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for H. T. Gray, Supervisor  
Laboratory Records Dept.  
ORNL

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DATE July 23, 1948

SUBJECT Single Source Lanthanum Test -  
AHROU Program.

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Measurements were made at 3, 6 and 12 feet from the ground. The electroscope was used in preference to a Geiger-Muller counter because of its greater accuracy in measuring roentgens. Lauritzen electroscopes were used, the chamber of which was surrounded by 1/4 inch plywood. Distances from source to electroscope are shown on Figure 1, together with the results of the measurements.

The ordinates in Figure 1 were computed by multiplying the reciprocal of the time of discharge of the electroscope by the square of the distance from source to instrument. The values are corrected for background, which was 1/5 of the total intensity at 1,900 feet. The segment of the curve taken with the medium source was fitted to the large source curve at 500 feet. The data on the smallest source was fitted to the medium source at 100 feet.

A large portion of the drop in the measured value of intensity times distance squared, apparent for all three sources at small distances, is undoubtedly due to non-saturation in the electroscope chamber in high-intensity fields. Time does not permit further investigation of this result.

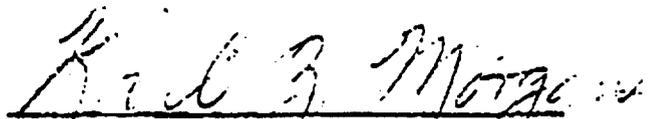
The readings at 3, 6 and 12 feet do not differ appreciably at great distances, except at the 1,600 foot position, where the 3 and 6 foot elevations were below the ground level and shielded from the direct beam. At near distances any variation would have been obscured because of the high radiation intensity of the direct beam.

At the 600 foot distance a reading was made beside the truck, and another with the truck moved back to 700 feet. The two readings differed by less than 1% so the scattering from the truck did not introduce a serious error in these measurements.

Each measured value is the average of three readings whose internal consistency was better than 3%. The extrapolated value may be low by as much as 10%, though this is doubtful because of the good agreement between the small and medium source values at 200 and 100 feet.

#### Experimental Results

The half thickness of the straight portion of the curve is 450 feet (130 meters) corresponding to a coefficient of absorption of  $5.3 \times 10^{-5} \text{ cm}^{-1}$  of air or a relaxation distance of 650 feet (190 meters).

  
K. L. Morgan  
Director, Health Physics Division

  
C. N. Rucker  
Executive Director

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JHRoberson:mco

—Fig 1—

La SOURCES

- 1300 CURIE SOURCE — 12'
- + 100 " " — 12'
- ^ 20 " " — 12'
- 1300 " " — 3'
- 1300 " " — 6'

