

Schlumberger soundings in the
Moscow, Idaho - Pullman, Washington
area

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SCHLUMBERGER SOUNDINGS IN THE MOSCOW,
IDAHO-PULLMAN, WASHINGTON, AREA

By Dallas B. Jackson

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SCHLUMBERGER SOUNDINGS IN THE MOSCOW,
IDAHO-PULLMAN, WASHINGTON, AREA

By Dallas B. Jackson

In 1975, the U.S. Geological Survey made 24 symmetric Schlumberger soundings in the Moscow, Idaho-Pullman, Washington, area to aid in hydrologic studies. Figure 1 shows the index map for the location, number, and azimuth of the Schlumberger sounding stations. The maximum electrode spacing ranged from $AB/2 = 610$ m (2,000 f) to $AB/2 = 3,660$ m (12,000 f). All the sounding curves were automatically processed and interpreted as shown in the graphs given in the appendix. Each graph shows the following:

- (1) field data, designated by a segmented solid-line curve with diamond symbols for observed data;
- (2) a continuous-dashed curve, which represents:
 - (a) the continuous "field" curve obtained by shifting the various segments upwards or downwards, generally with respect to the last segment on the segmented field curve (Zohdy and others, 1973), and
 - (b) the digitized curve at the rate of six points per logarithmic cycle. Although the digitized points are not shown on the dashed curve, they were computed using a subroutine in a computer program for bicubic spline functions (Anderson, 1971). The digitized data were then fed into the automatic

References

- Anderson, W. L., 1971, Application of bicubic spline functions to two dimensional gridded data: U.S. Dept. Commerce Nat. Tech. Inf. Service Rept. PB-203597, Springfield, Va. 22161, 87 p.
- Zohdy, Adel A. R., 1974a, A computer program for the automatic interpretation of Schlumberger sounding curves over horizontally stratified media: U.S. Geol. Survey Rept. USGS-GD-74-017, 25 p.; available only from Springfield, Va. 22161 as Rept. PB-232703/AS.
- Zohdy, Adel A. R., 1974b, The use of Dar-Zarrouk curves in the interpretation of VES data: U.S. Geol. Survey Bull. 1313-D, 41 p.
- Zohdy, Adel A. R., 1975, Automatic interpretation of Schlumberger sounding curves using modified Dar-Zarrouk functions: U.S. Geol. Survey Bull. 1313-E, 39 p.
- Zohdy, Adel A. R., Anderson, L. A., and Muffler, L. J. P., 1973, Resistivity, self potential, and induced polarization surveys of a vapor-dominated geothermal system: Geophysics, v. 38, p. 1130-1144.

interpretation program (Zohdy, 1974a and 1975) to obtain the best-fitting theoretical sounding curve for a horizontally layered medium;

- (3) the theoretical best-fitting sounding curve, plotted as (+) signs:
- (4) the detailed layering for which the theoretical curve is calculated; and
- (5) the D.Z. (Dar Zarrouk) curve for the detailed layering. The ordinate values for the D.Z. curves are shifted upward or downward by one logarithmic cycle to avoid crowding on the graph paper. The D.Z. curves can be used to obtain equivalent and simpler solutions containing fewer layers; solutions in which certain constraints are imposed on the layer thickness and resistivities (Zohdy, 1974b).

All these graphs were generated on a Hewlett Packard 7203-A graphic plotter. The plotter driving subroutines were developed by G. I. Evenden of the U.S. Geological Survey.

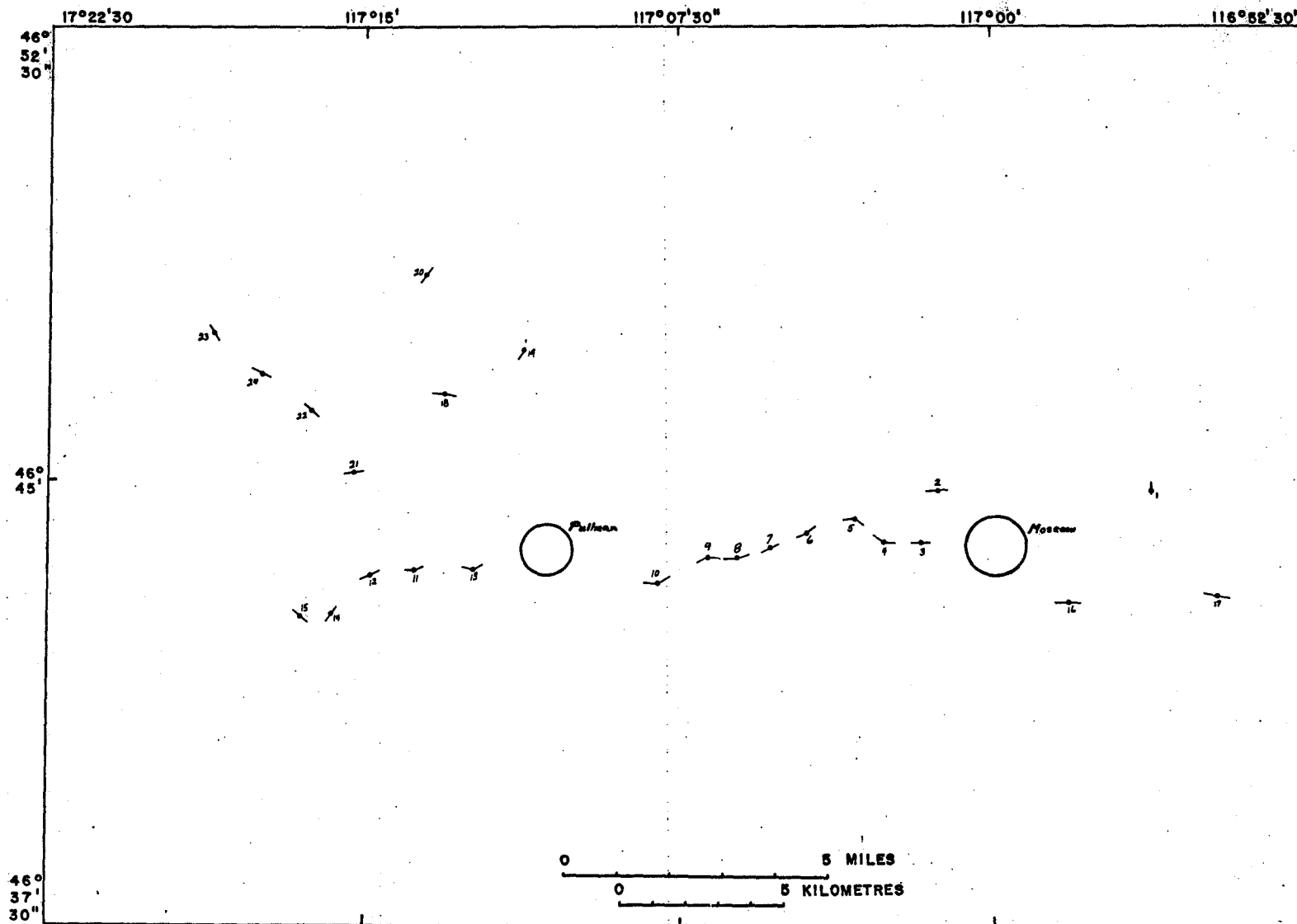


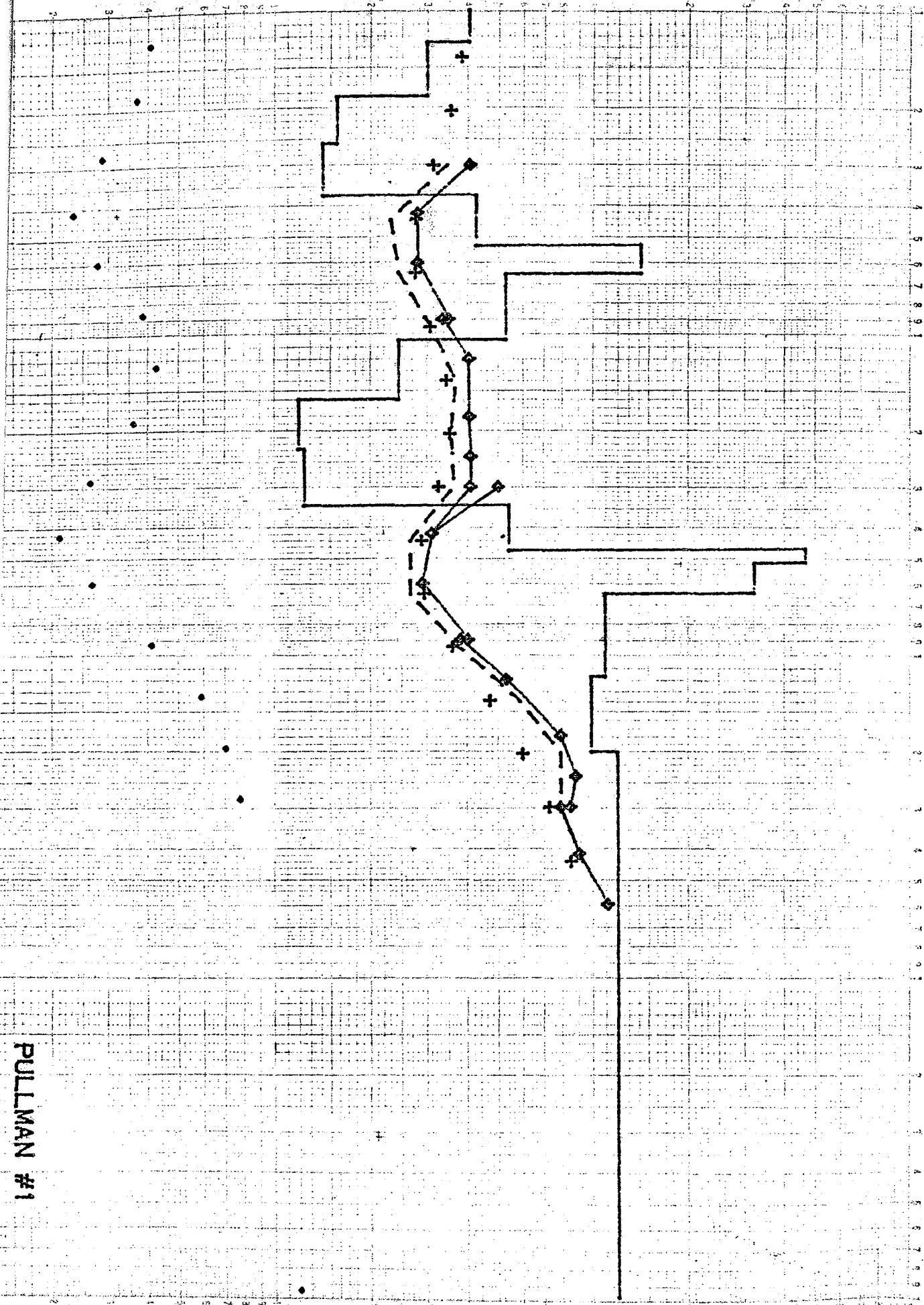
Figure 1.--Station locations, numbers, and azimuths for Schlumberger soundings, Moscow, Idaho--Pullman, Washington

RESISTIVITIES IN OHM-METRES

10

100

1000



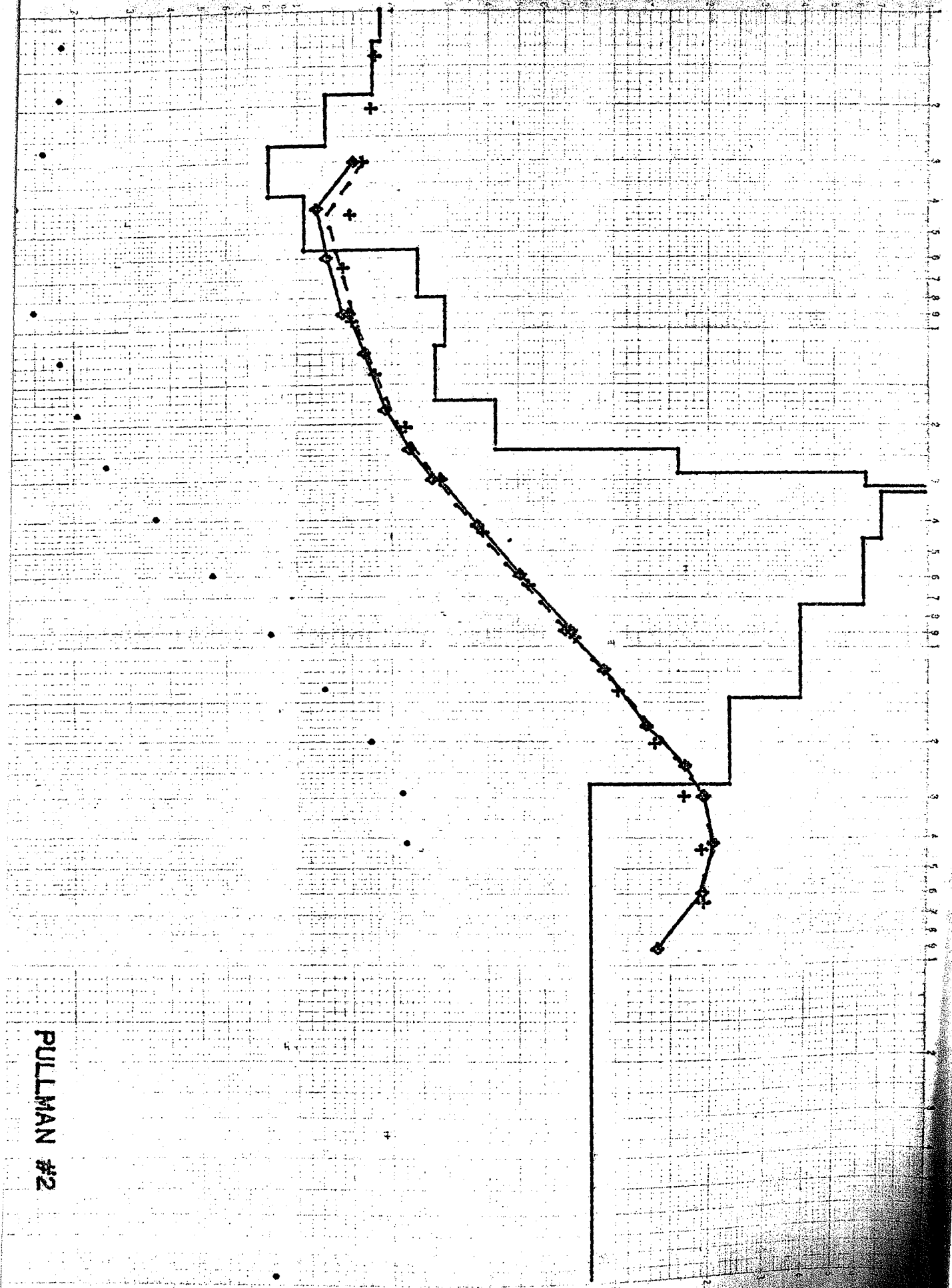
PULLMAN #1

RESISTIVITIES IN OHM METERS

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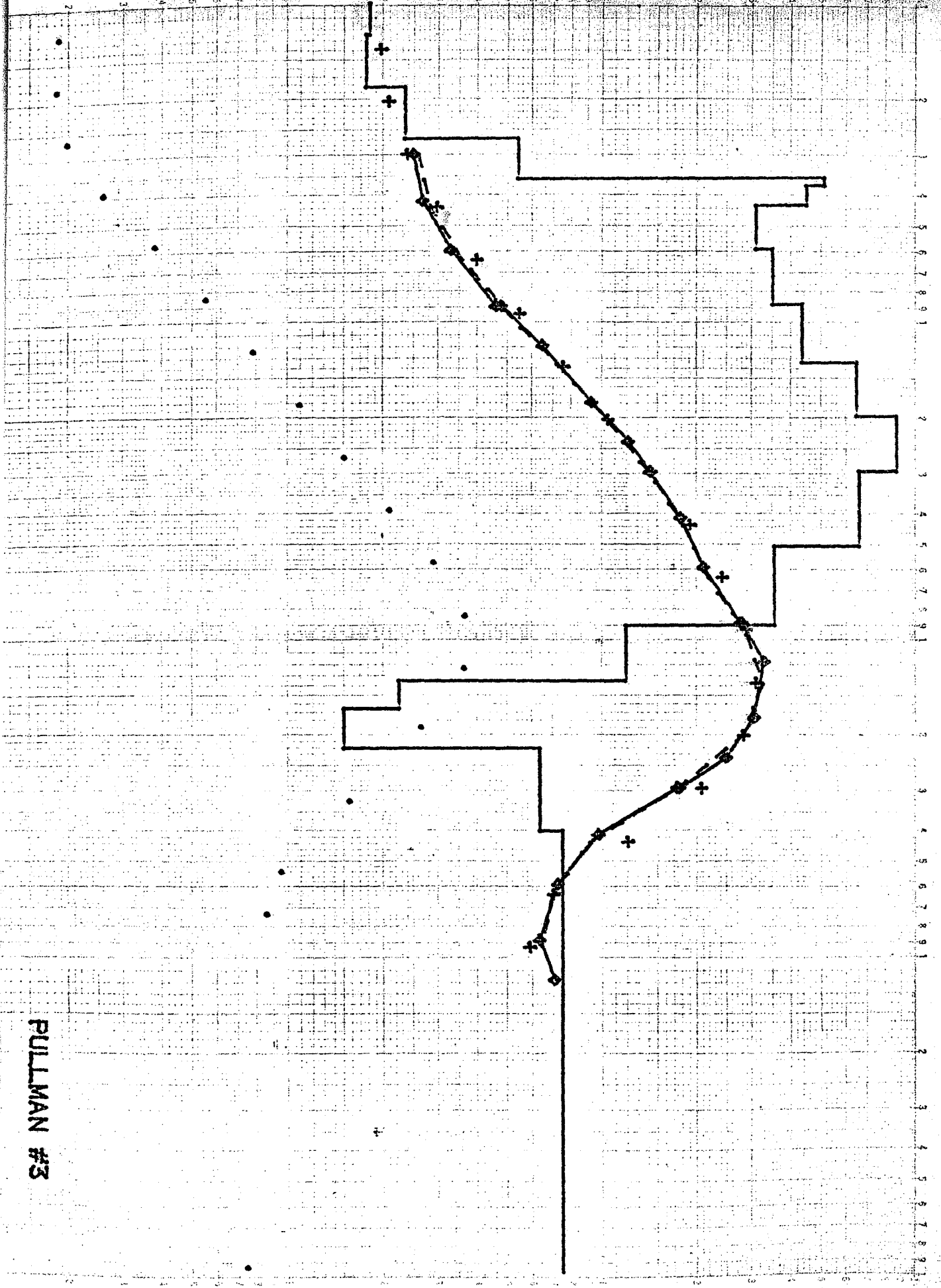
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PULLMAN #2

PULLMAN #3



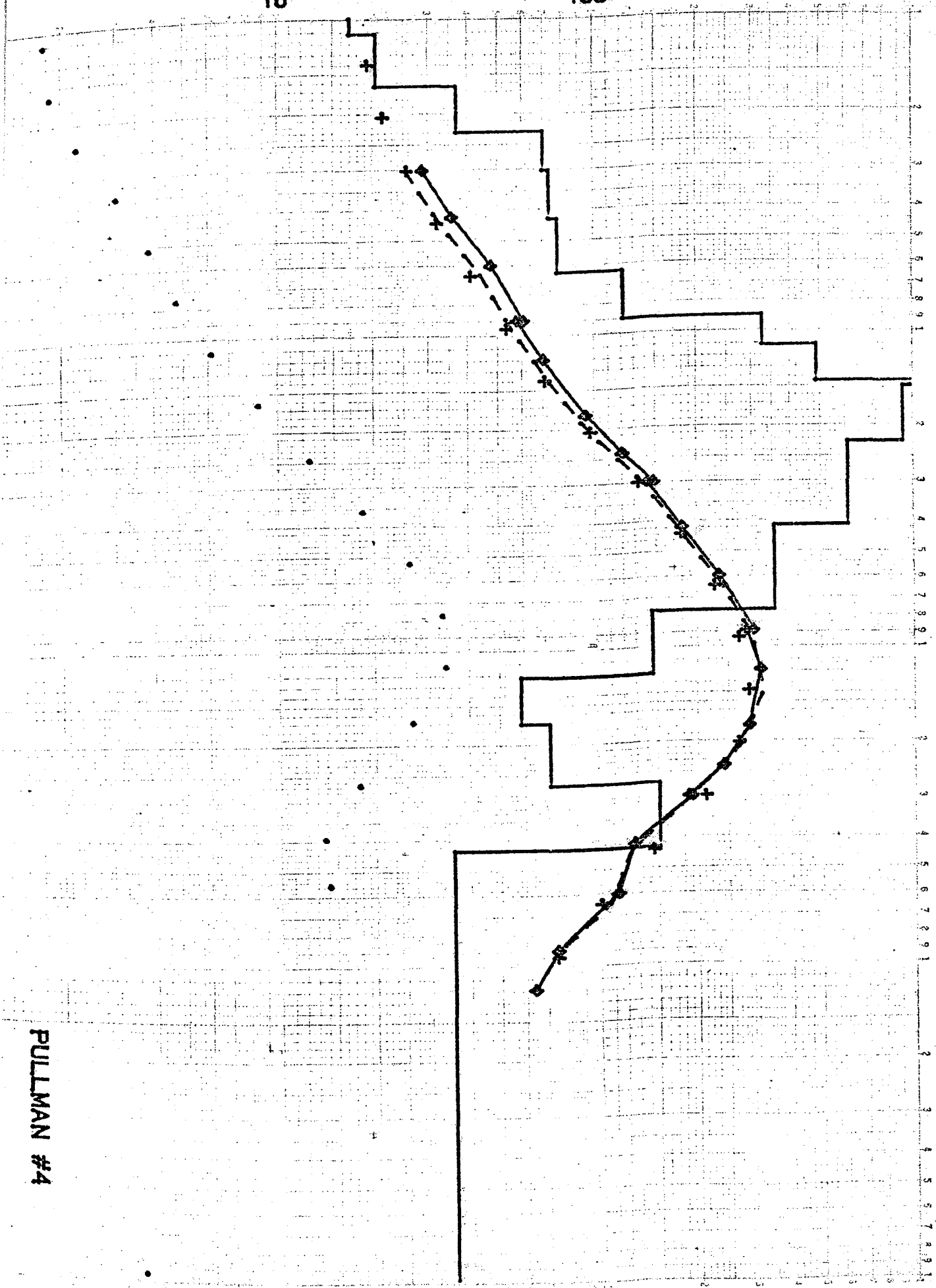
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100

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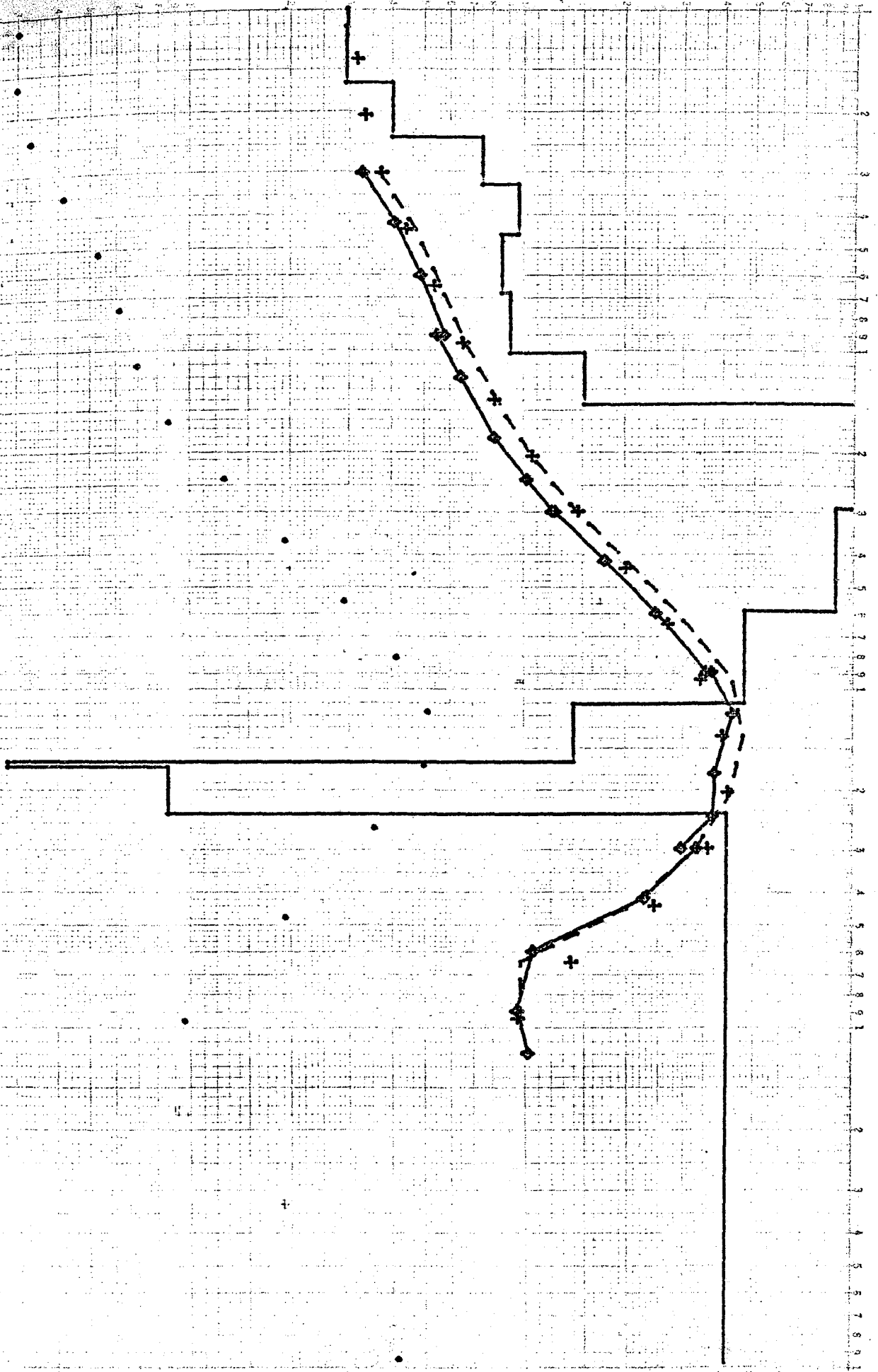


RESISTIVITIES IN OHM-METRES

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100

1000



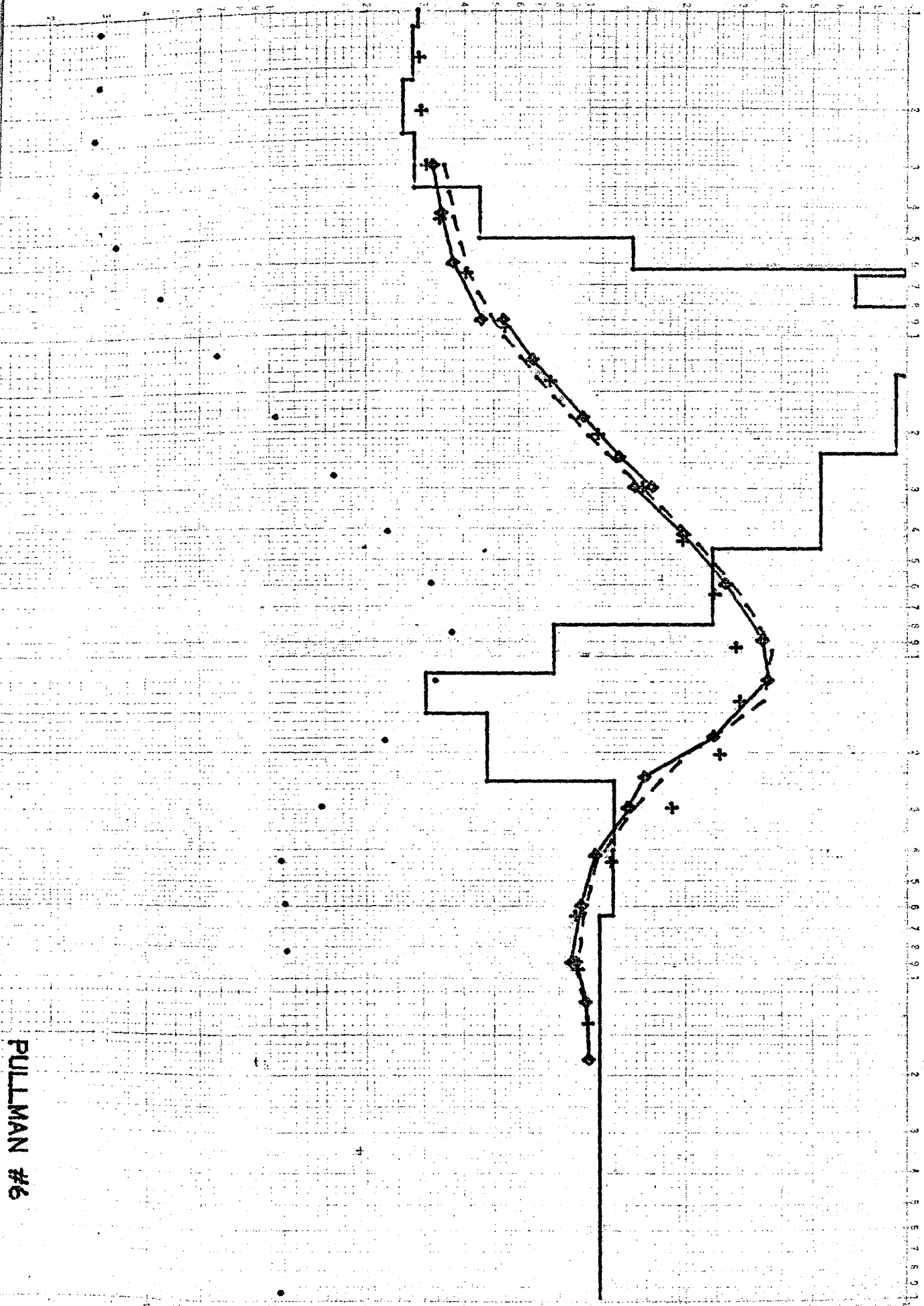
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RESISTIVITIES IN OHM-METRES

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100

1000



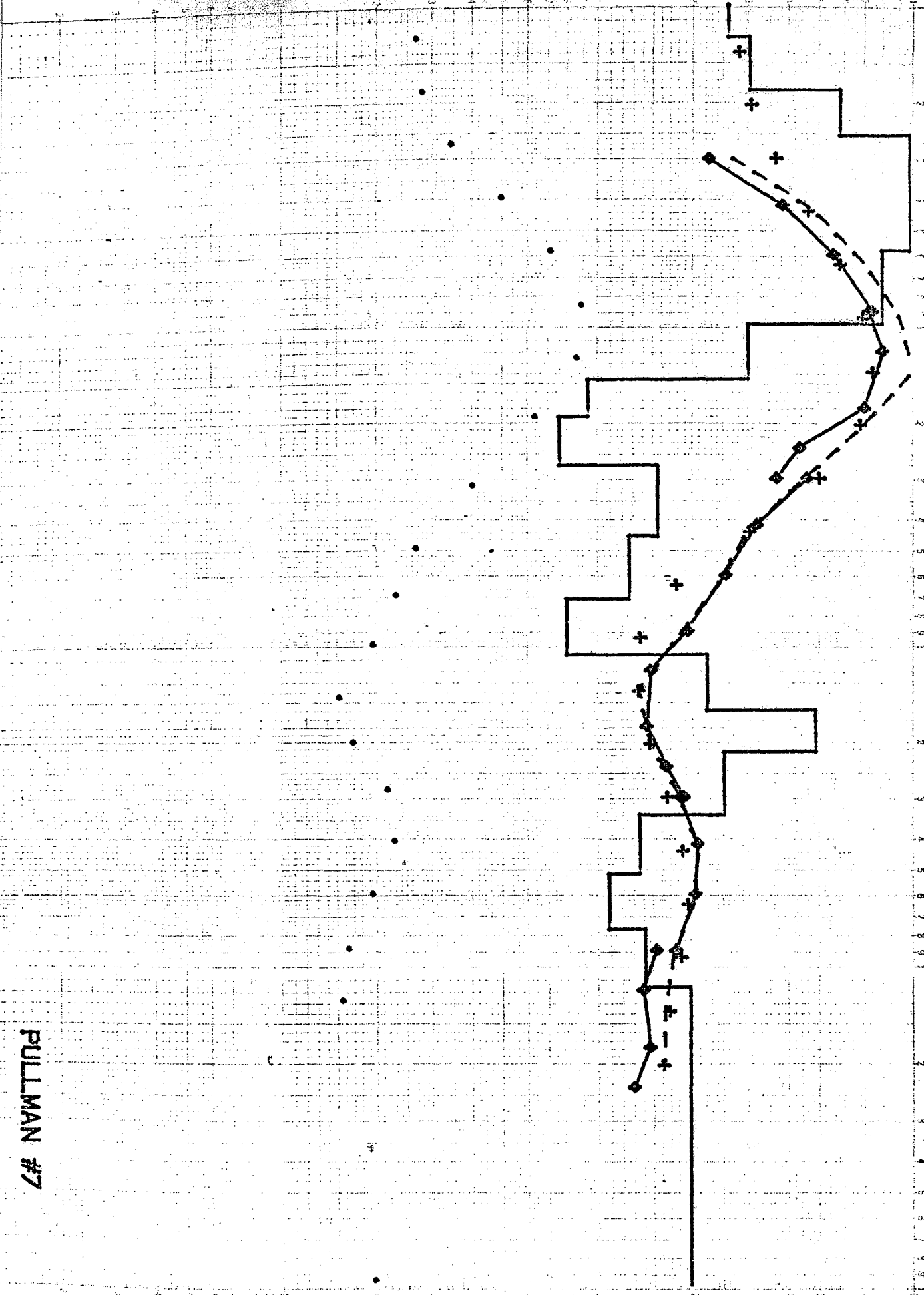
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RESISTIVITIES IN OHM-METRES

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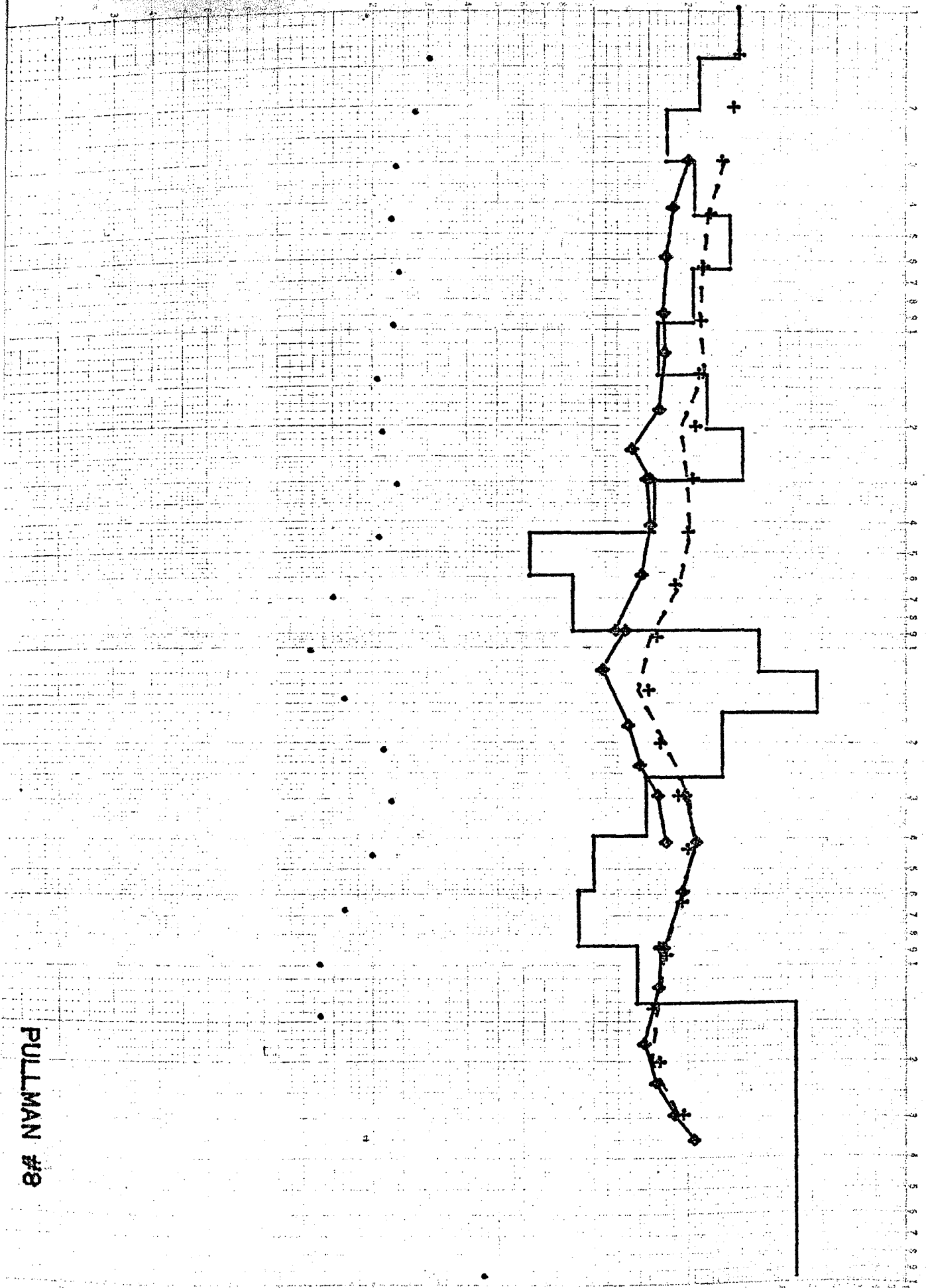
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RESISTIVITIES IN OHM-METRES

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100

1000



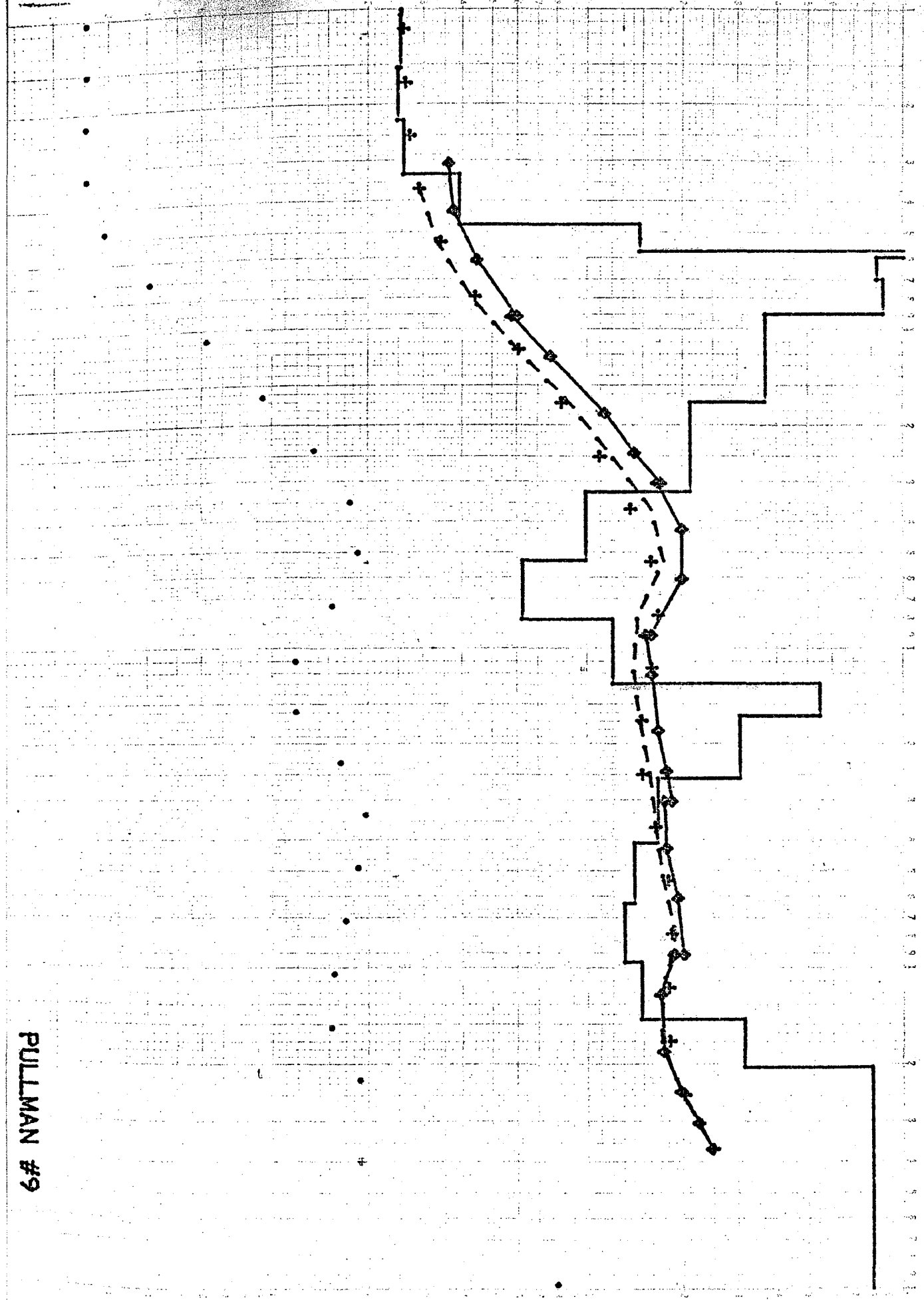
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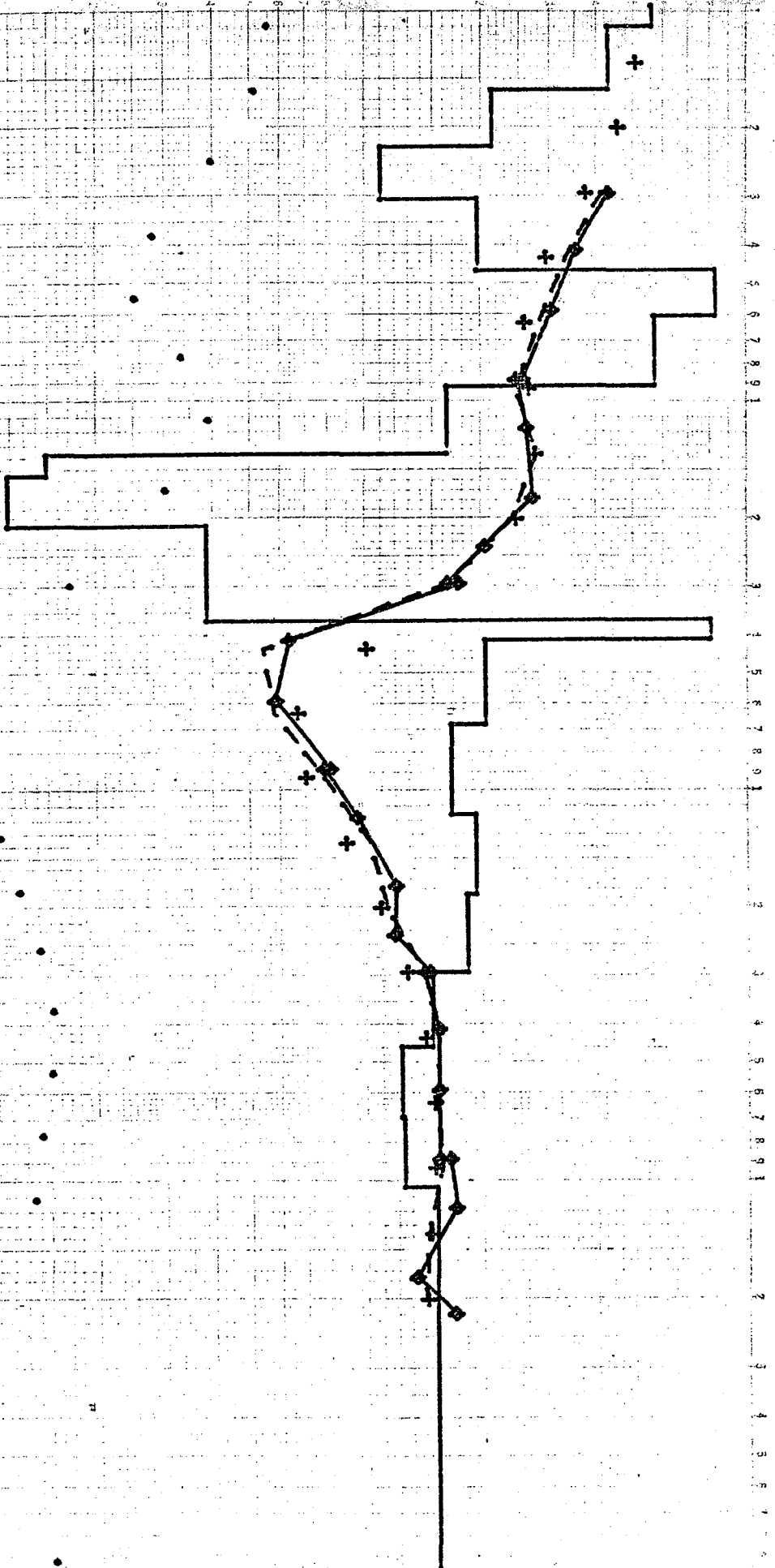
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100

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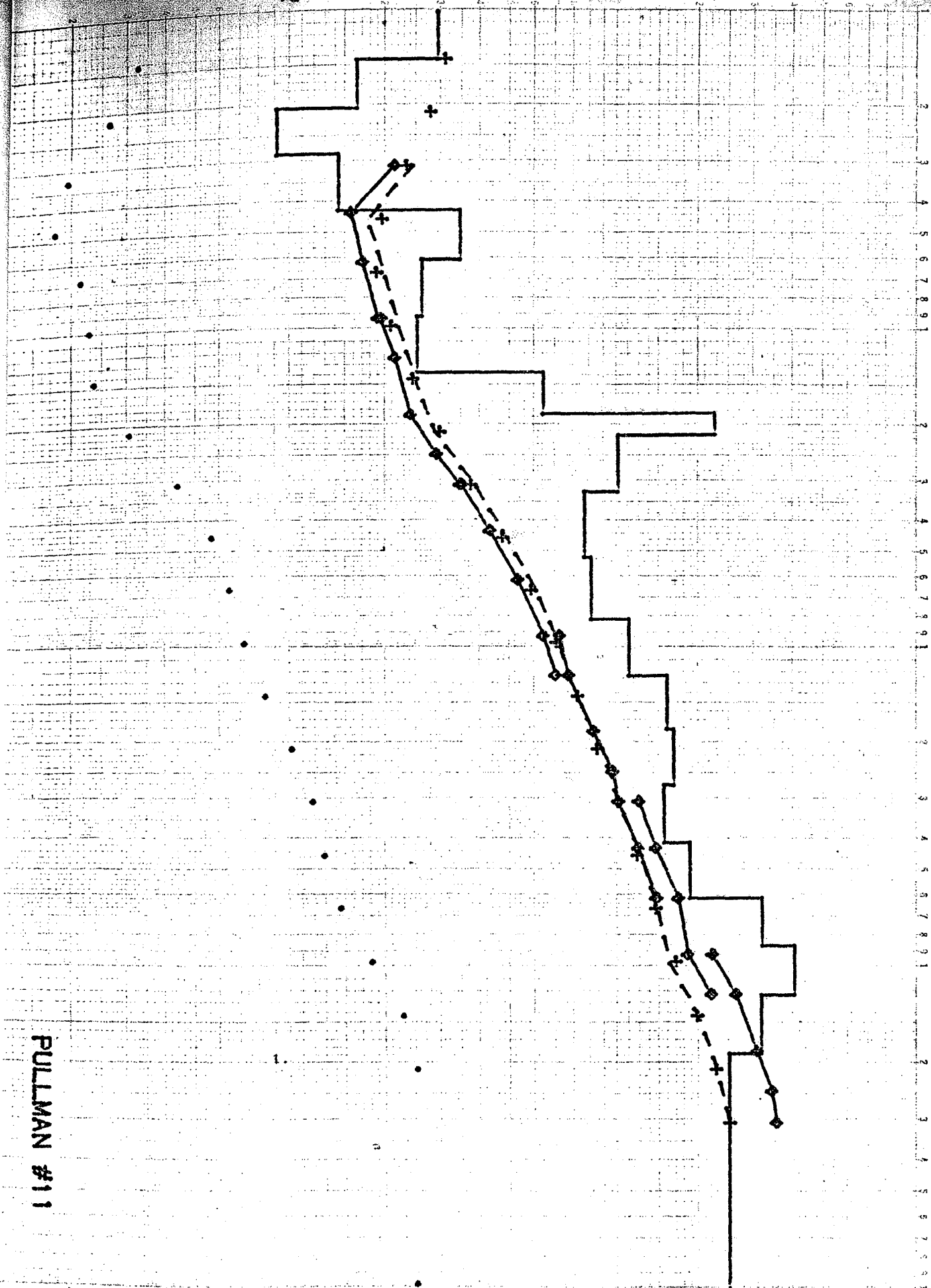
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RESISTIVITIES IN OHM-METRES

10

100

1000



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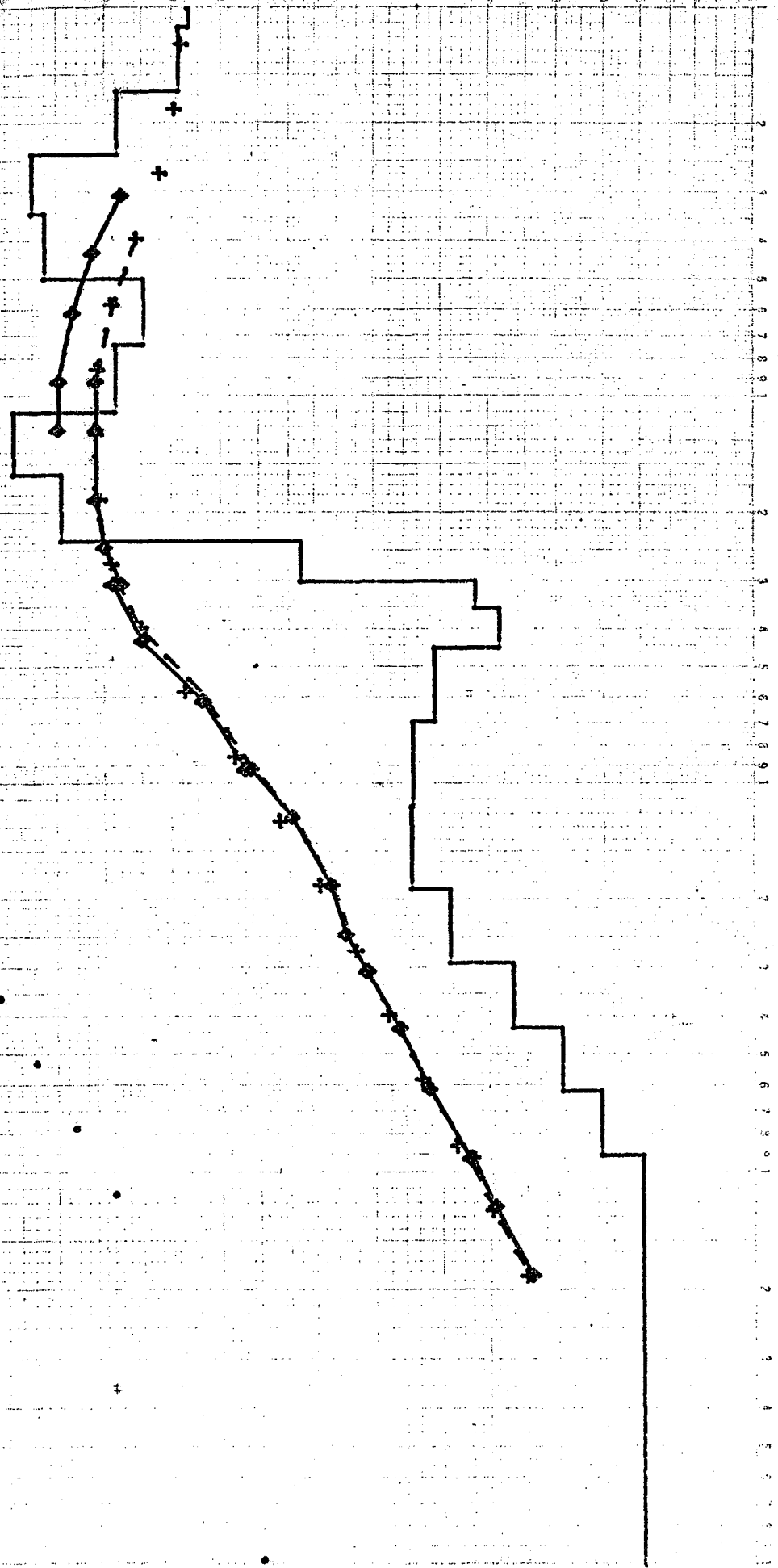
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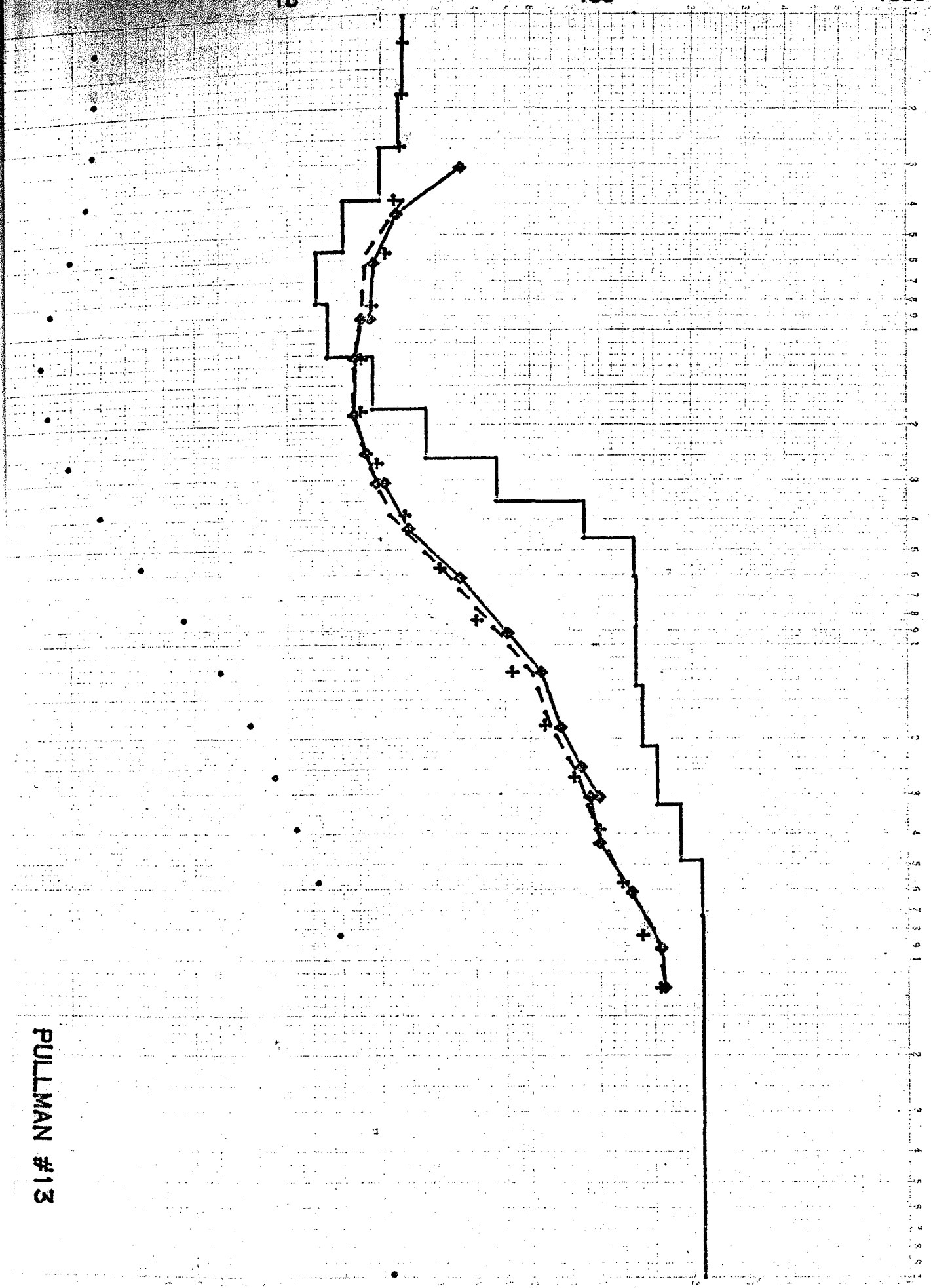
RESISTIVITIES IN OHM-METRES

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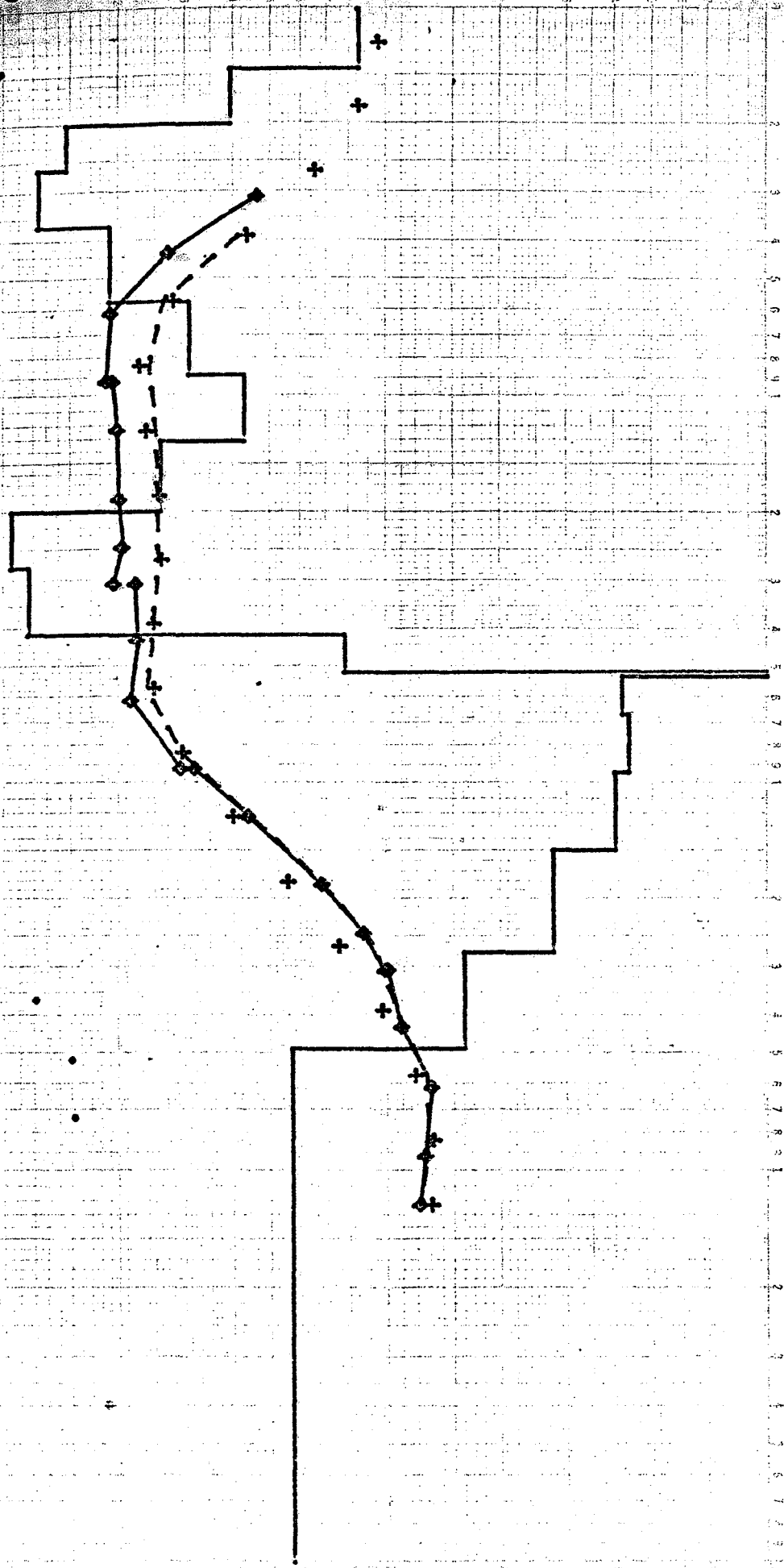
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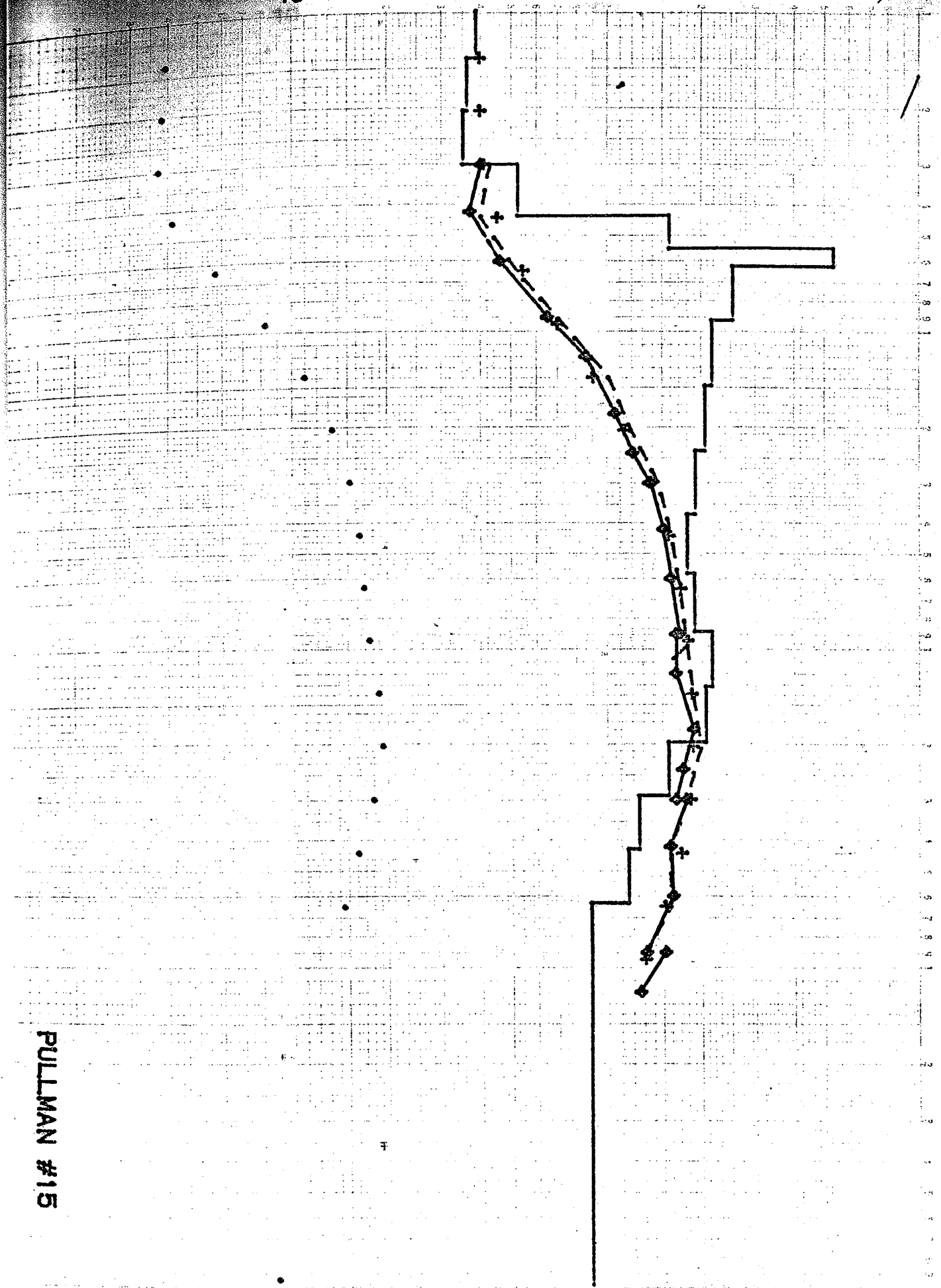


RESISTIVITIES IN OHM-METRES

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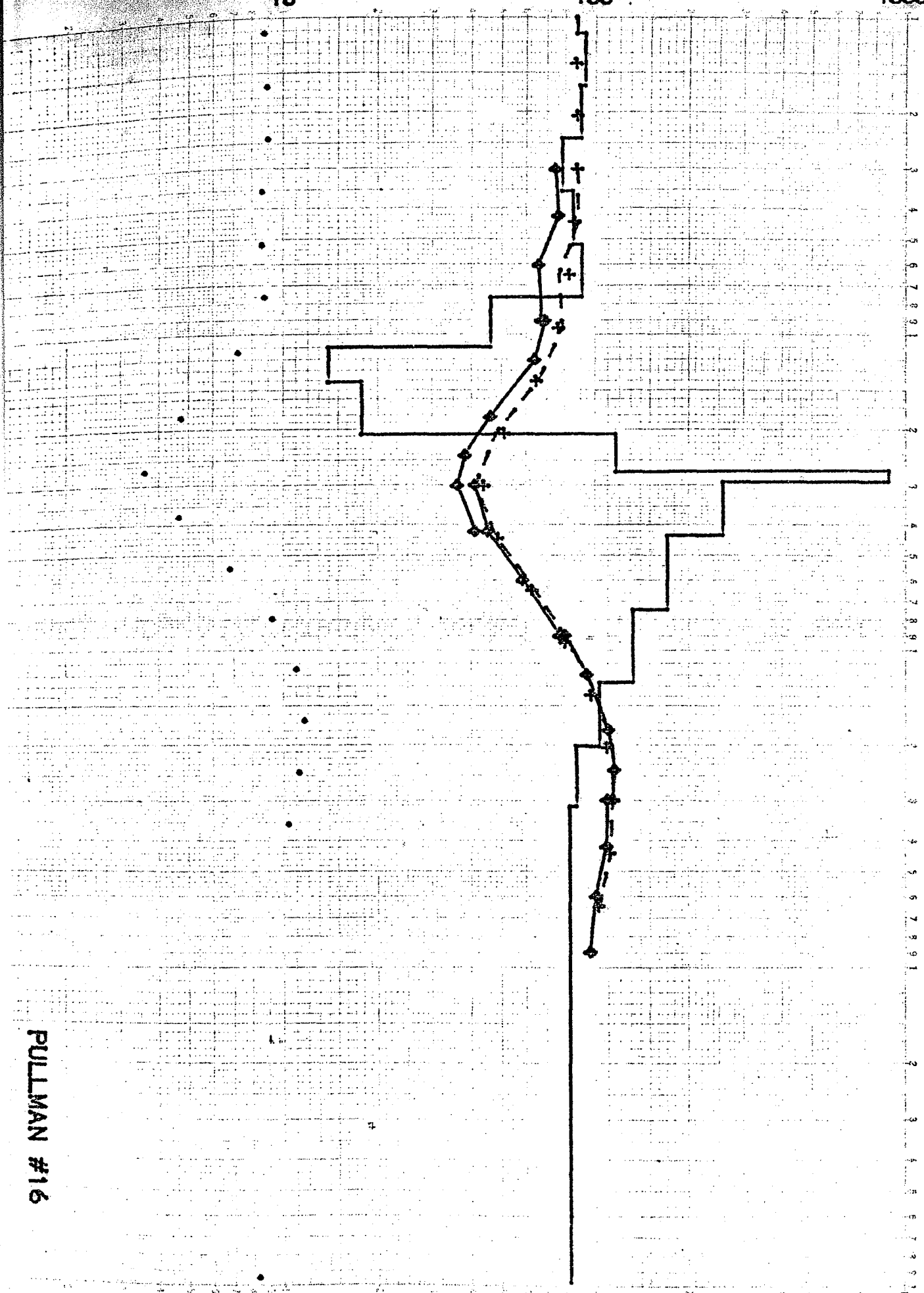
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RESISTIVITIES IN OHM-METRES

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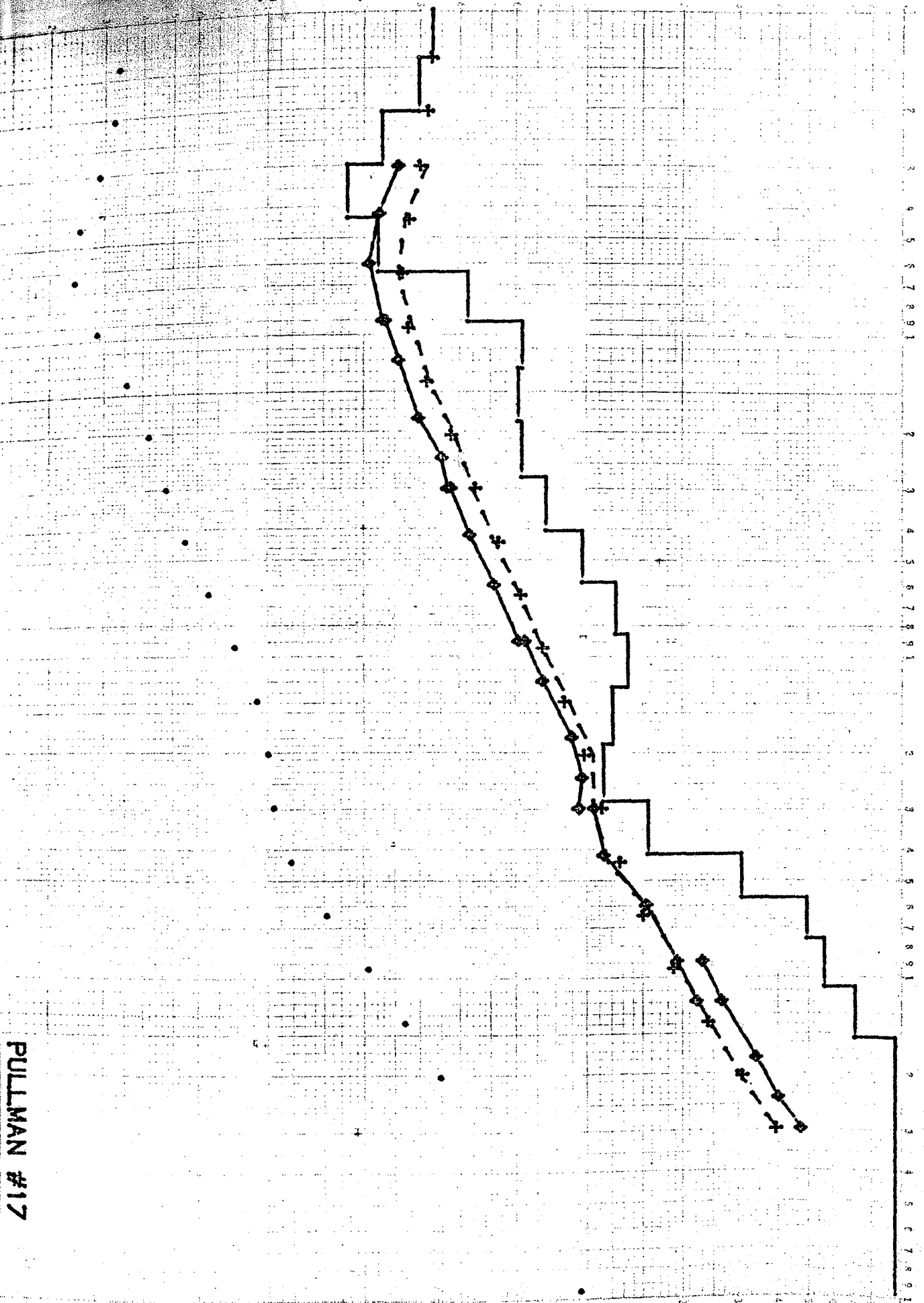
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RESISTIVITIES IN OHM-METRES

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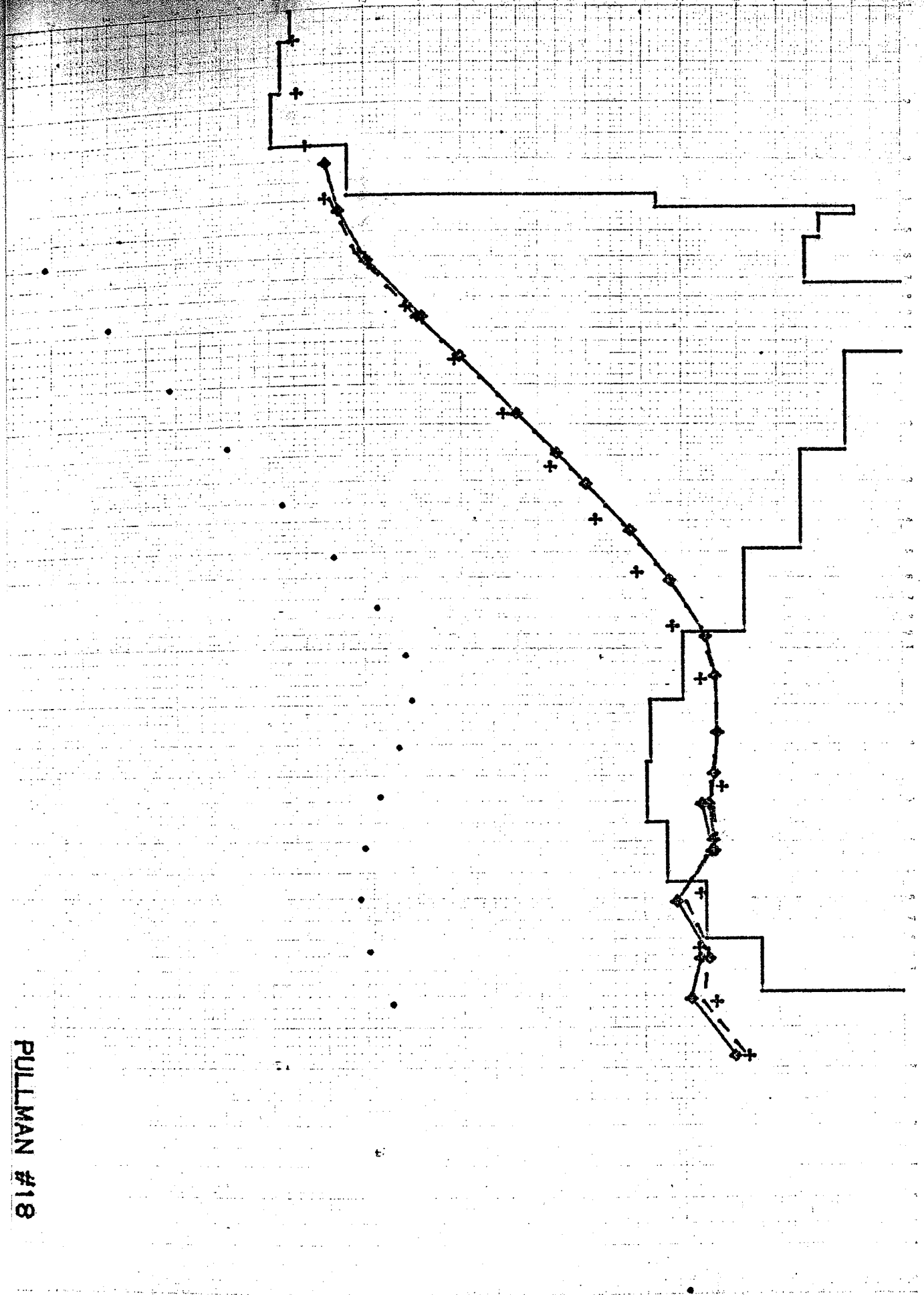
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RESISTIVITIES IN OHM-METRES

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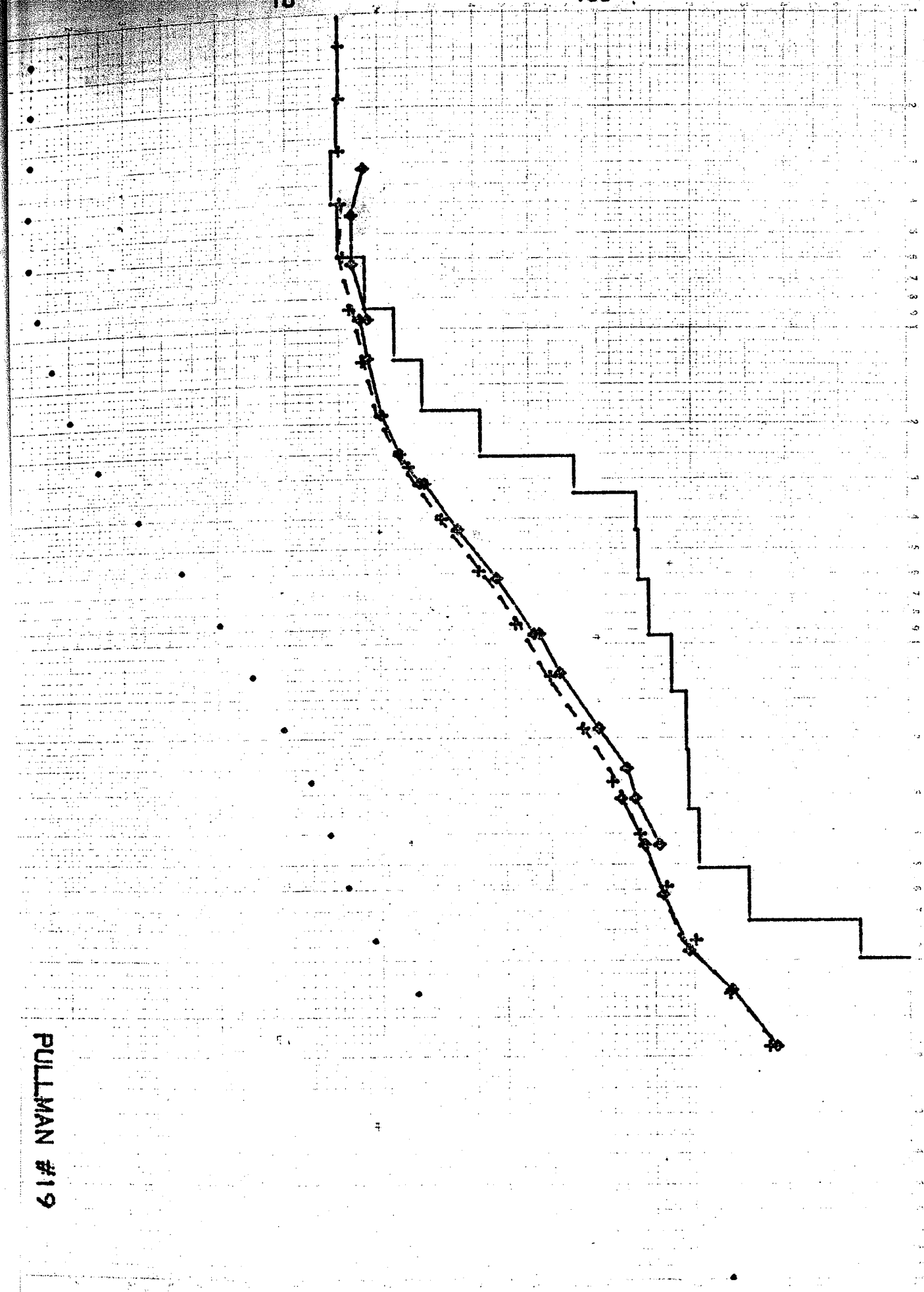
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RESISTIVITIES IN OHM-METRES

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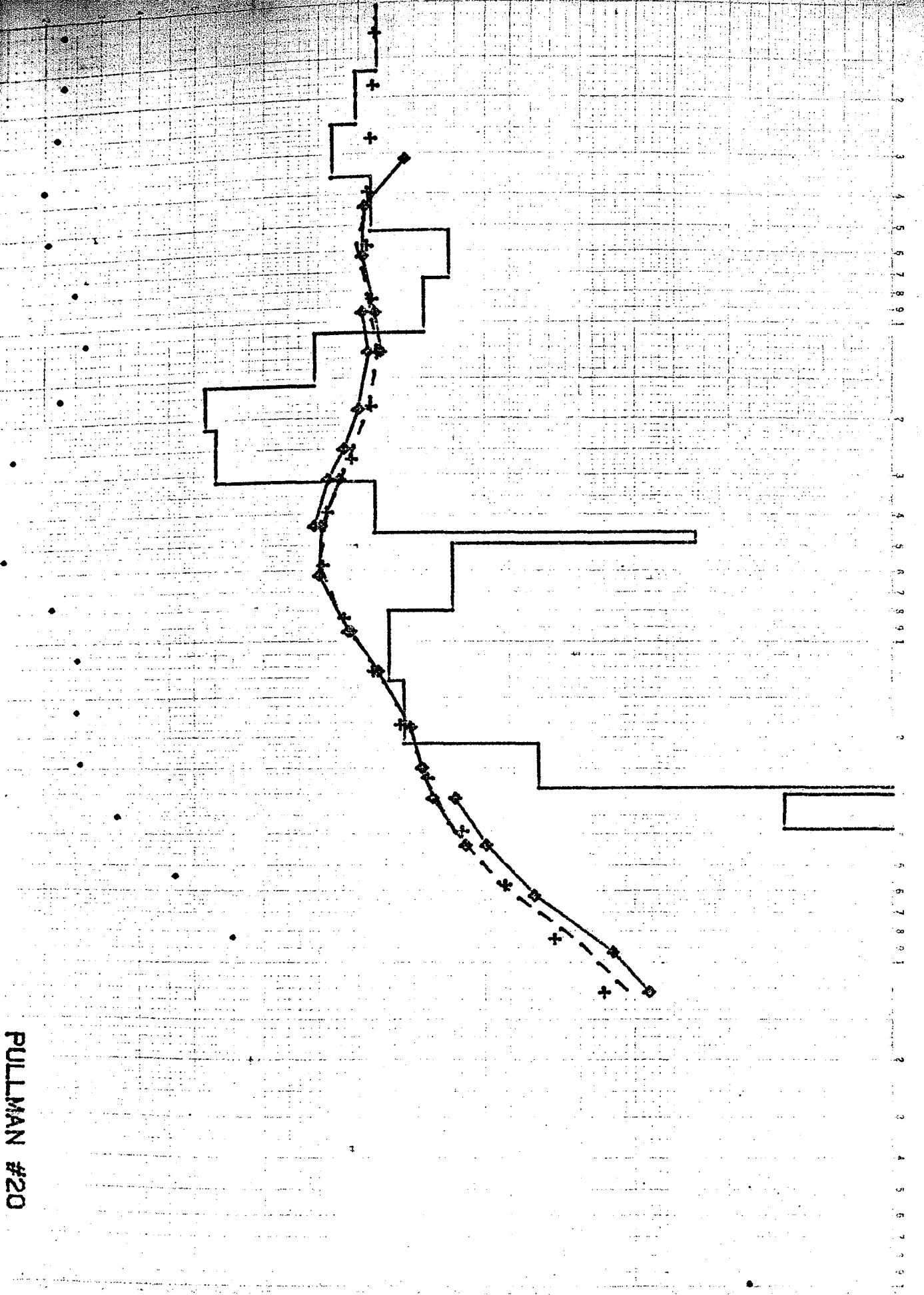
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RESISTIVITIES IN OHM-METRES

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100

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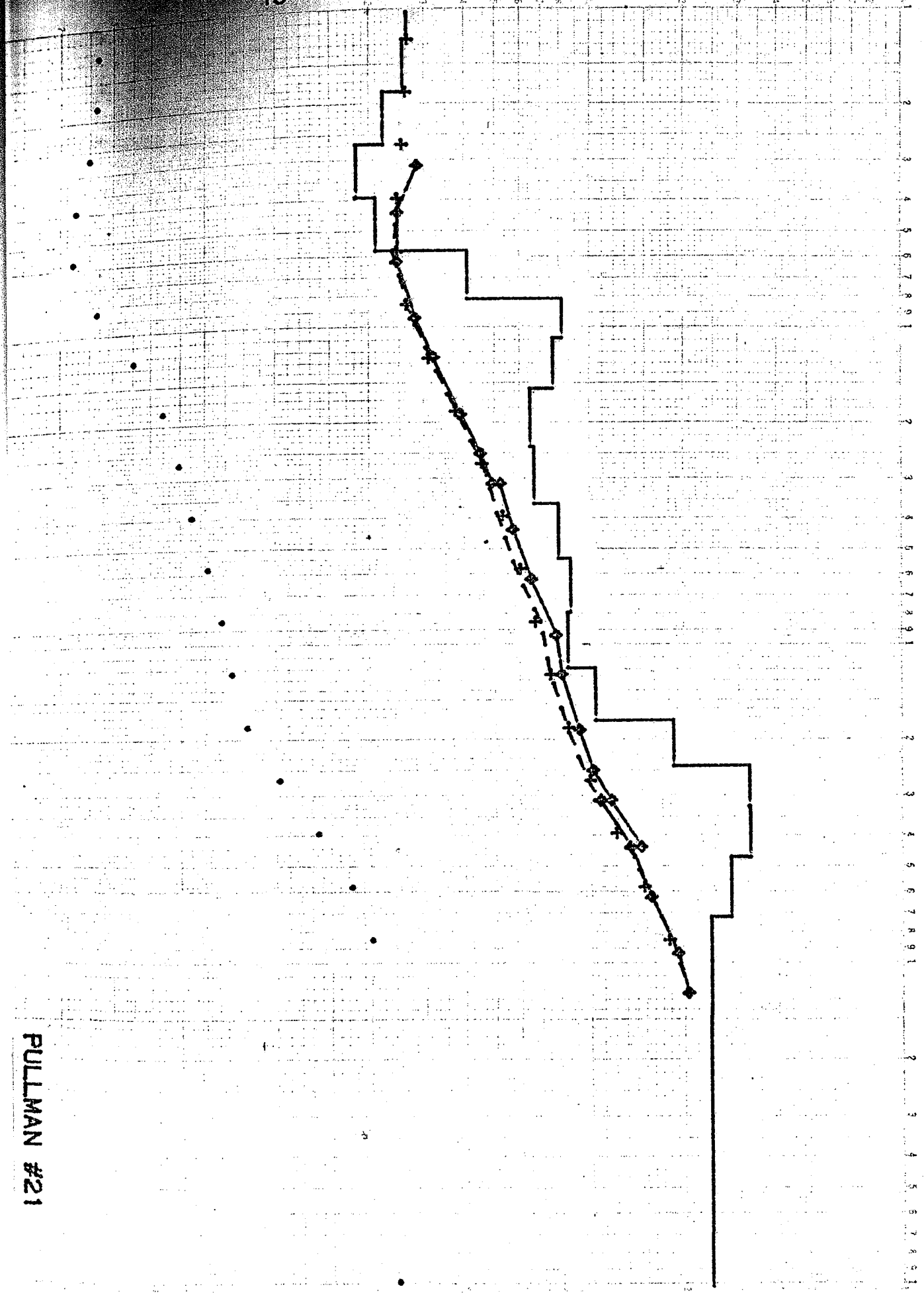
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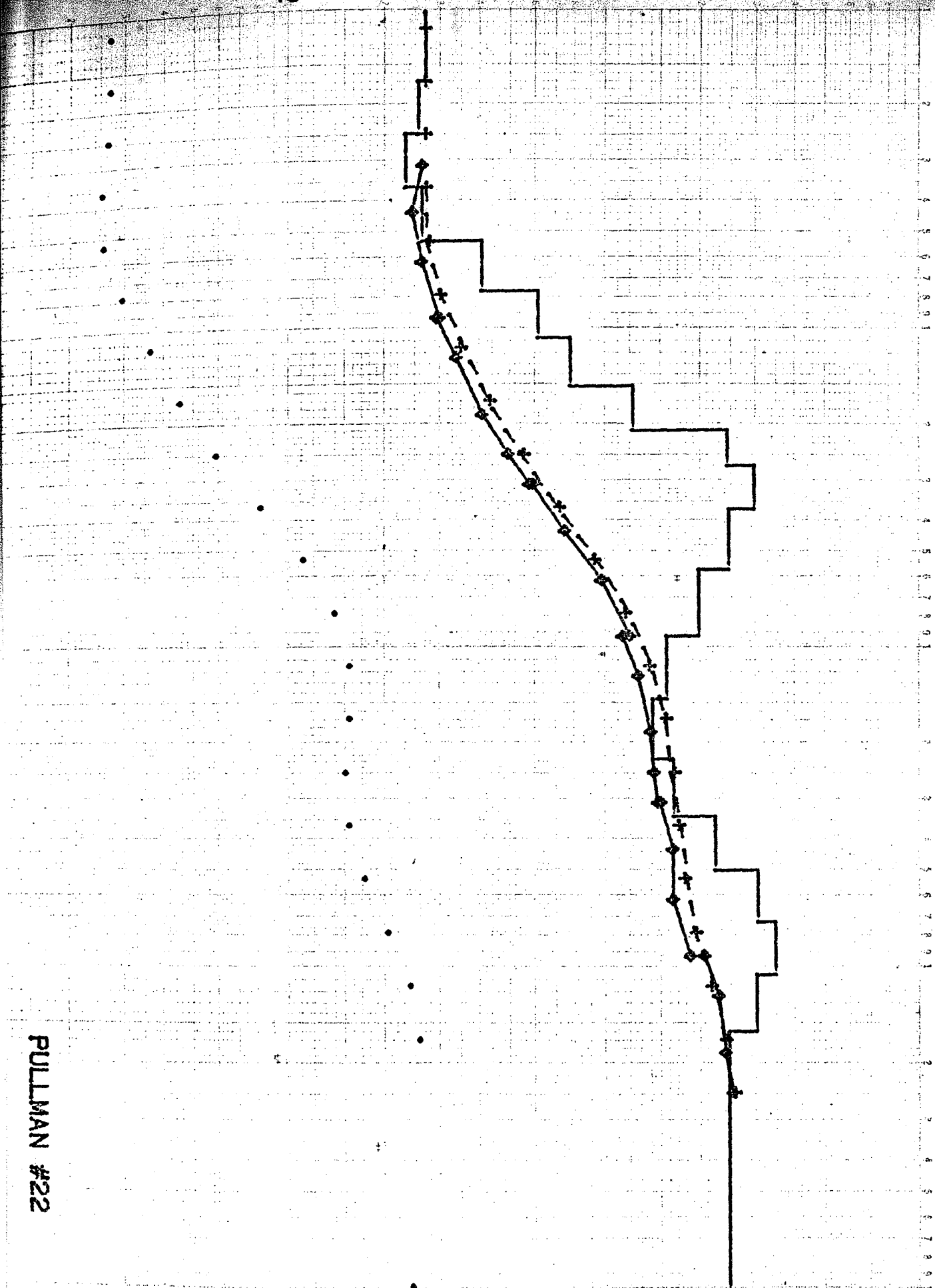
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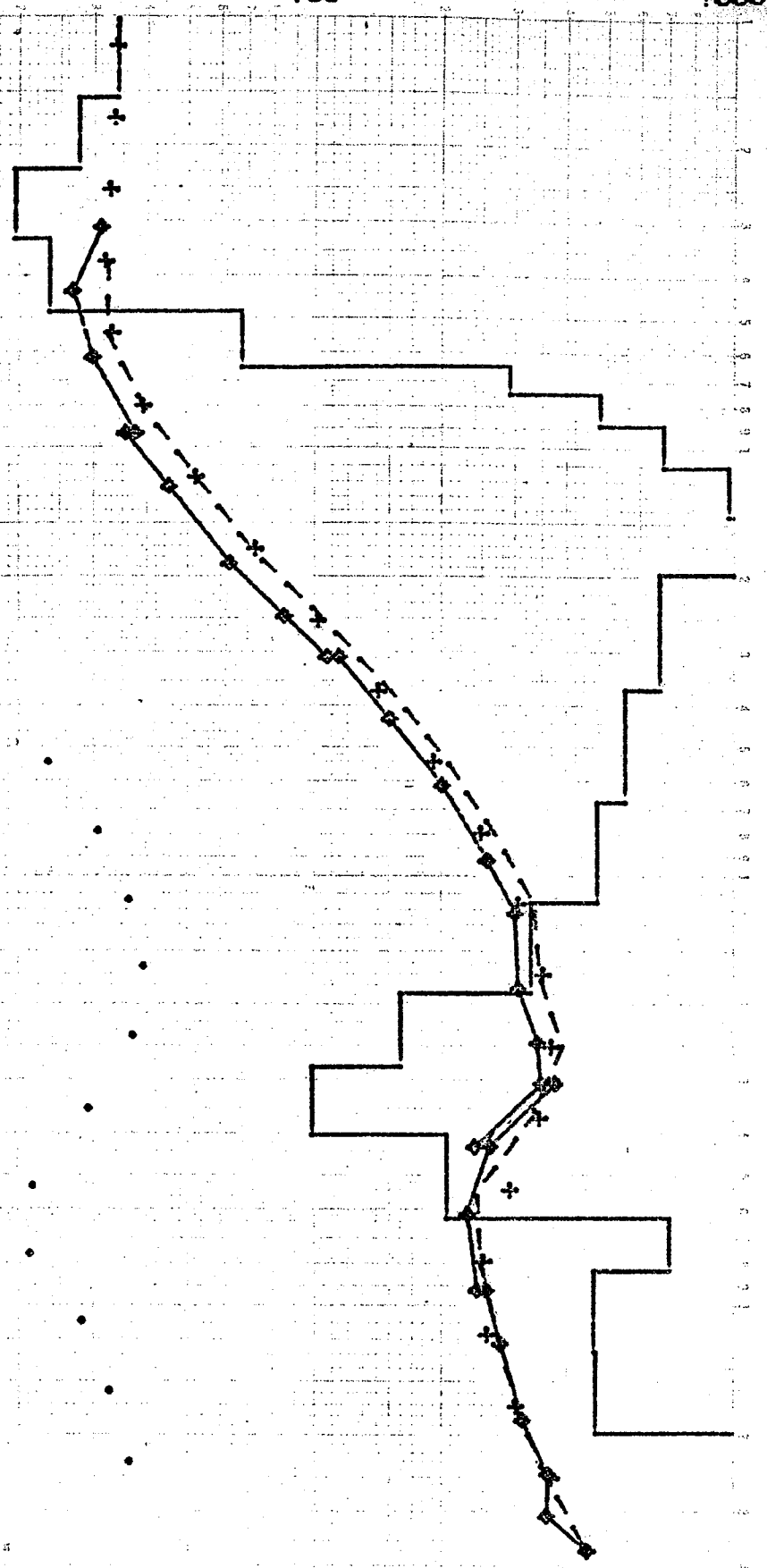
RESISTIVITIES IN OHM-METRES

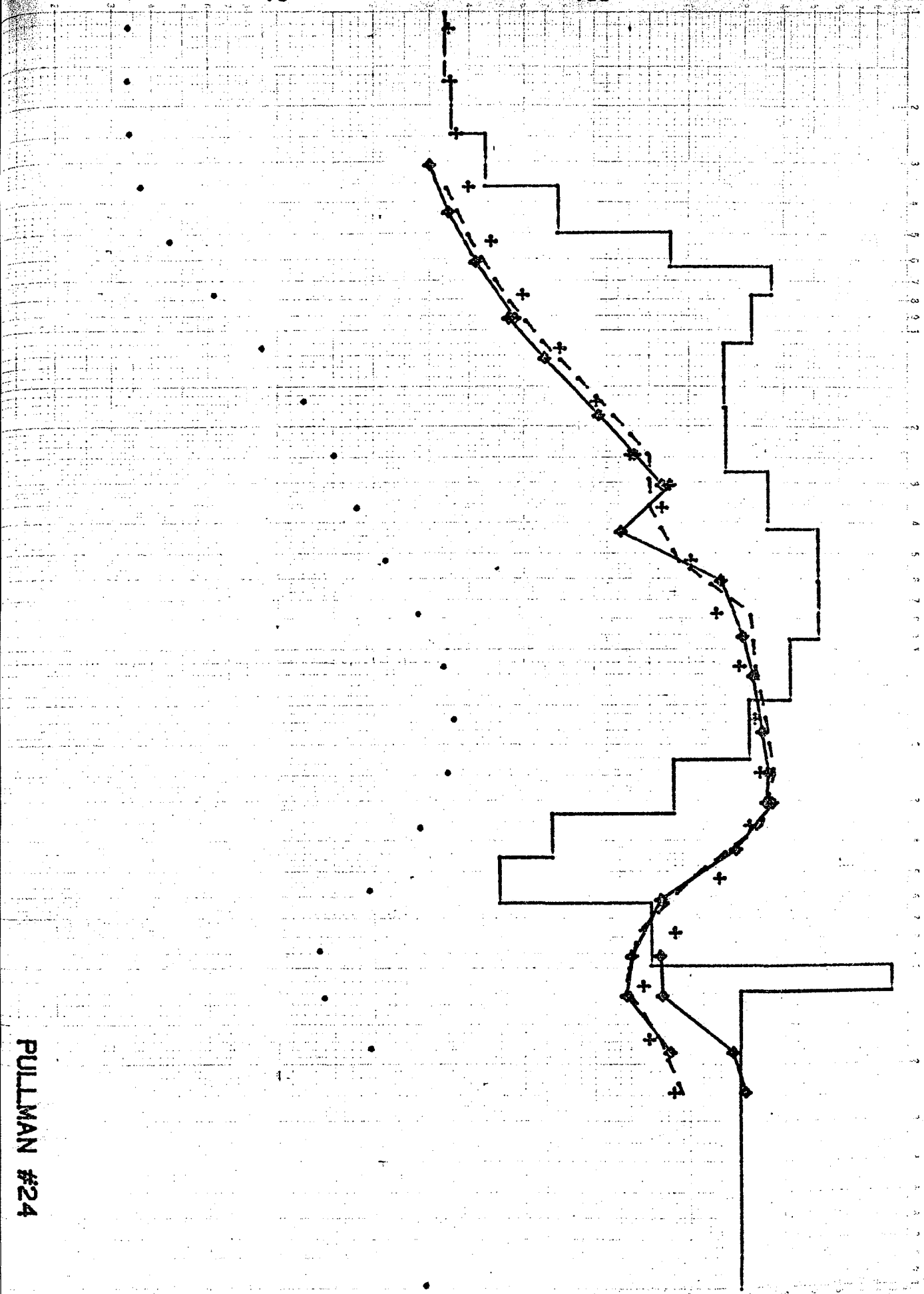
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PULLMAN #23





PULLMAN #24