GL03040
1 of 3

Bridgeport Area, CA. Dipole-Dipole Lines R-4, R-7 Model Results

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October 4, 1982

Mr. G. W. Chase
State of California
Division of Mines and Geology
2815 "O" Street
Sacramento, CA 95816

Dear Gordon:

Enclosed please find computed models for the two dipole-dipole lines from the Bridgeport area that you recently sent me. Because of limitations in our modelling algorithm it was necessary to divide these long lines into eastern and western segments for modelling purposes.

The Hot Springs (R-7) line was modeled using our standard mesh in which a flat air-earth interface is assumed. The calculated values are shown, for the most part, to be within ± 10% of the observed values. Please note that I have converted your observed data from ohm-feet to ohm-meters for direct comparison with the computer results. In the computer model the intrinsic resistivity varies between 10 and 30 ohm-meters. The low resistivity zone (10 ohm-meters) extending, at depth, between stations 24 and 40 east may be associated with the spring area. However, the limited amount of observed data does not support this with certainty.

The Travertine Hot Springs (R-4) line had sufficient topographic relief, particularly on the eastern end of the line, to warrant the use of a non-standard mesh. The mesh designed and used incorporates this elevation change. The model results are again in ohm-meters with agreement between

observed and calculated resistivities generally being good to ± 10%.

The calculated model also agrees well with the geologic section. The older Tertiary andesite apperas to have an intrinsic resistivity of 10-35 ohm-meters over most of line R-4. The maximum resistivity used was 50 ohm-meters and then only on the western end of the line. There are three very conductive areas (5 ohm-meters) indicated by the computer model. The first occurs at the surface in the spring zone between stations 44-48E. Observed data from the station interval 44-46E are all that controls this anomalous area and while it is tempting to associate this modeled low resistivity zone with the spring area it cannot be done with any degree of certainty.

The second anomalous area occurs at depth beneath stations 30-44E. This low resistivity zone is controlled only by observed data in the station interval 32-34E. Its presence was inferred based solely upon the observed value (4 ohm-meters) taken at the deeper separation of n = 6 which suggests a decrease in resistivity. In no way is this low resistivity zone well documented in the observed data.

The third and final conductive area on line R-4 occurs at the surface between stations 8-20E. This interval is shown on the geologic section to contain Quaternary alluvium which appears to be of sufficient thickness to account for the 8 ohm-meter value observed at the separation of n = 1.

I have included for your perusal copies of the computer output as well as the modeled pseudosections for the two lines.

A word of caution is necessary regarding these models. They show much greater detail than can be documented by the observed data, particularly in the areas not occupied by transmitting electrodes. As a result these models may not be a very accurate representation of the electrical resistivity distribution within the ground, everywhere along the lines.

In constructing the models I assumed homogeneity in the area between one transmitting electrode pair and the next adjoining pair. This assumption seems to be supported by the geologic sections you included with the electrical data.

It has been our experience that to accurately map the subsurface electrically with the dipole-dipole arrray requires the use of surface electrodes arranged in a "7-spread" configuration. The added control these data produce in the computed models more than compensates for the extra time and expense needed to acquire the data.

It is a pleasure to be of service to you. If we can be of further assistance please don't hesitate to call upon us.

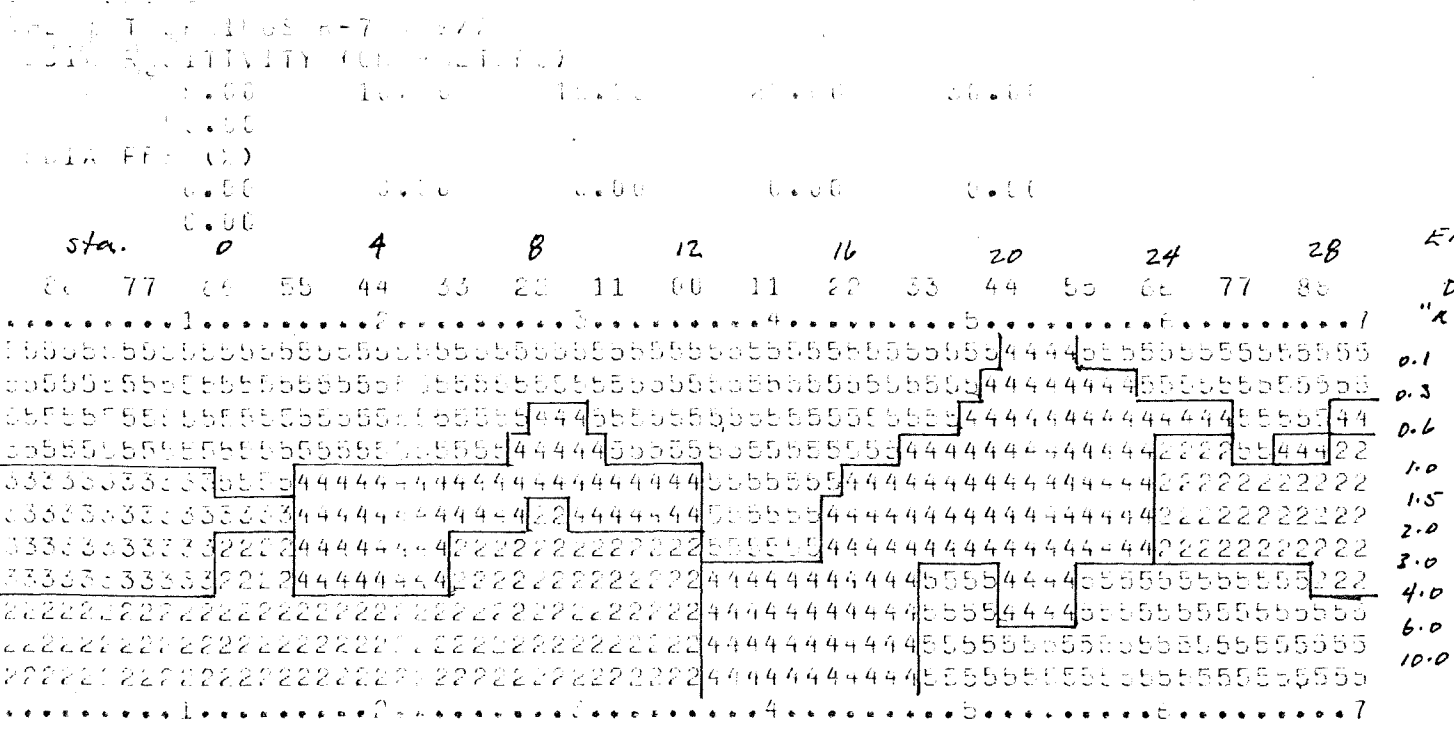
Respectfully yours,

Claron E. Mackelprang
Geophysicist

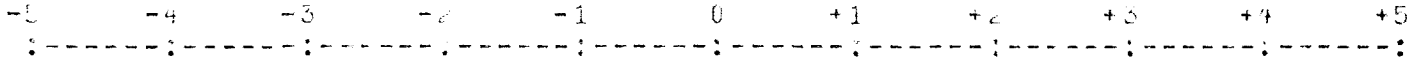
CEM:jp

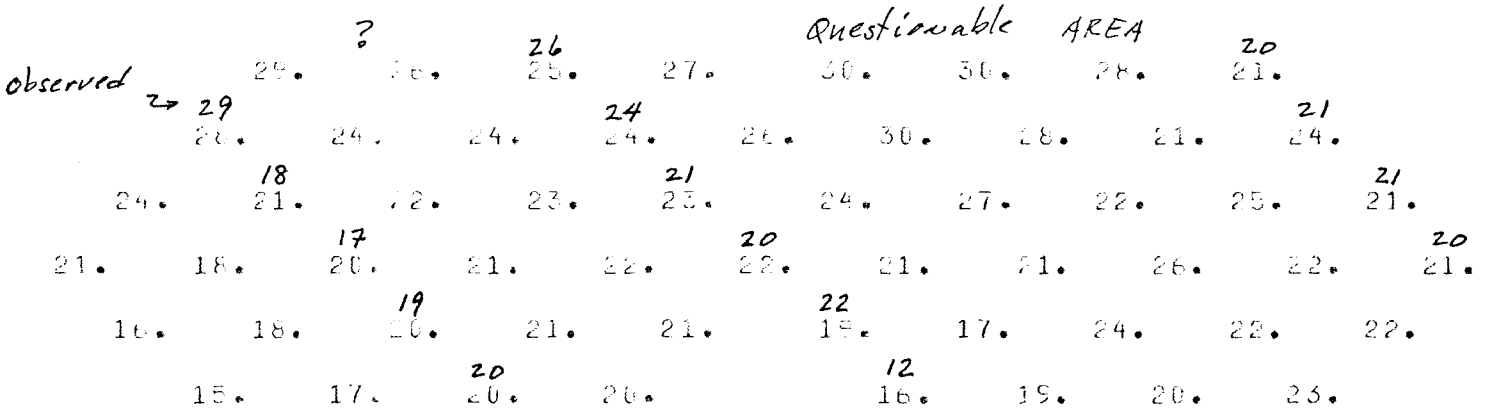
cc: Duncan Foley

enclosure

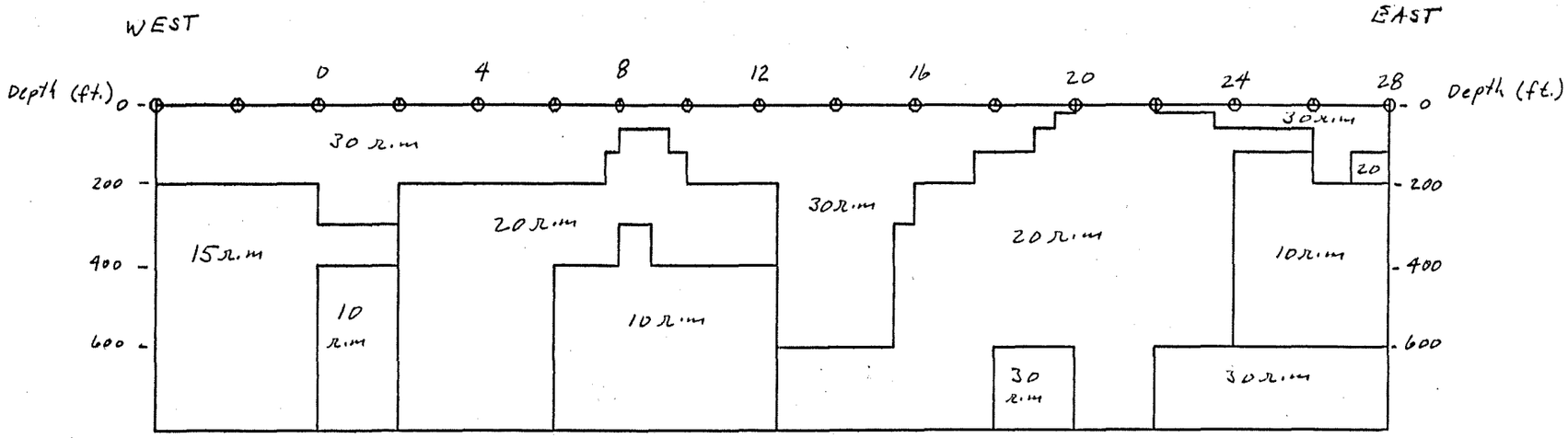


APPARENT RESISTIVITY (CALCULATED)

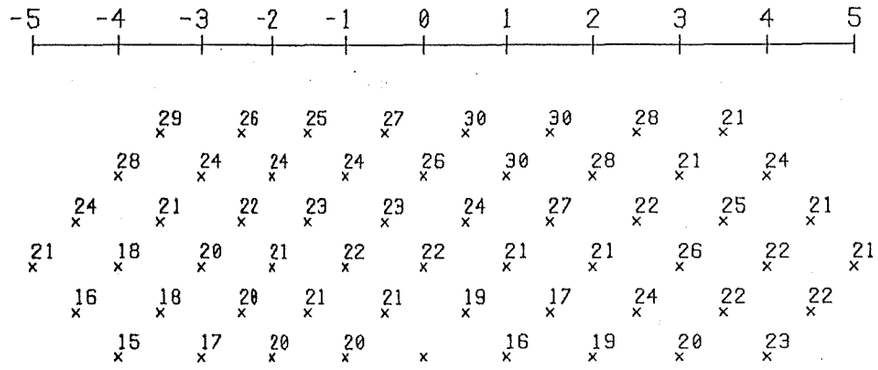




BRIDGEPORT AREA
THE HOT SPRINGS R-7 . W/2



APPARENT RESISTIVITY - COMPUTED



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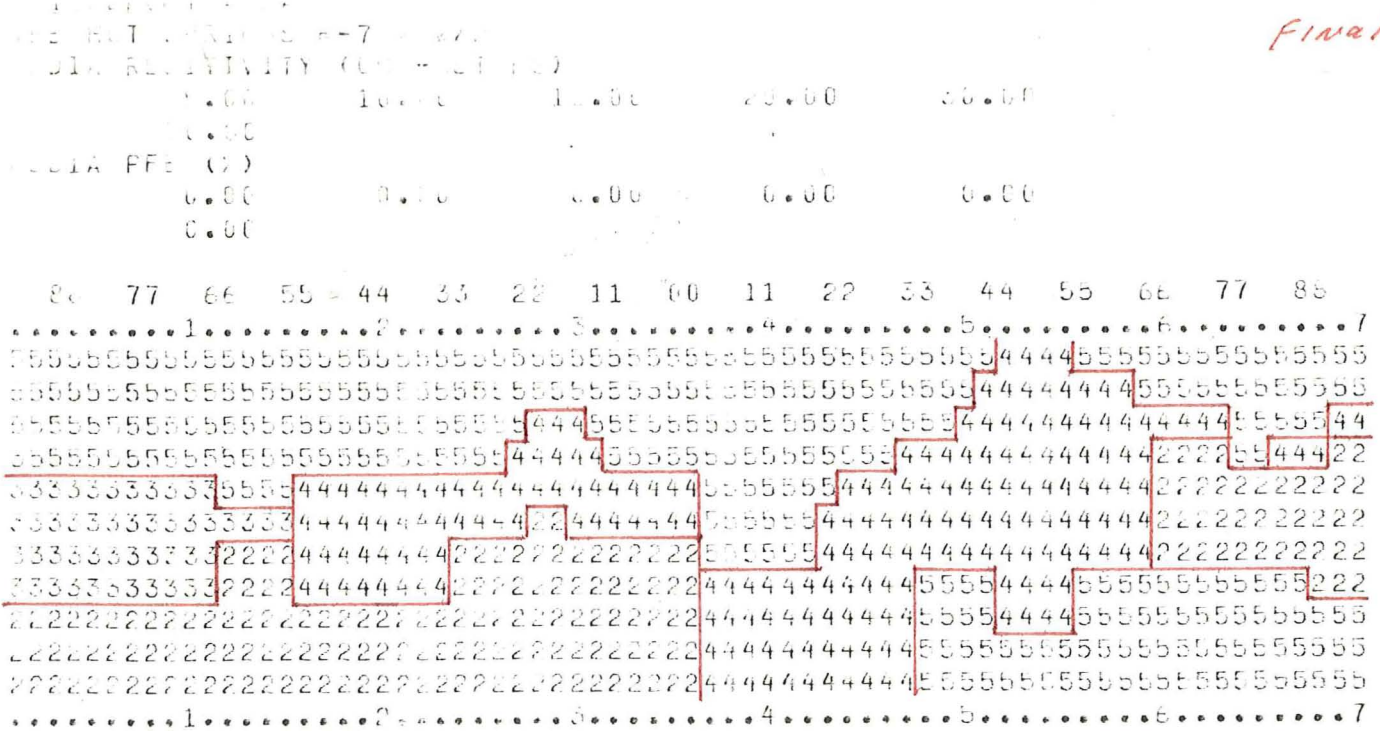
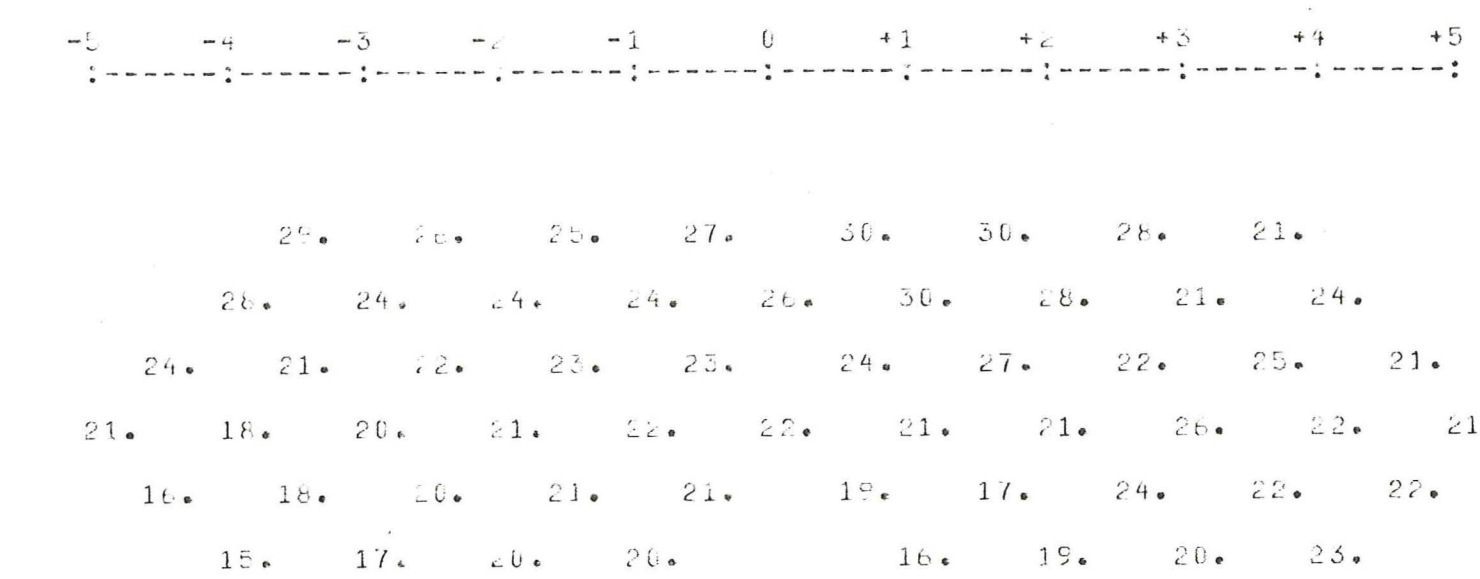


APPARENT RESISTIVITY (CALCULATED)



29. 28. 25. 27. 30. 30. 28. 21.

28. 24. 24. 24. 26. 30. 28. 21. 24.

24. 21. 22. 23. 23. 24. 27. 22. 25. 21.

21. 18. 20. 21. 22. 22. 21. 21. 26. 22. 21.

16. 18. 20. 21. 21. 19. 17. 24. 22. 22.

15. 17. 20. 20. 16. 19. 20. 23.

F18

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BRIDGEPORT AREA
THE HOT SPRINGS R-7 , W/2
MEDIA RESITIVITY (OHM-METERS)
        5.00       10.00       15.00       20.00       30.00
       50.00
MEDIA PFE (%)
        0.00        0.00        0.00        0.00        0.00
        0.00
```

```
  88   77   66   55   44   33   22   11   00   11.  22   33   44   55   66   77   88
.........1.........2.........3.........4.........5.........6.........7
5555555555555555555555555555555555555555555555555554444555555555555555
5555555555555555555555555555555555555555555555555544444444555555555555
5555555555555555555555555554445555555555555555554444444444444444555554 4
5555555555555555555555555544444555555555555555444444444444422225544422
3333333333355554444444444444444444444555555544444444444444442222222222 2
3333333333333334444444444442244444445555554444444444444444422222222222
3333333333322224444444422222222222225555554444444444444444422222222222
3333333333322224444444422222222222224444444444455554444555555555555222
2222222222222222222222222222222222224444444444455554444555555555555555
2222222222222222222222222222222222224444444444455555555555555555555555
2222222222222222222222222222222222224444444444455555555555555555555555
.........1.........2.........3.........4.........5.........6.........7
```

5

APPARENT RESISTIVITY (CALCULATED)

```
 -5      -4      -3      -2      -1       0      +1      +2      +3      +4      +5
  :-------:-------:-------:-------:-------:-------:-------:-------:-------:-------:

                                26                                      20
          29.     26.     25.     27.     30.     30.     27.     20.

      29                      24                                      21
      28.     24.     24.     24.     26.     30.     27.     21.     24.

          18                      21                                      21
  24.     21.     22.     23.     23.     25.     26.     22.     25.     21.

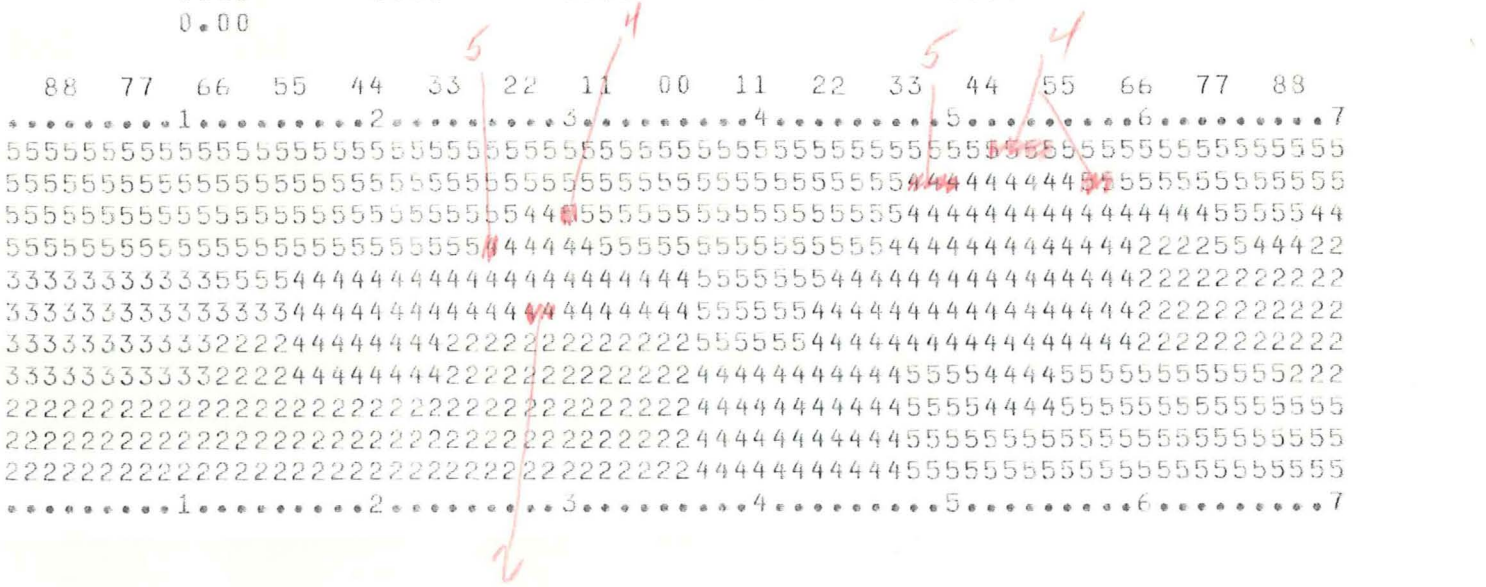
              17                      20                                      20
21.   18.     20.     21.     22.     22.     20.     21.     26.     22.     21.

                  19                      22
  16.     18.     20.     21.     21.     19.     17.     24.     22.     23.

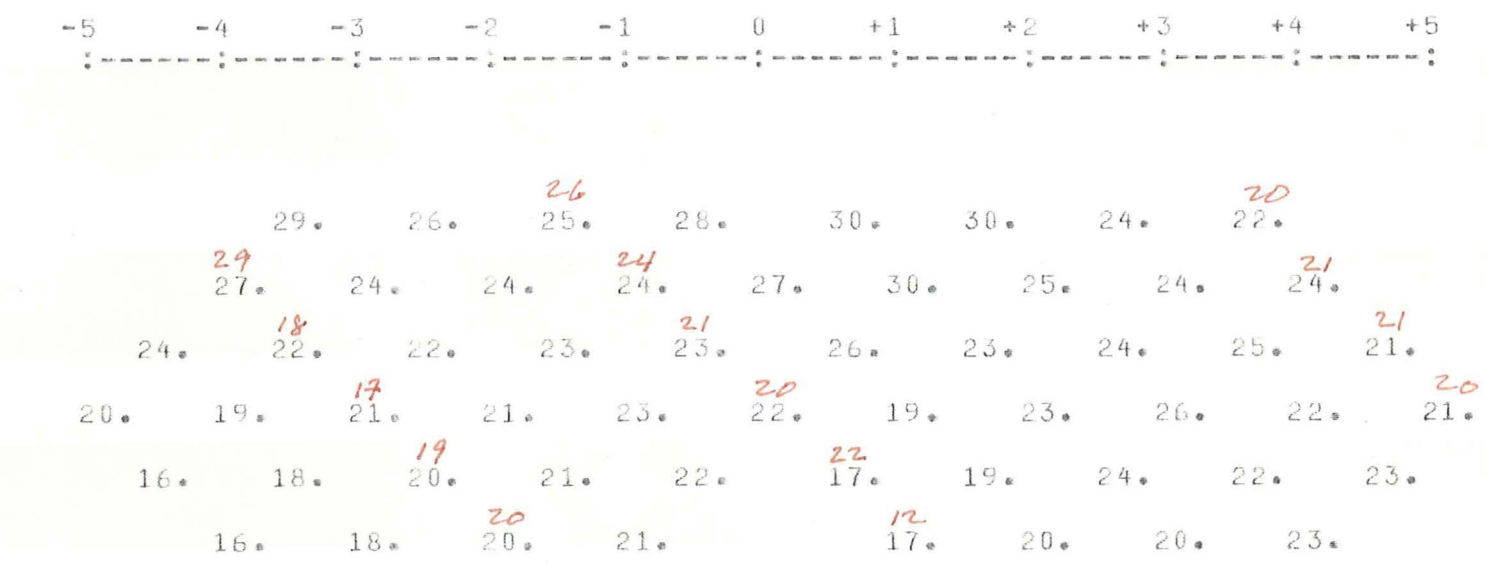
                  20                      12
      15.     17.     20.     20.             16.     19.     21.     23.
```

F15

BRIDGEPORT AREA
THE HOT SPRINGS R-7 , W/2
MEDIA RESITIVITY (OHM-METERS)
5.00 10.00 15.00 20.00 30.00
50.00
MEDIA PFE (%)
0.00 0.00 0.00 0.00 0.00
0.00



APPARENT RESISTIVITY (CALCULATED)



Rev on 18

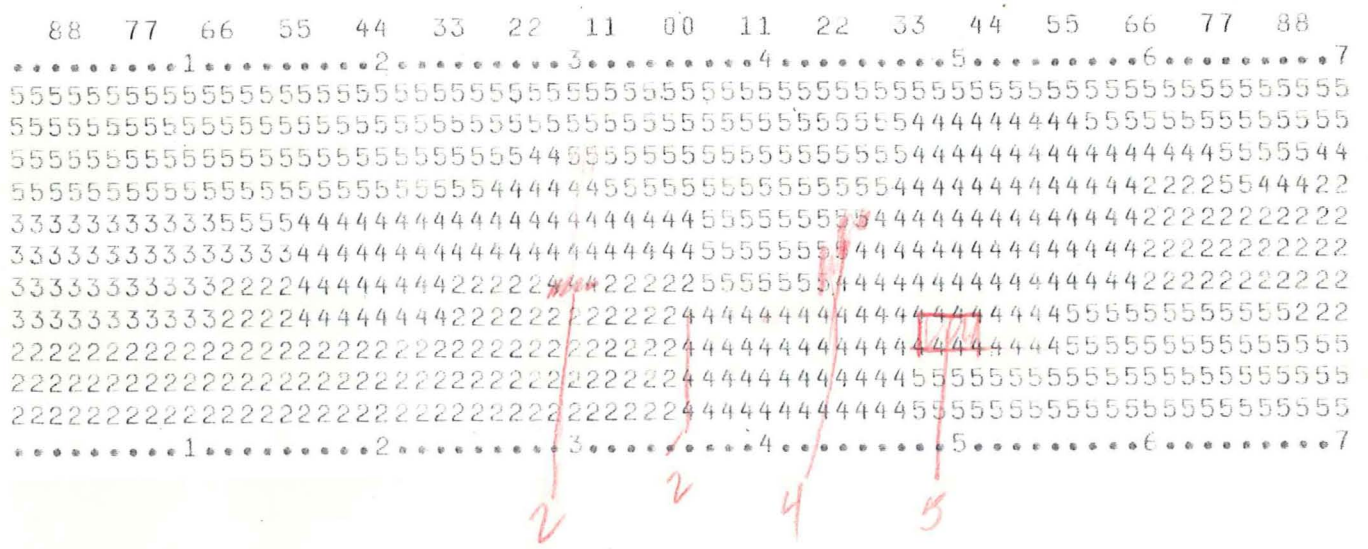
F14

BRIDGEPORT AREA
THE HOT SPRINGS R-7 , W/2
MEDIA RESITIVITY (OHM-METERS)

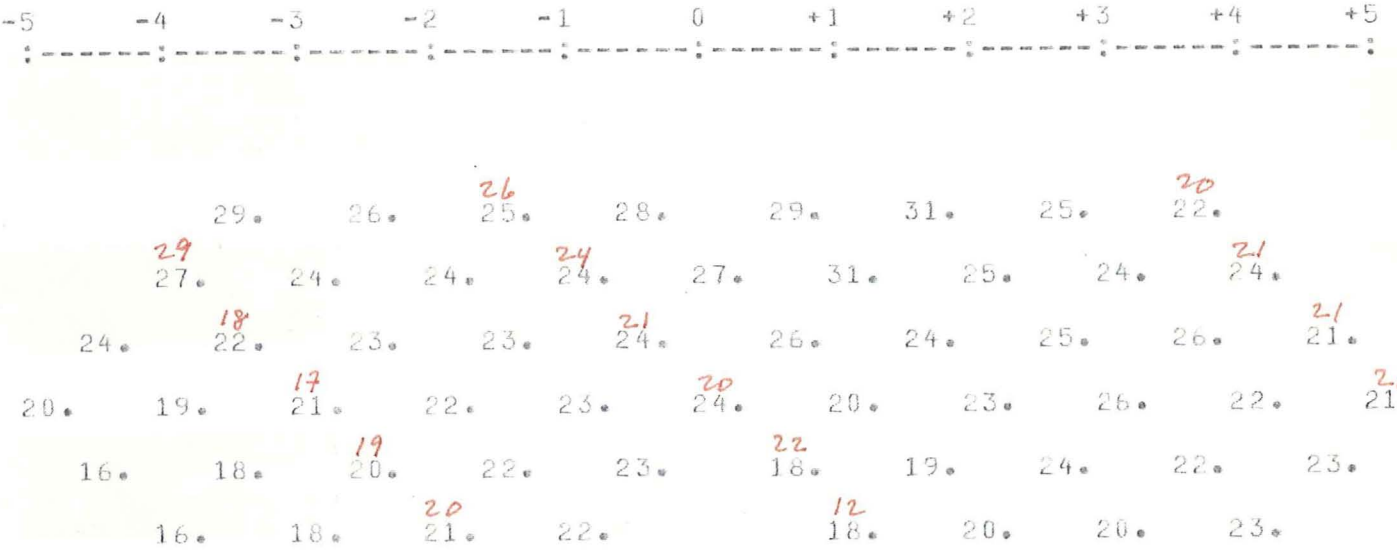
5.00 10.00 15.00 20.00 30.00
50.00

MEDIA PFE (%)

0.00 0.00 0.00 0.00 0.00
0.00



APPARENT RESISTIVITY (CALCULATED)



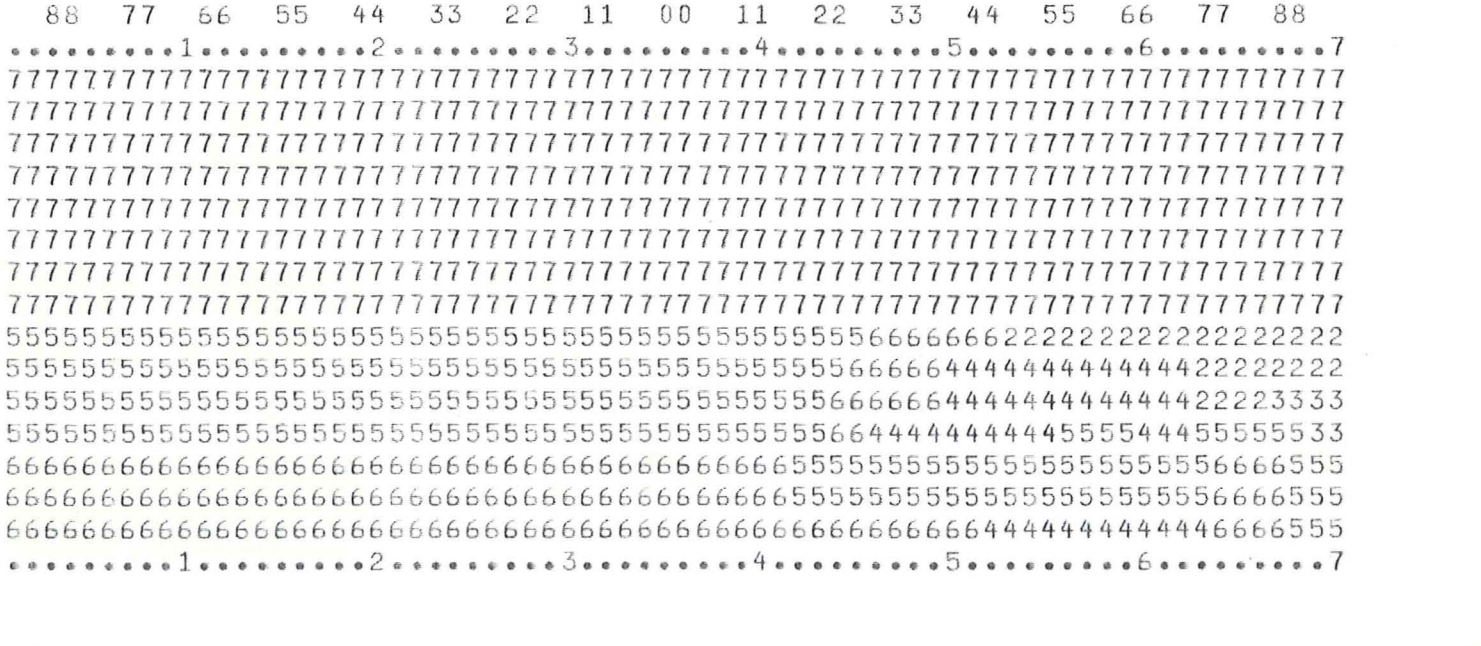
Random 15

BRIDGEPORT AREA
TRAVERTINE HOT SPRINGS R-4 , W/2
MEDIA RESITIVITY (OHM-METERS)

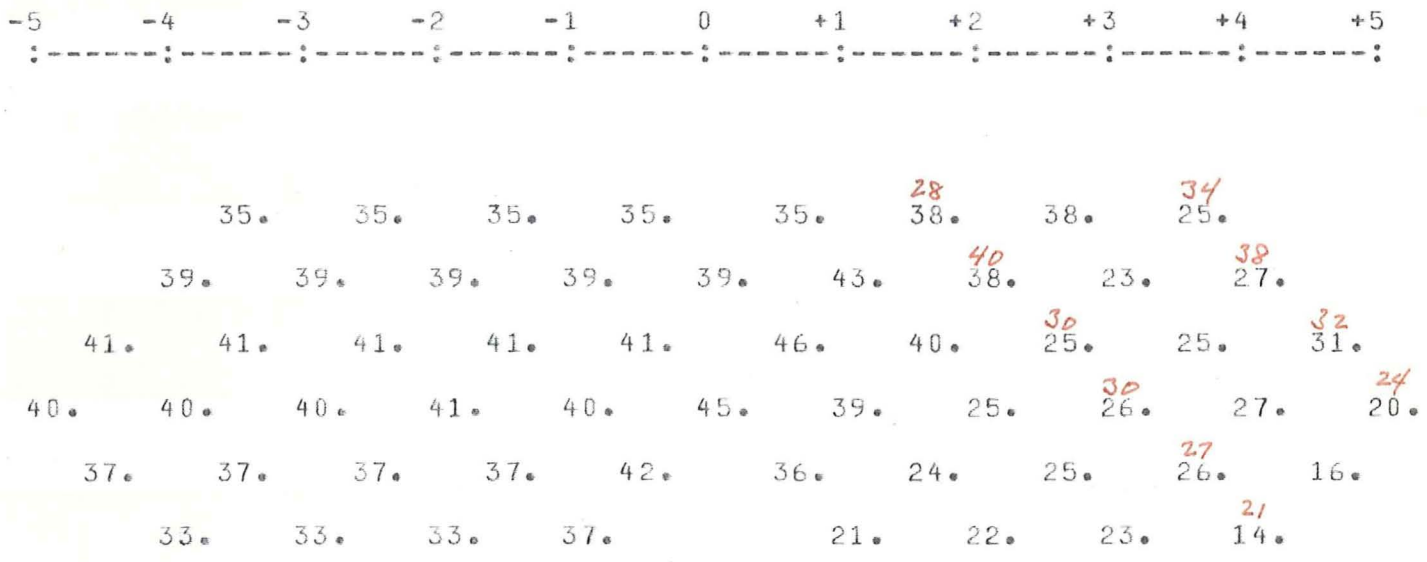
2.00	5.00	10.00	20.00	35.00
50.00	10000.00			

MEDIA PFE (%)

0.00	0.00	0.00	0.00	0.00
0.00	0.00			



APPARENT RESISTIVITY (CALCULATED)

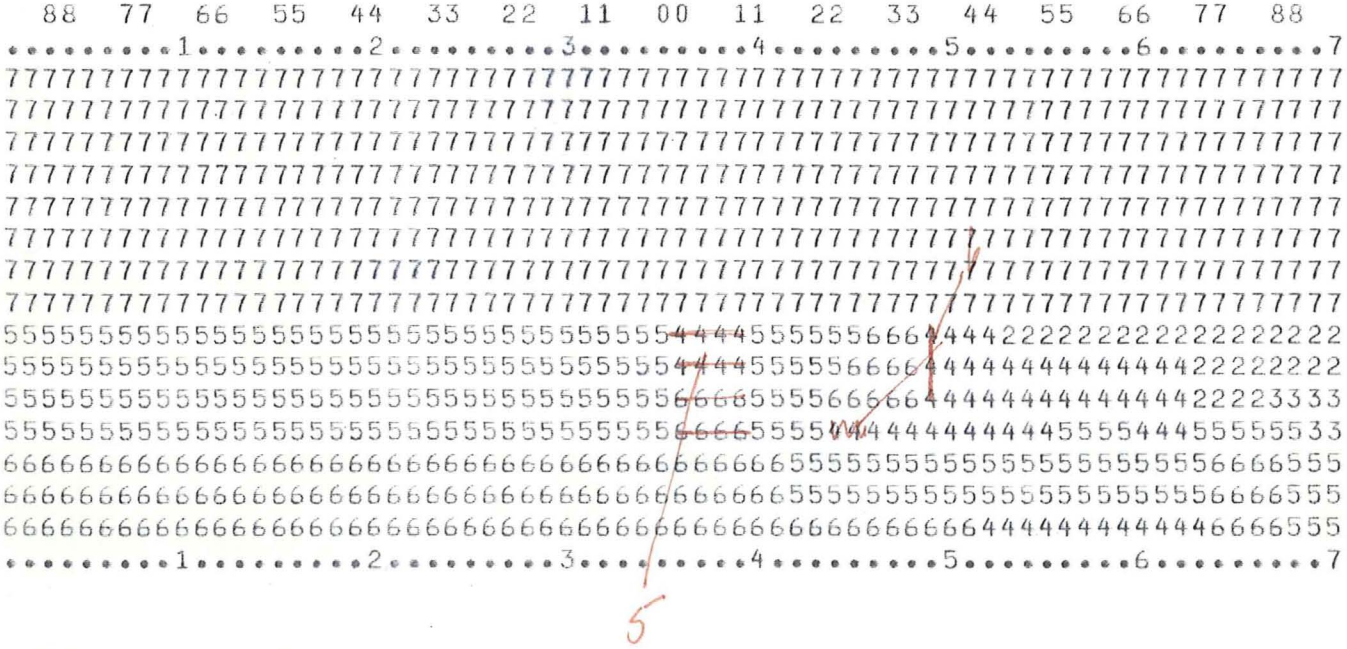


BRIDGEPORT AREA
TRAVERTINE HOT SPRINGS R-4 , W/2
MEDIA RESITIVITY (OHM-METERS)

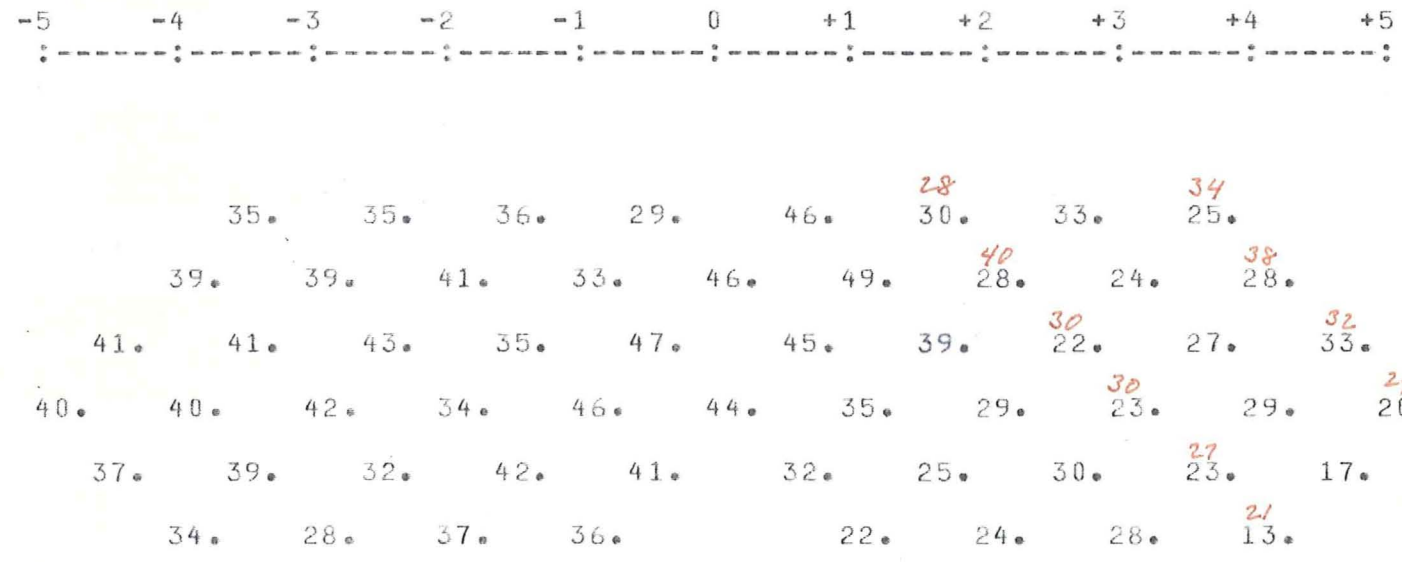
2.00	5.00	10.00	20.00	35.00
50.00	10000.00			

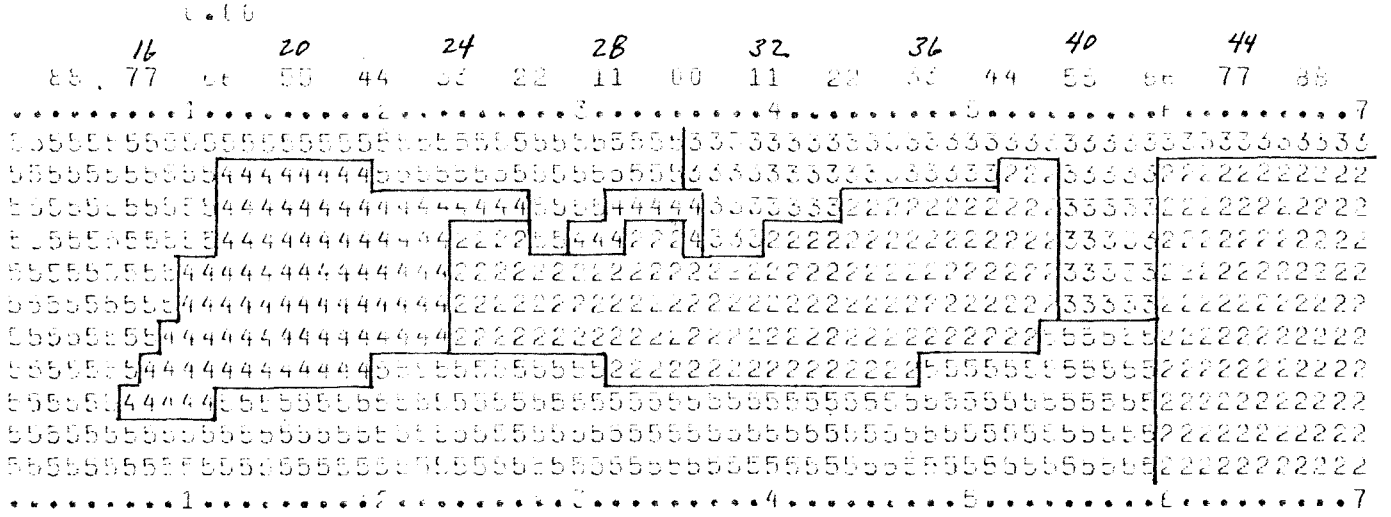
MEDIA PFE (%)

0.00	0.00	0.00	0.00	0.00
0.00	0.00			

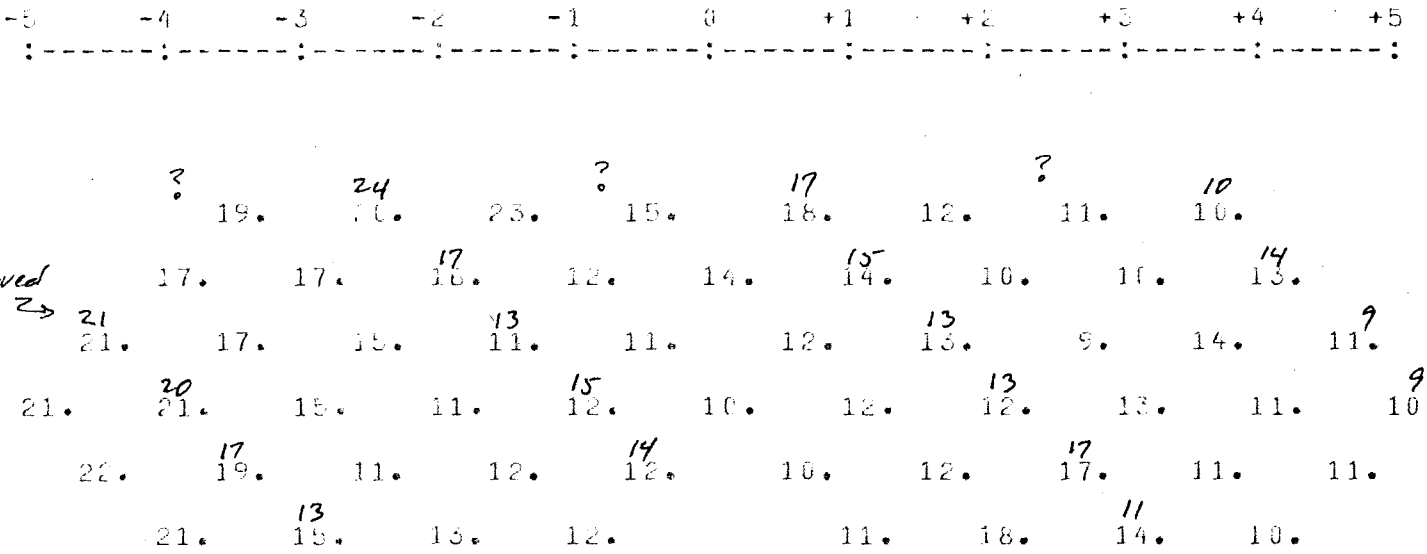


APPARENT RESISTIVITY (CALCULATED)





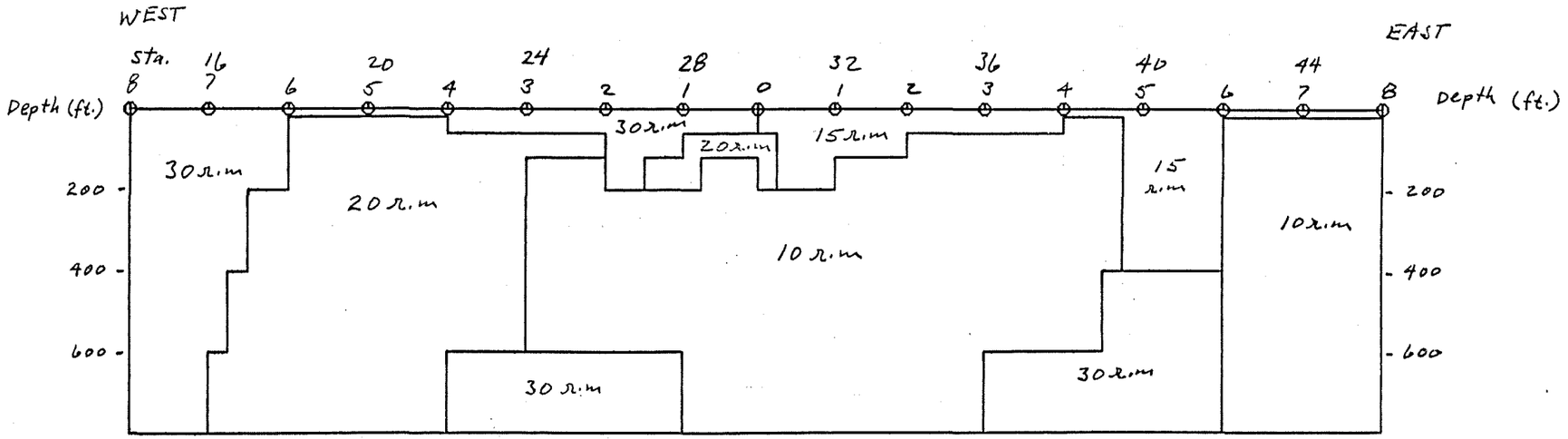
APPARENT RESISTIVITY (CALCULATED)



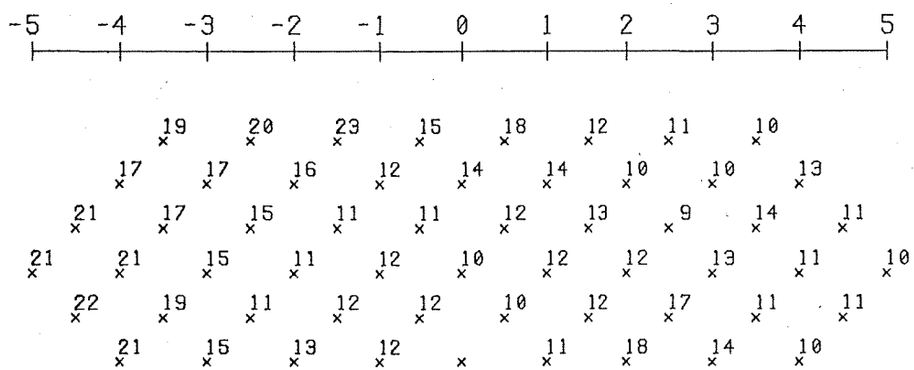
note: 1) Values in ohm-meters.

2) Questionable areas

BRIDGEPORT AREA
THE HOT SPRINGS R-7 , E/2



APPARENT RESISTIVITY - COMPUTED



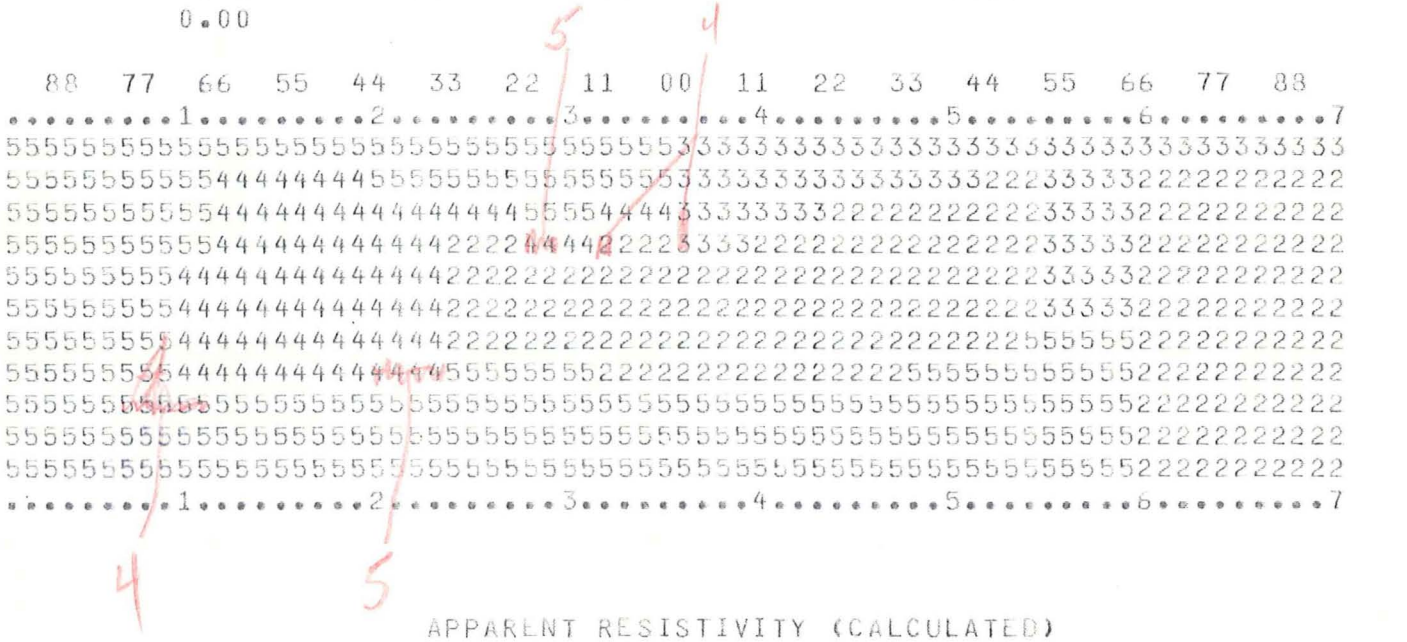
F14

BRIDGEPORT AREA
THE HOT SPRINGS R-7 , E/2
MEDIA RESITIVITY (OHM-METERS)

5.00 10.00 15.00 20.00 30.00
50.00

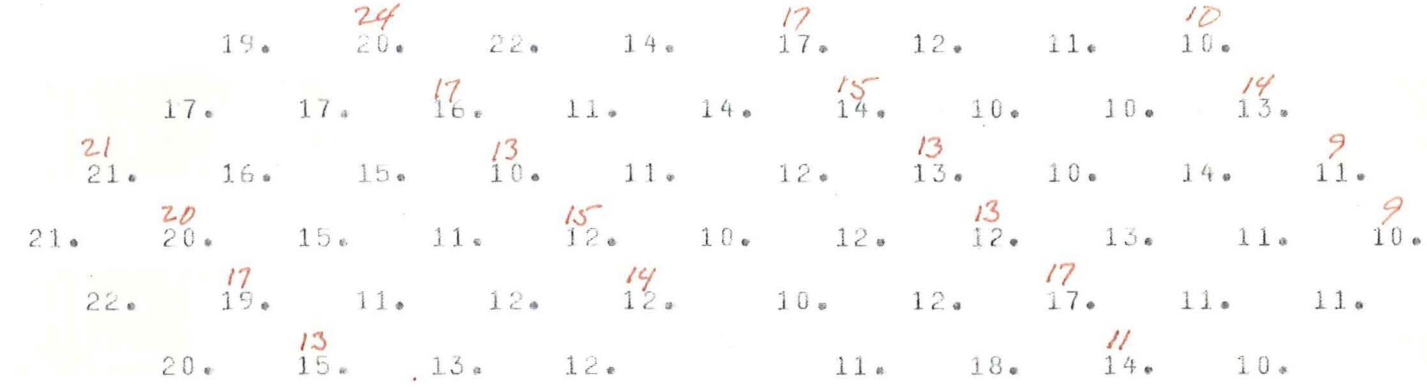
MEDIA PFE (%)

0.00 0.00 0.00 0.00 0.00
0.00



APPARENT RESISTIVITY (CALCULATED)

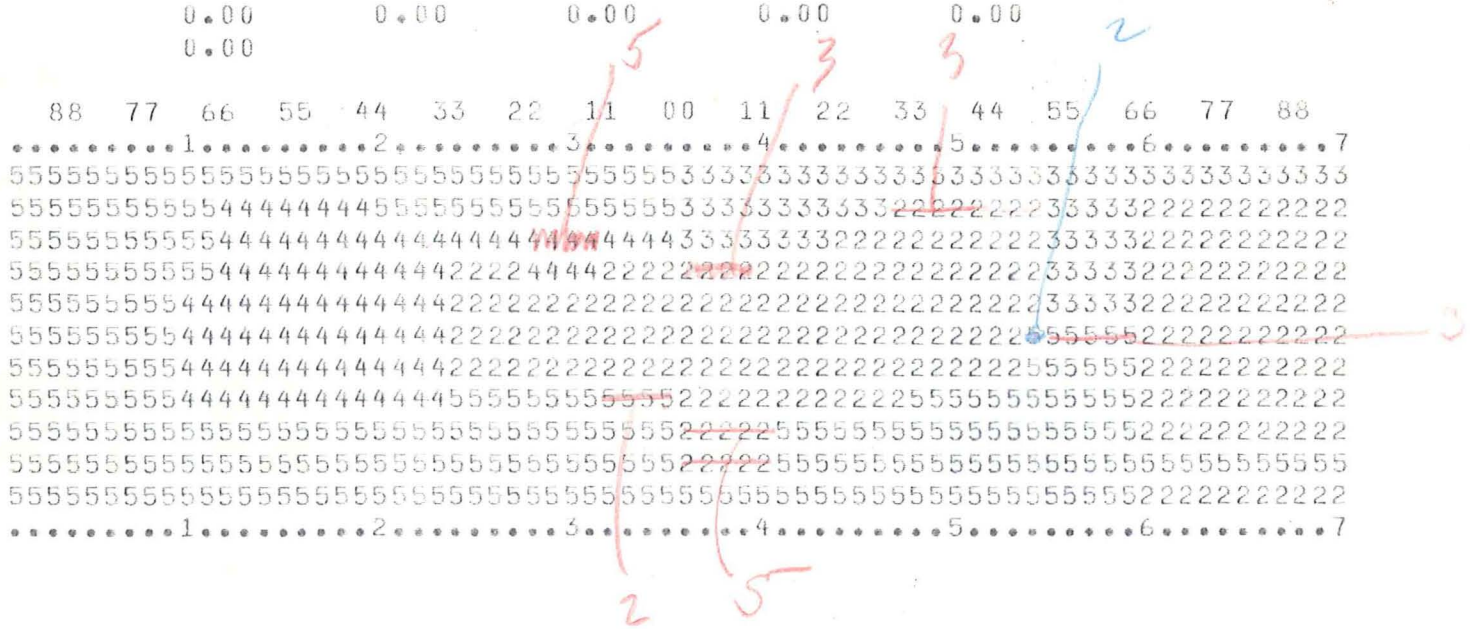
-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5



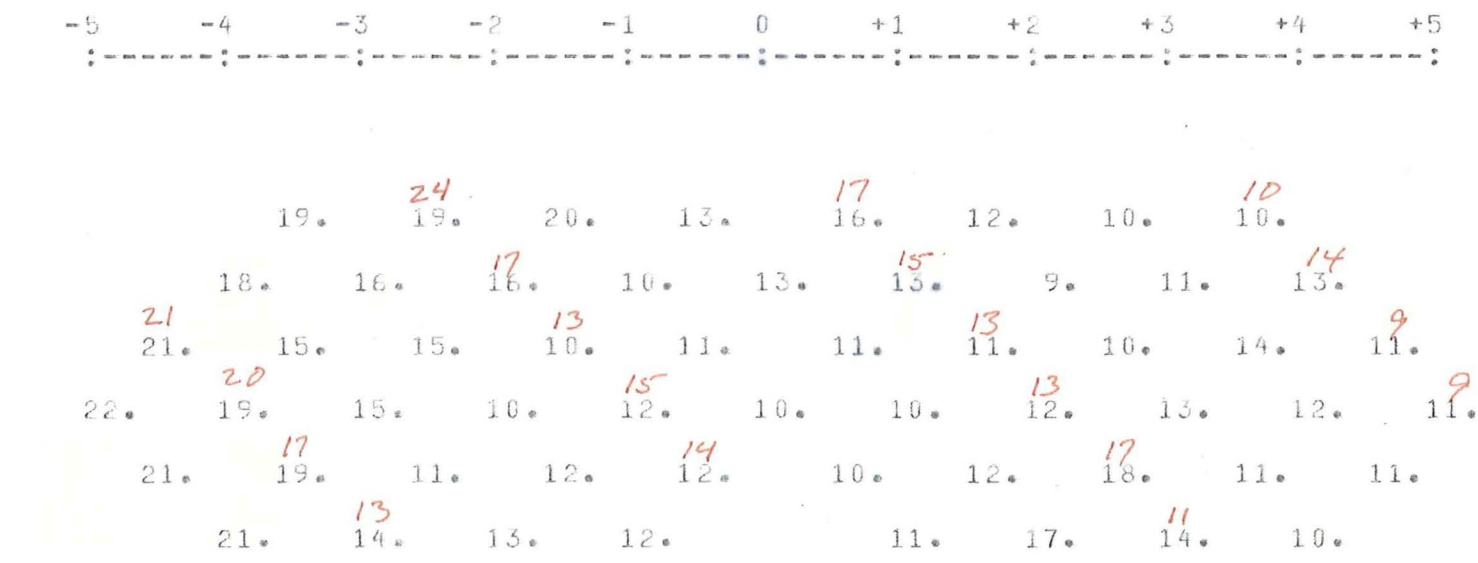
Rev on 15

BRIDGEPORT AREA
THE HOT SPRINGS R-7 , E/2
MEDIA RESITIVITY (OHM-METERS)
5.00 10.00 15.00 20.00 30.00
50.00
MEDIA PFE (%)
0.00 0.00 0.00 0.00 0.00
0.00

F11



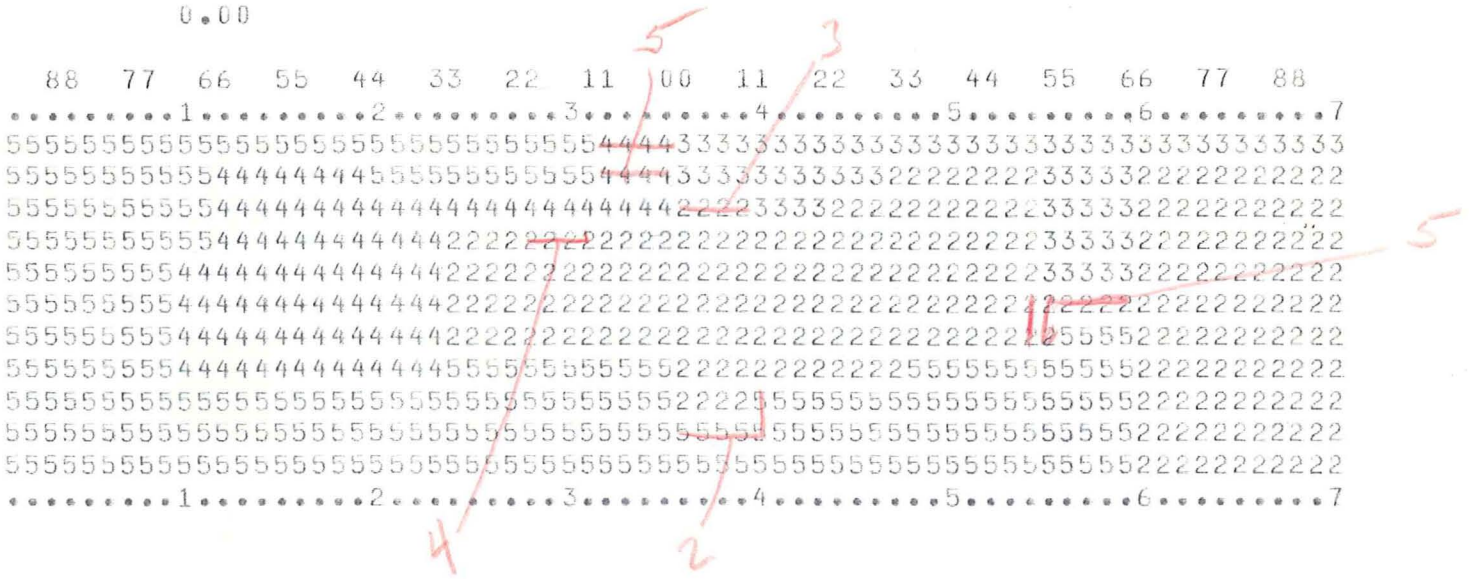
APPARENT RESISTIVITY (CALCULATED)



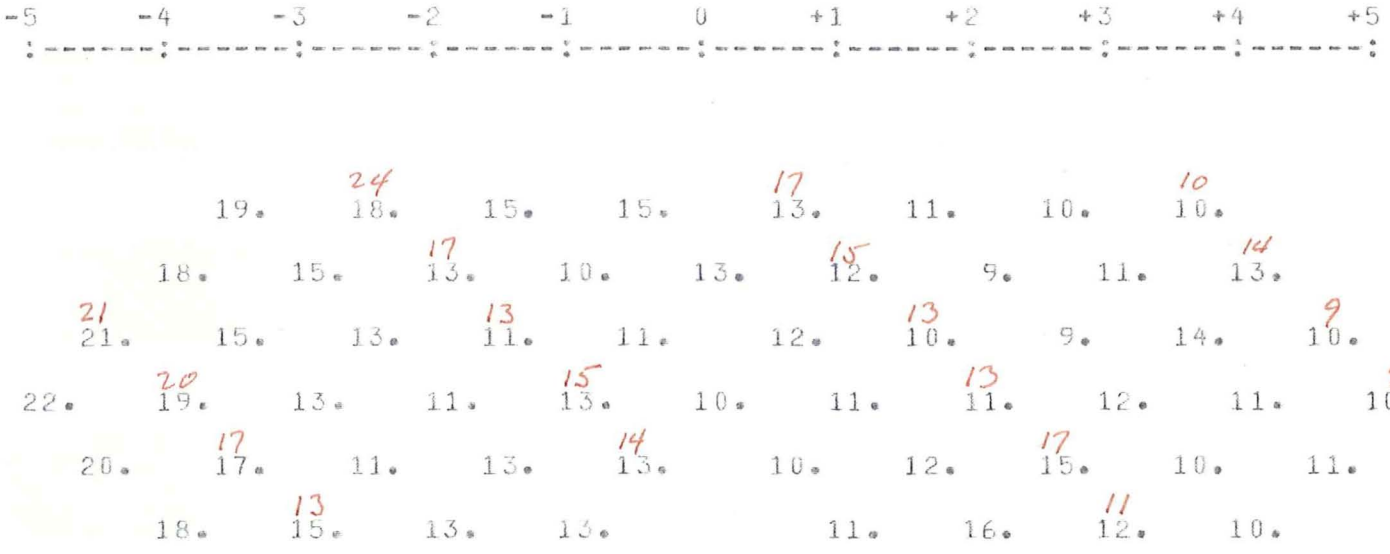
Rev on 14

F10

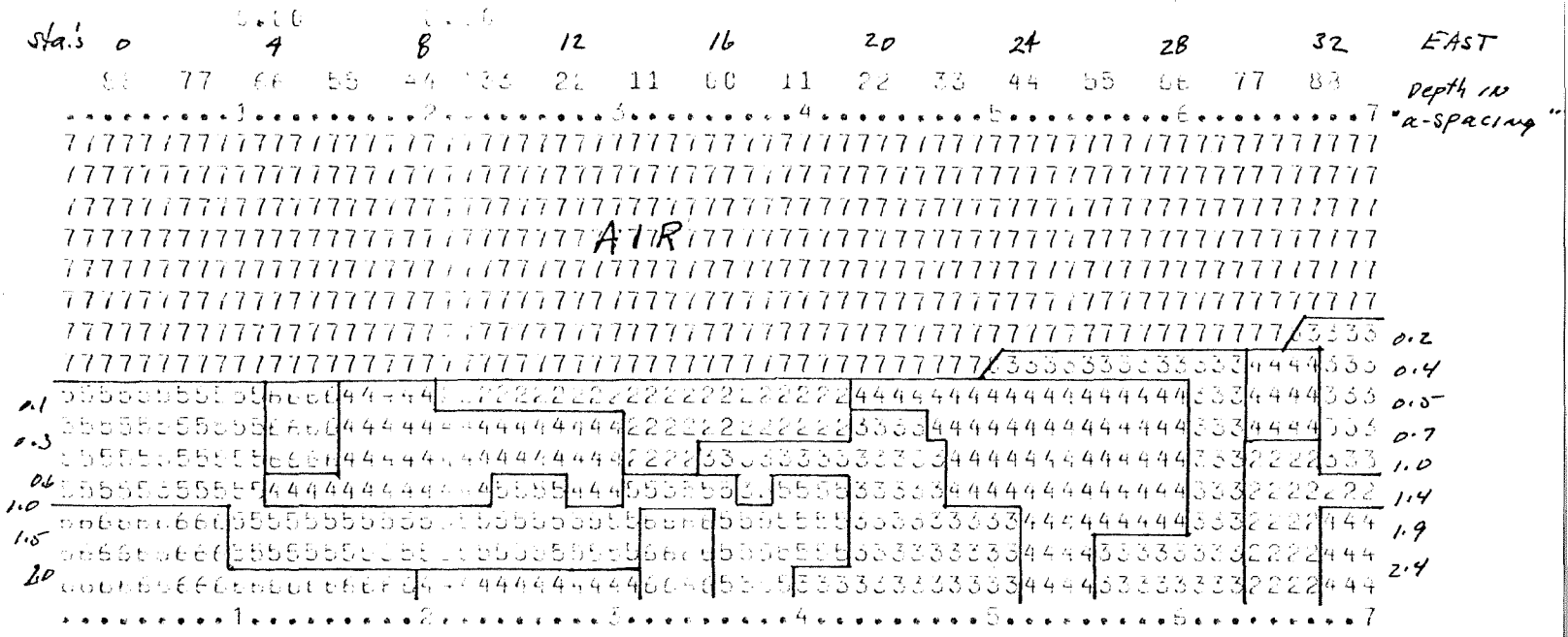
BRIDGEPORT AREA
THE HOT SPRINGS R-7 ; E/2
MEDIA RESITIVITY (OHM-METERS)
5.00 10.00 15.00 20.00 30.00
50.00
MEDIA PFE (%)
0.00 0.00 0.00 0.00 0.00
0.00



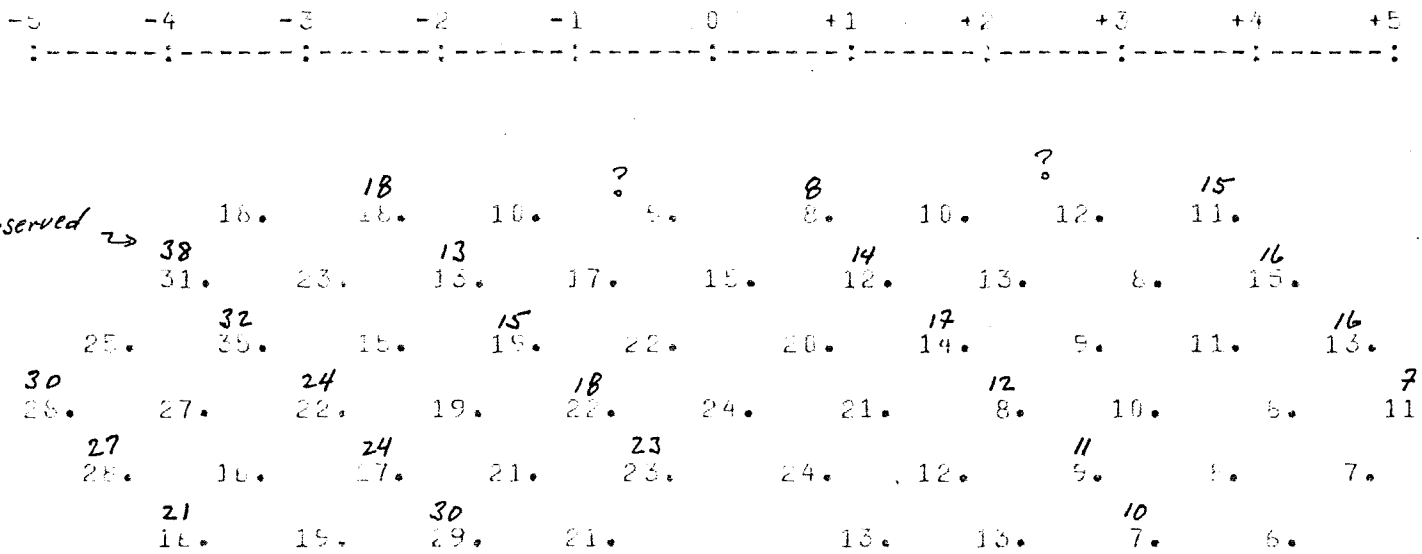
APPARENT RESISTIVITY (CALCULATED)



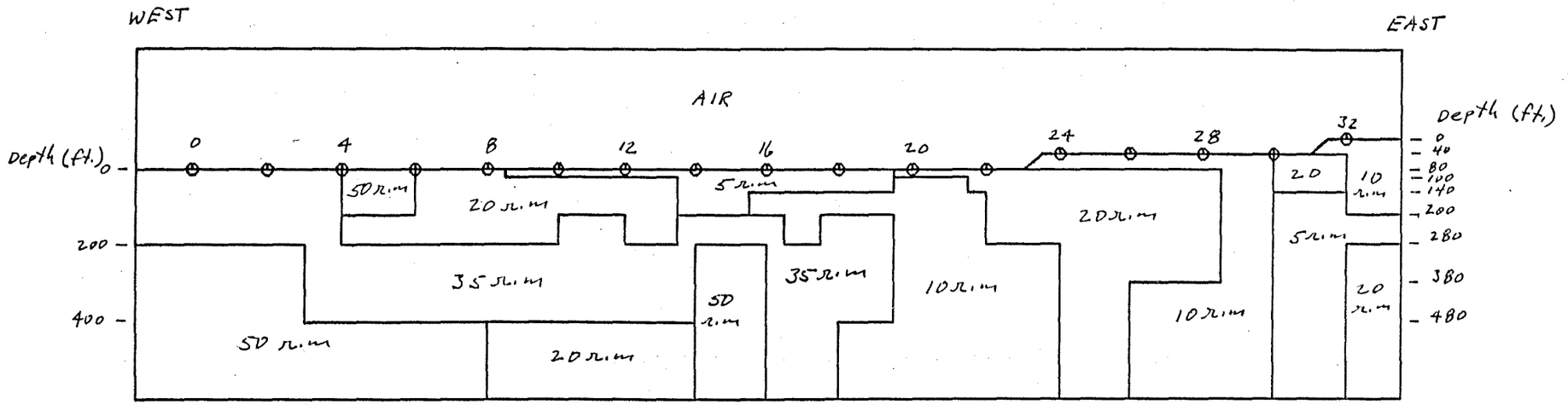
Rev on 11



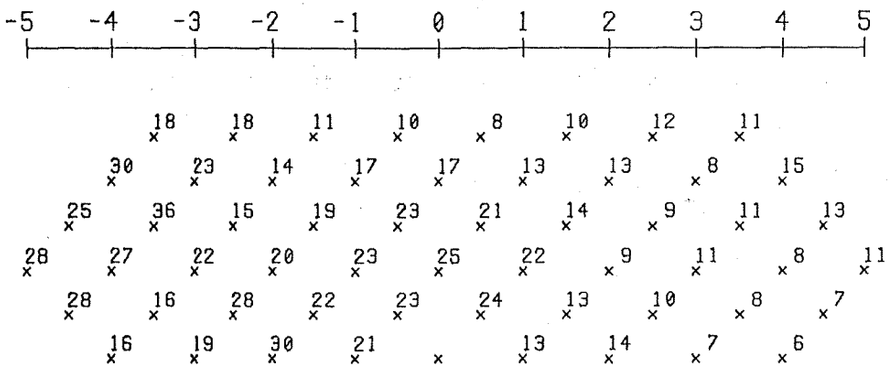
APPARENT RESISTIVITY (CALCULATED)

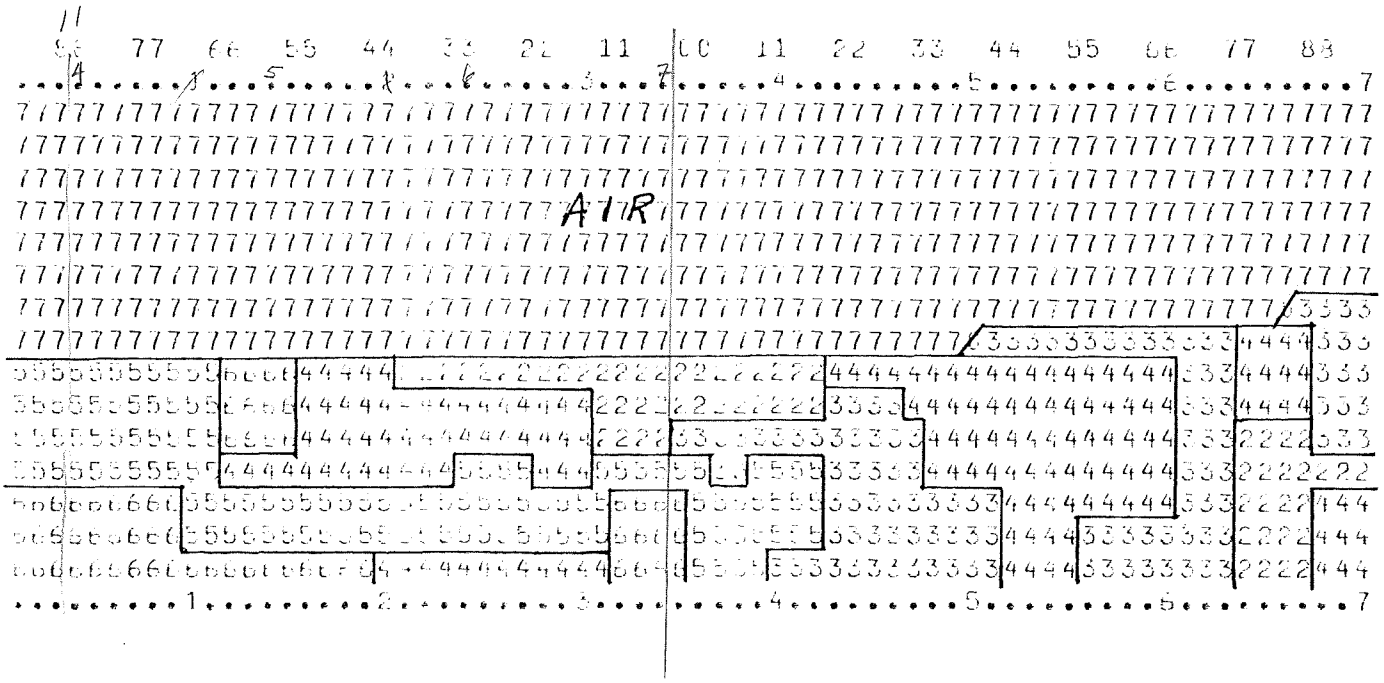


BRIDGEPORT AREA
TRAVERTINE HOT SPRINGS R-4 , W/2

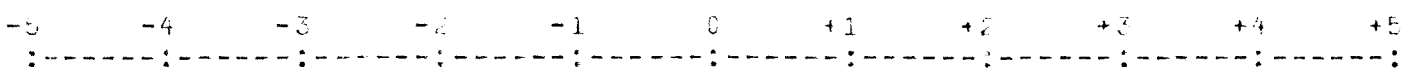


APPARENT RESISTIVITY - COMPUTED





APPARENT RESISTIVITY (CALCULATED)



Observed →

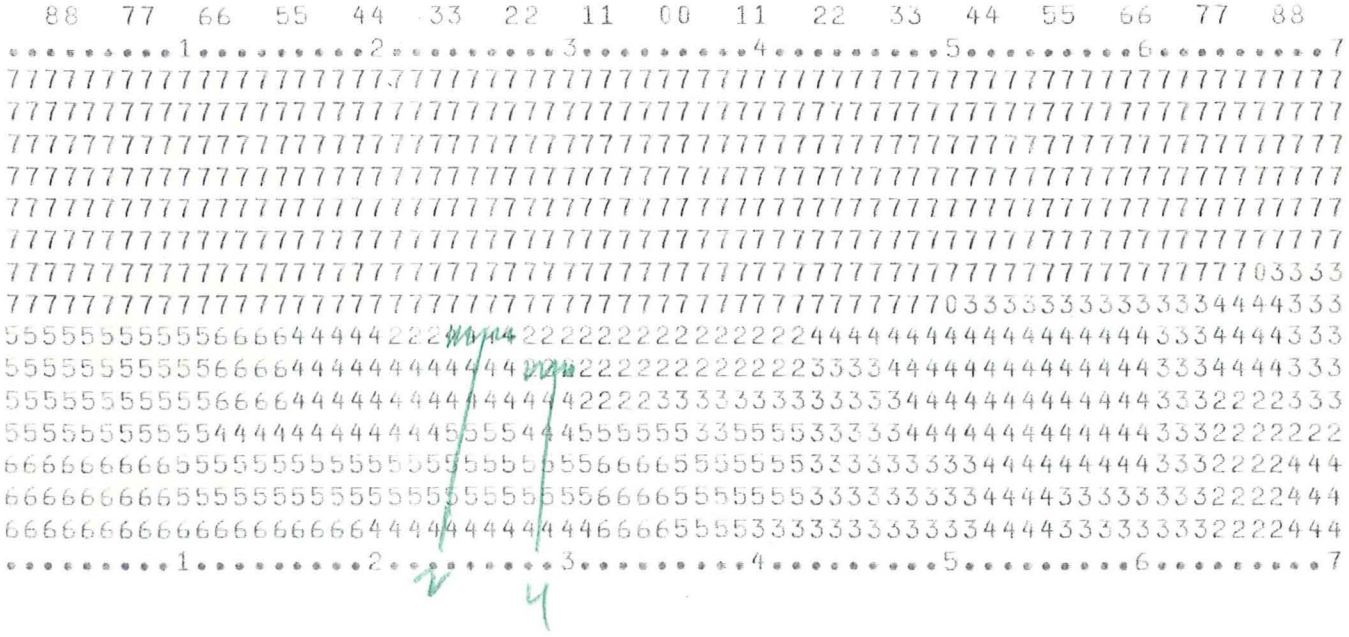
		18			8			15		
	16.	18.	10.	9.	8.	10.	12.	11.		
38		13			14			16		
31.	23.	13.	17.	15.	12.	13.	8.	15.		
	32		15			17			16	
25.	35.	15.	19.	22.	20.	14.	9.	11.	13.	
30		24		18			12			7
28.	27.	22.	19.	22.	24.	21.	8.	10.	8.	11.
27		24		23			11			
28.	16.	27.	21.	23.	24.	12.	9.	8.	7.	
	21		30					10		
	18.	19.	29.	21.		13.	13.	7.	6.	

BRIDGEPORT AREA
TRAVERTINE HOT SPRINGS R-4 , W/2
MEDIA RESITIVITY (OHM-METERS)

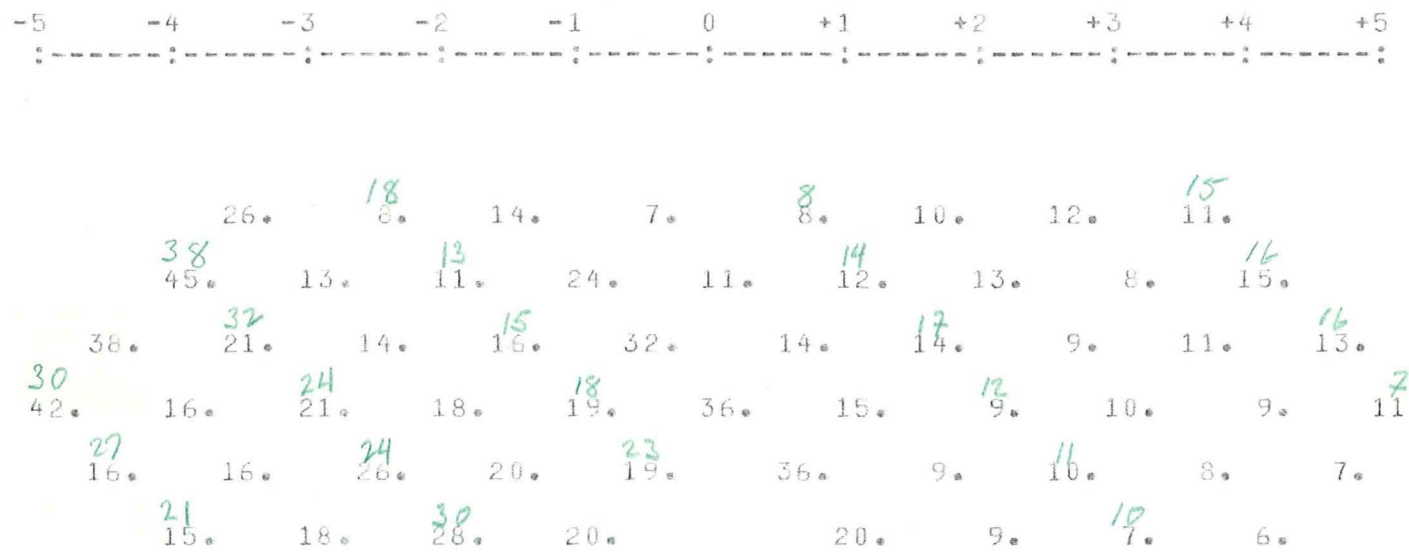
2.00	5.00	10.00	20.00	35.00
50.00	10000.00			

MEDIA PFE (%)

0.00	0.00	0.00	0.00	0.00
0.00	0.00			



APPARENT RESISTIVITY (CALCULATED)



BRIDGEPORT AREA
TRAVERTINE HOT SPRINGS R-4 , W/2
MEDIA RESITIVITY (OHM-METERS)

2.00	5.00	10.00	20.00	35.00
50.00	10000.00			

MEDIA PFE (%)

0.00	0.00	0.00	0.00	0.00
0.00	0.00			

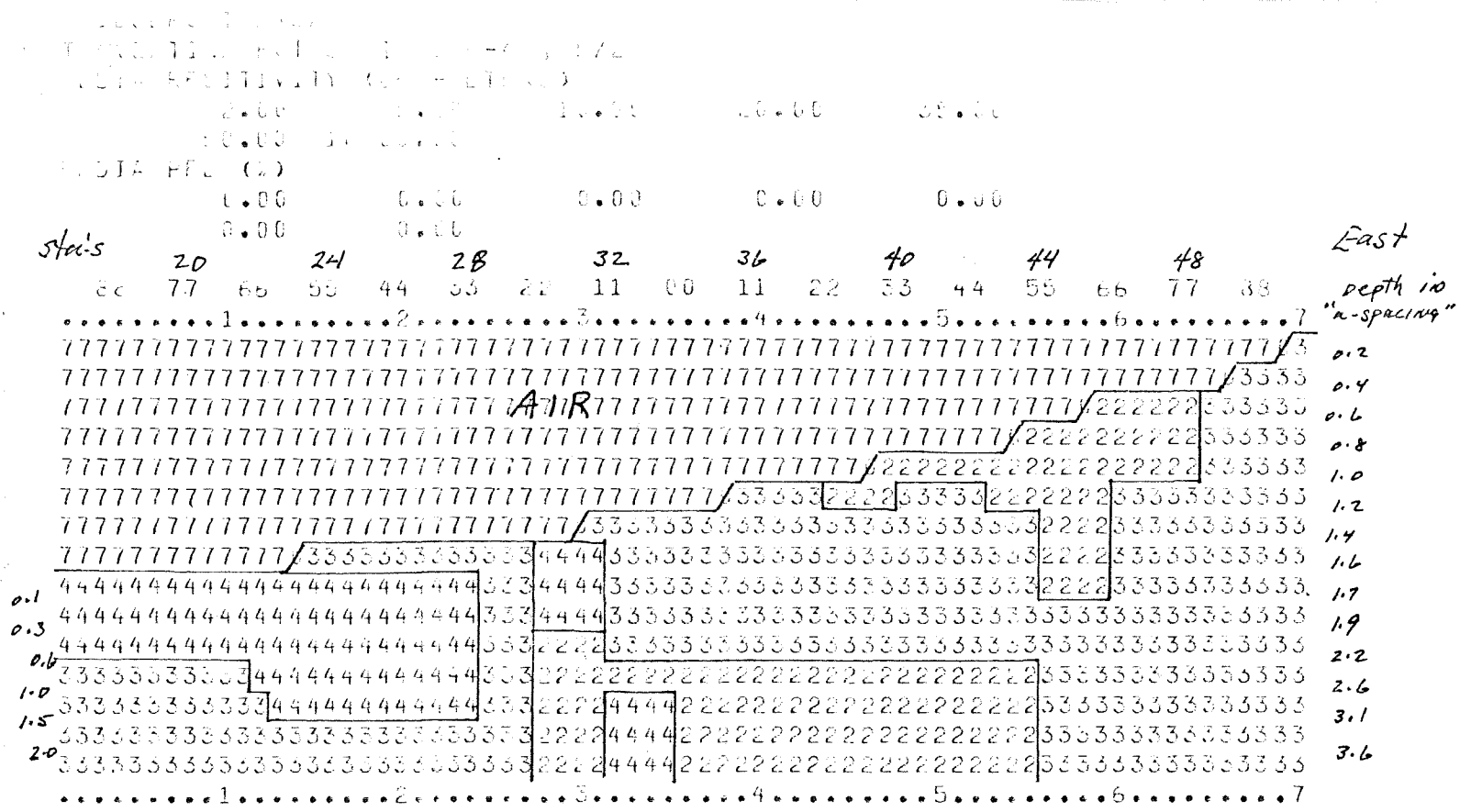
4

2 5 1 3

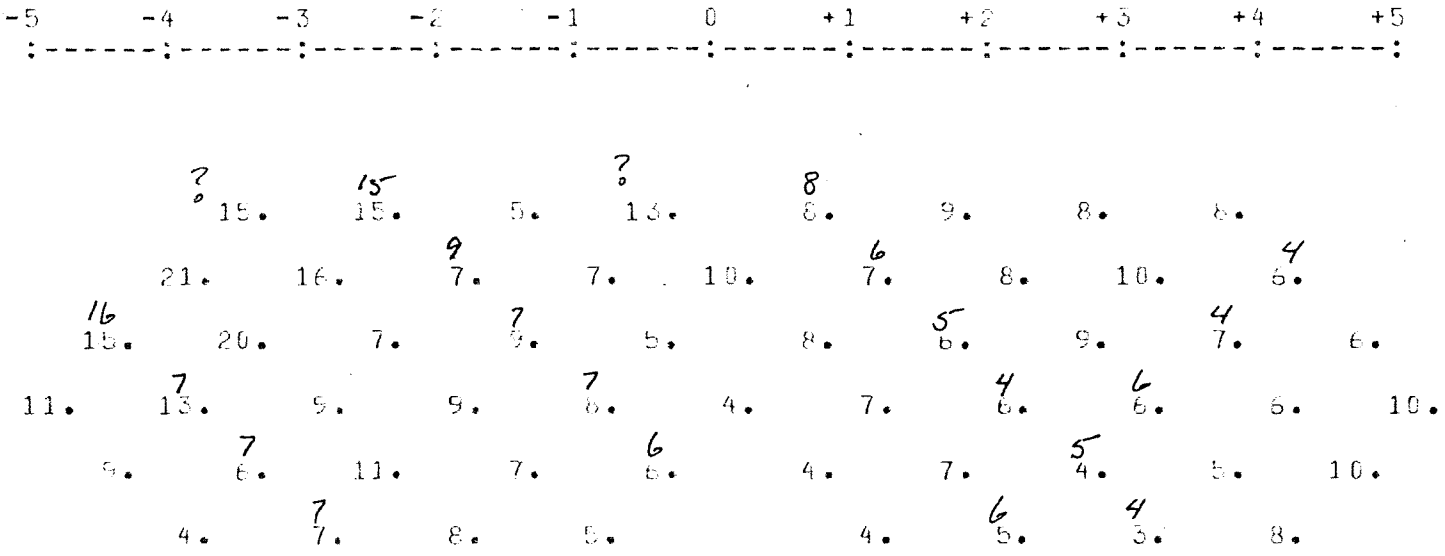
APPARENT RESISTIVITY (CALCULATED)

		18		8				15		
	18.	18.	11.	10.	8.	10.	12.	11.		
	38		13		14				16	
	30.	23.	14.	17.	17.	13.	13.	8.	15.	
		32		15			17			16
25.	36.	15.	19.	23.	21.	14.	9.	11.	13.	
30		24		18		12				7
28.	27.	22.	20.	23.	25.	22.	9.	11.	8.	11.
27		24		23		11				
28.	16.	28.	22.	23.	24.	13.	10.	8.	7.	
	21		30				10			
	16.	19.	30.	21.		13.	14.	7.	6.	

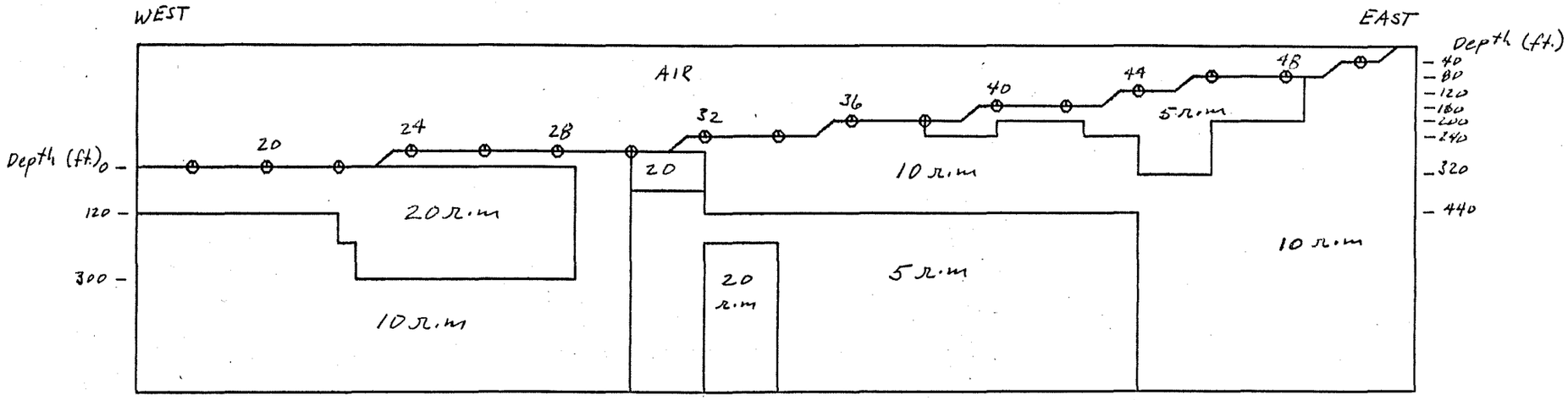
RW
F22



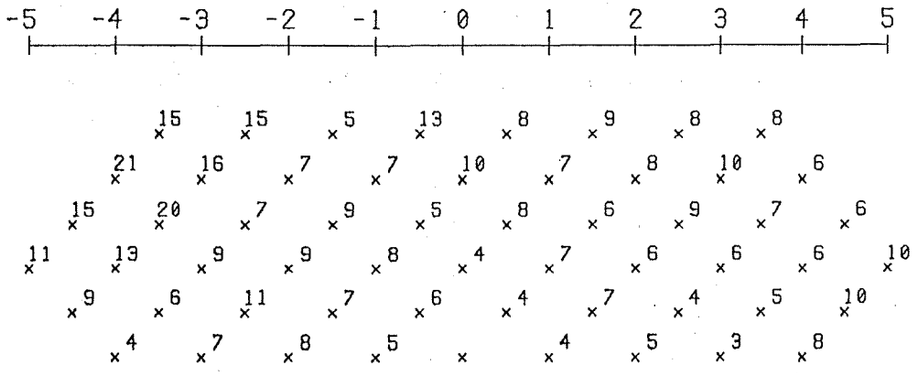
APPARENT RESISTIVITY (CALCULATED)



BRIDGEPORT AREA
TRAVERTINE HOT SPRINGS R-4 , E/2



APPARENT RESISTIVITY - COMPUTED



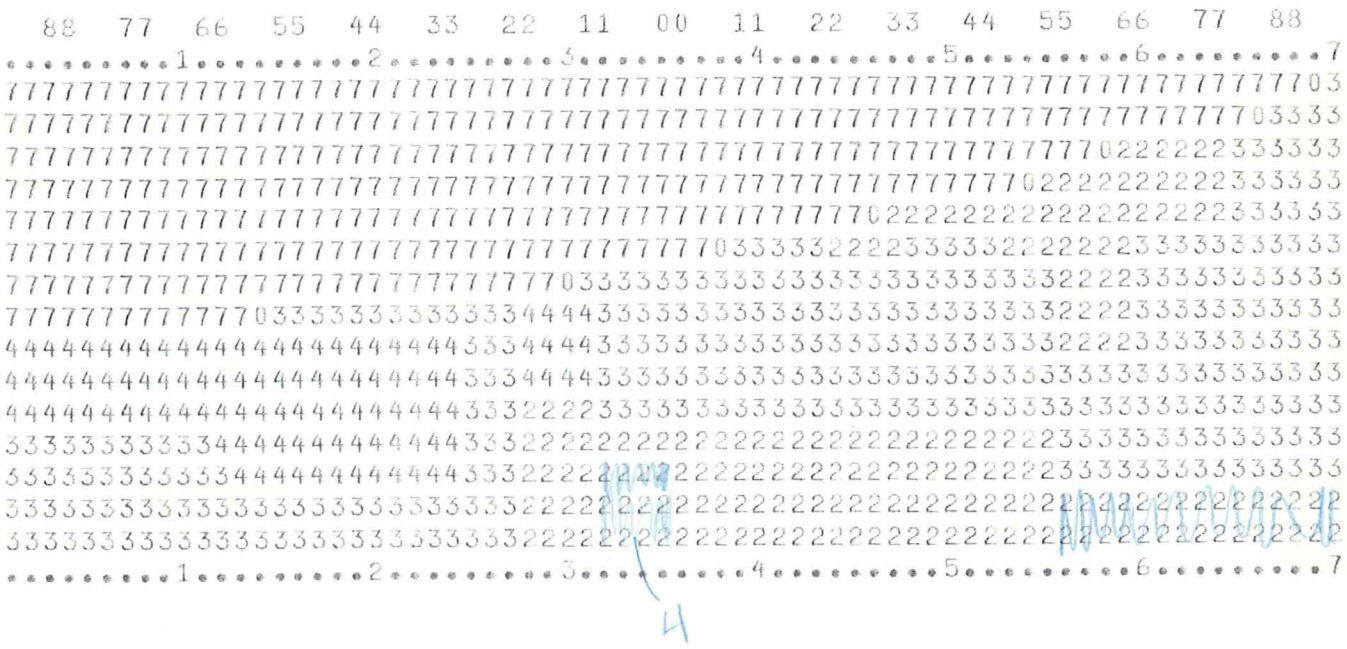
F17

BRIDGEPORT AREA
TRAVERTINE HOT SPRINGS R-4 , E/2
MEDIA RESITIVITY (OHM-METERS)

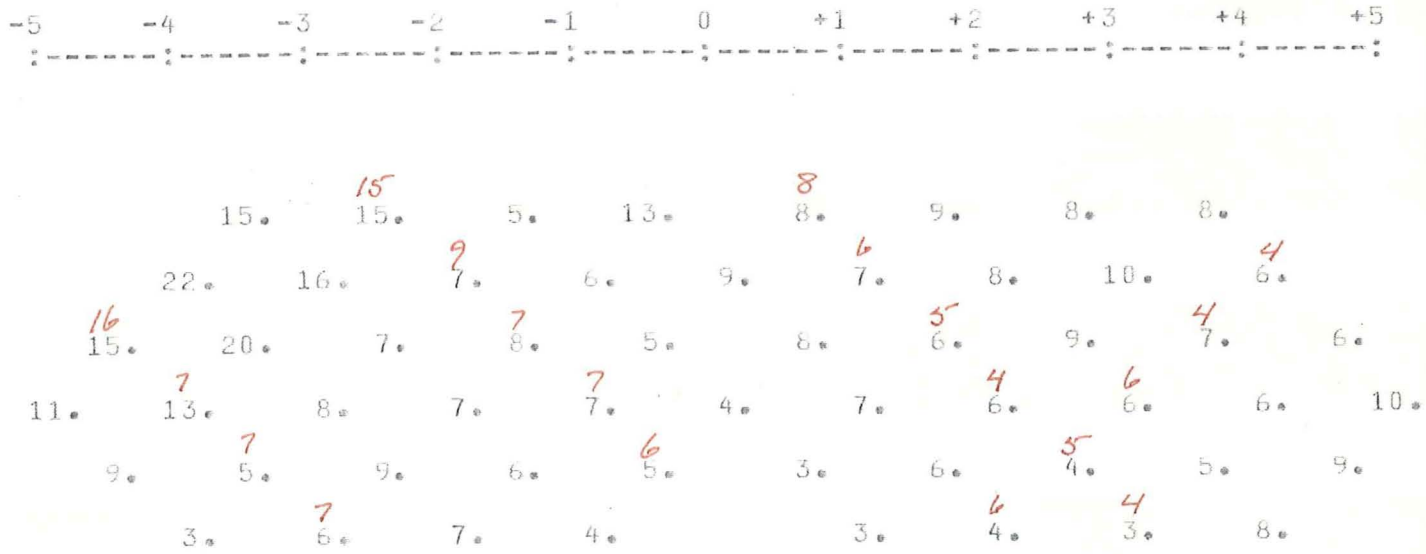
2.00	5.00	10.00	20.00	35.00
50.00	10000.00			

MEDIA PFE (%)

0.00	0.00	0.00	0.00	0.00
0.00	0.00			



APPARENT RESISTIVITY (CALCULATED)



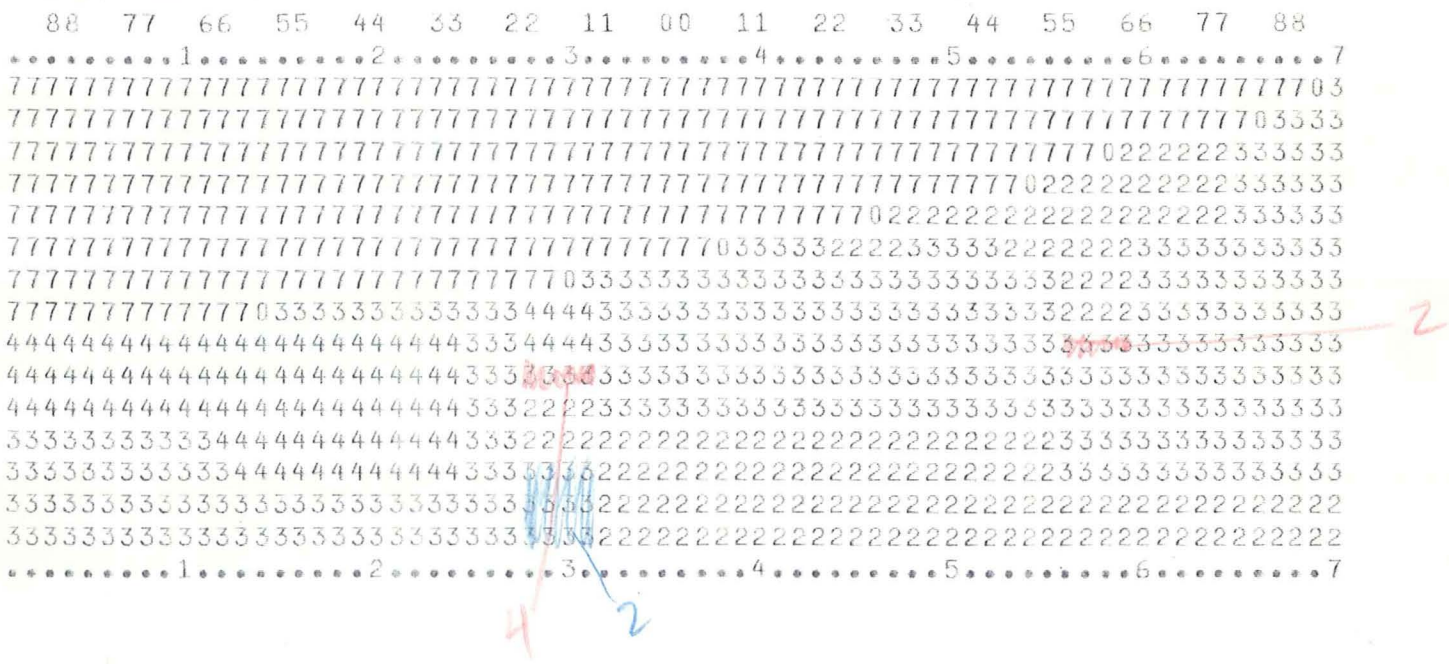
F16

BRIDGEPORT AREA
TRAVERTINE HOT SPRINGS R-4 , E/2
MEDIA RESITIVITY (OHM-METERS)

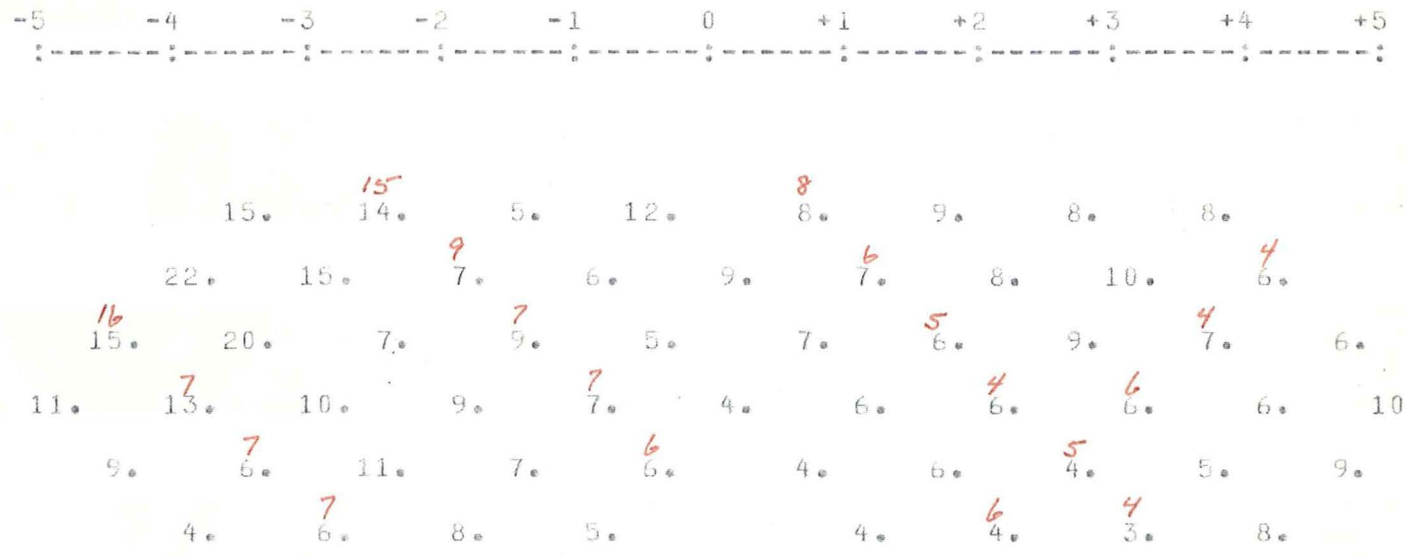
2.00	5.00	10.00	20.00	35.00
50.00	10000.00			

MEDIA PFE (%)

0.00	0.00	0.00	0.00	0.00
0.00	0.00			

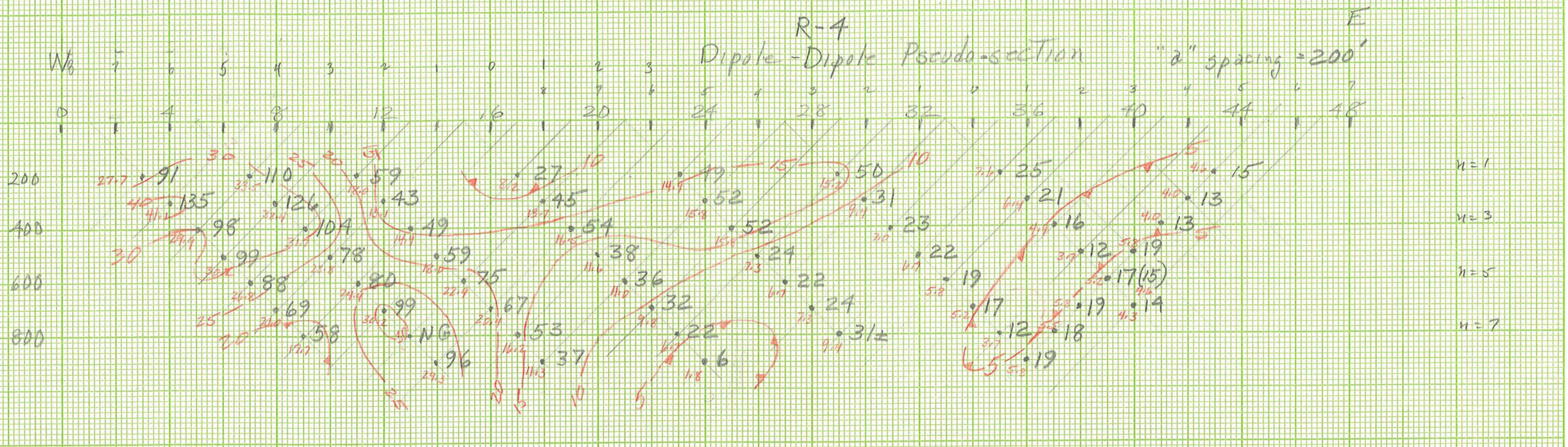


APPARENT RESISTIVITY (CALCULATED)



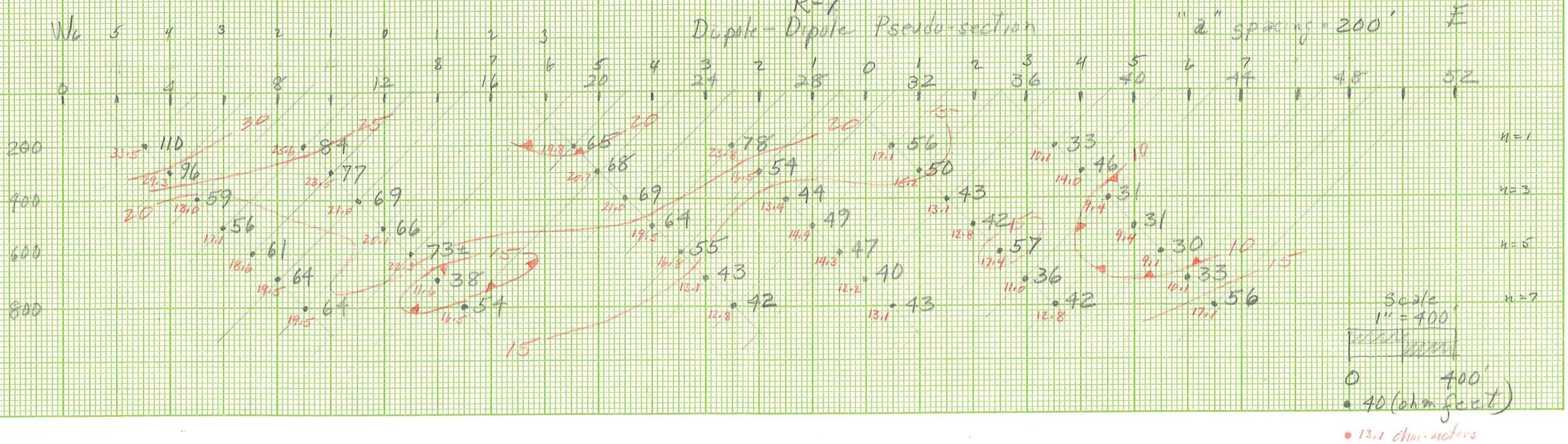
Bridgeport Area
Travertine Hot Springs

R-4
Dipole-Dipole Pseudo-section "a" spacing = 200'



Bridgeport Area
The Hot Springs

R-7
Dipole-Dipole Pseudo-section "a" spacing = 200'



• 13.1 characters