DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
W. E. WRATHER, DIRECTOR

PREPARED IN COOPERATION WITH THE
UNITED STATES ATOMIC ENERGY COMMISSION

GEOPHYSICAL INVESTIGATIONS
MAP GP 123

AIRBORNE RADIOACTIVITY SURVEY OF THE EDISTO ISLAND AREA
BERKELEY, CHARLESTON, COLLETON, AND DORCHESTER COUNTIES
SOUTH CAROLINA

by J. L. Meuschke

The accompanying maps show the results of an airborne radioactivity survey of 322 square miles in Berkeley, Charleston, Colleton, and Dorchester Counties, S. C. The survey was made April 22 to 29, 1954, by the U. S. Geological Survey as part of a cooperative program with the U. S. Atomic Energy Commission.

The survey was made with scintillation detection equipment. Parallel traverse lines, spaced at quarter-mile intervals were flown approximately 500 feet above the ground at an average air speed of 150 miles per hour. Aerial photographs were used for pilot guidance, and the flight path of the aircraft was recorded by a gyrostabilized continuous-strip-film camera. The distance of aircraft from the ground was measured with a continuously recording radio altimeter.

At 500 feet above the ground the width of the zone from which anomalous radioactivity is measured varies with the intensity of radiation of the source; for strong sources the width is as much as 1,400 feet. Quarter-mile spacing of the flight paths of the aircraft should be adequate to detect anomalies from strong sources of radioactivity. However, small areas of considerable radioactivity midway between flight paths may not be noted.

The present technique of airborne radioactivity measurement does not permit distinguishing between activity due to thorium and that due to uranium. An anomaly therefore may represent radioactivity due entirely to one or to a combination of these elements.

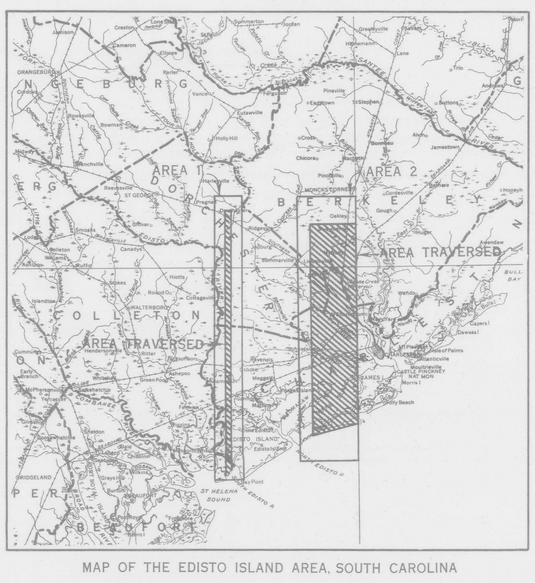
The approximate locations of the radioactivity anomalies are shown on the accompanying map. The plotted position of these anomalies may be in error by as much as a quarter of a mile owing to errors in available base maps or to areas on the base maps as large as several square miles in which it is impossible to find and plot recognizable landmarks.

The anomalies shown have apparently resulted from uraniferous phosphatic materials associated with the Cooper marl (Eocene), the Hawthorn formation (Miocene), and Pleistocene terrace and alluvial deposits.[1] The abnormal radioactivity recorded along the Atlantic Ocean beach may be due in part to thorium-bearing heavy-mineral deposits.

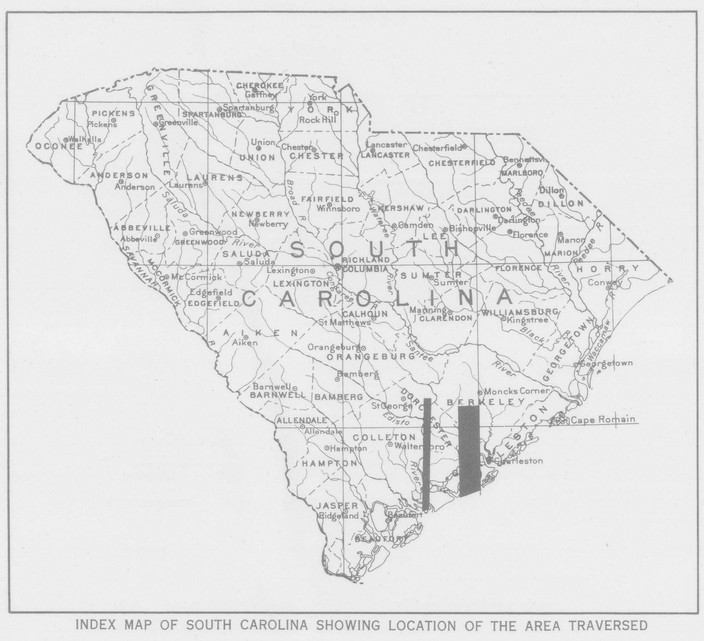
Investigations of a few of the anomalous areas indicate that some of the anomalies have resulted from concentrations and exposures of phosphatic material remaining from phosphate mining operations, and others from the use of phosphatic material in highway construction. At other anomalous areas there was no indication of previous mining or exploratory operations. The majority of the anomalies occur in undeveloped areas.

It is not possible to determine the extent or radioactive content of the materials responsible for abnormal radioactivity. The information given on the accompanying map indicates only those localities of greater-than-average radioactivity and therefore suggests areas in which uranium or thorium deposits are more likely to occur.

[1] Cooke, C. W., 1936, Geology of the coastal plain of South Carolina: U. S. Geol. Survey Bull. 867.



MAP OF THE EDISTO ISLAND AREA, SOUTH CAROLINA



INDEX MAP OF SOUTH CAROLINA SHOWING LOCATION OF THE AREA TRAVERSED

EXPLANATION

- X340 — LOCATION OF MAXIMUM INTENSITY
- 340 — MAXIMUM INTENSITY: counts per second
- 100 — AVERAGE BACKGROUND INTENSITY: includes cosmic component
- ANOMALY: greater-than-average radioactivity
- BOUNDARY OF AREA TRAVERSED

1 0 1 2 3 4 MILES

CONTOUR INTERVAL 20 FEET
AREA 1

CONTOUR INTERVAL 10 FEET
AREA 2

Base map from Corps of Engineers, U. S. Army, quadrangle sheets

APPROXIMATE MEAN DECLINATION, 1954

AIRBORNE RADIOACTIVITY SURVEY OF THE EDISTO ISLAND AREA BERKELEY, CHARLESTON, COLLETON AND DORCHESTER COUNTIES SOUTH CAROLINA

1955

GEOPHYSICAL INVESTIGATIONS
MAP GP 123

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C. M-R 6-54
For sale by U. S. Geological Survey, price 30 cents