314001

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COMMENTS ON
FURTHER INDUCED POLARIZATION
AND TOTAL MAGNETIC FIELD SURVEYS
OVER THE CLARK RIVER GRID
NEAR QUEENSTOWN, TASMANIA
ON BEHALF OF
THE MOUNT LYELL MINING & RAILWAY COMPANY LTD.

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COMMENTS ON FURTHER INDUCED POLARIZATION AND TOTAL MAGNETIC FIELD SURVEYS OVER THE CLARK RIVER GRID NEAR QUEENSTOWN, TASMANIA ON BEHALF OF THE MOUNT LYELL MINING & RAILWAY COMPANY LTD.

BY

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GEOPHYSICIST

SYDNEY, N.S.W.

MAY, 1979
TAS-062A

SCINTREX

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314004

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COMMENTS ON

FURTHER INDUCED POLARIZATION

AND TOTAL MAGNETIC FIELD SURVEYS

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INTRODUCTION

As a result of geophysical surveys carried out by Scintrex Pty. Ltd. on the Clark River grid in January and February, 1978, additional work was carried out on intermediate lines to further define the zones of interest delineated in that survey.

These surveys were requested by Mr. K. Reid, Chief Geologist for The Mount Lyell Mining & Railway Company Ltd., and the work undertaken on 7.5 double and six single operator days between 19th January and 4th February, 1979. The party leader was Mr. R. Sims and the geological direction and supervision was undertaken by Mr. R. Meares, Senior Exploration Geologist for Mt. Lyell.

The original survey data was discussed in a report dated April, 1978 (TAS-054D) entitled" A Report on Gradient Array EIP and Total Magnetic Field Surveys over the Clark River Grid, near Queenstown Tasmania on behalf of The Mount Lyell Mining & Railway Company Ltd." These comments can be considered to be an appendix to that report.

PROCEDURE

As far as possible the electrodes used in the original reconnaissance survey were re-occupied in the detailed survey, thus allowing the 'new data' to be entirely compatible with the old.

Unfortunately the large 10/15 kilowatt generator was not available to the follow-up survey due to malfunction and delay, however, the noise conditions fortuitously were significantly lower over the period the work was carried out, so the 3 kilowatt unit used, proved adequate for the task.

DATA PRESENTATION

The data is displayed at the scale of 1:2500, with resistivity being shown on a 10 centimetre log scale and the chargeability at 1 centimetre = 2 millivolts/volt with only M_3 being plotted. The magnetic field is shown on two scales; 1 centimetre = 50 gamma and 1 centimetre = 500 gamma, depending on the observed gradient.

The contour interpretations of all three parameters have been added to the original data and are presented in revised Plates 1, 2 and 3 at the scale of 1:6000. In these presentations the original data has been repositioned as the re-surveyed grid, and with the exception of the north-eastern section of the grid, the trends remain similar.

DISCUSSION OF RESULTS

Two areas were detailed. In the north-eastern section short 400 metre lines were inserted between lines 44N and 24N centred at 4200E in the north and 4100E in the south. In the south a short intermediate line 14N was added in the west, and larger intermediate lines between lines 12N and 00, with three 200 metre spaced lines to the south. These two areas are separately discussed below.

NORTHERN AREA

These lines are described from north to south.

LINE 42N ..... The resistivity data profile shows a 7000 ohm-metres maximum at 4125E and a lesser peak of 1800 ohm-metres at 4212E. These are considered to correlate to maxima of 9000 ohm-metres and 5000 ohm-metres at 4088E and 4162E on line 40N, however the correlation with line 44N is not easy to see. A sharp, single station anomaly of 14 millivolts/volt above the background of 14 millivolts/volt has a maximum depth of 25 metres, and is related to zone 'M' on line 40N centred at 4050E.

A significant series of higher chargeability maxima over a broad zone from 4150E to 4375E, all within local reduced apparent resistivities of 4000 to 5000 ohm-metres are related to zone 'L'. Maxima of 66 millivolts/volt, 55 millivolts/volt and 41 millivolts/volt at 4188E, 4288E and 4337E have maximum depths of between 37 and 50 metres. These are related to zone 'L' on line 40N, however

correlation of individual maxima between lines 42N and 40N are not possible.

LINE 38N ..... The higher resistivities centred at 4200E(±75 metres) are considered to correlate with the twin peaks at 4130E(±) on line 40N, while the two significant induced polarization maxima on the eastern flank thereof, at 4237E (14 millivolts/volt above background) and at 4288E (18 millivolts/volt above background), relate to Zone 'L', perhaps 'L1' and 'L2' respectively. The maximum depths to the disseminated source are about 50 metres in both cases.

A rise in the chargeability level of about 6 millivolts/volt at 4075E may represent zone 'M' on this line.

LINE 34N ..... A most striking 50 millivolts/volt chargeability response from a very shallow (less than 25 metres) source was defined at 4212E. The form suggests a west dip, while a 45% decline in resistivity to 2500 ohm-metres infers the source; disseminated, or weakly electrically interconnected, to be contained within a less resistive host. The form of the resistivity profile suggests a correlation to a much smaller response of 6 millivolts/volt at 4188E on line 32N, zone 'I', but no *clear* correlation with any response on line 30N can be made.

LINE 30N ..... Two distinct resistivity minima of 2000 ohm-metres at 4162E and 2500 ohm-metres at 4237E each accompanied by substantial 36 and 29 millivolts/volt induced polarization anomalies, are

considered to correlate with a resistivity 'shoulder' at 4188E on line 32N (which is zone 'I') and at 4237E on the same line which shows only a minor rise in chargeability. On line 28N a 74.5 millivolts/volt response at 4112E is designated zone 'I', but no sign of the second response 4200E/37E is seen on line 28N. The maximum depth to these features is between 25 metres (4162E) and 50 metres (4237E), and the nature of the source is disseminated or weakly interconnected sulphides and/or graphite.

LINE 26N ..... Three weak to moderate above background chargeability responses were located centred at 4088E, 4188E and 4262E, the former and latter being associated with high 6000 ohm-metres resistivity, while the centre anomaly with lower 4000 ohm-metres resistivity. The response at 4188E forms part of zone 'I;. The outside anomalies have disseminated chargeable sources at maximum depths of 25 metres while zone 'I' has a source at no greater than 50 metres depth.

SOUTHERN AREA

The salients features of the data profiles from the intermediate and additional lines are discussed from north to south.

LINE 14N ..... Two relatively minor chargeability maxima of 18 millivolts/volt at 2762E and 22 millivolts/volt at 2862E probably relate to zone 'D'.

LINE 10N ..... No truly major features were observed on this

intermediate line. Higher readings of 6 to 10 millivolts/volt between 3230E and 3437E relate to zone 'C', in particular, that at 3362E. This shows the restricted northerly extent of this zone.

LINE 6N ..... The major feature observed on this line was a broad anomaly of 36 millivolts/volt centred at 3337E, from a source (or sources) ±20 metres of this point. The maximum depth to source is about 50 metres. A striking 70% fall in resistivity to 1800 ohm-metres infers either a less resistive host, or more likely, weak interconnection between the grains making up the source. This response clearly demonstrates the southerly extension of zone 'C'.

The chargeability data revealed maxima of 28 millivolts/volt at 2712E, 21 millivolts/volt at 2762E and 24 millivolts/volt at 2912E, all of which gave greater emphasis to moderate chargeable sources located in the western sector. The maximum depths to these sources are respectively, 50 metres, 25 metres and 25 metres.

On the eastern end of the profile, an increase in chargeability, which is open to the east, may infer a continuation of zone 'B' to the north. It is unfortunate that this line stops critically short.

LINE 2N ..... There are no major features on this line, although the minor features located correlated well with lines to the north and south.

LINE 2S ..... A significant 22 millivolts/volt above background (16 millivolts/volt) anomaly designated zone 'X', was located at 3485E, the maximum depth to the source of which is estimated to be 40 metres. The accompanying resistivities are high, 4000 ohm-metres, thus the source is disseminated or electrically dicontinuous in nature. The form of the response, together with the higher resistivity and its stratigraphic positions, suggests that it is related to zone 'B'.

LINE 4S ..... No major anomalies were located, however one or both of sharp single station responses at 3412E and 3462E of 10 millivolts/volt *may* be related to zone 'X'. The maximum depth to these disseminated chargeable sources is about 25 metres.

LINE 6S ..... On this the most southerly line surveyed, a significant response designated zone 'Y' of 14 millivolts/volt was located centred at 3462E, with a broad (or multiple) source within ±20 metres of that centre. The resistivity remains a high 2000 ohm-metres (±) indicating the source to be disseminated chargeable material whose depth is estimated to be no greater than 50 metres.

This zone may be related to 'X' (and 'B'?) to the north

THE MAGNETIC FIELD DATA

In the *southern extension* the clear cut change between the 'quiet' area to the west, and the 'noisy' areas to the east continues south. On line 2N the field rises steeply east of 3275E; on line 0 east

of 3300E, on line 2S east of 3225E; on line 4S east of 3225E and on line 6S east of 3125E.

Anomaly 'Y' at 3462E on line 6S is associated with a significantly *lower* magnetic field than observed to the immediate east and west of the anomaly itself. Thus, the source is not due to a greater segregation of magnetite. In fact, the higher magnetite content does not significantly influence the chargeability level. Zone 'X' on line 2S at 3485E on the other hand is not influenced by the higher magnetic field readings, thus the source must be sulphides and/or graphite only. Similarly the extensions to zone 'C' defined at 3337E on line 6N show no significant distortion in the magnetic field, thus the source cannot contain significant quantities of magnetite.

On the northern intermediate lines, absolutely no correlation was recorded between the magnetic field and chargeability data.

CONCLUSIONS

1 - The detailed lines surveyed tied in well with the original lines surveyed in the 1978 season, both in level and form. This work has defined the anomalies located well and yielded two other zones designated 'X' and 'Y'.

2 - The distribution of chargeable material is best seen on the chargeability contour maps. It would appear that some extension of the work south of line 00 and east of about 3400E *may* be

warranted.

3 - As with the original survey, the anomalies located are interpreted to be disseminated or electrically discontinuous in nature. Even when lower resistivity was recorded over chargeable zones, it is always of a magnitude which suggests disseminated to electrically discontinuous.

4 - The depths to source never exceed 50 metres, the majority being between 25 and 50 metres.

5 - With the exception of zone 'Y' at 3485E on line 6S where *lower* magnetic fields were observed on *higher* chargeability, no direct correlation between chargeability and magnetic field was observed on this survey.

Respectfully submitted on behalf of:

SCINTREX PTY. LTD.

A.W. HOWLAND-ROSE, MSc, DIC, AMAusIMM, FGS.

GEOPHYSICIST

011

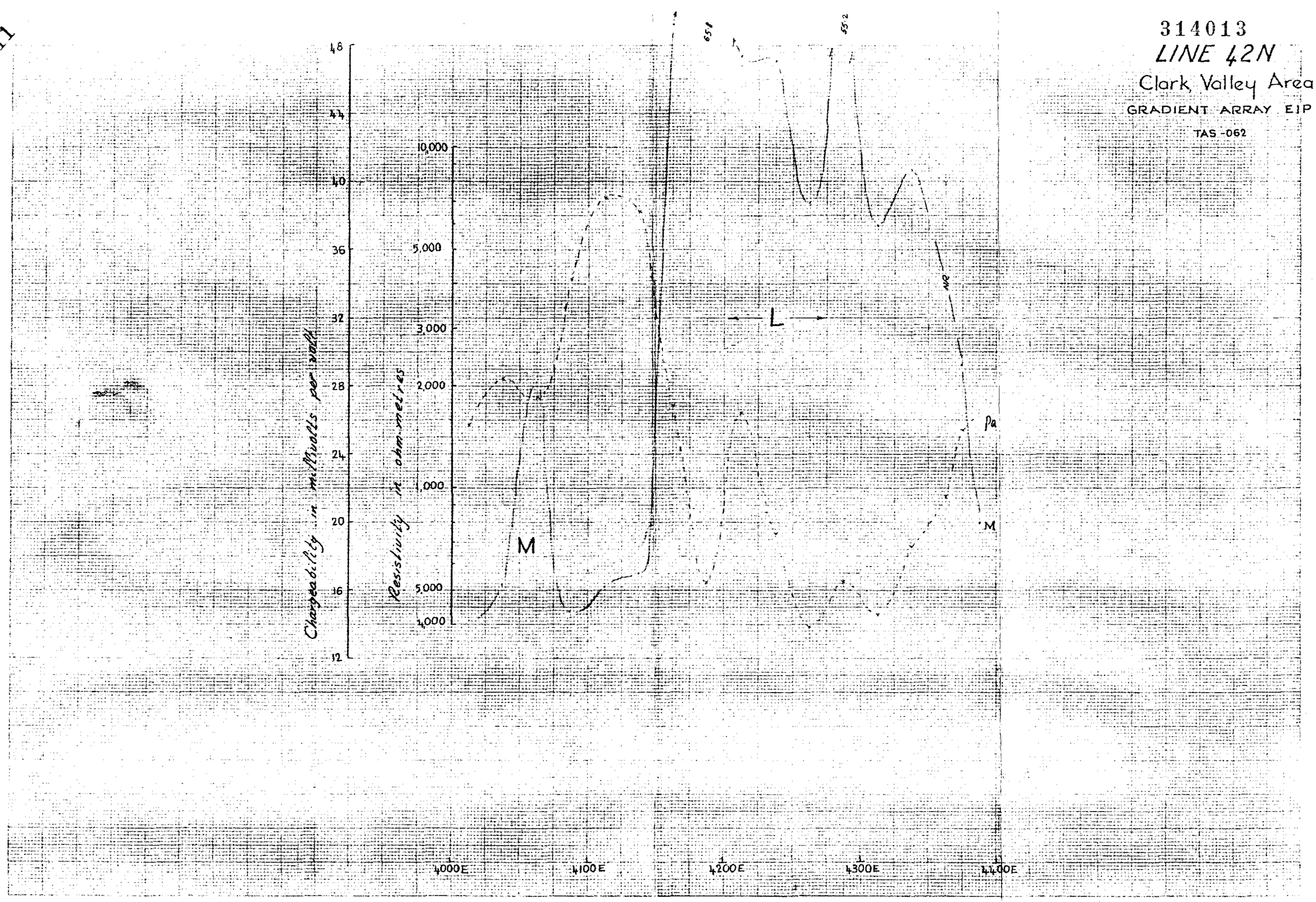
314013

LINE 42N

Clark Valley Area

GRADIENT ARRAY EIP

TAS-062



012

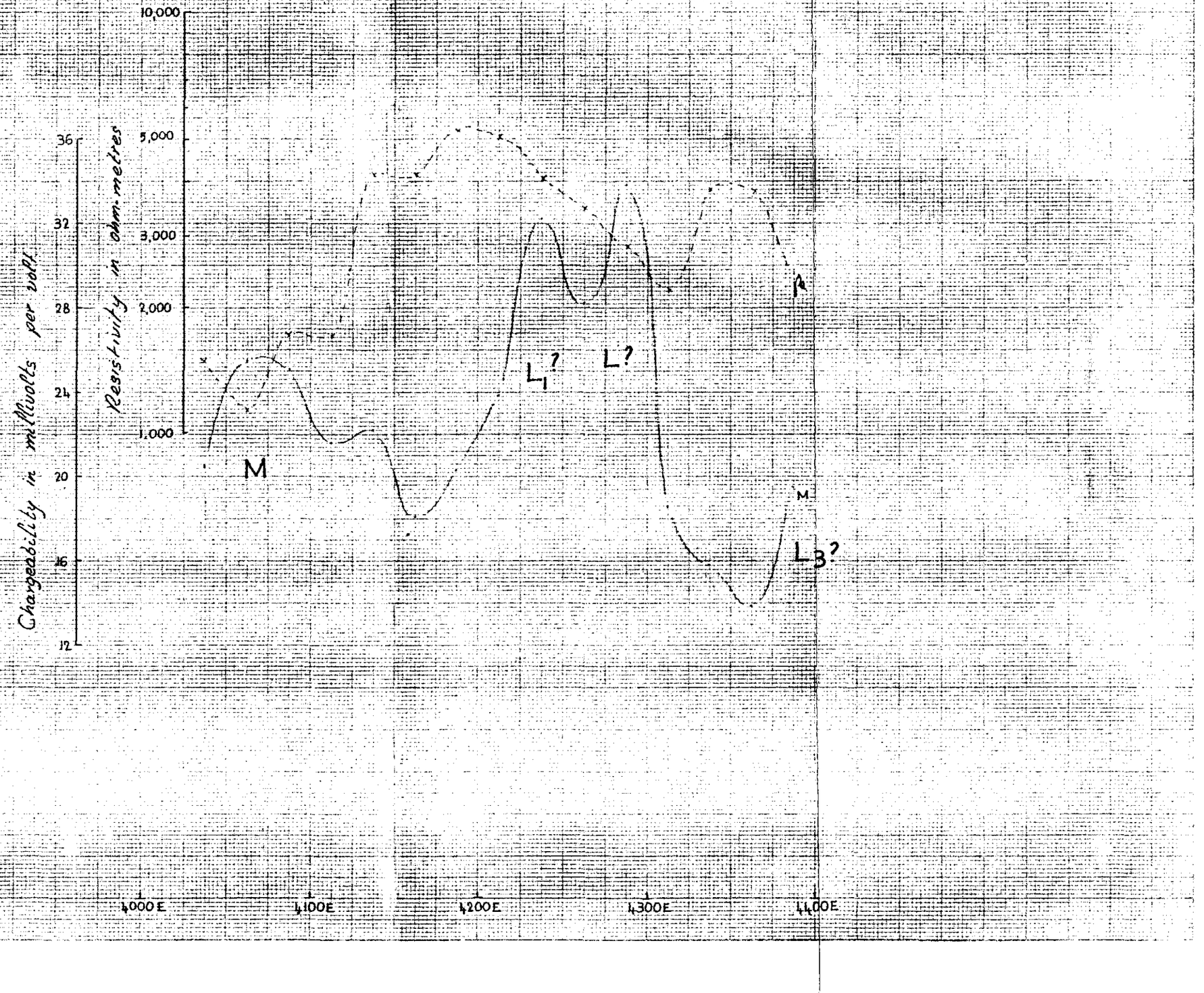
314014

LINE 38 N

Clark Valley Area

GRADIENT ARRAY EIP

TAS-062



013

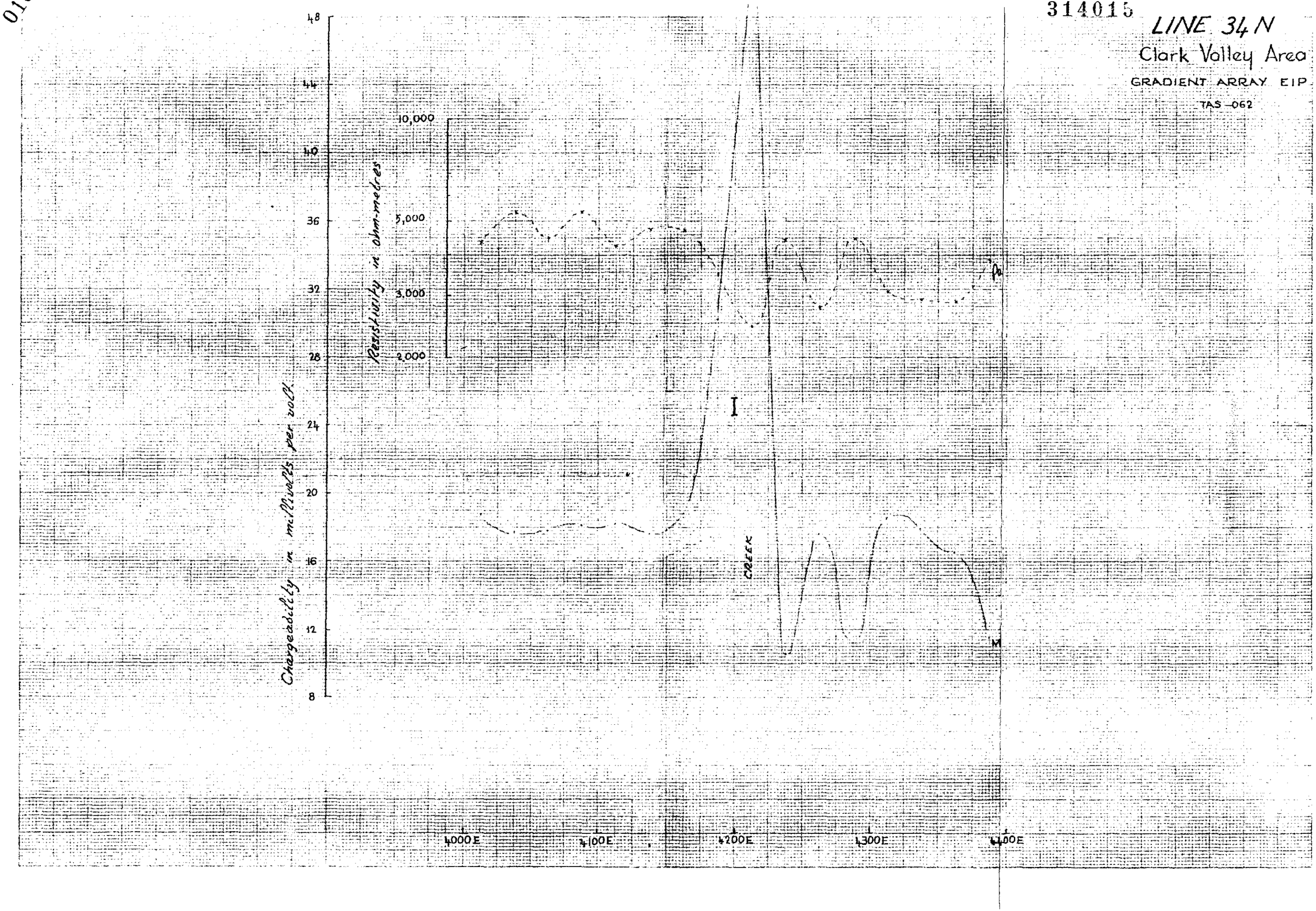
314015

LINE 34 N

Clark Valley Area

GRADIENT ARRAY EIP

TAS-062



014

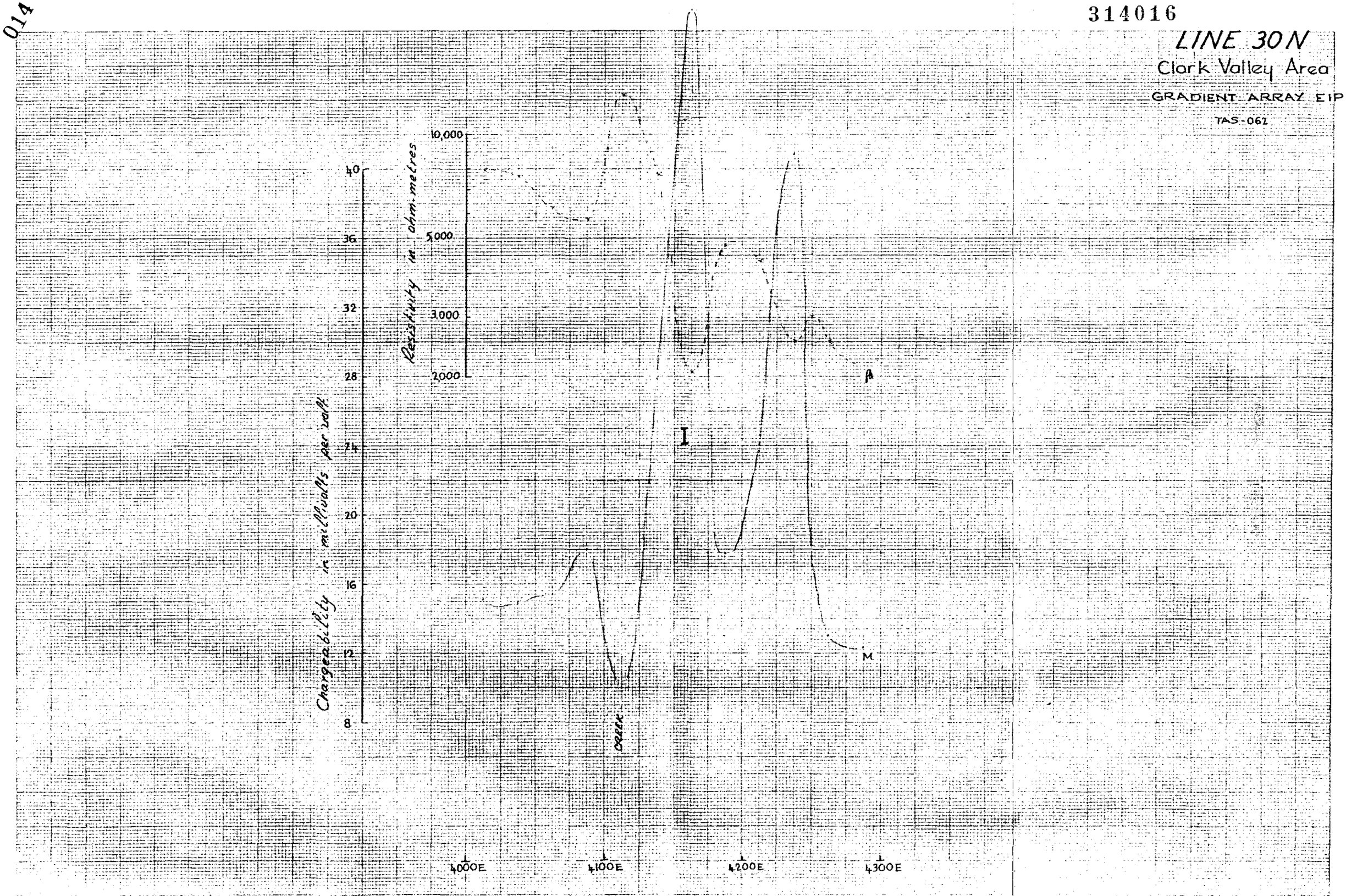
314016

LINE 30N

Clark Valley Area

GRADIENT ARRAY EIP

TAS-061



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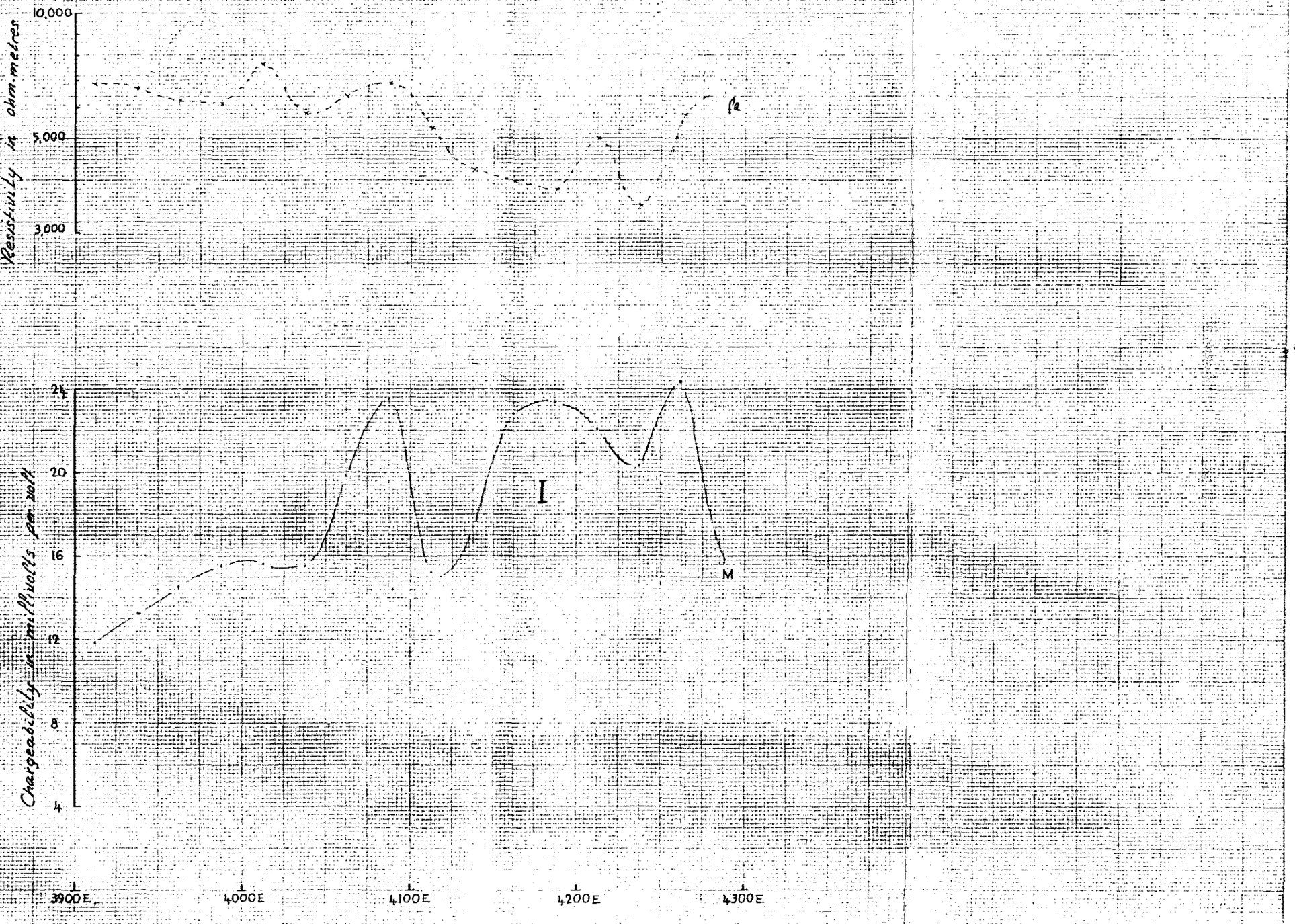
314017

LINE 26 N

Clark Valley Area

GRADIENT ARRAY EIP

TAS-062



016

314018

LINE 14N

Clark Valley Area

GRADIENT ARRAY EIP

TAS-062

20,000
10,000
5,000
3,000
Resistivity in ohm-metres

24
20
16
12
8
4
Chargeability in milliVolts per Volt

D
D1
M
CREEK

2600E
2700E
2800E
2900E
3000E

017

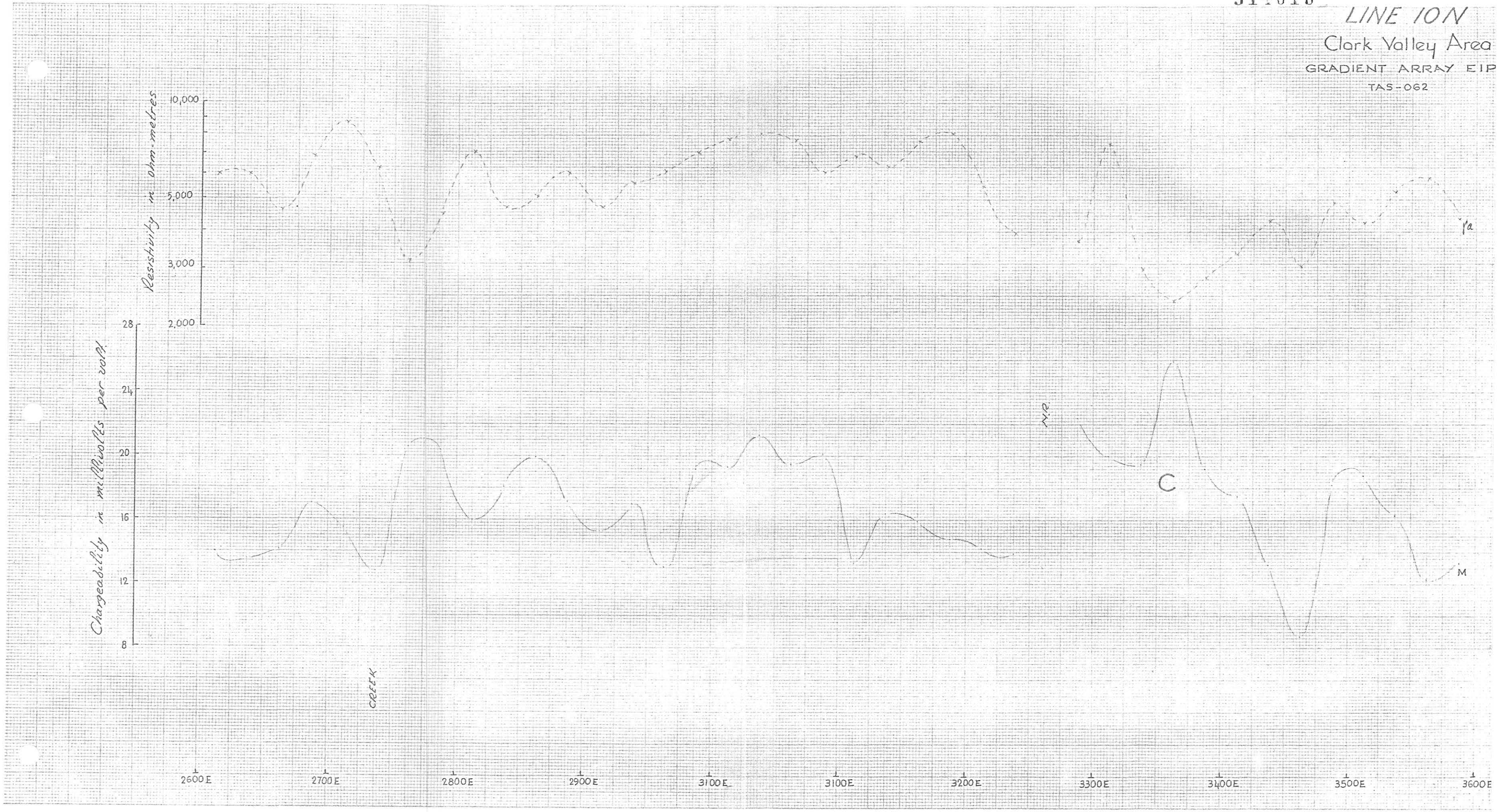
314019

LINE 10N

Clark Valley Area

GRADIENT ARRAY EIP

TAS-062



018

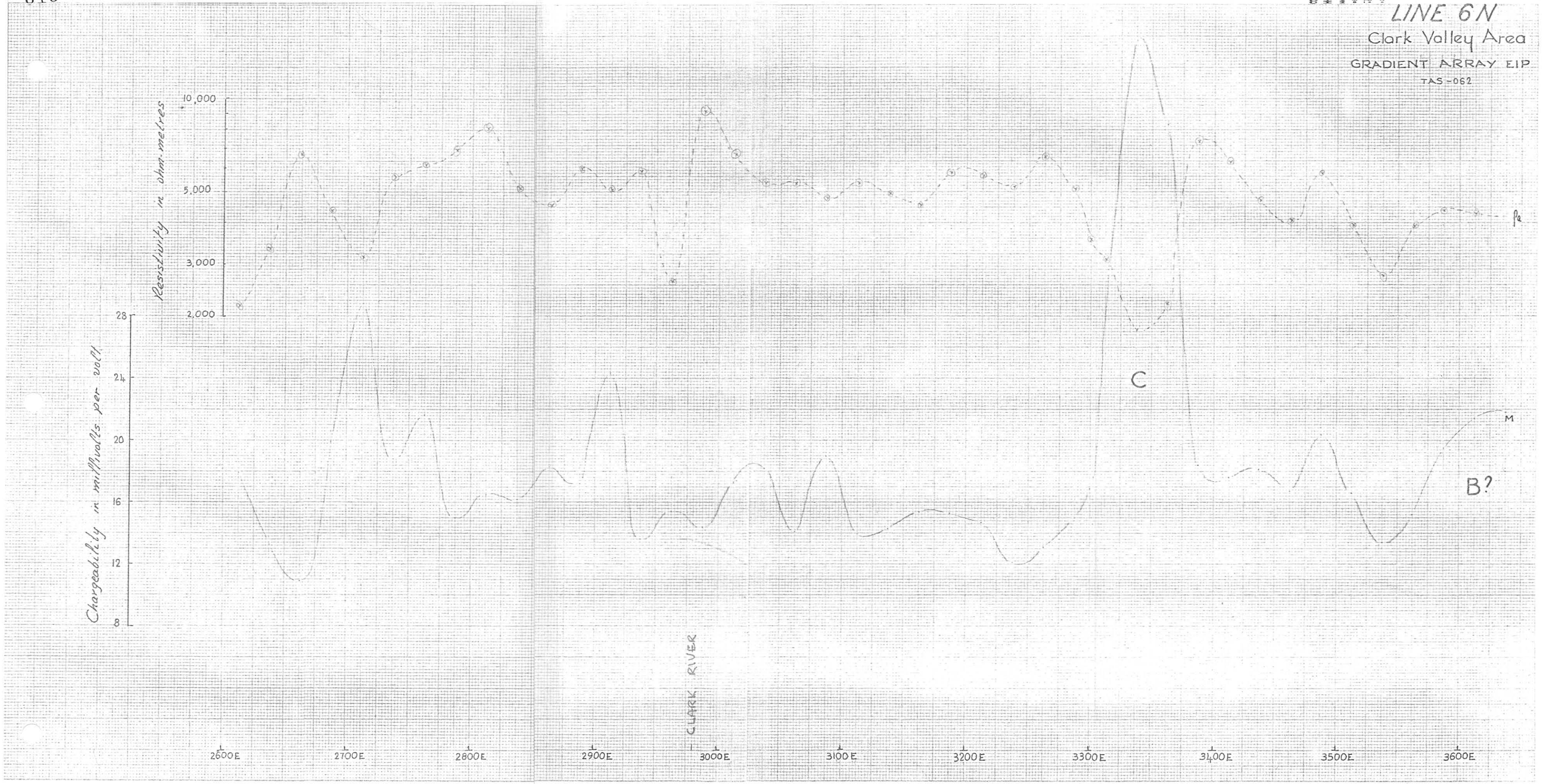
314020

LINE 6N

Clark Valley Area

GRADIENT ARRAY EIP

TAS-062



019

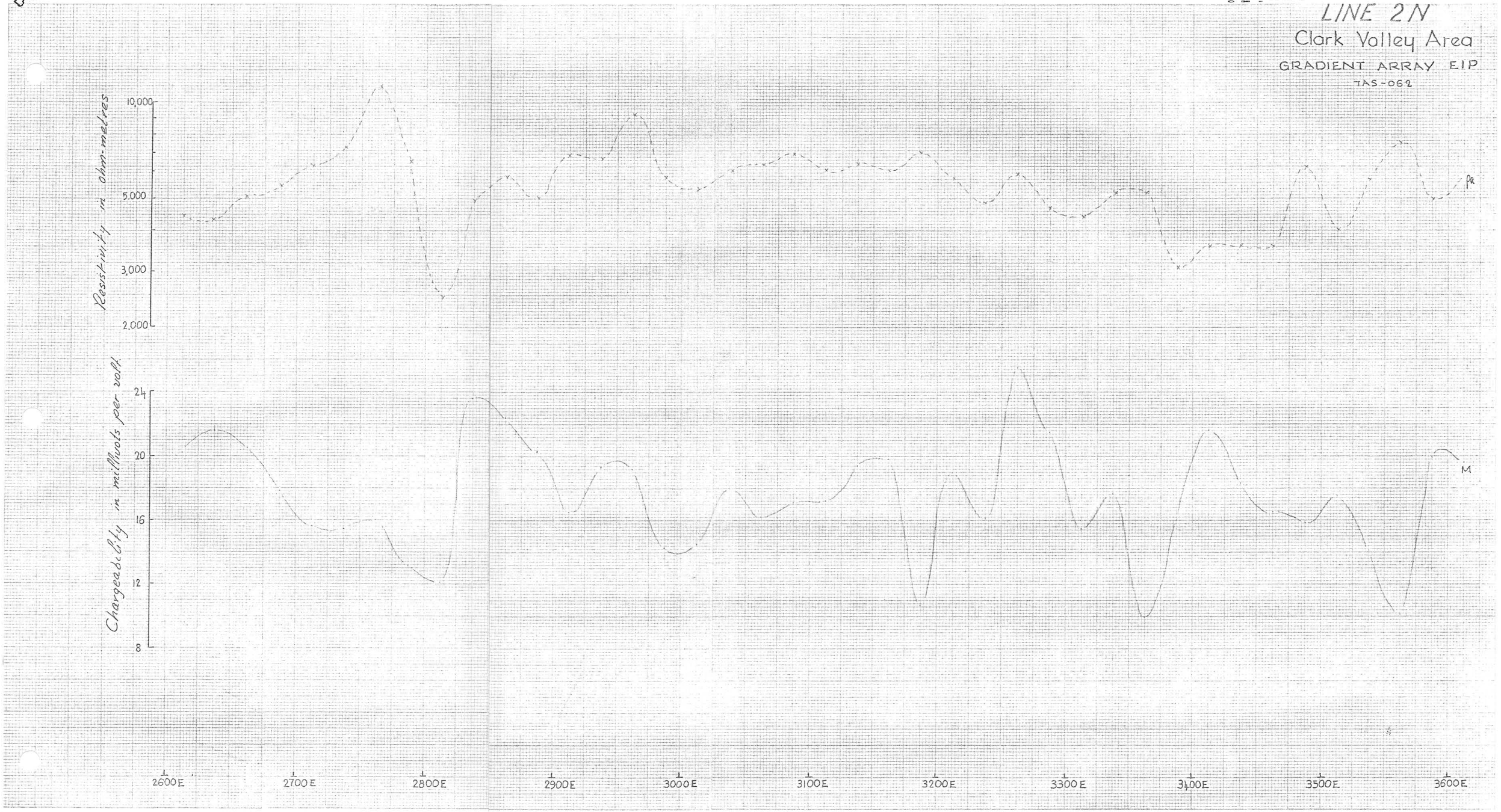
314021

LINE 2N

Clark Valley Area

GRADIENT ARRAY EIP

TAS-062



020

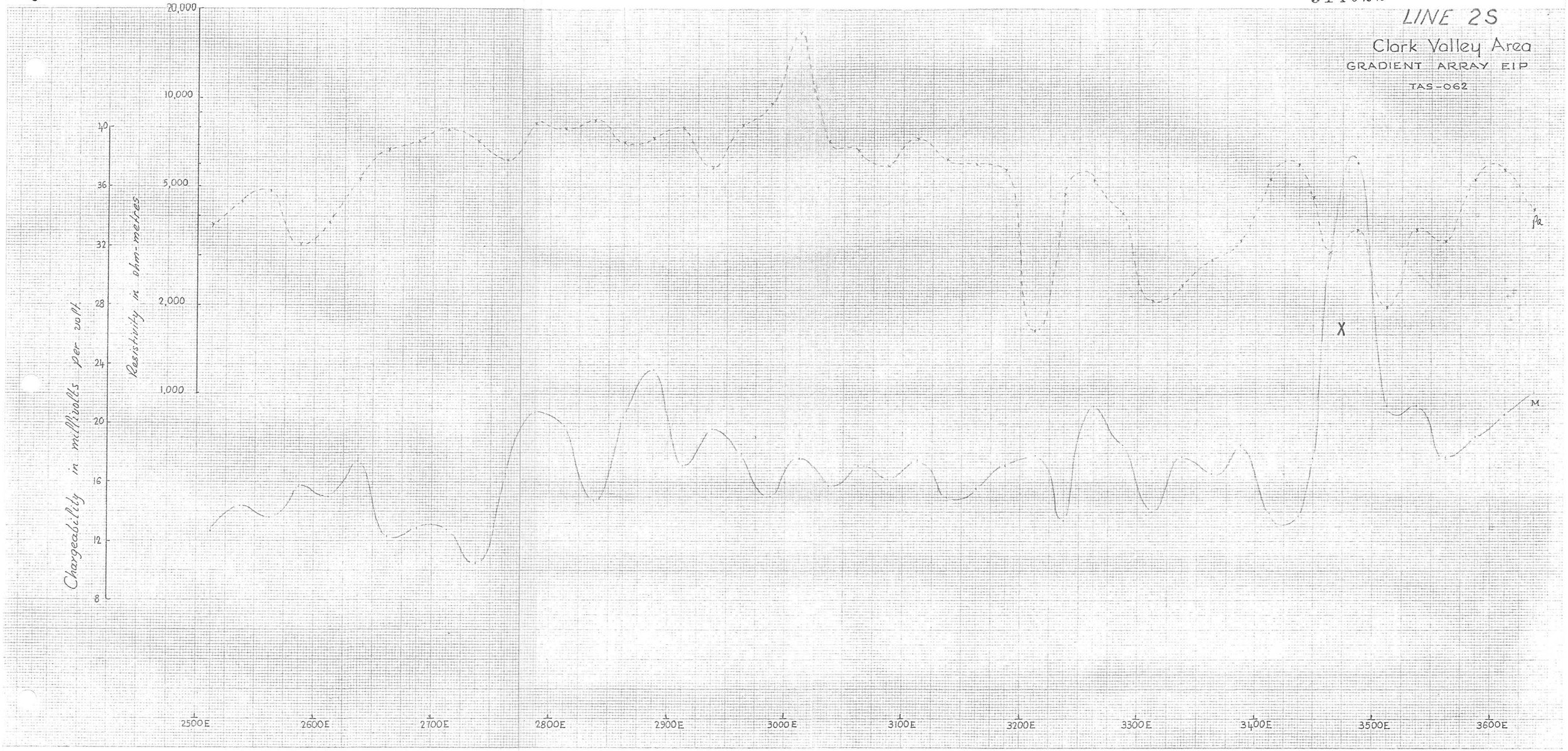
314022

LINE 2S

Clark Valley Area

GRADIENT ARRAY EIP

TAS-062



021

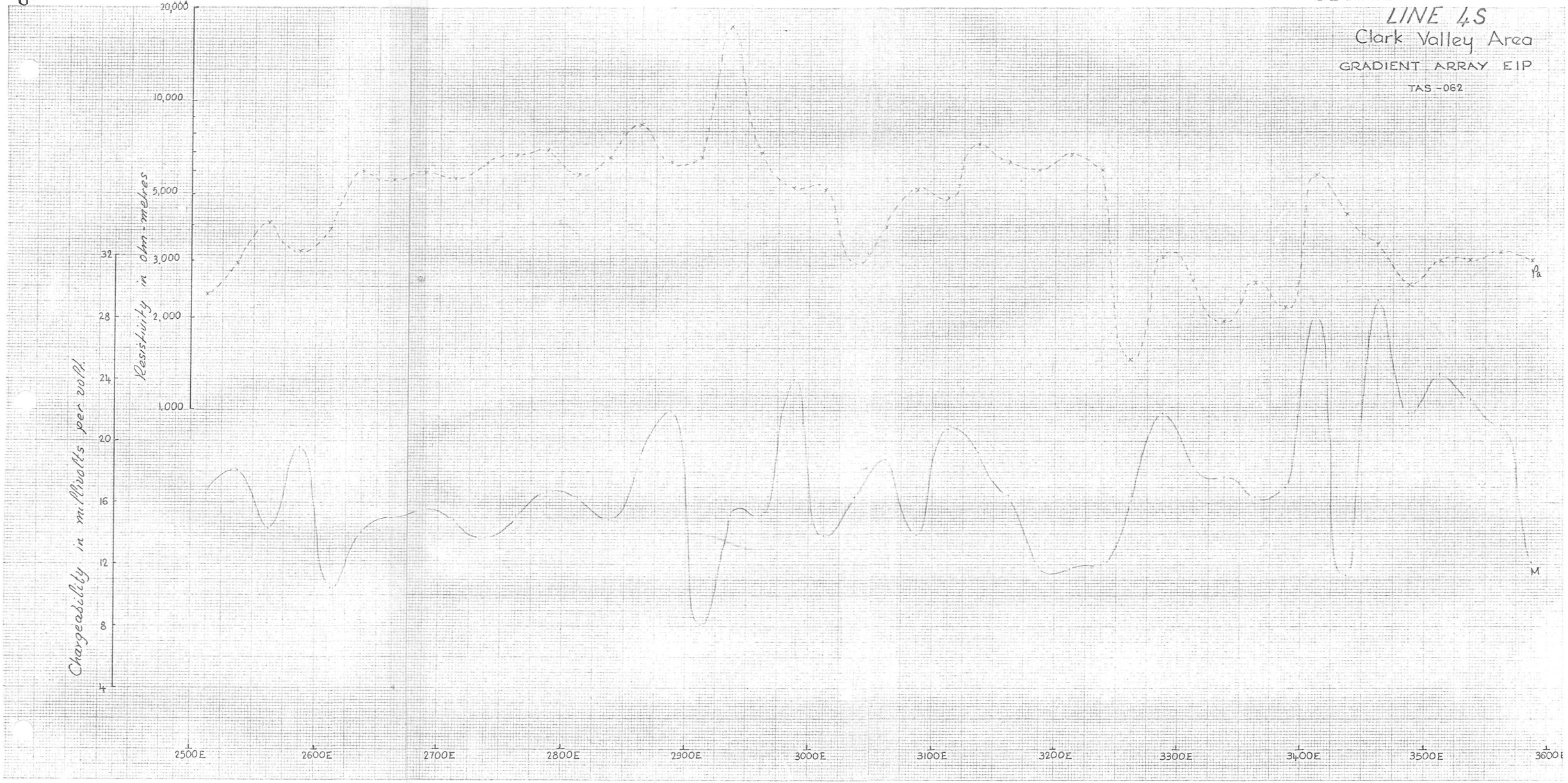
314023

LINE 4S

Clark Valley Area

GRADIENT ARRAY EIP

TAS-062



022

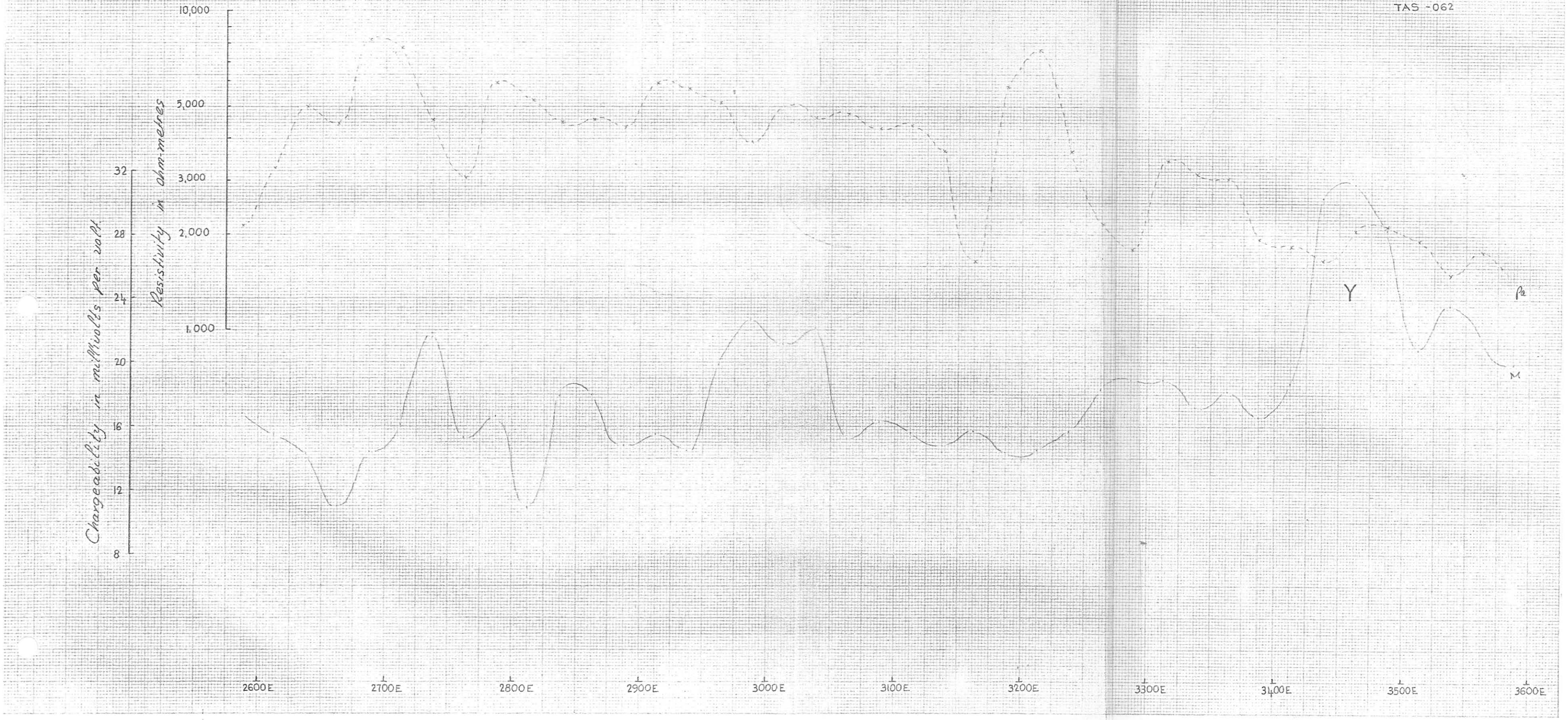
314024

LINE 6S

Clark Valley Area

GRADIENT ARRAY EIP

TAS -062



023

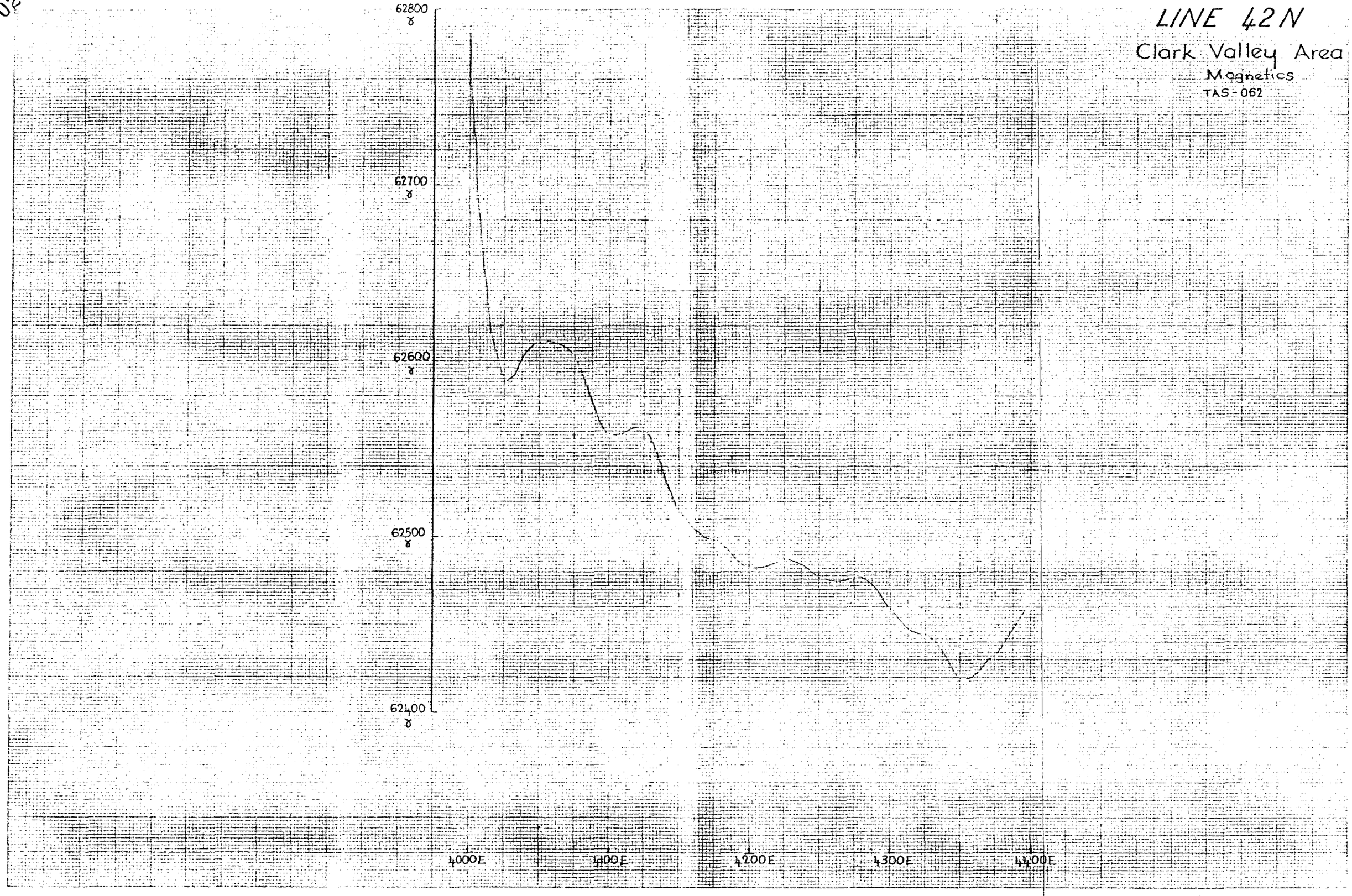
314025

LINE 42N

Clark Valley Area

Magnetics

TAS-062



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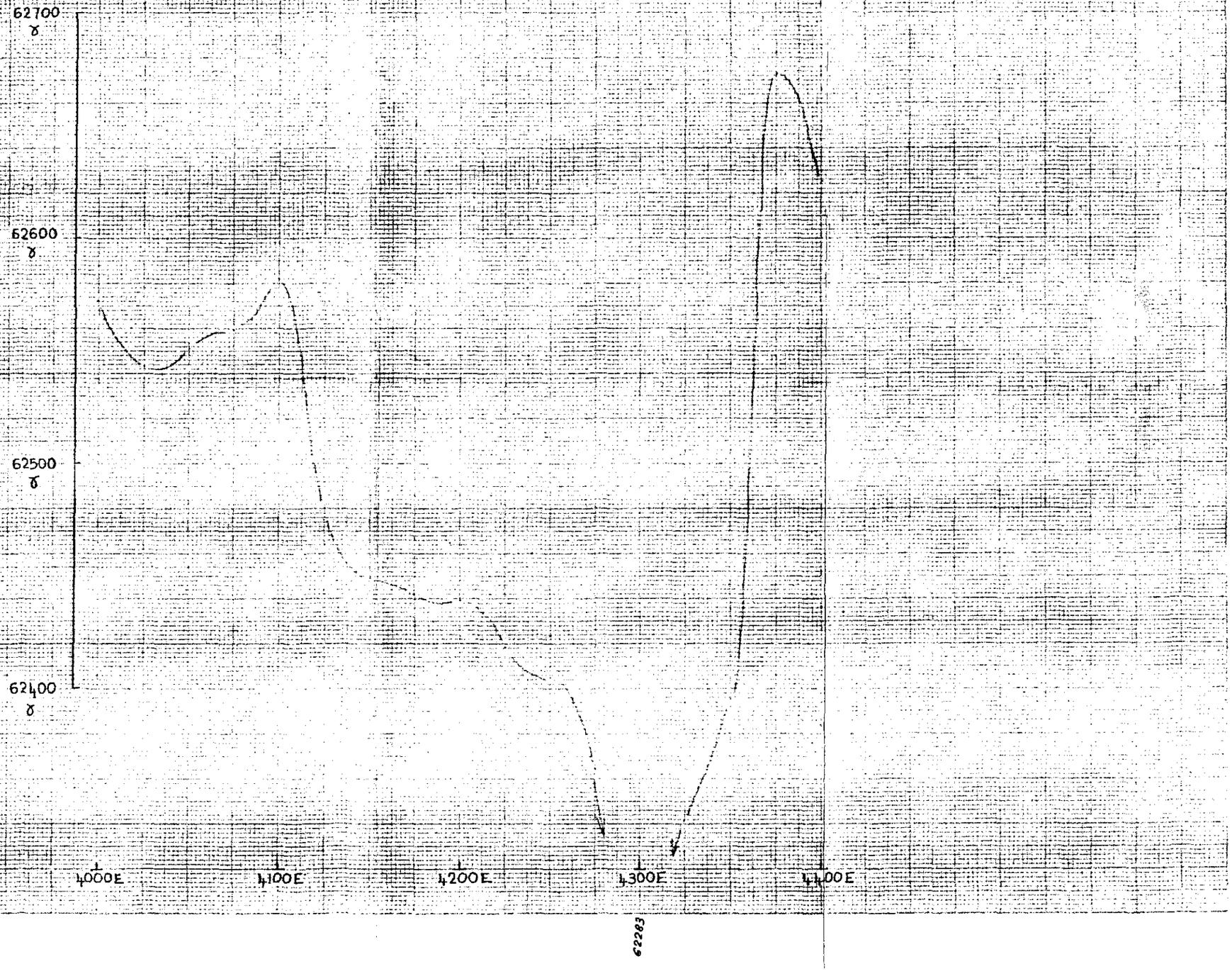
314026

LINE 38N

Clark Valley Area

Magnetics

TAS-062



025

314027

LINE 34N

Clark Valley Area

Magnetics

TAS-062

026

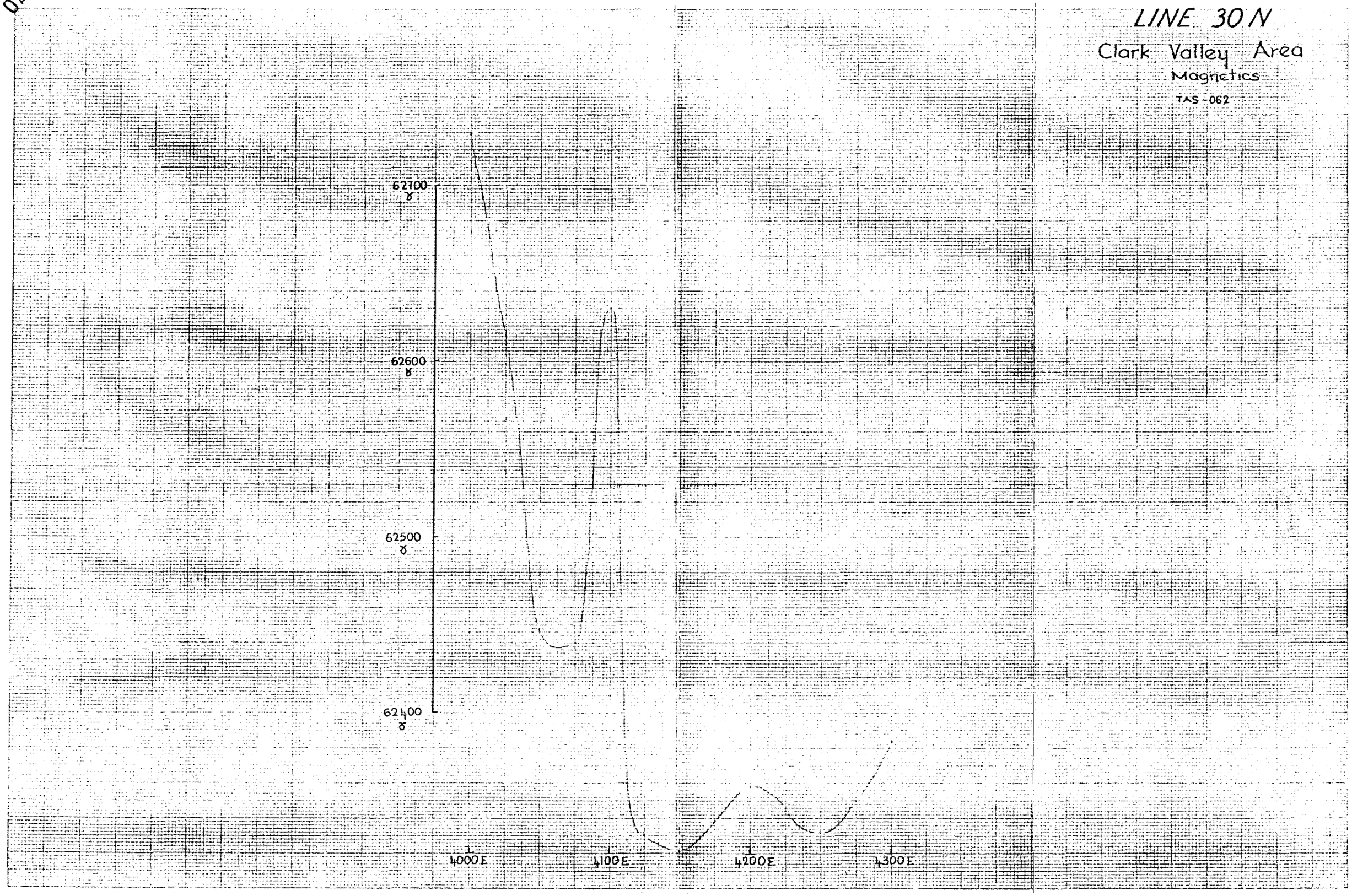
314028

LINE 30N

Clark Valley Area

Magnetics

TAS-062



027

314029

LINE 26N

Clark Valley Area

Magnetics

TAS-062

028

314030

LINE 14N

Clark Valley Area

Magnetics

TAS-062

62600 γ

62500 γ

62400 γ

2600E

2700E

2800E

2900E

3000E

029

314031

LINE 10N

Clark Valley Area

Magnetics

TAS-062

63246 64115 63658 63090 62947 62770 62598 63568 64463 62967 66022 73881

62600 γ

62500 γ

62400 γ

62300 γ

62200 γ

2600E 2700E 2800E 2900E 3000E 3100E 3200E 3300E 3400E 3500E 3600E

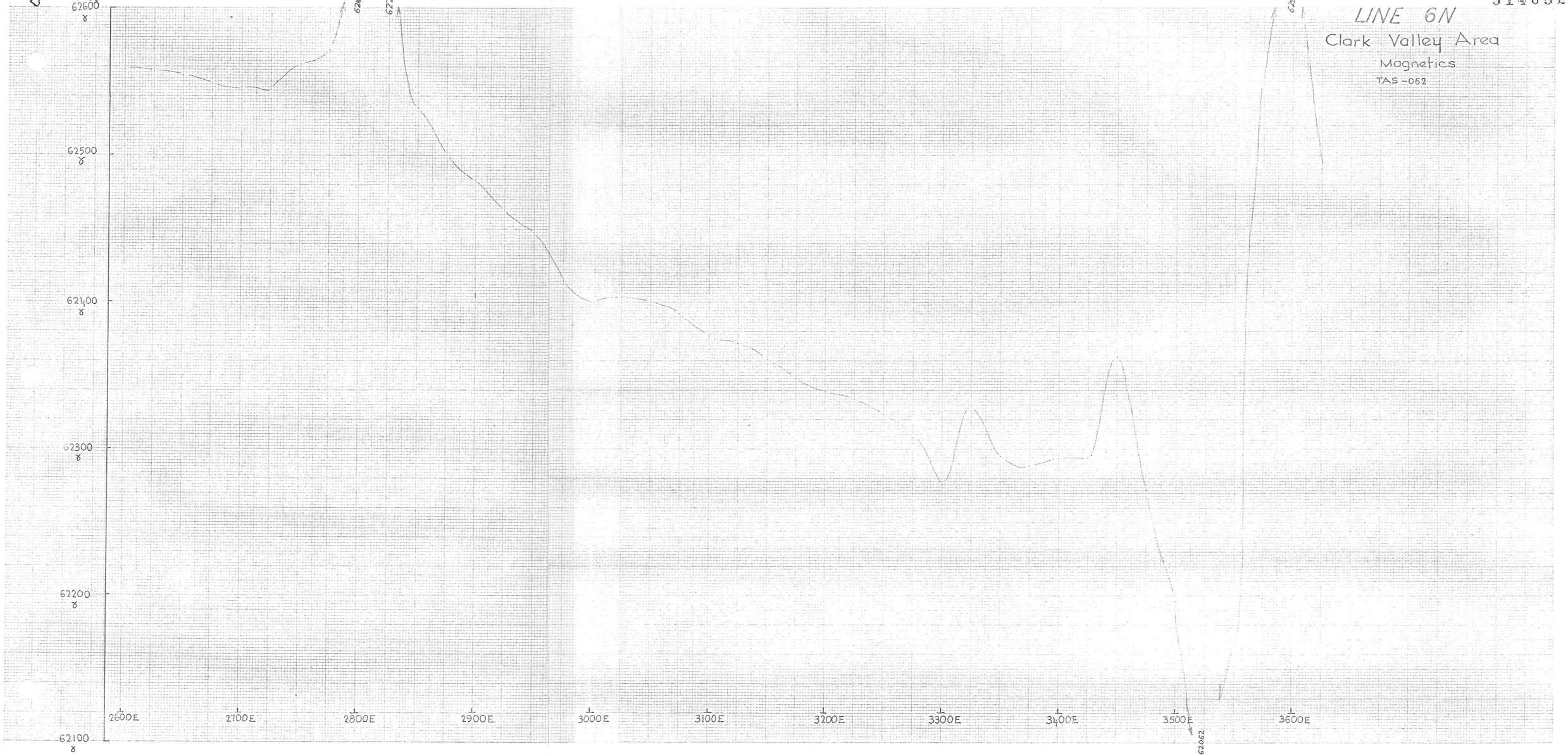
6191

LINE 6N

Clark Valley Area

Magnetics

TAS-062



031

314033

LINE 2N
Clark Valley Area
Magnetics
TAS-062

62500 γ
62400 γ
62300 γ
62200 γ

62635 67630 62622 62650 62650 62739 63156 62857 62706 62624 66029 59819 59869

2600E 2700E 2800E 2900E 3000E 3100E 3200E 3300E 3400E 3500E 3600E

032 314034

LINE 2S

Clark Valley Area

Magnetics

TAS-062

62600 γ

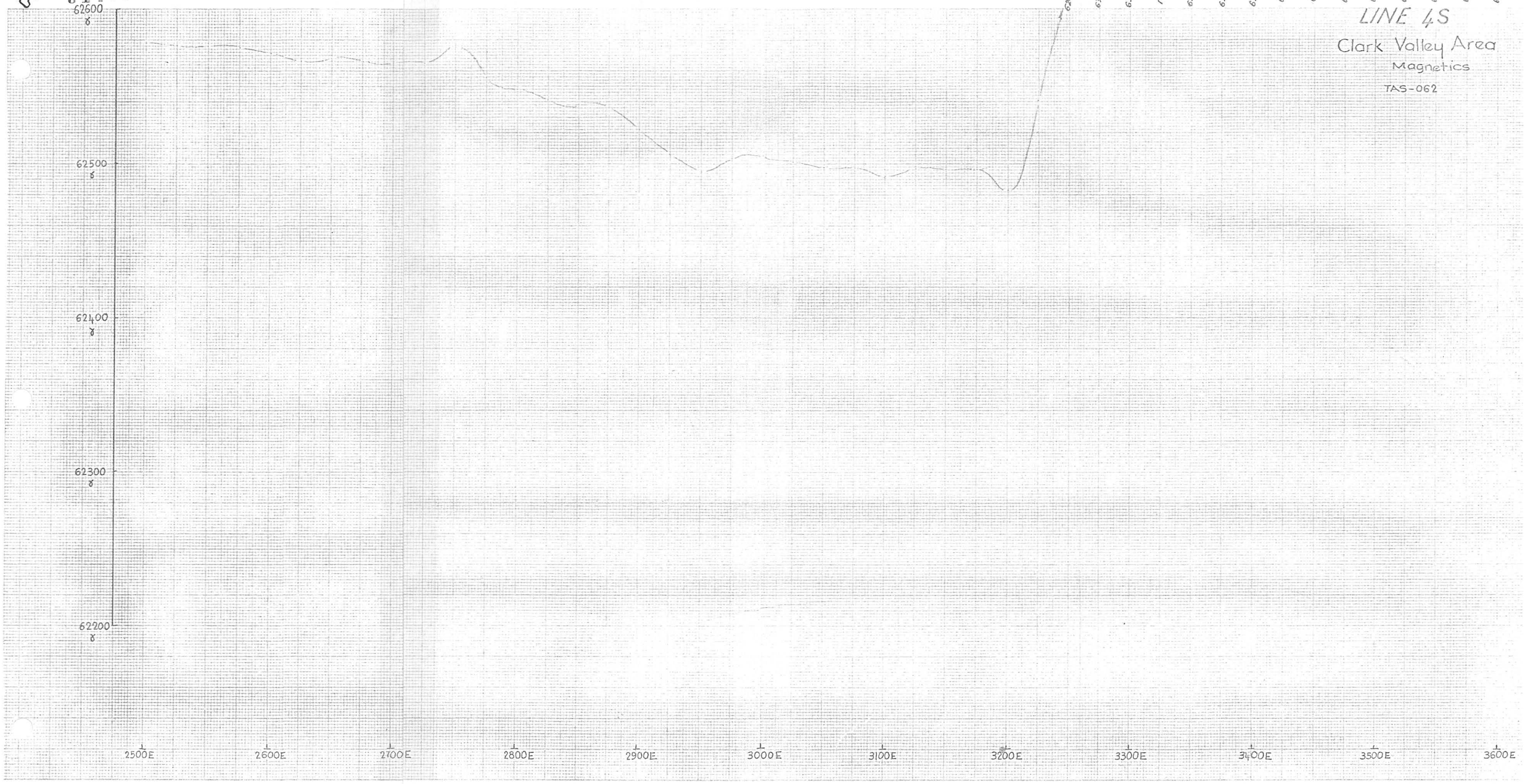
62500 γ

62400 γ

6.1633 6.1173 62945 6.3081 63421 63448 63325 63900 62162 62633 62631 62653 62631 62601

2500E 2600E 2700E 2800E 2900E 3000E 3100E 3200E 3300E 3400E 3500E 3600E

033 314035



LINE 4S

Clark Valley Area

Magnetics

TAS-062

034

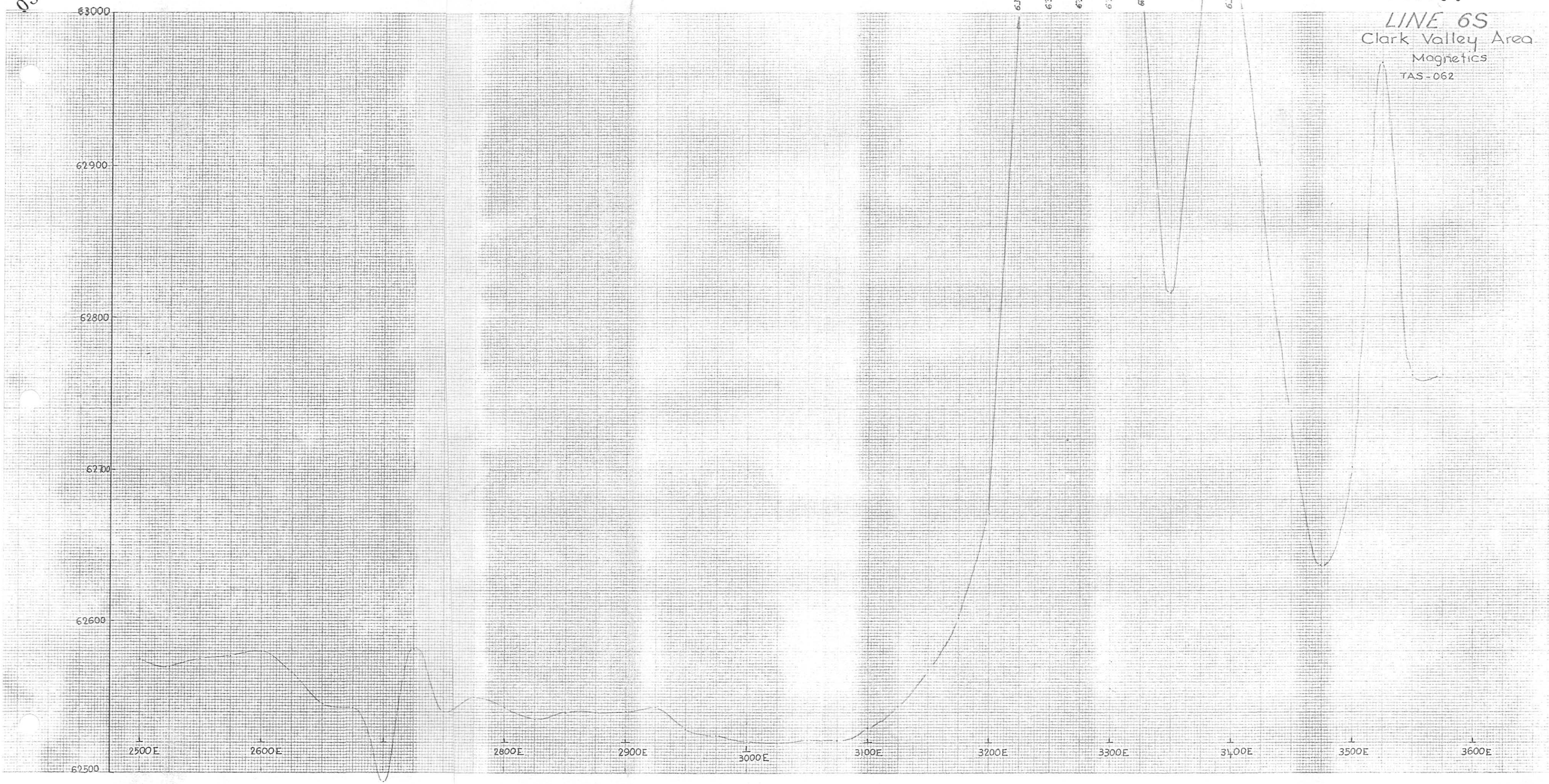
314036

LINE 6S

Clark Valley Area

Magnetics

TAS-062



035

baseline 3000 E

361,000 yds E

44 N
42 N
40 N
38 N
36 N
34 N
32 N
30 N
28 N
26 N
24 N
20 N
16 N
14 N
12N
10 N
8N
6 N
4N
2N
00
2S
4S
6S

199,000 yds N

797,000 yds N

MOUNT LYELL MINING & RAILWAY COMPANY

CLARK RIVER GRID
NEAR QUEENSTOWN - TASMANIA

GRADIENT ARRAY
ELECTRICAL INDUCED POLARIZATION SURVEY

REVISED
CHARGEABILITY CONTOUR PLAN
INCORPORATING EXTENSIONS & INFILL LINES

SURVEYED & COMPILED BY
SCINTREX

JAN-FEB 1978 (TAS-054)
JAN-FEB 1979

314037

SCALE 1:6000

5 cm

Job Nº TAS-062-A Sht 1 of 1 PLATE 1.

035

84-2246

036

baseline 3000 E

361,000 yds E

44N

42N

40N

38N

36N

34N

32N

30N

799,000 yds N

28N

26N

24N

20N

16N

14N

797,000 yds N

12N

10N

8N

6N

4N

2N

00

2S

4S

6S

MOUNT LYELL MINING & RAILWAY COMPANY

CLARK RIVER GRID

NEAR QUEENSTOWN – TASMANIA

GRADIENT ARRAY
ELECTRICAL INDUCED POLARIZATION SURVEY

REVISED

RESISTIVITY CONTOUR PLAN

INCORPORATING EXTENSIONS & INFILL LINES

SURVEYED & COMPILED BY
SCINTREX

JAN - FEB 1978 (TAS-054)
JAN - FEB 1979

314038

SCALE 1:6000

5 cm

Job Nº TAS-062-A

Sht 1 of 1

PLATE 2

036

84-2246

037

baseline 3000 E

361,000 yds E

44 N
42 N
40 N
38 N
36 N
34 N
32 N
30 N
28 N
26 N
24 N
20 N
16 N
14 N
12N
10 N
8N
6 N
4 N
2N
00
2S
4S
6S

799,000 yds N

797,000 yds N

MOUNT LYELL MINING & RAILWAY COMPANY LTD.

CLARK RIVER GRID

NEAR QUEENSTOWN - TASMANIA

REVISED

TOTAL MAGNETIC FIELD CONTOUR PLAN

INCORPORATING EXTENSIONS & INFILL LINES

314039

SURVEYED & COMPILED BY
SCINTREX

JAN - FEB 1978 (TAS-054)
JAN - FEB 1979

SCALE 1:6000

5 cm

Job Nº TAS-062-A

Sht 1 of 1

PLATE 3

037

84-2246