

UNITED STATES DEPARTMENT OF INTERIOR

GEOLOGICAL SURVEY

SCHLUMBERGER SOUNDINGS IN THE AEOLIAN BUTTES

AND MONO CRATERS, CALIFORNIA

BY

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Open-file Report ~~77~~-291

This report is preliminary  
and has not been edited or  
reviewed for conformity  
to Geological Survey standards.

SCHLUMBERGER SOUNDINGS IN THE AEOLIAN BUTTES  
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In 1976, the U.S. Geological Survey made fourteen Schlumberger resistivity soundings near Aeolian Buttes and Mono Craters, California. The survey was made to estimate the thickness of fill (primarily pumice) covering the Sierran Basement Complex.

Plate 1 shows the index map for the location, number, and azimuth of the 14 Schlumberger sounding stations. All the sounding curves were automatically processed and interpreted (Zohdy, 1973 and 1975) 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 which is generally obtained by maintaining the position of the last segment and shifting each of the previous segments, up or down so that the last point on each segment coincides with the corresponding point on the following segment (Zohdy and others, 1973).
  - (b) The digitized curve at the rate of six points per logarithmic cycle. Although the individual digitized

points are depicted on the dashed curve (to avoid cluttering the graphs) they were computed using a subroutine in a computer program for bicubic spline functions (Anderson, 1971). The digitized data from the continuous dashed curve were then fed into the automatic interpretation program (Zohdy, 1973) to obtain the best fitting theoretical sounding curve for a horizontally layered medium. The automatic interpretation program used here was slightly modified from the one referred to in the above reference. The modifications are identical to those used in another program recently written for inverting Wenner sounding curves (Zohdy and Bisdorf, 1975).

- (3) The theoretical best fitting sounding curve plotted as (+) signs.
- (4) The detailed layering for which the theoretical curve is calculated.
- (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 cluttering the graphs. The D.Z. curves can be used to obtain equivalent and simpler solutions containing fewer number of layers. In addition they can be used to impose certain constraints on the layer thicknesses and resistivities (Zohdy, 1974).

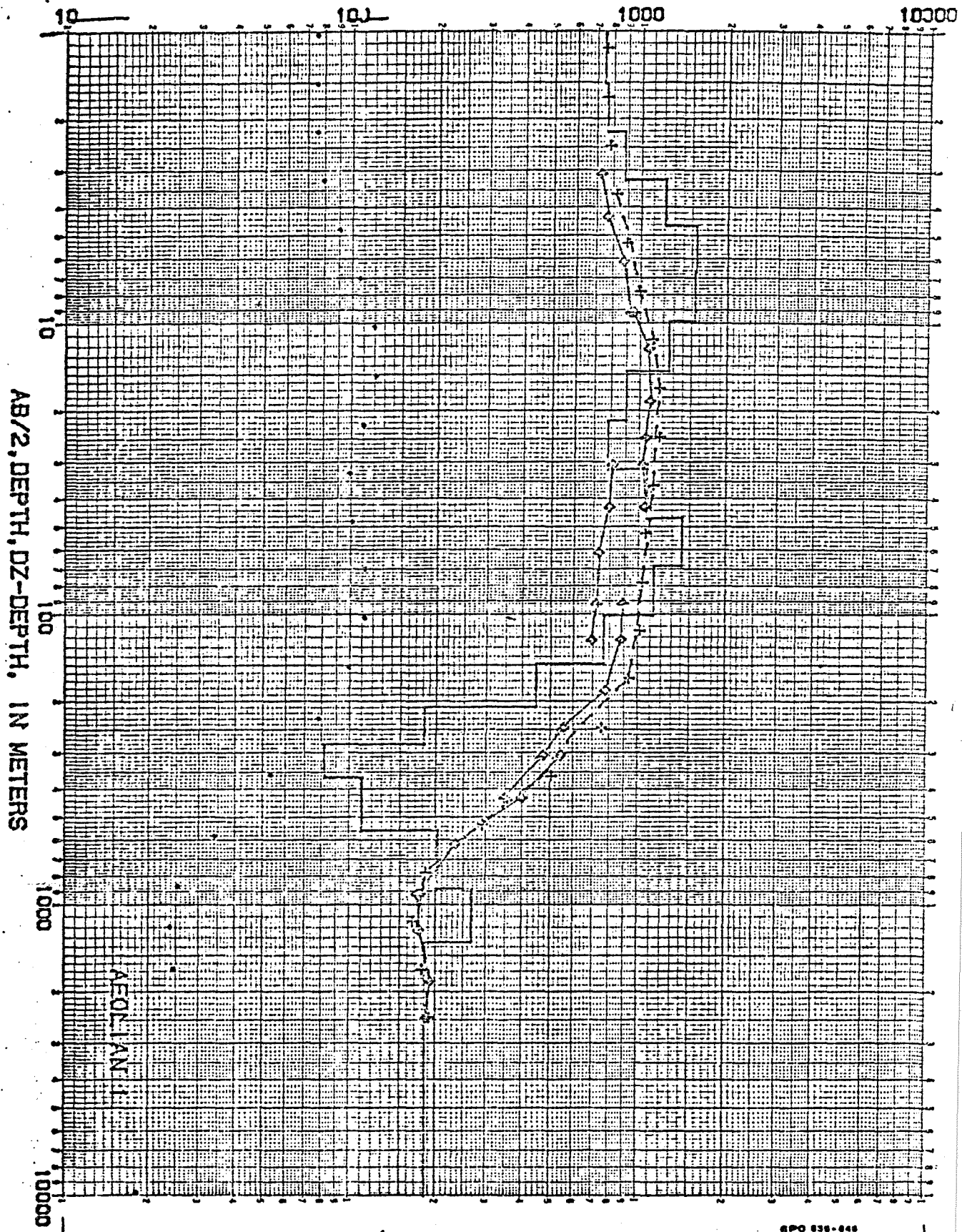
All these graphs were generated on a graphic plotter. The plotter-driving subroutines were developed by Evenden (1975).

## References

- Anderson, W. L., 1971, Application of bicubic spline functions to two dimensional gridded data: NTIS (National Technical Information Service), No. PB-203579, Springfield, Virginia.
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- Zohdy, Adel A. R., 1974, The use of Dar-Zarrouk curves in the interpretation of VES data: U.S. Geol. Survey Bull. 1313-D, 41 p.
- Zohdy, A. A. R., 1975, Automatic interpretation of Schlumberger sounding curves using modified Dar-Zarrouk functions: U.S. Geol. Survey Bull. 1313-E, 39 p.
- Zohdy, A. A. R., Anderson, L. A., and Muffler, L. J. P., 1973, Resistivity self potential, and induced polarization surveys of vapor-dominated geothermal system: Geophysics, v. 38, p. 1130-1144.
- Zohdy, A. A. R., and Bisdorf, R. J., 1975, Computer programs for the forward calculation and automatic inversion of Wenner sounding curves: NTIS (Natl. Tech. Inf. Service) PB-247265/AS, Springfield, Virginia.

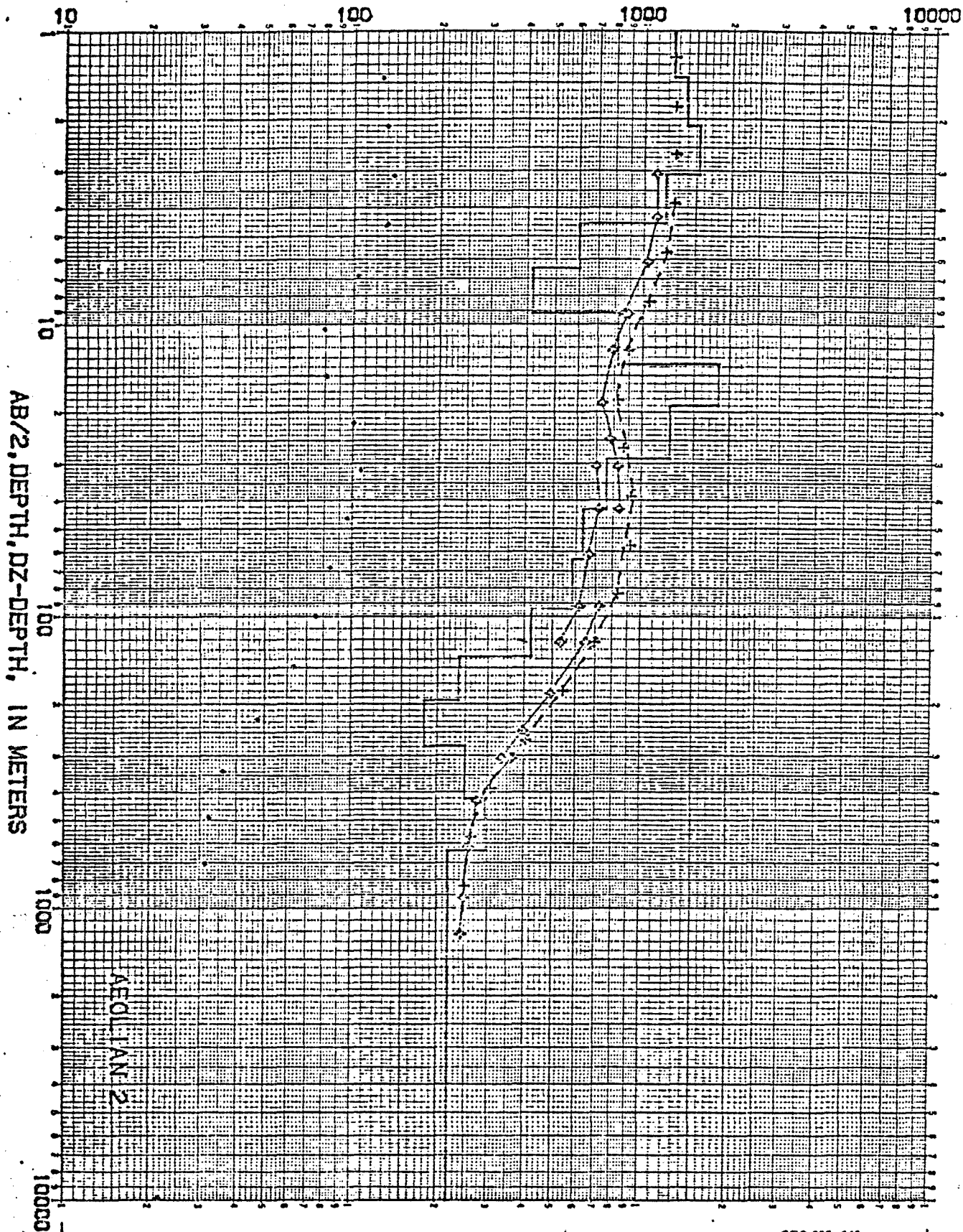
APPENDIX I

RESISTIVITIES IN OHM-METERS



GPO 836-646

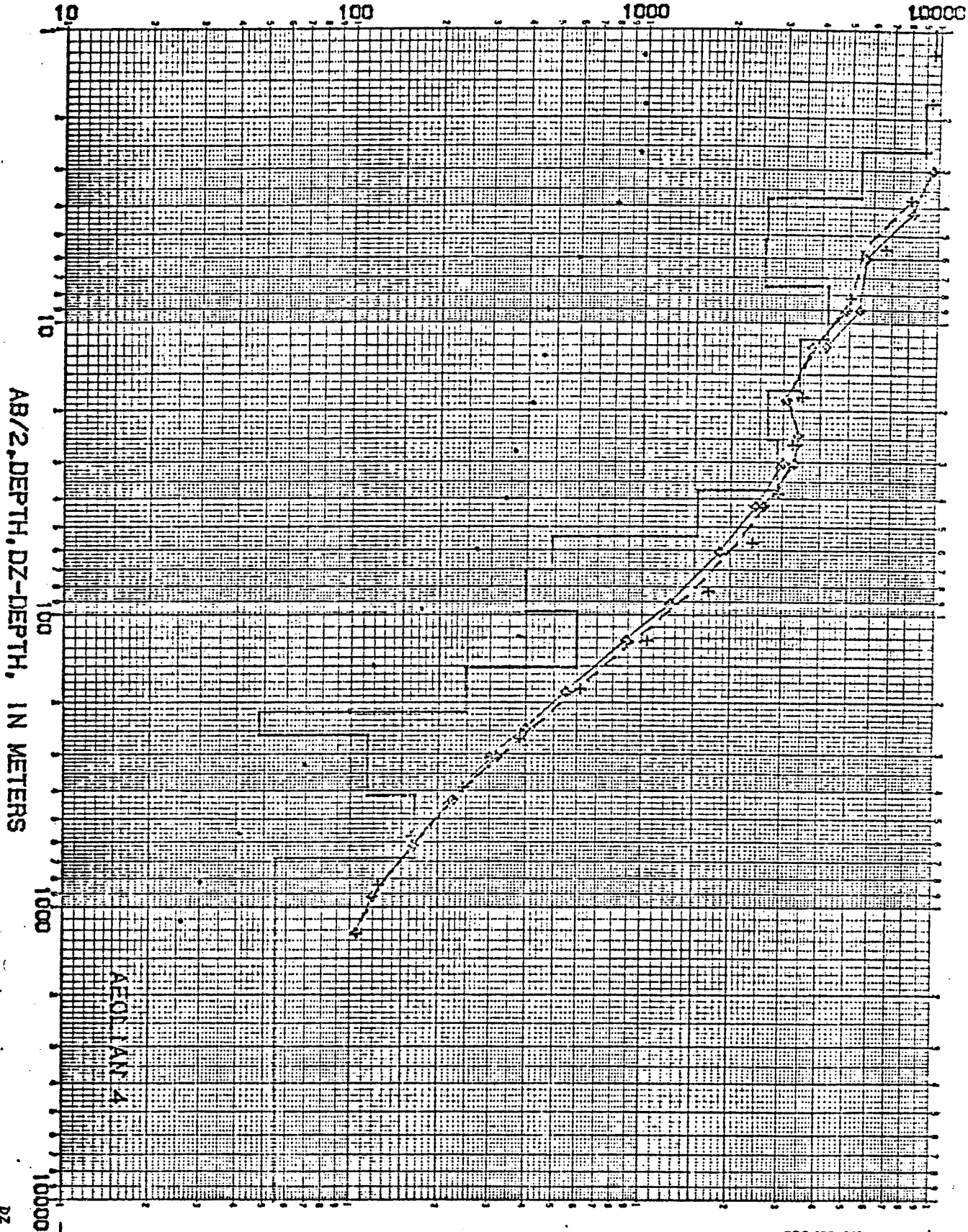
RESISTIVITIES IN OHM-METERS



AB/2, DEPTH, DZ-DEPTH, IN METERS

AEOLIAN 2

RESISTIVITIES IN OHM-METERS

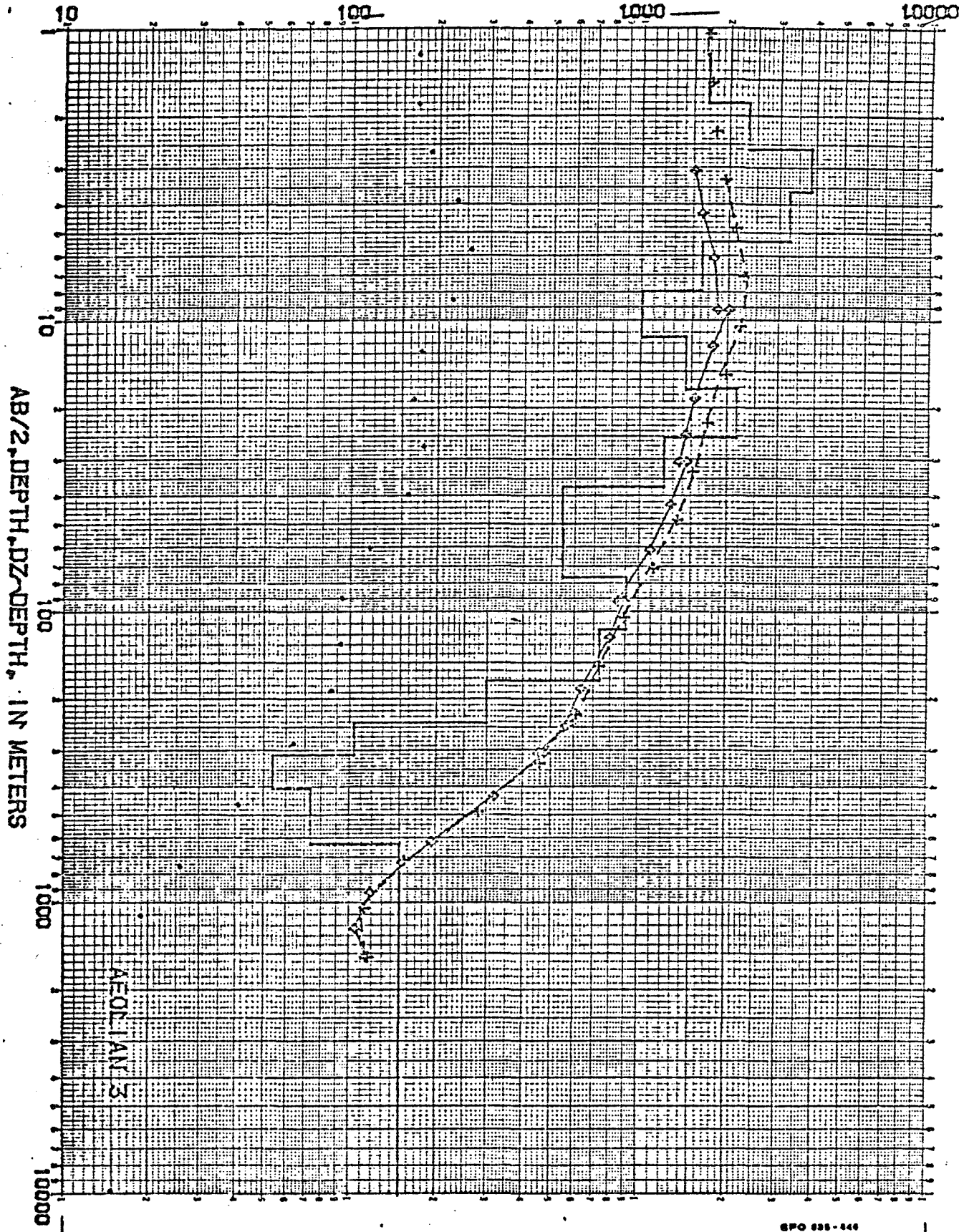


DZ-5VH.

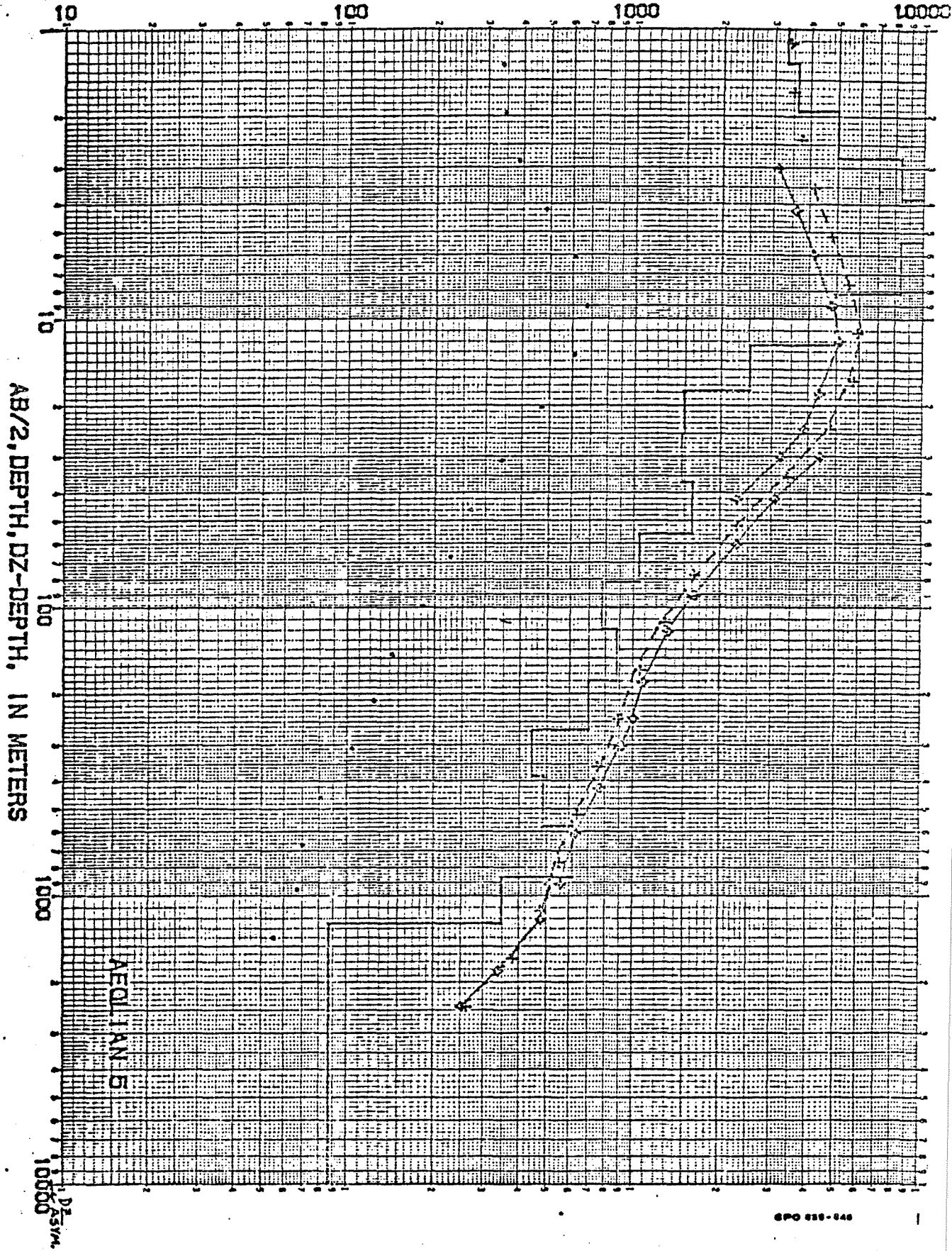
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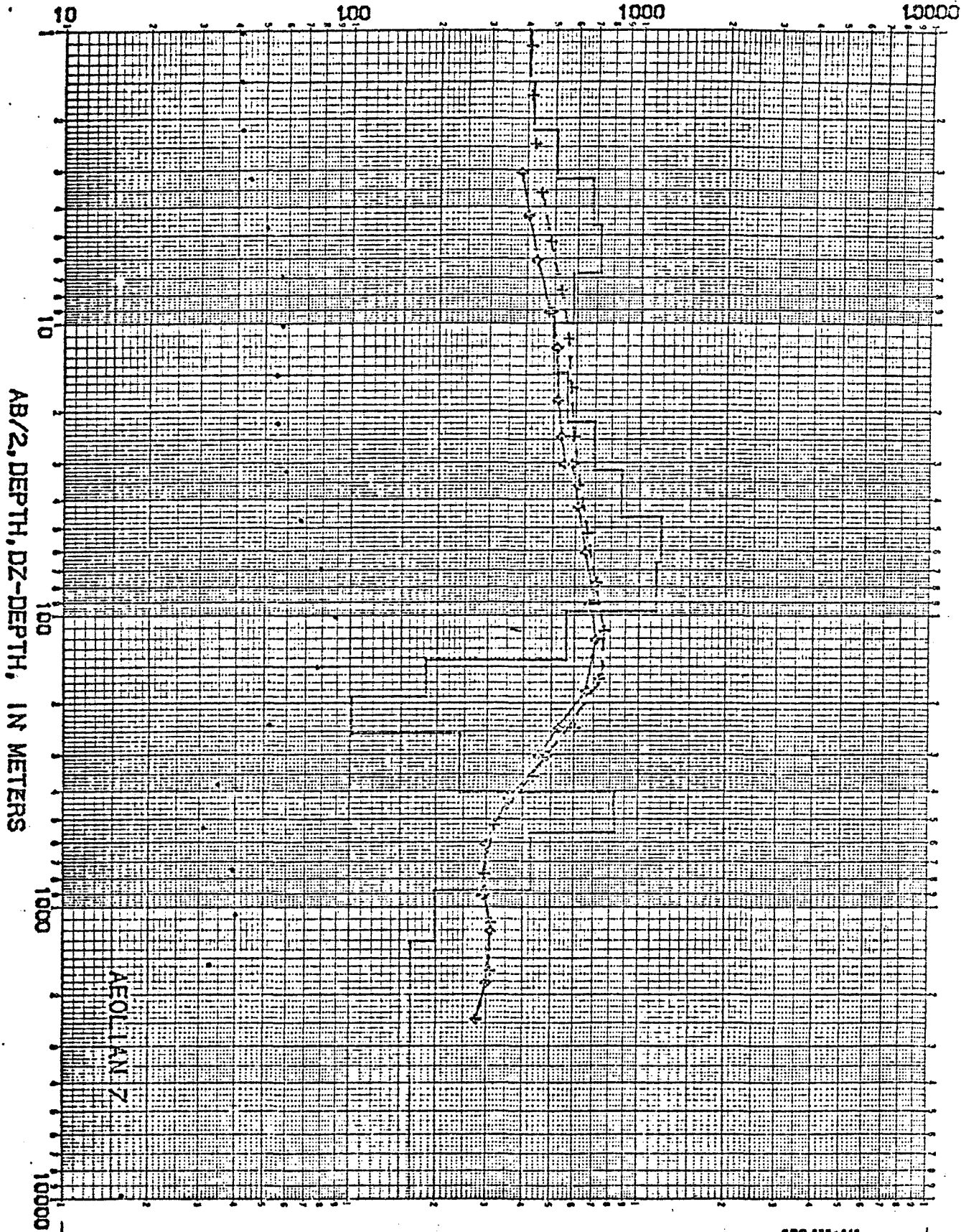
RESISTIVITIES IN OHM-METERS



RESISTIVITIES IN OHM-METERS



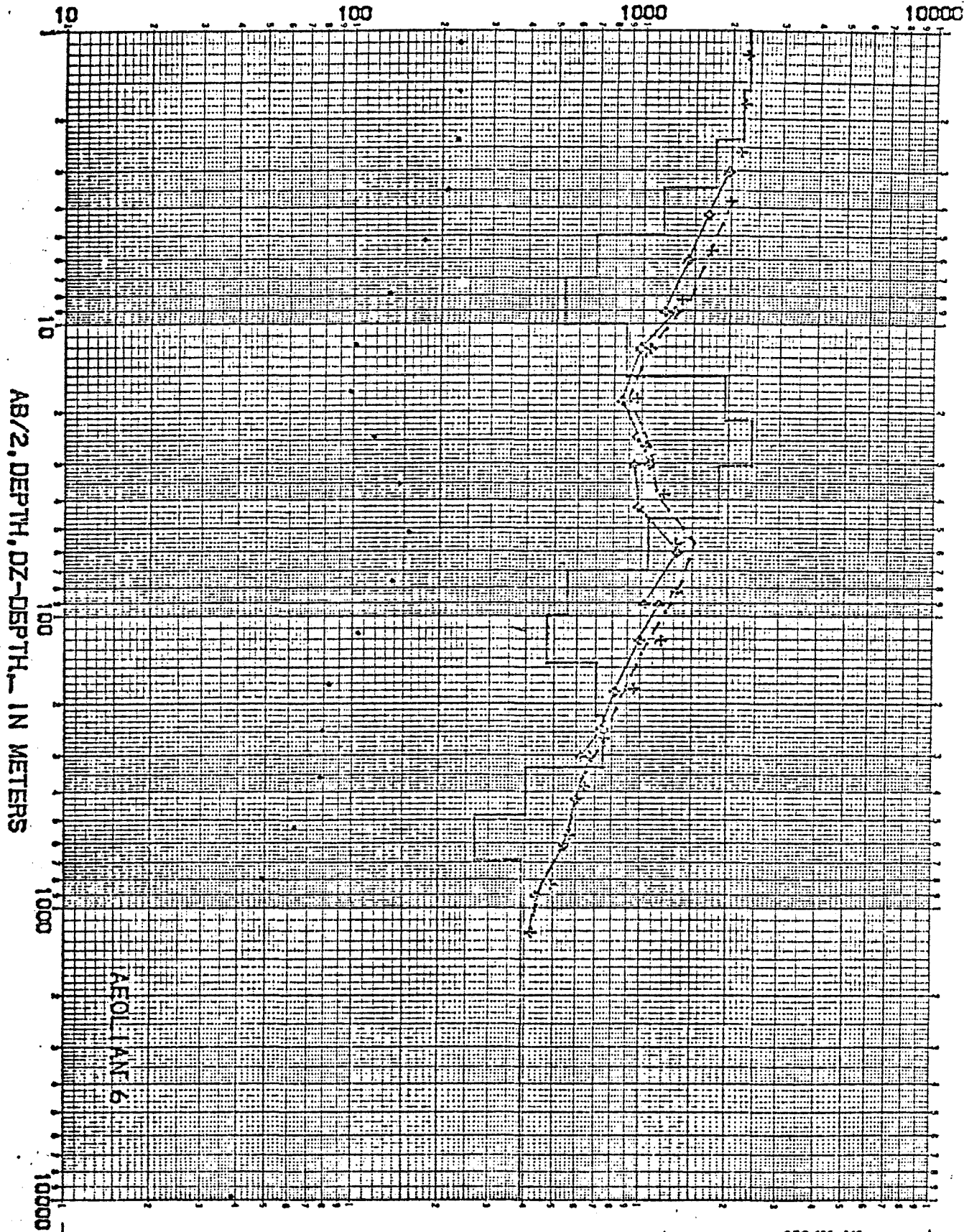
RESISTIVITIES IN OHM-METERS



AB/2, DEPTH, DZ-DEPTH, IN METERS

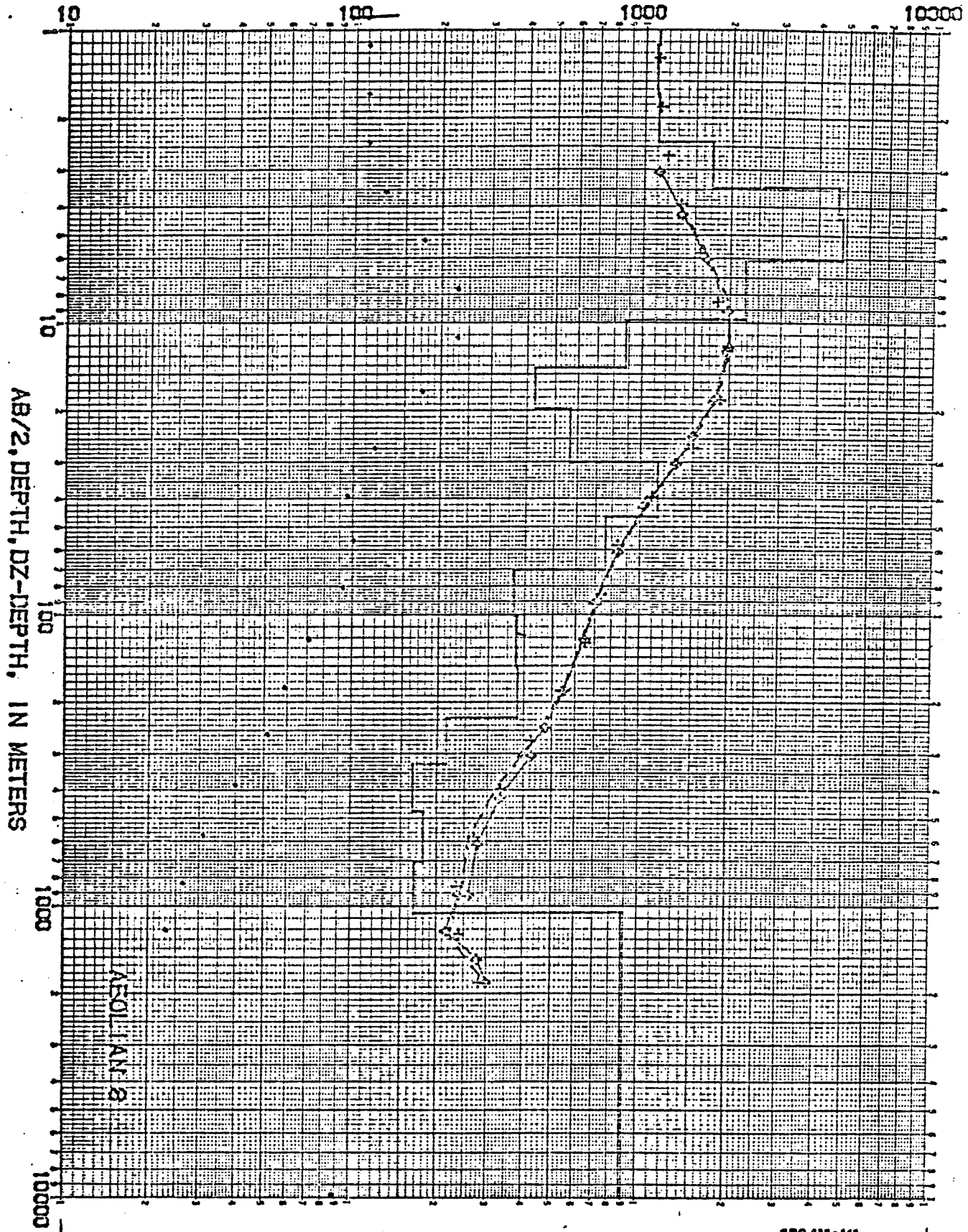
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RESISTIVITIES IN OHM-METERS

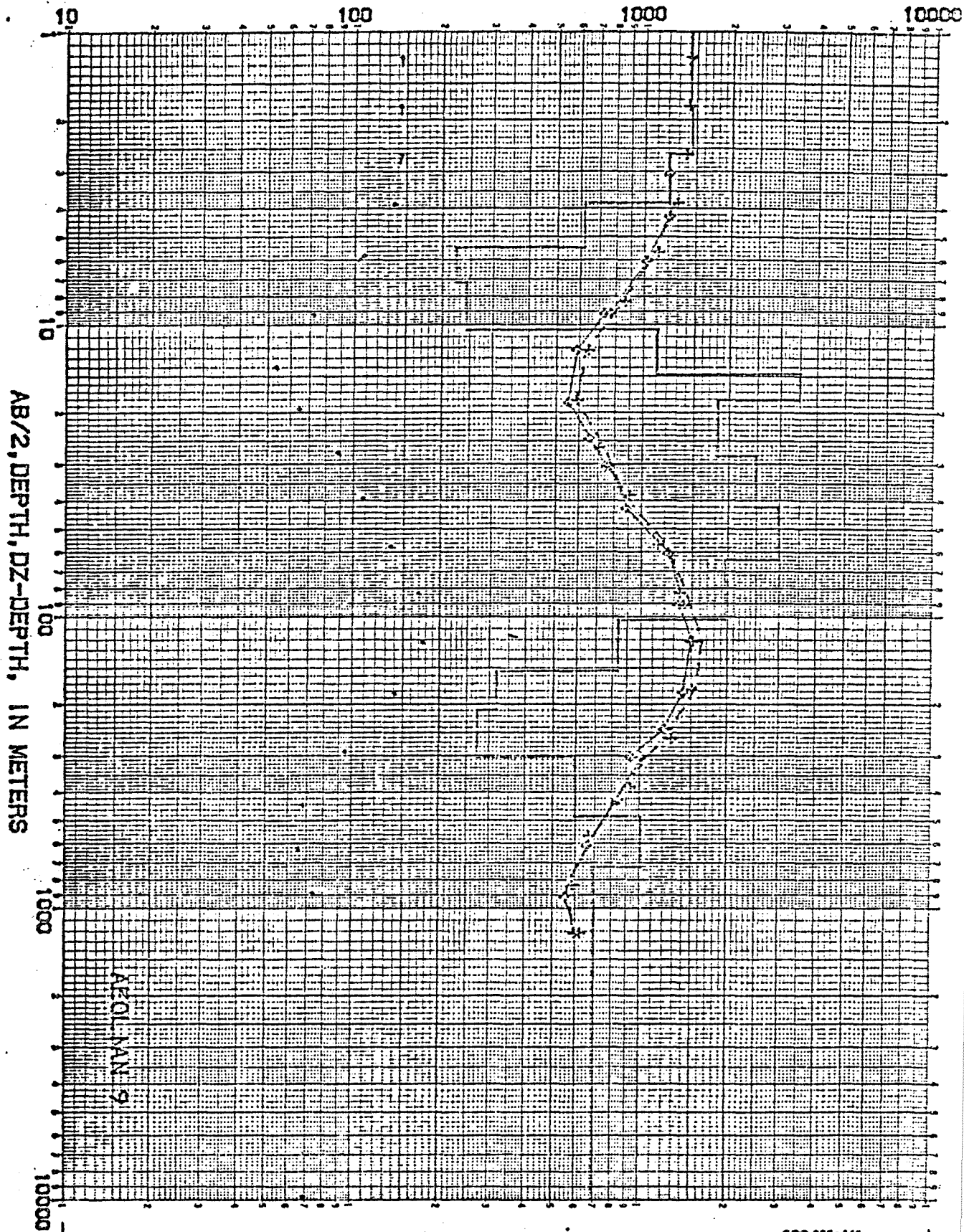




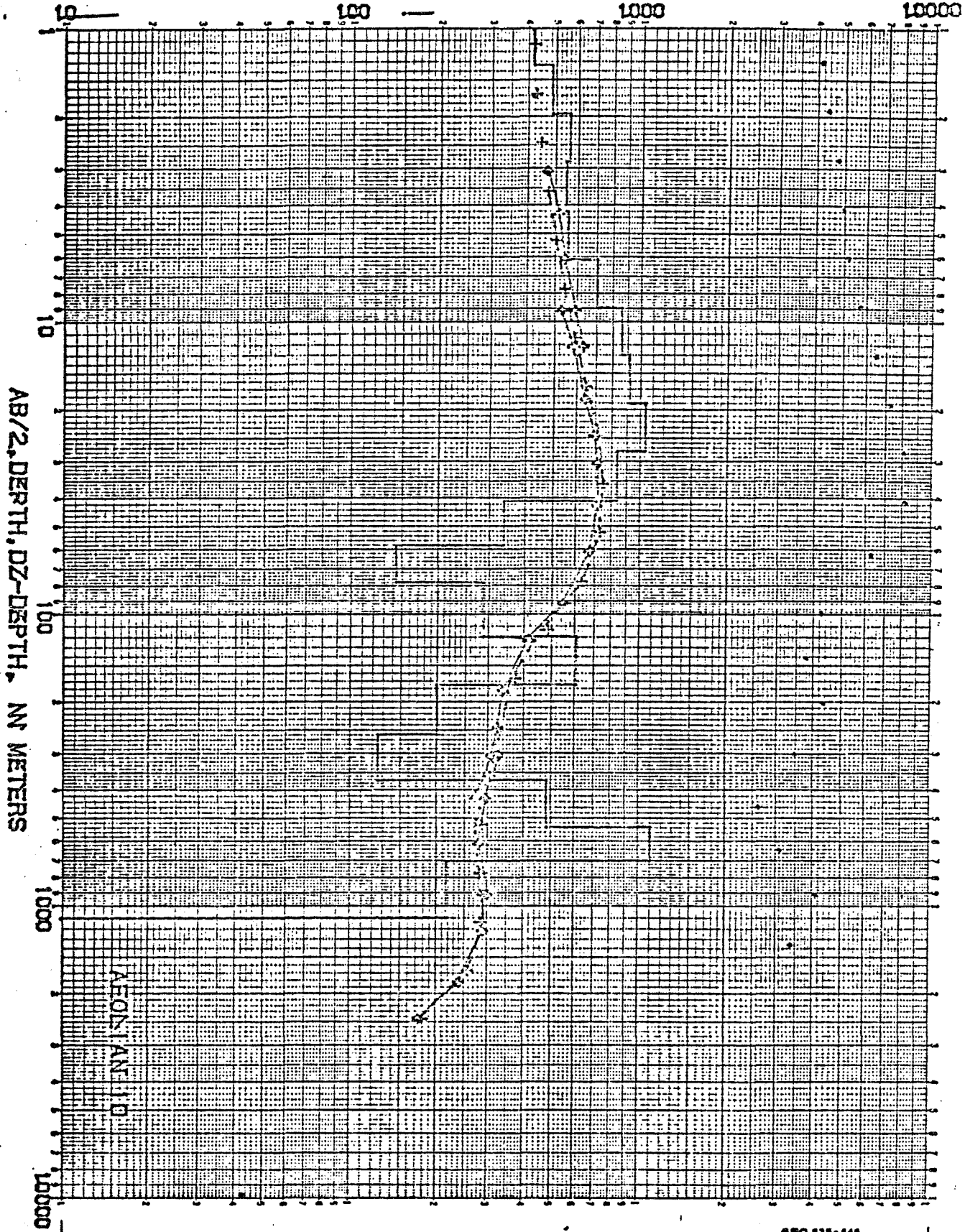
RESISTIVITIES IN OHM-METERS



RESISTIVITIES IN OHM-METERS

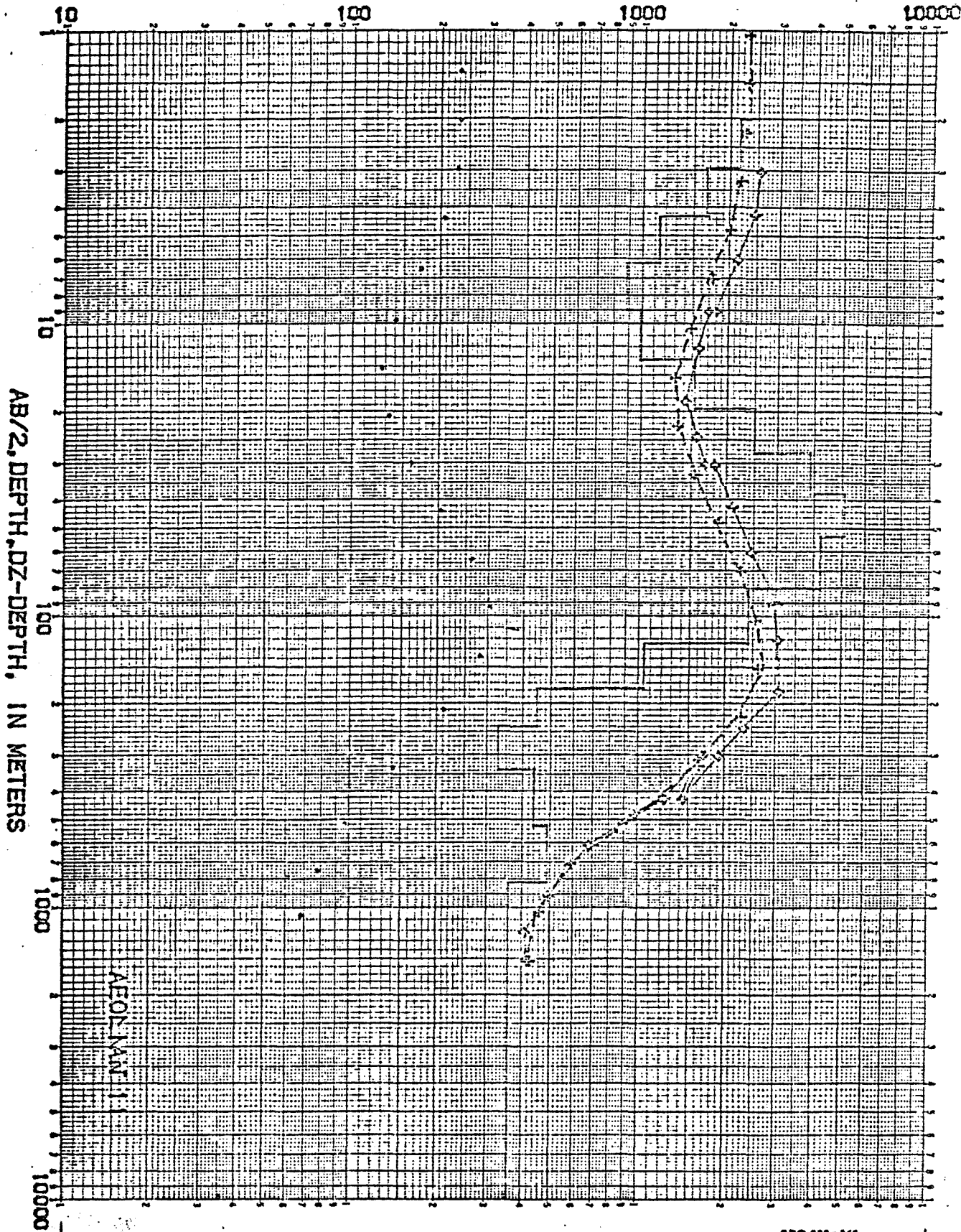


RESISTIVITIES IN OHM-METERS



GPO 535-648

RESISTIVITIES IN OHM-METERS

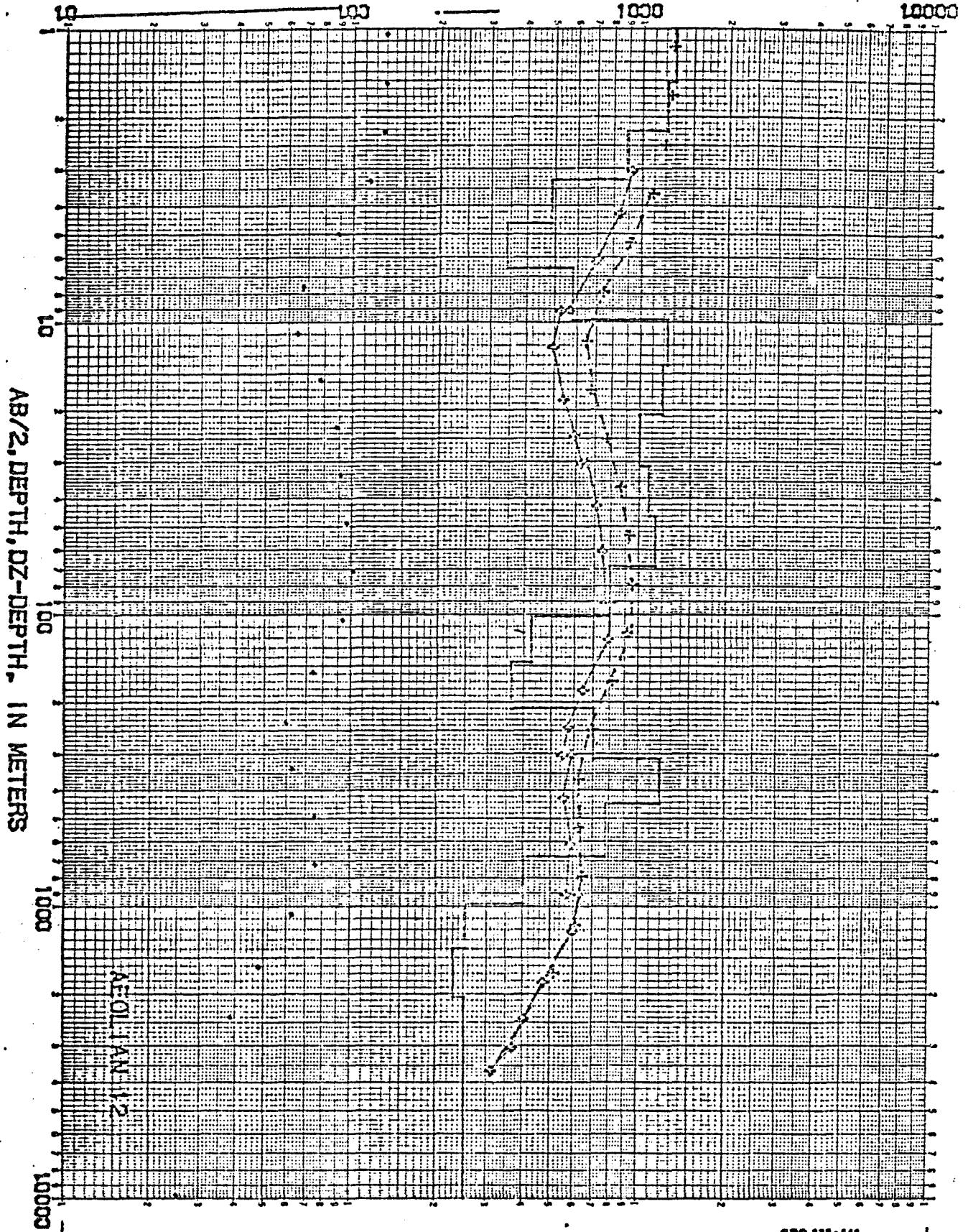


AB/2, DEPTH, DZ-DEPTH, IN METERS

AEOLIAN

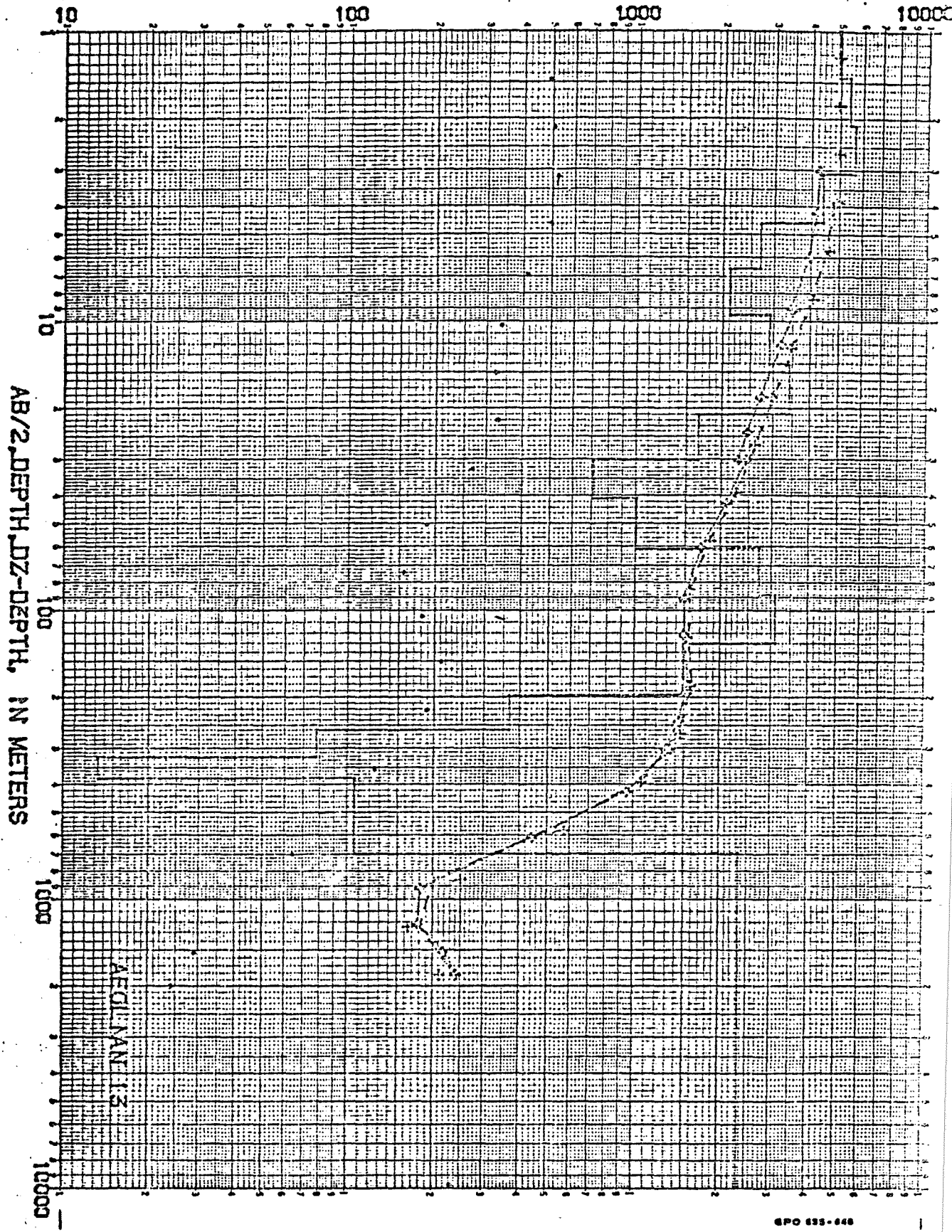


RESISTIVITIES IN OHM-METERS



GPO 635-646

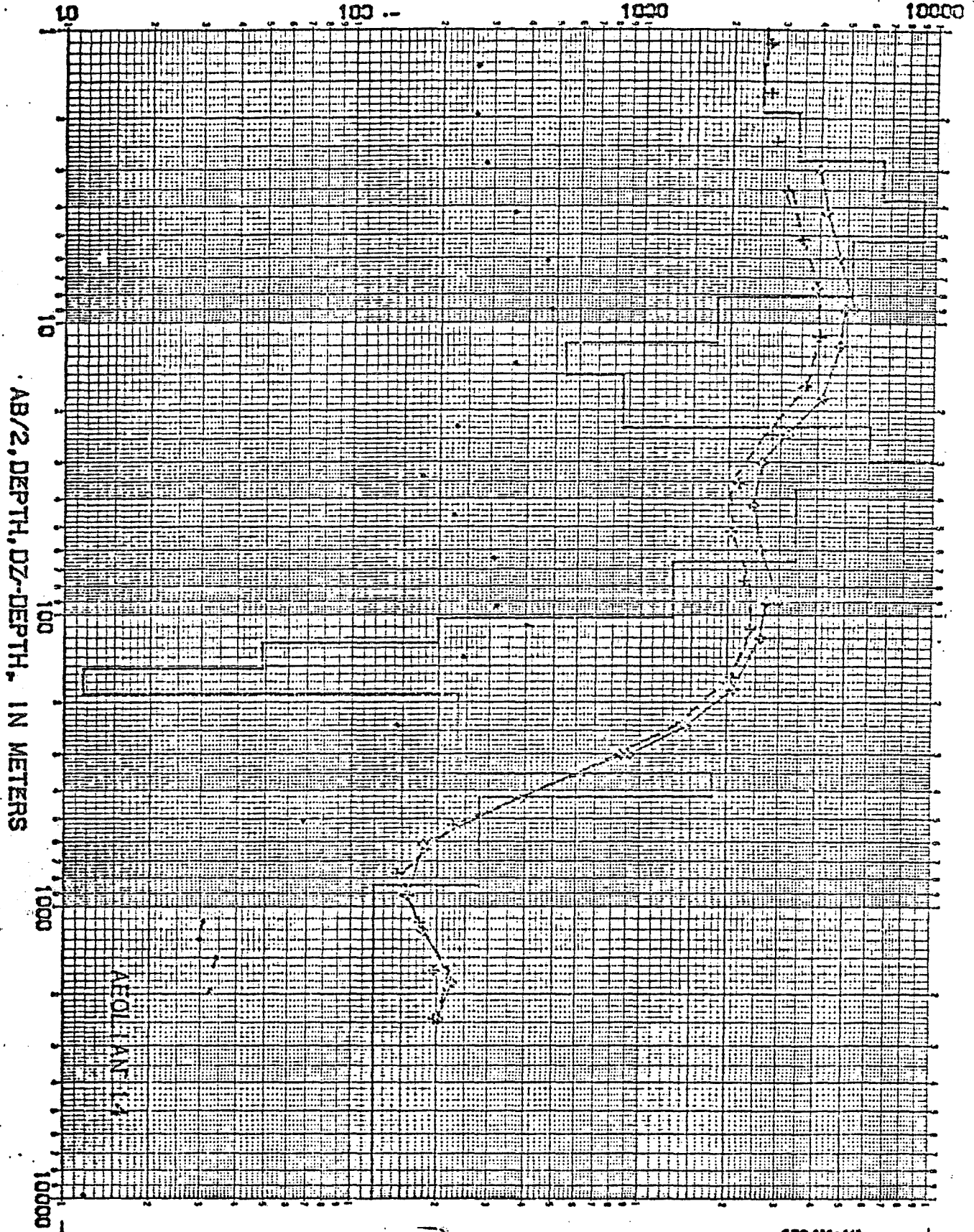
RESISTIVITIES IN OHM-METERS



AB/2, DEPTH, DZ-DEPTH, IN METERS

AEGULIAN 13

RESISTIVITIES IN OHM-METERS



GPO 855-648