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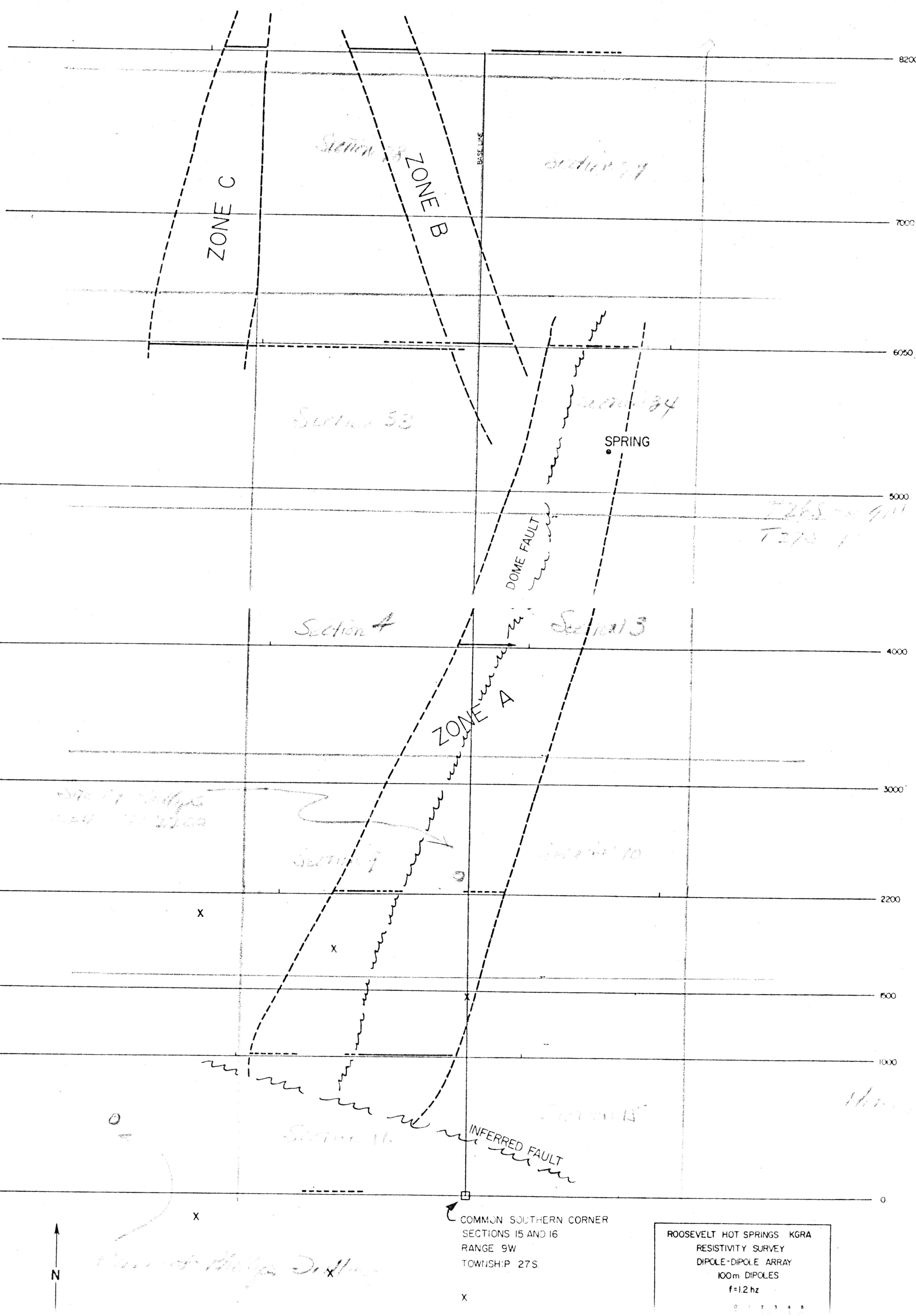

ROOSEVELT HOT SPRINGS KGRA
RESISTIVITY SURVEY
DIPOLE-DIPOLE ARRAY
100m DIPOLES
f=1.2 hz
ZONE A
ZONE B
ZONE C
DOME FAULT
INFERRED FAULT
SPRING
BASE LINE
COMMON SOUTHERN CORNER
SECTIONS 15 AND 16
RANGE 9W
TOWNSHIP 27S
N
8200
7000
6050
5000
4000
3000
2200
1500
1000
0

Report on Preliminary Resistivity Survey, Roosevelt Hot Springs KGRA

by

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and

T. Crebs

1.0 Introduction

A dipole-dipole resistivity survey was completed on six traverse lines across the Roosevelt Hot Springs KGRA during the summer of 1974. For the most part, dipole lengths of 100m were used. On one traverse line, dipole lengths of 30m, 100m, and 300m were used. A frequency of 1·2hz was employed; electromagnetic coupling should not exceed 3% for 100m dipoles at fourth separation.

2.0 Data Presentation

The apparent resistivities have been plotted in psuedo-sections in Figures 1 through 8. The defined and possible resistivity lows have been marked on these data sheets. Figure 9 is a plan map showing the defined and possible resistivity lows and their grouping into zones.

3.0 Results

Line 0015N

A resistivity low of possible importance lies at depth between 750W and 1200W. This area is underlain by a magnetic rock unit, probably granite. This line lies south of the area of near surface alteration and of high thermal gradient. Surface geologic mapping suggests an east-west fault at about 500N. It is possible that this fault is downthrown to the south and so the target is deeper south of it. On the other hand, thermal gradients are generally low south of the fault.

Line 1000N

A pronounced resistivity low extends from 150W to 800W and possibly beyond. It reflects a very shallow steeply dipping feature. It lies entirely to the east of the siliceous sinter and would appear to be bounded on the west by the Dome Fault. There is no obvious geologic feature associated with its eastern boundary. It is underlain entirely by a magnetic rock unit, which we believe to be granite. The lowest apparent resistivities are of the order of 4 ohm m and occur between 300W and 600W.

A pronounced magnetic low lies between 250E and 700E.

A possible deep resistivity low lies between 1250W and 1600W. The siliceous sinter dome presumably produces a superficial resistivity high. Thus, the deep possible low between 1250W and 1600W really is the western extension of the main resistivity low. If this is true, then the main resistivity low would have a maximum width of 1500m and would center on the Dome Fault.

A saline and fractured granite would appear to be the most logical source of the main resistivity low.

Line 2200N

A narrow steeply-dipping low extends from 700W to 900W. It could be as much as 300m broader than this or it could be wedge shaped with the apex up. It is underlain by a magnetic rock unit. The lowest apparent resistivities occur at depth. It lies entirely west of the Dome Fault and is, in fact, immediately west of an outcrop of Precambrian metamorphic rock. A possible deep eastward extension lies between 50W and 250E. If the two lows are related, then a siliceous sinter cover would be expected between 50W and 500W which is east of the Dome Fault. A maximum target width of 1250m, straddling the Dome Fault, is thus a possibility.

Line 4000N

A shallow apparent resistivity low extends from 100W to at least 300E; it has not been delineated on the east. The lowest values are of order 4 ohm m. It straddles the contact between a magnetic rock unit to the west and a non-magnetic rock unit to the east. As far as one can determine, it is a steeply dipping zone. The Dome Fault is mapped here at about 150E. Silica-cemented gravels underlie most of the anomaly.

Line 6050N

A narrow shallow zone of low resistivity has been mapped between 825E and 900E. It has a broad zone of somewhat low resistivity material on either side of it. The central part of the low, a steeply dipping feature, corresponds with the position of a linear projection of the Dome Fault northward from 4000N. It separates a magnetic rock unit on the west from a non-magnetic rock unit on the east.

A broad shallow zone of low resistivity extends from 250E to 200W and possibly beyond to 700W. The 100M dipole data suggested a westward dip which was confirmed when the 300m dipole data found an anomaly offset to the west. Another deep resistivity low is shown from 1700W to 2400W in the 300m dipole data. As far as can be determined, anomalies are underlain by a magnetic rock type.

Line 8200N

A broad, somewhat deep, resistivity low occurs from 500W to 100W. It is dipping westward and would appear to correlate with a similar feature on Line 6050N. No magnetic correlation is obvious.

Siliceous sinter is encountered between lines 6050N and 8200N within the anomalous zone.

A somewhat broad shallow resistivity low extends from 50E to at least 600E, but possibly to 1100E. This low appears to be dipping eastward and may correlate with a zone of siliceous sinter noted between stations 100E and 900E. Another possible resistivity low is noted between 1400E and 1600E. This low would appear to be steeply dipping, and has no obvious explanation. These two anomalous zones seem to be underlain at depth by a broad magnetic rock unit.

A very deep anomaly underlies the region from 1600W to 1900W. It seems to correlate with a similar deep zone on line 6050N.

4.0 Discussion

When the maximum widths of the low resistivity zones are plotted and grouped, as in Figure 9, three zones are delineated. The dominant zone, Zone A, is roughly coincident with the center of the thermal gradient anomaly. It has a maximum width of 1500m and a minimum length of 6500m. The Dome Fault extends throughout it and most of the evidence of hot spring activity occurs within this steeply dipping zone.

The hot spring activity has altered feldspars to alunite but has not led to any obvious gross reduction in magnetite content. The shearing and saline waters are believed to cause the low resistivity.

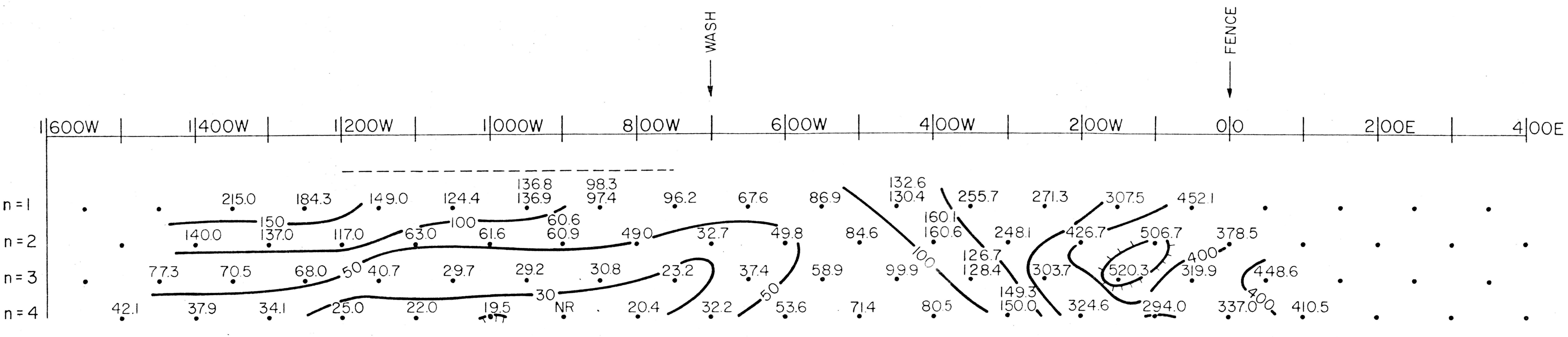
Zone B is not well defined as yet but it does span at least one zone where evidence of hot spring activity is present. It dips westward.

Zone A is deep and of entirely unknown origin.

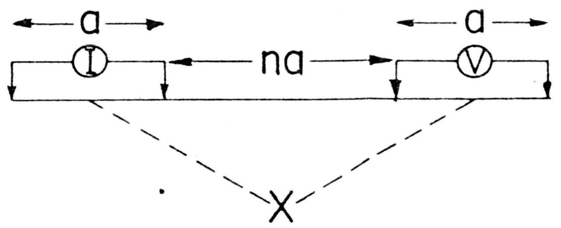
5.0 Future Resistivity Surveying

Based on the foregoing analysis of the resistivity data, the following additional resistivity surveying is required.

LINE	EXTENT	DIPOLE	PURPOSE
500N	500E to 2000W	100M	Define the end of Zone A
1500N	500E to 2000W	100M	Determine continuity of structure
3000N	1500E to 1500W	100M	Determine continuity of structure
3500N	400E to 1500E	100M	Determine eastern boundary of Zone A
Nigger Mag Wash	500W to 1500E	100M	Determine continuity of structure
7000N	1500W to 2000E	100M	Determine continuity of structure
2200N	2000E to 500W	300M	Explore deeper possibilities to east
Baseline	700S to 1400N		To attempt to define the inferred east-west fault
1000W	500S to 1700N		
2000W	100S to 1800N		



DIPOLE - DIPOLE ARRAY



LEGEND

——— DEFINED RESISTIVITY LOW

- - - - - POSSIBLE RESISTIVITY LOW

Fig. 1

LINE 0015 N.
PROJECT – KGRA
LOCATION – ROOSEVELT HOT SPRINGS
RESISTIVITY – PSEUDOSECTION
TRANSMITTER – KCC
RECEIVER – KCC (MARK II)
SCALE – 1=5000
f = 1.2 hz, a = 100m

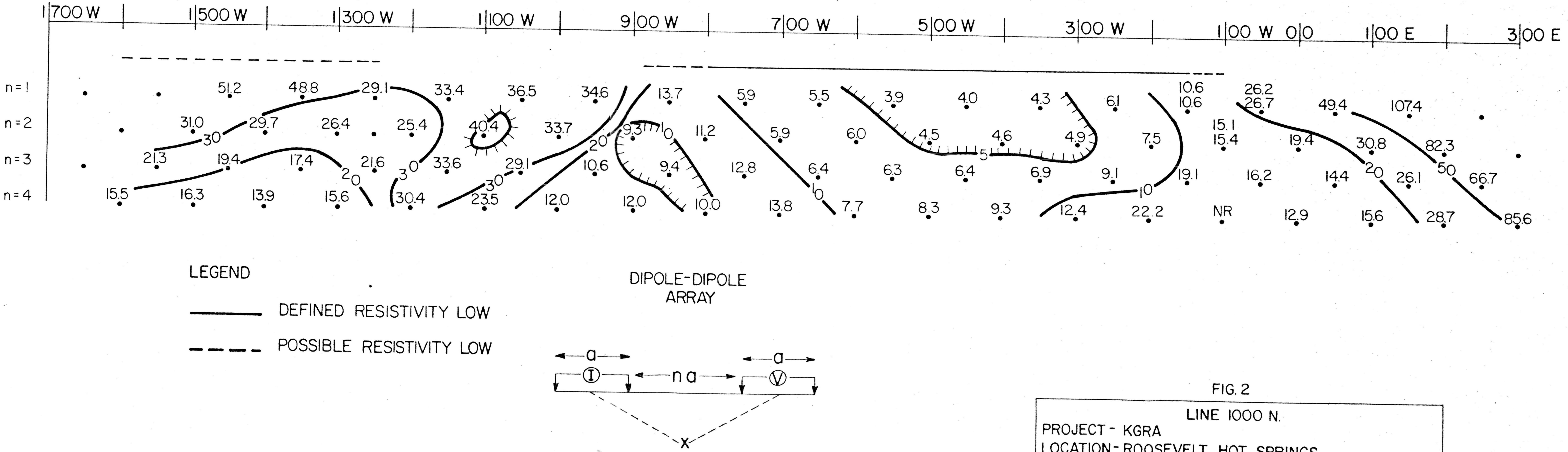
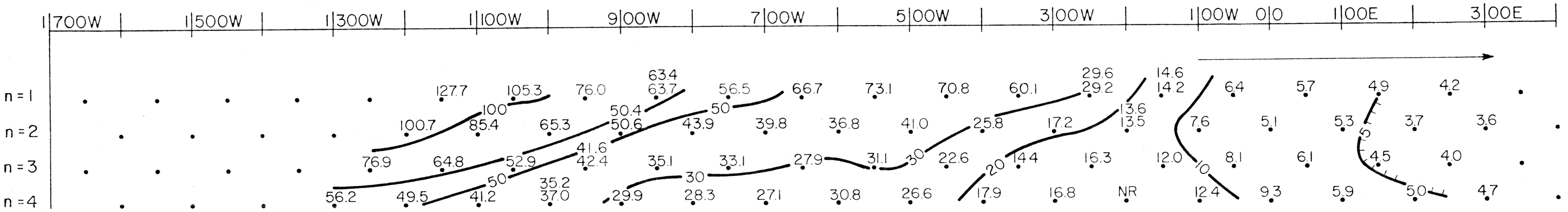
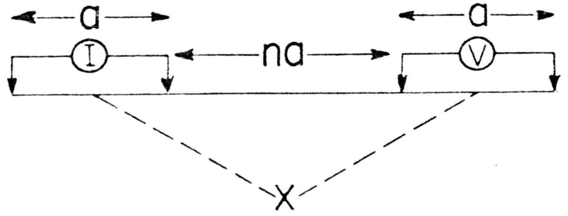


FIG. 2

LINE 1000 N.
PROJECT - KGRA
LOCATION - ROOSEVELT HOT SPRINGS
RESISTIVITY - PSEUDOSECTION
TRANSMITTER - KCC
RECEIVER - KCC (MARK II)
SCALE - 1=5000



DIPOLE-DIPOLE
ARRAY



LEGEND

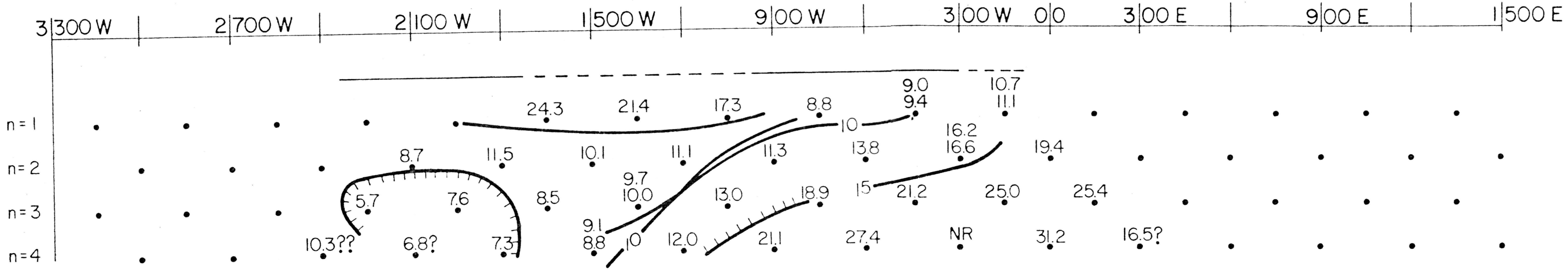
—— DEFINED RESISTIVITY LOW

- - - - POSSIBLE RESISTIVITY LOW

Fig. 4

LINE 4000N.

PROJECT - KGRA
LOCATION - ROOSEVELT HOT SPRINGS
RESISTIVITY - PSEUDOSECTION
TRANSMITTER - KCC
RECEIVER - KCC (MARK II)
SCALE - 1 = 5000
f = 1/2 hz, a = 100m



LEGEND

DEFINED RESISTIVITY LOW

POSSIBLE RESISTIVITY LOW

DIPOLE-DIPOLE ARRAY

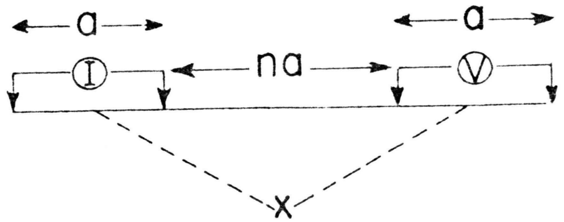
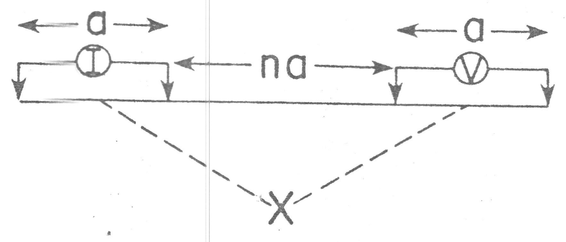


FIG. 7

LINE 6050

PROJECT - KRGA
LOCATION - ROOSEVELT HOT SPRINGS
RESISTIVITY - PSEUDOSECTION
TRANSMITTER - HOPKINS
RECEIVER - GEOTRONICS
SCALE - 1=15,000 (HORIZ.)
f=1hz, a=300 m

DIPOLE-DIPOLE ARRAY



LEGEND

——— DEFINED RESISTIVITY LOW

- - - - POSSIBLE RESISTIVITY LOW

Fig. 8

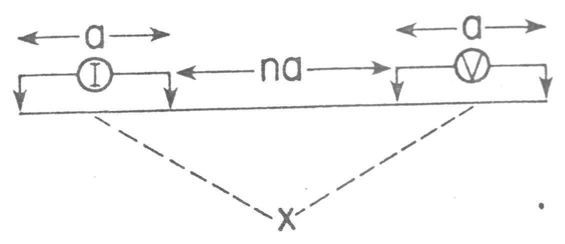
LINE 6050W.
PROJECT-KGRA
LOCATION-ROOSEVELT HOT SPRINGS
RESISTIVITY-PSEUDOSECTION
TRANSMITTER-KCC
RECEIVER-KCC (MARK II)
SCALE- 1=1500

Fig.6

LINE 8200 N.

PROJECT-KGRA
LOCATION-ROOSEVELT HOT SPRINGS
RESISTIVITY-PSEUDOSECTION
TRANSMITTER-KCC
RECEIVER-KCC (MARK II)
SCALE- 1=5000
f=1.2 hz a=100m

DIPOLE- DIPOLE
ARRAY



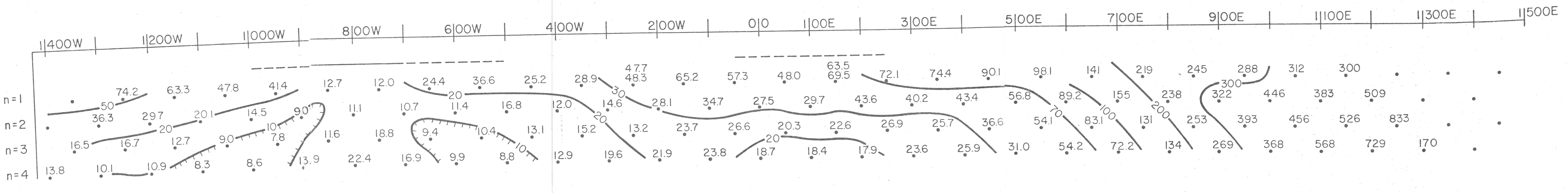
LEGEND

——— DEFINED RESISTIVITY LOW

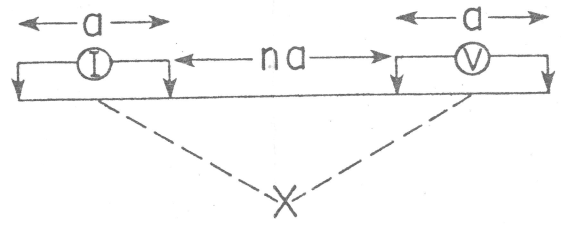
- - - - POSSIBLE RESISTIVITY LOW

Fig. 5

LINE 6050 N
PROJECT- KGRA
LOCATION- ROOSEVELT HOT SPRINGS
RESISTIVITY- PSEUDOSECTION
TRANSMITTER- KCC
RECEIVER- KCC (MARK II)
SCALE- 1=5000
f=1.2 hz, a=100m
DATE- 7-5-74



DIPOLE-DIPOLE
ARRAY



LEGEND

DEFINED RESISTIVITY LOW

POSSIBLE RESISTIVITY LOW

Fig. 3

LINE 2200N.
PROJECT-KGRA
LOCATION-ROOSEVELT HOT SPRINGS
RESISTIVITY-PSEUDOSECTION
TRANSMITTER-KCC
RECEIVER-KCC (MARK II)
SCALE- 1=5000
f=1.2hz, a=100m