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UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

UNIVERSITY OF UTAH  
RESEARCH INSTITUTE  
EARTH SCIENCE LAB.

Audio-magnetotelluric Data Log and Station  
Location Map for Gerlach Known Geothermal  
Resource Area, Nevada

By

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U.S. Geological Survey

Open-file Report 75-669  
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This report is preliminary and has not been  
edited or reviewed for conformity with U.S.  
Geological Survey standards and nomenclature.

## ADVISORY NOTE

Running along the edge of the KGRA (Known Geothermal Resource Area) is a high-voltage ( $\pm 400,000$  V), D.C. transmission line belonging to the city of Los Angeles. The transmission line was a serious source of noise in the AMT frequency band. Large-amplitude, even harmonics of 60Hz were radiated by the line, providing difficulty in operating in the mid-frequency range. In addition, large-amplitude, apparently natural signals in the lower frequency AMT range were noted when operating near the transmission line. It is not known whether this latter effect is due to concentration of the natural fields in the vicinity of the transmission line or noise due to DC/AC converters and load variations on the line.

Users of this data should keep in mind that the plane-wave assumptions used in computing the apparent resistivities may not be valid.

U.S. GEOLOGICAL SURVEY A.M.T. DATA LOG

pa = observed apparent resistivity in ohm-metres  
 N = number of observations  
 Er = standard error in ohm-metres - = no data

"NOTE" - Telluric line orientation indicated with station numbers.

| Sta. No. |    | FREQUENCY |      |      |      |      |      |     |      |      |      |       |       |
|----------|----|-----------|------|------|------|------|------|-----|------|------|------|-------|-------|
|          |    | 7.5       | 10   | 14   | 27   | 76   | 285  | 685 | 1.2K | 3.3K | 6.7K | 10.2K | 18.6K |
| 1NS      | pa | 1.84      | 6.45 | 9.1  | 7.2  | 6.5  | -    | -   | -    | -    | 26.3 | 44.6  | 167   |
|          | N  | 5         | 6    | 8    | 12   | 7    | -    | -   | -    | -    | 9    | 6     | 1     |
|          | Er | .51       | 1.0  | .89  | .65  | .25  | -    | -   | -    | -    | .9   | 5     | -     |
| 1EW      | pa | 8.66      | 3.97 | 3.44 | 2.6  | 2.87 | -    | -   | -    | -    | 20   | 146   | 259   |
|          | N  | 6         | 7    | 5    | 11   | 7    | -    | -   | -    | -    | 13   | 6     | 1     |
|          | Er | 2.0       | .62  | .28  | .24  | .30  | -    | -   | -    | -    | 1.0  | 2.7   | -     |
| 2NS      | pa | 27.5      | 35.9 | 31.3 | 83.1 | 26.5 | -    | -   | -    | -    | 214  | 174   | 849   |
|          | N  | 6         | 8    | 12   | 6    | 7    | -    | -   | -    | -    | 7    | 8     | 1     |
|          | Er | .72       | 2.5  | 1.6  | 4.8  | 1.9  | -    | -   | -    | -    | 21.7 | 12.9  | -     |
| 2EW      | pa | 84.7      | 53.9 | 37.7 | 19.2 | 12.8 | 38.1 | -   | -    | -    | 27.7 | 108   | 62    |
|          | N  | 6         | 7    | 8    | 6    | 7    | 7    | -   | -    | -    | 6    | 7     | 1     |
|          | Er | 3.9       | 6.1  | 4.5  | 1.2  | .36  | 3.2  | -   | -    | -    | 3.4  | 11.7  | -     |
| 3NS      | pa | 16.8      | -    | 15.7 | 5.4  | 97.5 | -    | -   | -    | -    | -    | -     | -     |
|          | N  | 8         | -    | 4    | 11   | 7    | -    | -   | -    | -    | -    | -     | -     |
|          | Er | 2.8       | -    | .44  | 1.7  | 13.8 | -    | -   | -    | -    | -    | -     | -     |
| 3EW      | pa | -         | -    | -    | -    | -    | -    | -   | -    | -    | -    | -     | -     |
|          | N  | -         | -    | -    | -    | -    | -    | -   | -    | -    | -    | -     | -     |
|          | Er | -         | -    | -    | -    | -    | -    | -   | -    | -    | -    | -     | -     |
| 5NS      | pa | -         | -    | .83  | 0.6  | -    | .25  | -   | -    | -    | 64.9 | 44.3  | 327   |
|          | N  | -         | -    | 7    | 14   | -    | 2    | -   | -    | -    | 10   | 6     | 1     |
|          | Er | -         | -    | .25  | .01  | -    | 0    | -   | -    | -    | 3.7  | .12   | -     |
| 5EW      | pa | -         | -    | .57  | .29  | .26  | .52  | -   | -    | -    | 7.6  | 39.4  | 162   |
|          | N  | -         | -    | 8    | 13   | 10   | 7    | -   | -    | -    | 8    | 7     | 1     |
|          | Er | -         | -    | .17  | .02  | .01  | .02  | -   | -    | -    | .6   | .05   | -     |

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| Sta. No. |    | FREQUENCY |      |      |      |      |      |     |      |      |      |       |       |
|----------|----|-----------|------|------|------|------|------|-----|------|------|------|-------|-------|
|          |    | 7.5       | 10   | 14   | 27   | 76   | 285  | 685 | 1.2K | 3.3K | 6.7K | 10.2K | 18.6K |
| 6NS      | pa | 7.9       | 6.1  | 7.6  | 4.0  | 1.5  | 1.5  | -   | -    | -    | 132  | 170   | 629   |
|          | N  | 8         | 6    | 7    | 6    | 7    | 7    | -   | -    | -    | 6    | 1     | 1     |
|          | Er | .67       | .88  | 1.3  | 1.38 | .14  | .03  | -   | -    | -    | 8.2  | -     | -     |
| 6EW      | pa | 15.0      | 12.0 | 3.75 | 2.9  | 2.6  | 3.1  | -   | -    | -    | 22.5 | 109   | 575   |
|          | N  | 6         | 6    | 8    | 6    | 8    | 7    | -   | -    | -    | 7    | 1     | 1     |
|          | Er | 2.3       | 1.07 | .55  | .9   | .15  | .12  | -   | -    | -    | .9   | -     | -     |
| 7NS      | pa | 1.8       | 1.9  | 2.1  | 2.1  | .92  | .47  | -   | -    | -    | 56.5 | 48.2  | 431   |
|          | N  | 12        | 9    | 7    | 9    | 7    | 11   | -   | -    | -    | 7    | 7     | 1     |
|          | Er | .19       | .16  | .54  | .17  | .04  | .03  | -   | -    | -    | 6.3  | 1.0   | -     |
| 7EW      | pa | 3.4       | 2.3  | 1.39 | 1.24 | .88  | 1.32 | -   | -    | -    | 8.6  | 40.7  | 175   |
|          | N  | 18        | 8    | 8    | 11   | 8    | 10   | -   | -    | -    | 12   | 6     | 1     |
|          | Er | .44       | .40  | .15  | .07  | .05  | .07  | -   | -    | -    | .3   | .6    | 1     |
| 8NS      | pa | 7.51      | 4.14 | 6.9  | 7.0  | -    | 11.9 | -   | -    | -    | -    | -     | -     |
|          | N  | 8         | 6    | 8    | 7    | -    | 6    | -   | -    | -    | -    | -     | -     |
|          | Er | 1.30      | .54  | 1.14 | .72  | -    | 4.7  | -   | -    | -    | -    | -     | -     |
| 8EW      | pa | 6.9       | 7.5  | 6.73 | 5.11 | -    | -    | -   | -    | -    | -    | -     | -     |
|          | N  | 6         | 7    | 7    | 7    | -    | -    | -   | -    | -    | -    | 1     | -     |
|          | Er | 2.7       | 2.6  | .92  | .82  | -    | -    | -   | -    | -    | -    | -     | -     |
| 9NS      | pa | 9.16      | 8.47 | 7.52 | 7.16 | 2.23 | 1.59 | -   | -    | -    | 62.0 | 63.7  | 334   |
|          | N  | 9         | 7    | 8    | 13   | 7    | 13   | -   | -    | -    | 10   | 7     | 1     |
|          | Er | .41       | .74  | .55  | .46  | .12  | .09  | -   | -    | -    | 1.9  | 2.6   | -     |
| 9EW      | pa | 4.39      | 231  | 3.70 | 1.58 | 2.19 | 1.44 | -   | -    | -    | 14.6 | 160   | 174   |
|          | N  | 7         | 6    | 7    | 11   | 10   | 10   | -   | -    | -    | 13   | 6     | 7     |
|          | Er | .61       | .26  | .36  | .12  | .18  | .14  | -   | -    | -    | .99  | 6.2   | -     |

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|----------|-----------|------|------|------|------|------|------|------|------|------|-------|-------|------|
|          | 7.5       | 10   | 14   | 27   | 76   | 285  | 685  | 1.2K | 3.3K | 6.7K | 10.2K | 18.6K |      |
| 12NS     | pa        | 3.67 | 3.05 | 3.67 | 1.62 | 1.10 | 1.80 | -    | -    | -    | 71.3  | 83.1  | 305  |
|          | N         | 9    | 10   | 7    | 8    | 7    | 8    | -    | -    | -    | 8     | 1     | 1    |
|          | Er        | .21  | .18  | .80  | .17  | .07  | .16  | -    | -    | -    | 1.8   | -     | -    |
| 10EW     | pa        | 2.77 | 1.57 | .16  | .93  | 1.91 | 4.38 | -    | -    | -    | 17.1  | 125   | 68.3 |
|          | N         | 7    | 8    | 8    | 8    | 8    | 7    | -    | -    | -    | 8     | 1     | 1    |
|          | Er        | .42  | .21  | .12  | .07  | .28  | .66  | -    | -    | -    | 1.3   | -     | -    |
| 11NS     | pa        | 46   | .33  | .53  | .40  | 1.04 | .13  | -    | -    | -    | 31.6  | 33.3  | 178  |
|          | N         | 8    | 7    | 9    | 14   | 9    | 9    | -    | -    | -    | 9     | 1     | 1    |
|          | Er        | .10  | .10  | .11  | .04  | .06  | .02  | -    | -    | -    | 2.8   | -     | -    |
| 11EW     | pa        | 1.37 | .60  | .32  | .23  | .22  | .26  | -    | -    | -    | 3.3   | 16.9  | 164  |
|          | N         | 11   | 7    | 8    | 13   | 7    | 13   | -    | -    | -    | 12    | 1     | 1    |
|          | Er        | .17  | .07  | .05  | .03  | .01  | .01  | -    | -    | -    | .24   | -     | -    |
| 12NS     | pa        | .69  | .63  | .44  | .45  | .32  | -    | -    | -    | -    | 14.7  | 14.8  | 96   |
|          | N         | 6    | 9    | 6    | 6    | 8    | -    | -    | -    | -    | 3     | 1     | 1    |
|          | Er        | .22  | .14  | .08  | .08  | .10  | -    | -    | -    | -    | .68   | -     | -    |
| 12EW     | pa        | 1.42 | .44  | .15  | .18  | .16  | -    | -    | -    | -    | 1.6   | 10.1  | 38.9 |
|          | N         | 6    | 8    | 8    | 8    | 11   | -    | -    | -    | -    | 6     | 1     | 1    |
|          | Er        | .34  | .06  | .03  | .02  | .02  | -    | -    | -    | -    | .17   | -     | -    |
| 13NS     | pa        | .32  | .36  | .55  | .48  | -    | -    | -    | -    | -    | 38.1  | 27.6  | 156  |
|          | N         | 15   | 8    | 9    | 9    | -    | -    | -    | -    | -    | 8     | 1     | 1    |
|          | Er        | .02  | .06  | .03  | .04  | -    | -    | -    | -    | -    | 3.5   | -     | -    |
| 13EW     | pa        | .27  | .26  | .23  | .24  | -    | -    | -    | -    | -    | 9.6   | 196   | 70   |
|          | N         | 15   | 7    | 9    | 12   | -    | -    | -    | -    | -    | 9     | 1     | 1    |
|          | Er        | .02  | .06  | .03  | .04  | -    | -    | -    | -    | -    | .48   | -     | -    |

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| Sta. No.         |    | FREQUENCY |      |       |       |       |       |     |      |      |      |       |       |
|------------------|----|-----------|------|-------|-------|-------|-------|-----|------|------|------|-------|-------|
|                  |    | 7.5       | 10   | 14    | 27    | 76    | 285   | 685 | 1.2K | 3.3K | 6.7K | 10.2K | 18.6K |
| 14 <sub>NS</sub> | pa | 2.3       | 3.63 | 2.87  | 1.29  | .71   | .85   | -   | -    | -    | 208  | 176   | 1290  |
|                  | N  | 8         | 7    | 6     | 13    | 7     | 7     | -   | -    | -    | 3    | 1     | 1     |
|                  | Er | .35       | .42  | .64   | .19   | .05   | .13   | -   | -    | -    | 32.7 | -     | -     |
| 14 <sub>EW</sub> | pa | 6.4       | 7.39 | .61   | .44   | .44   | .49   | -   | -    | -    | 8.64 | 76.3  | 436   |
|                  | N  | 6         | 5    | 6     | 7     | 6     | 8     | -   | -    | -    | 6    | 1     | 1     |
|                  | Er | .62       | 1.76 | .11   | .08   | .02   | .03   | -   | -    | -    | .45  | -     | -     |
| 15 <sub>NS</sub> | pa | 1.74      | 16.7 | 13.11 | -     | -     | -     | -   | -    | -    | 14.2 | 16.4  | 36.4  |
|                  | N  | 10        | 3    | 3     | -     | -     | -     | -   | -    | -    | 12   | 1     | 1     |
|                  | Er | .31       | 3.02 | 2.4   | -     | -     | -     | -   | -    | -    | .87  | -     | -     |
| 15 <sub>EW</sub> | pa | 2.19      | 4.14 | 2.14  | -     | -     | -     | -   | -    | -    | 11.3 | 6.12  | 785   |
|                  | N  | 9         | 3    | 3     | -     | -     | -     | -   | -    | -    | 6    | 1     | 1     |
|                  | Er | .55       | 1.38 | .53   | -     | -     | -     | -   | -    | -    | 1.04 | -     | -     |
| 16 <sub>NS</sub> | pa | 1.21      | 1.29 | 1.04  | 1.16  | 2.2   | -     | -   | -    | -    | 96.5 | 107   | 482   |
|                  | N  | 6         | 12   | 8     | 8     | 5     | -     | -   | -    | -    | 2    | 6     | 1     |
|                  | Er | .18       | .11  | .13   | .12   | .10   | -     | -   | -    | -    | 11.6 | 4.8   | -     |
| 16 <sub>EW</sub> | pa | 1.98      | .91  | .44   | .69   | 4.10  | -     | -   | -    | -    | 6.76 | 10.5  | 16.6  |
|                  | N  | 7         | 8    | 6     | 6     | 3     | -     | -   | -    | -    | 6    | 6     | 1     |
|                  | Er | .48       | .18  | .04   | .06   | .44   | -     | -   | -    | -    | .60  | 1.9   | -     |
| 17 <sub>NS</sub> | pa | 69.7      | 60.7 | 64.4  | 119.7 | 343   | 1974  | -   | -    | -    | 73.6 | 623   | 246   |
|                  | N  | 7         | 8    | 5     | 7     | 6     | 10    | -   | -    | -    | 7    | 1     | 1     |
|                  | Er | 6.12      | 2.7  | 13.5  | 8.0   | 23.7  | .95   | -   | -    | -    | 7.58 | -     | -     |
| 17 <sub>EW</sub> | pa | 61.0      | 140  | 48.6  | 43.9  | 155.7 | 141.5 | -   | -    | -    | 41.5 | 1011  | 205   |
|                  | N  | 7         | 6    | 8     | 7     | 7     | 8     | -   | -    | -    | 7    | 1     | 1     |
|                  | Er | 8.3       | 31.5 | 1.66  | 12.9  | 96.5  | 114   | -   | -    | -    | 2.5  | -     | -     |

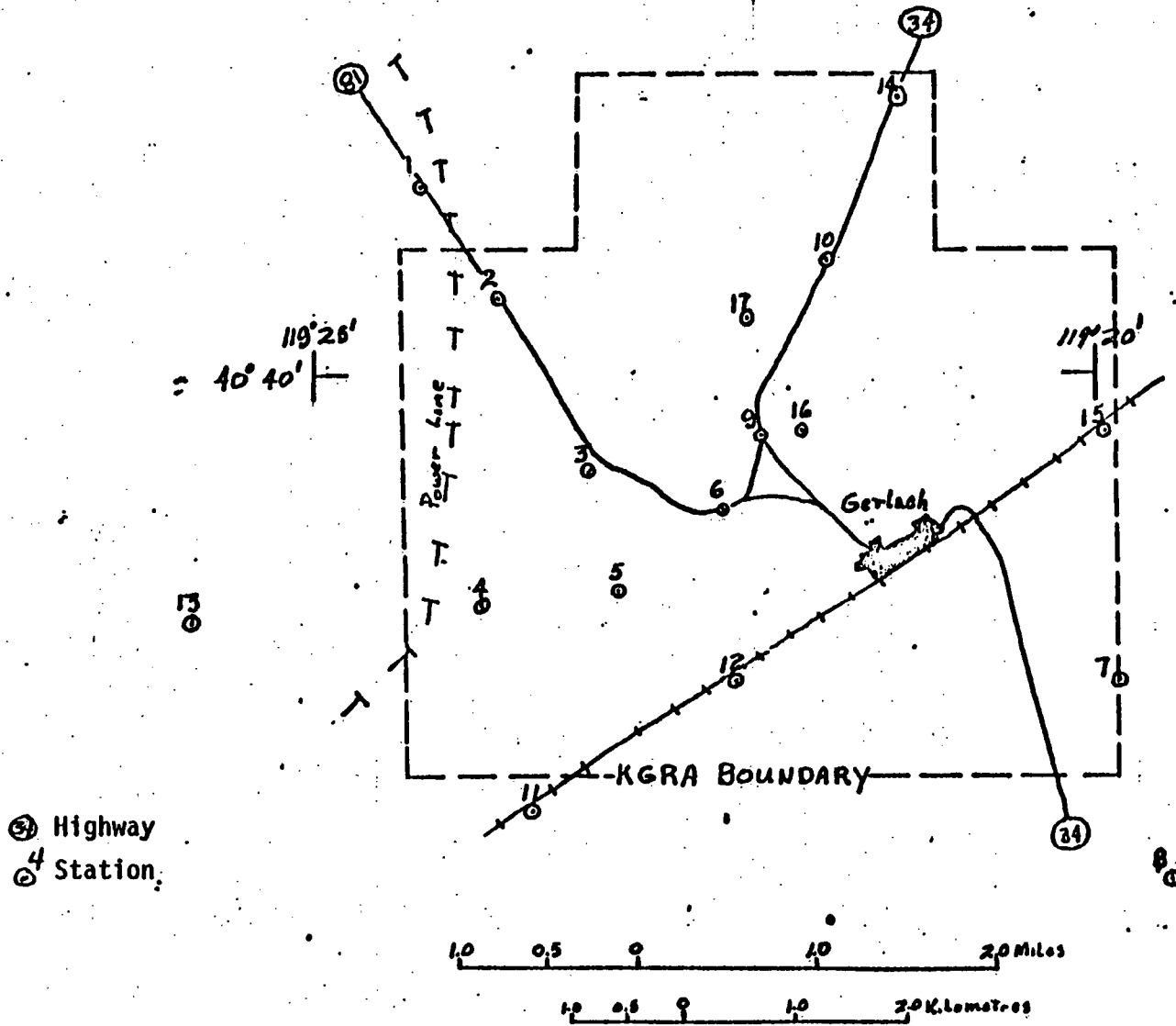


Figure 1. Audio-magnetotelluric station location map for the Gerlach KGRA (Known Geothermal Resource Area), Nevada.