DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
DALLAS L. PECK, DIRECTOR

PREPARED IN COOPERATION WITH THE
OHIO GEOLOGICAL SURVEY
HORACE R. COLLINS, STATE GEOLOGIST

GEOPHYSICAL INVESTIGATIONS SERIES
MAP GP–968 (SHEET 1 OF 3)

Base from U.S. Geological Survey, 1984

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA.—1985 —GB4335

Data were gridded at a spacing of 1 km on Lambert conformal conic projection
83° W as central meridian. Contours computer drawn

INTRODUCTION

The aerial radiometric data used to produce these maps were obtained from the U.S. Department of Energy (DOE) and are part of the data base obtained during the DOE National Uranium Resource Evaluation Program (NURE). Tapes containing digital data were assembled for the following 2° quadrangles: Canton (DOE, 1980a), Charleston (DOE, 1980c), Cincinnati (DOE, 1981d), Clarksburg (DOE, 1980b), Cleveland (DOE, 1982), Columbus (DOE, 1981h), Fort Wayne (DOE, 1981b), Huntington (DOE, 1981e), Louisville (DOE, 1981c), Marion (DOE, 1981g), Muncie (DOE, 1981a), and Toledo (DOE, 1981f). These data were measured by several different contractors using high-sensitivity gamma-ray spectrometers with 2000–3000 cubic inches of sodium-iodide detector crystals. The nominal survey altitudes were 400 feet above the ground surface. The flight lines were flown east-west at a nominal spacing of 6 miles with north-south tie lines spaced 15 miles apart. The data were fully corrected for background radiation, altitude variations, and airborne Bi–214 radiation. Using the DOE calibration pads at Grand Junction, Colorado (Ward, 1978) and the DOE dynamic test strip at Lake Meade, Arizona (Geodata International, Inc., 1977), the gamma-ray systems were calibrated so that the measurements could be expressed as the apparent surface concentrations of equivalent uranium (ppm eU), potassium (percent K), and equivalent thorium (ppm eTh).

Prior to preparation of the maps, the data were further processed. The processing steps were: (1) filtering of the flight-line data using a Gaussian filter with a standard deviation of 10 measurement points, (2) level and sensitivity corrections to remove differences between the measurement systems used by different contractors, (3) gridding the data using a minimum curvature algorithm (Briggs, 1974), and (4) low-pass filtering of the gridded data to remove wavelengths less than 25 kilometers. The flight-line data were filtered to reduce noise and high-frequency variations of the data prior to gridding. Level corrections were made by adding or subtracting constant values to limited parts of the data sets. Problems with data levels were usually within a single data set and were caused by small gain shifts in the spectra, the use of different background corrections, differences in soil water content as the result of rain, and errors in data processing by the contractors. Sensitivity corrections were made by multiplying an entire data set by a constant factor and were made necessary because the different contractor systems sometimes did not give the same results over the same materials. Because the systems were calibrated using the same calibration sources, these sensitivity differences should not have occurred. (The reasons for their occurrence is unknown at this time.) The lowpass filtering of the gridded data using a fast Fourier technique was done to remove small-wavelength features that were not consistent with the flight-line spacing and the map scale.

Because of the wide flight-line spacing, the 2-mile-grid interval, and the low-pass filters applied, these maps are regional maps and should only be used in a regional context. The accuracies of the concentration values are estimated to be better than 20 percent in a relative sense and from 50 to 100 percent in an absolute sense. By relative sense I mean the comparison of data from different parts of these maps. By absolute sense I mean the comparison of these concentration values to values obtained from other sources such as ground or laboratory measurements.

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Map A.—Surface concentration of uranium (ppm eU)

AERIAL RADIOMETRIC CONTOUR MAPS OF SURFACE CONCENTRATIONS OF URANIUM, POTASSIUM, AND THORIUM IN OHIO

By
Joseph S. Duval

1985

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