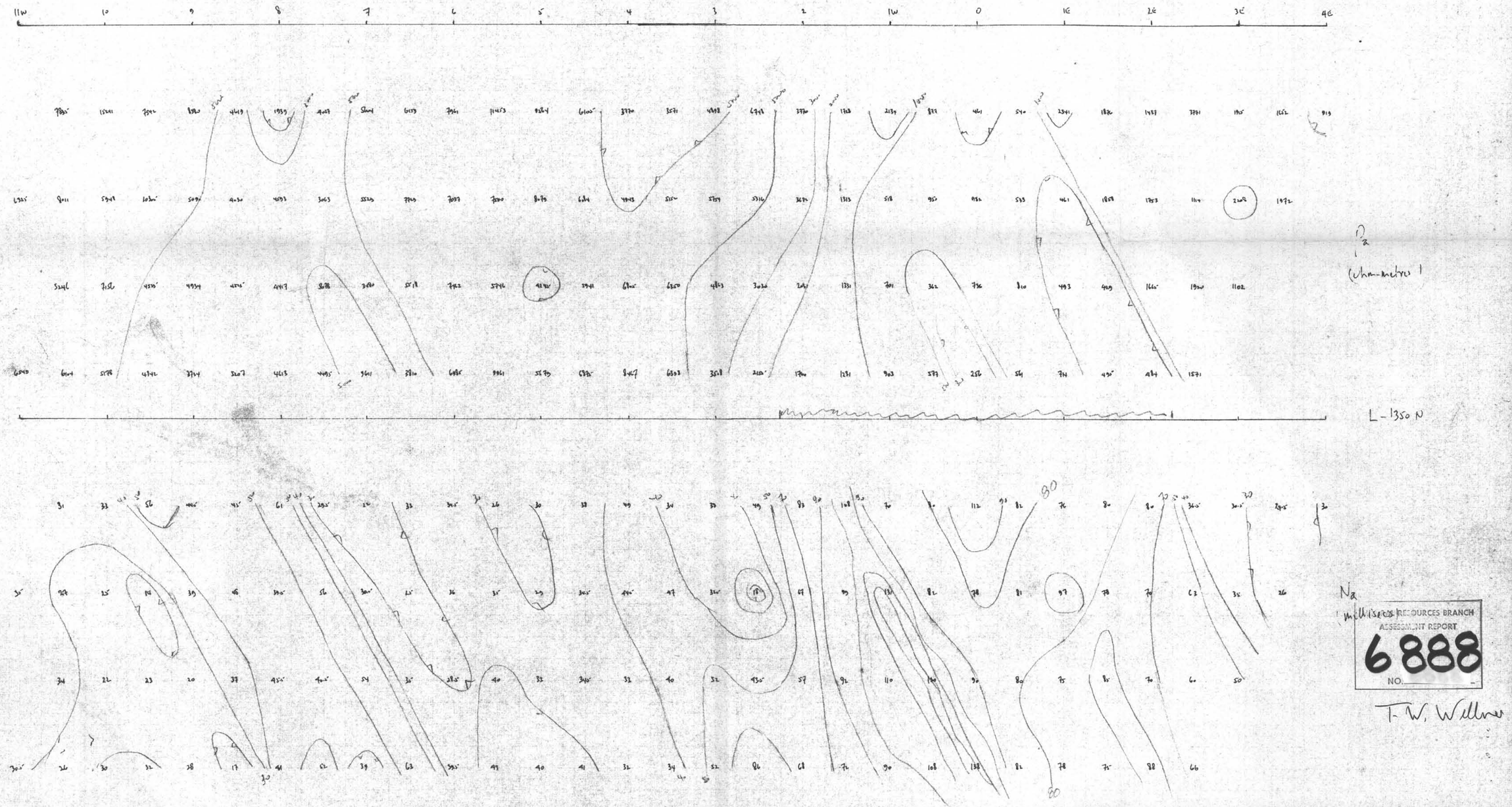
MAIN HORIZON: 1

MINOR SULPHIDES: 2

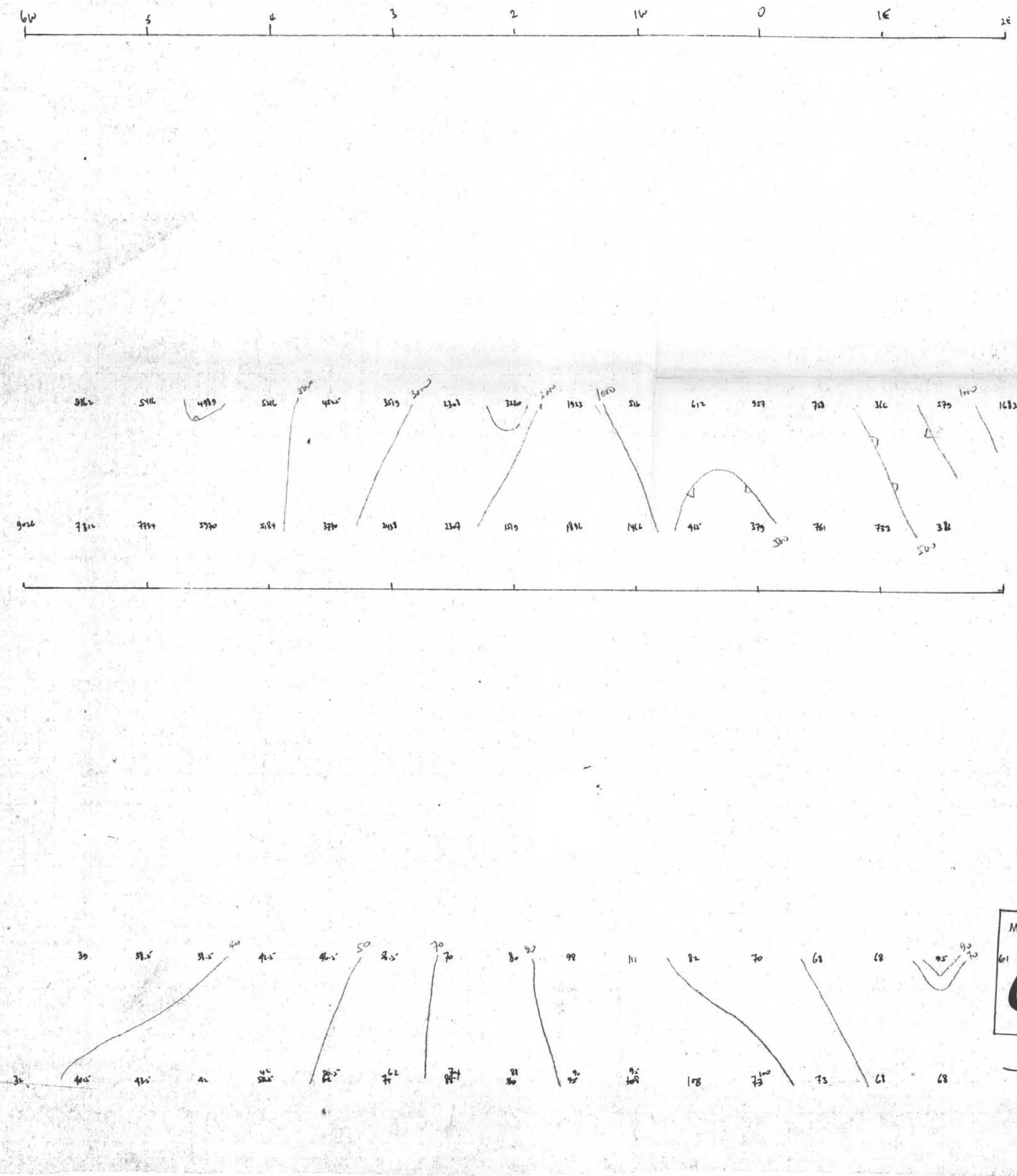
F.W. Wellings

Contour Interval: 500 ohm meters

Contours: 500, 1000, 1500, 2000, 2500, 5000



T. W. Willms



F W Willmer


L1100N
L-1100N
ρ_a (ohm-metres)
N_a (millisecs)
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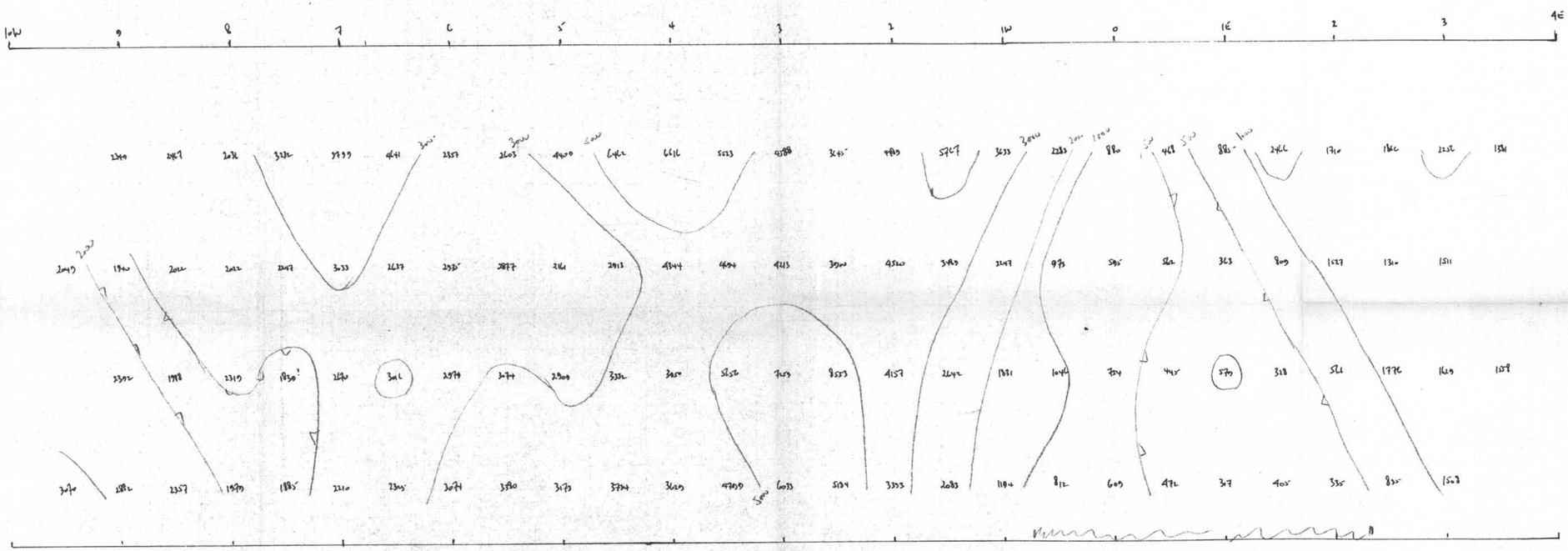
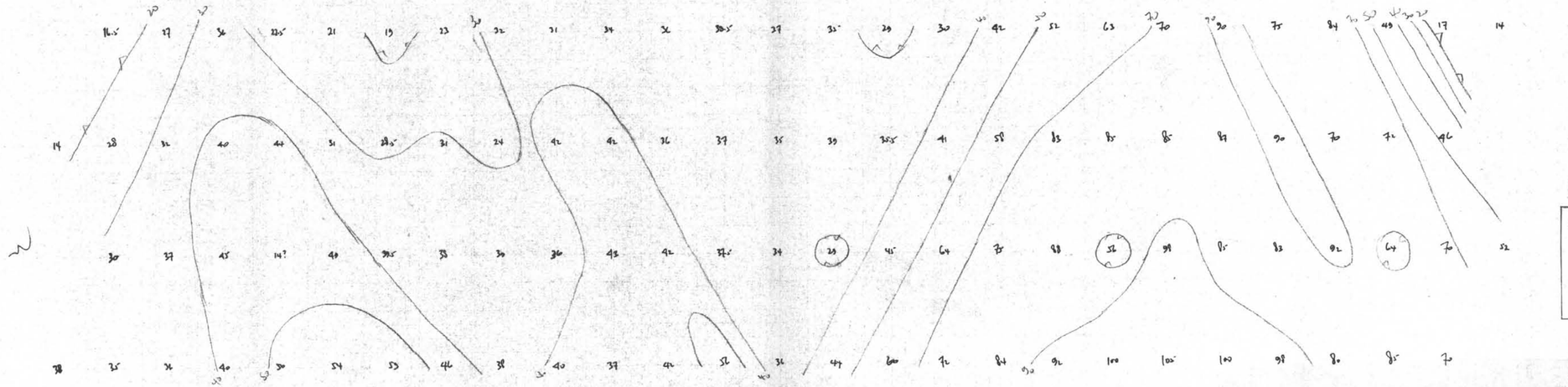
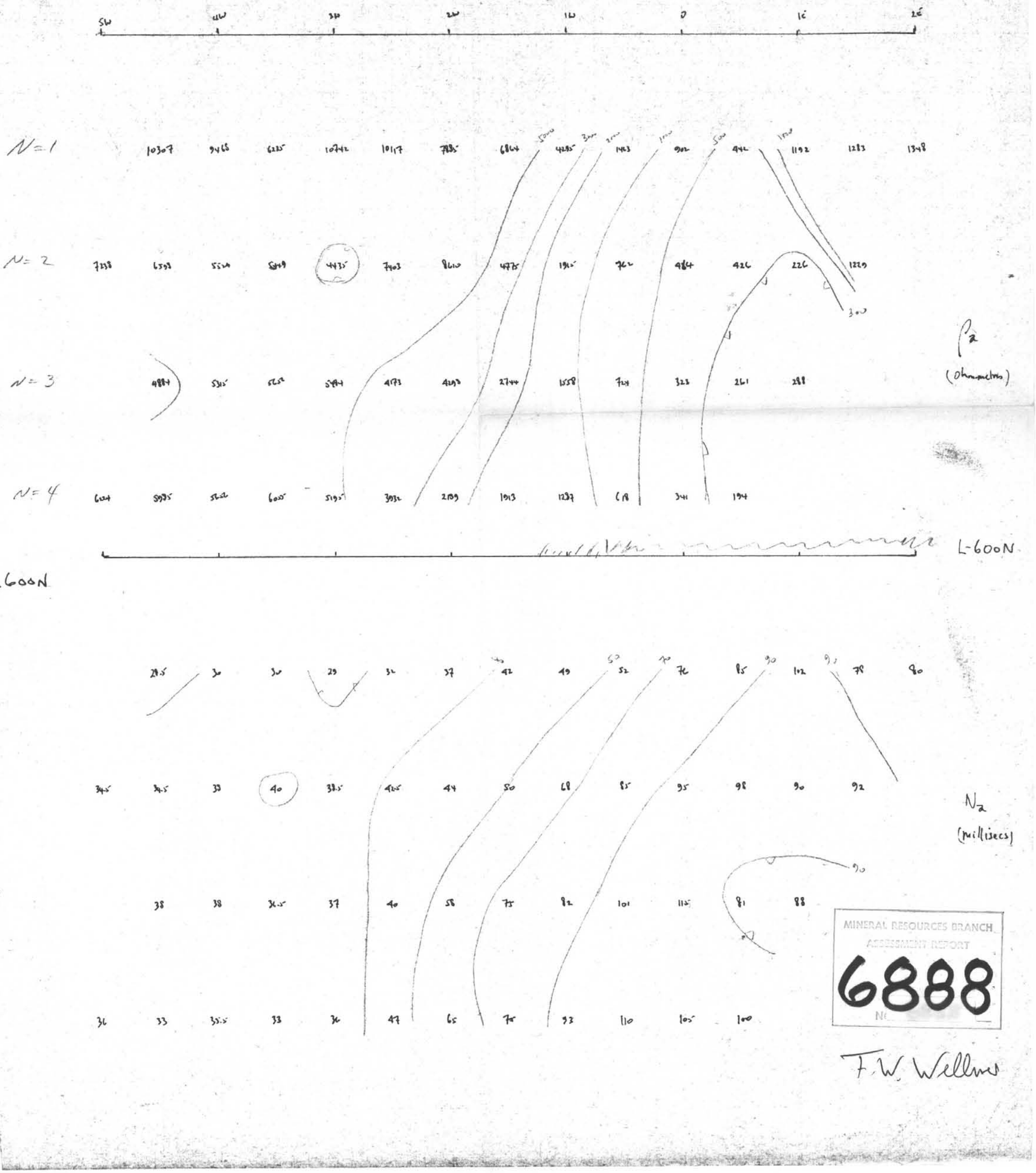
F.W. Willms





H.W. Wellman



F.W. Wellings

5W 4W 3W 2W 1W 0 1E 2E 3E

N=1

N=2 ρ_a (Ohm-metres)

N=3

N=4

Line 50S

Na (milliseconds)

30-59
60-79
80-99
100-119
120-?

SCALE 1:2500

F.W. Willms

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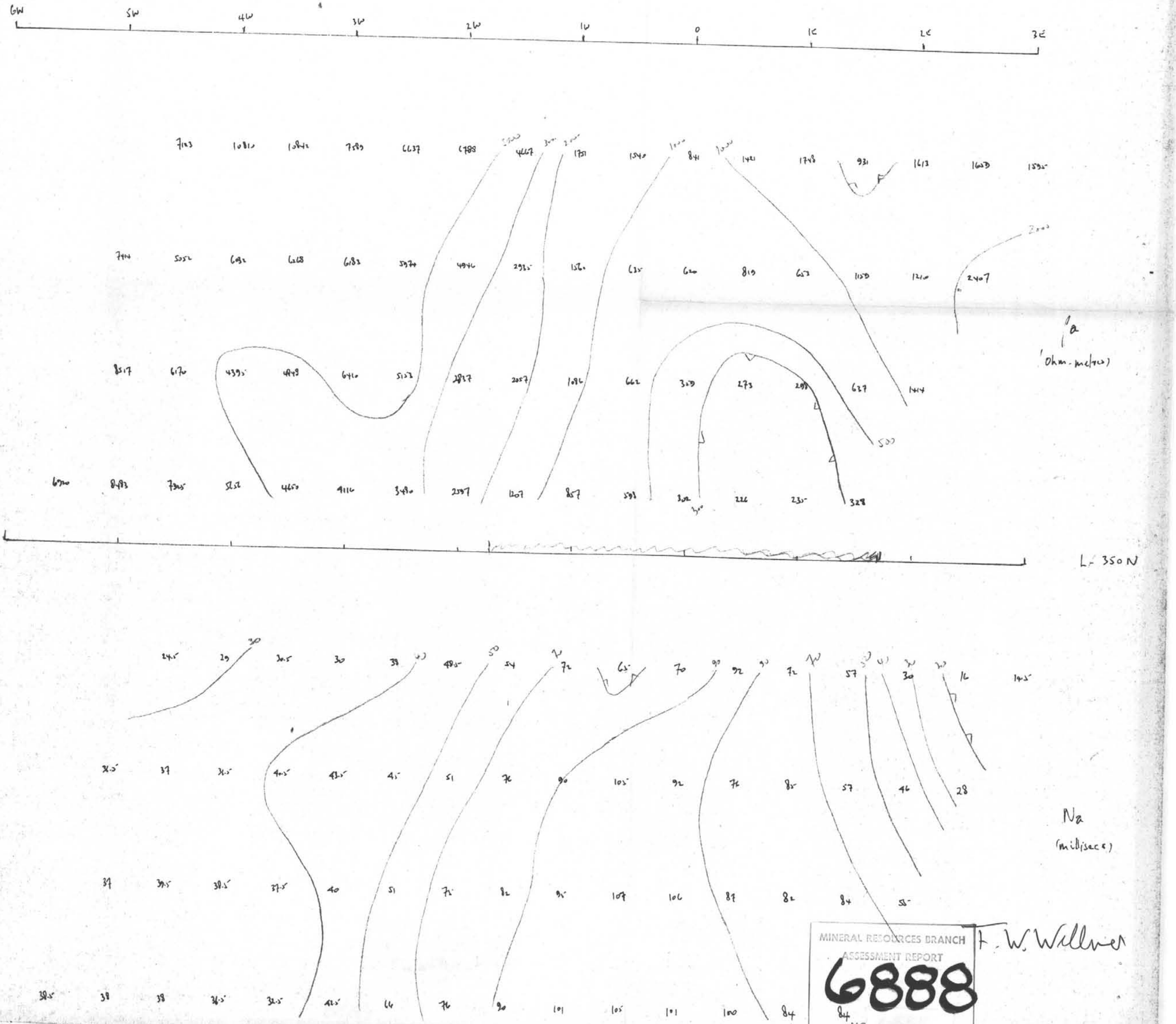
F.W. Wellmer



T. W. Willmer