MINISTRY OF NATURAL RESOURCES
PROVINCE OF ONTARIO

DEPARTMENT OF ENERGY, MINES AND RESOURCES
GEOLOGICAL SURVEY OF CANADA

AIRBORNE GAMMA-RAY SPECTROMETRIC MAP

Airborne gamma-ray spectrometry data collected in Ontario during the summer of 1975, are presented (1) as contour maps of the integral count, the potassium, equivalent uranium and equivalent thorium concentrations, and the eU/eTh, eU/K and eTh/K ratios; and (2) as stacked profiles of the seven radiometric parameters plotted for each of the 29 flight lines.

The airborne measurements were made using a four window spectrometer, with twelve 22.86 cm x 10.16 cm NaI(Tl) detectors, flown at a mean terrain clearance of 400 feet and 190 km/hr. North-south flight lines were at 5 km line spacing, and the numbered flight lines are plotted on each of the contour maps.

Uranium, thorium and potassium counts were measured over 2.5-second intervals; integral counts over 0.5-second intervals. The data have been corrected for background, height variation and spectral scattering. The computer programs used to produce the contour maps and profiles are described by R.L. Grasty, 1972 "Airborne Gamma Spectrometry Data Processing Manual", GSC Open File No. 109. Values shown on the profiles represent counts per 0.5-seconds for the integral, and counts per 2.5-seconds for uranium, thorium and potassium. The maps contoured in units of counts per 0.5-seconds for the integral, parts per million equivalent uranium and equivalent thorium, percent potassium, the concentration ratio for eU/eTh, and the concentration ratio x 10^4 for eU/K and eTh/K.

The values for the radioelement concentrations shown on the contour maps are "average surface concentrations" over the area sampled or analysed by the airborne spectrometer. This area generally includes some outcrop, overburden and water in small ponds, streams and swamps. Consequently, the average surface concentrations as shown on the contoured maps are usually considerably lower than the concentrations in the bedrock. However, the radioelement distribution pattern shown by the contour maps reflects the distribution of the elements in the bedrock.

Factors for converting airborne measurements to element concentrations were determined by relating the corrected airborne count rates over test strips in the Ottawa area to the known ground radioelement concentrations (R.L. Grasty, and B.W. Charbonneau, 1974, Gamma-ray Spectrometer Calibration Facilities, GSC Paper 74-1B, pp. 69-71).

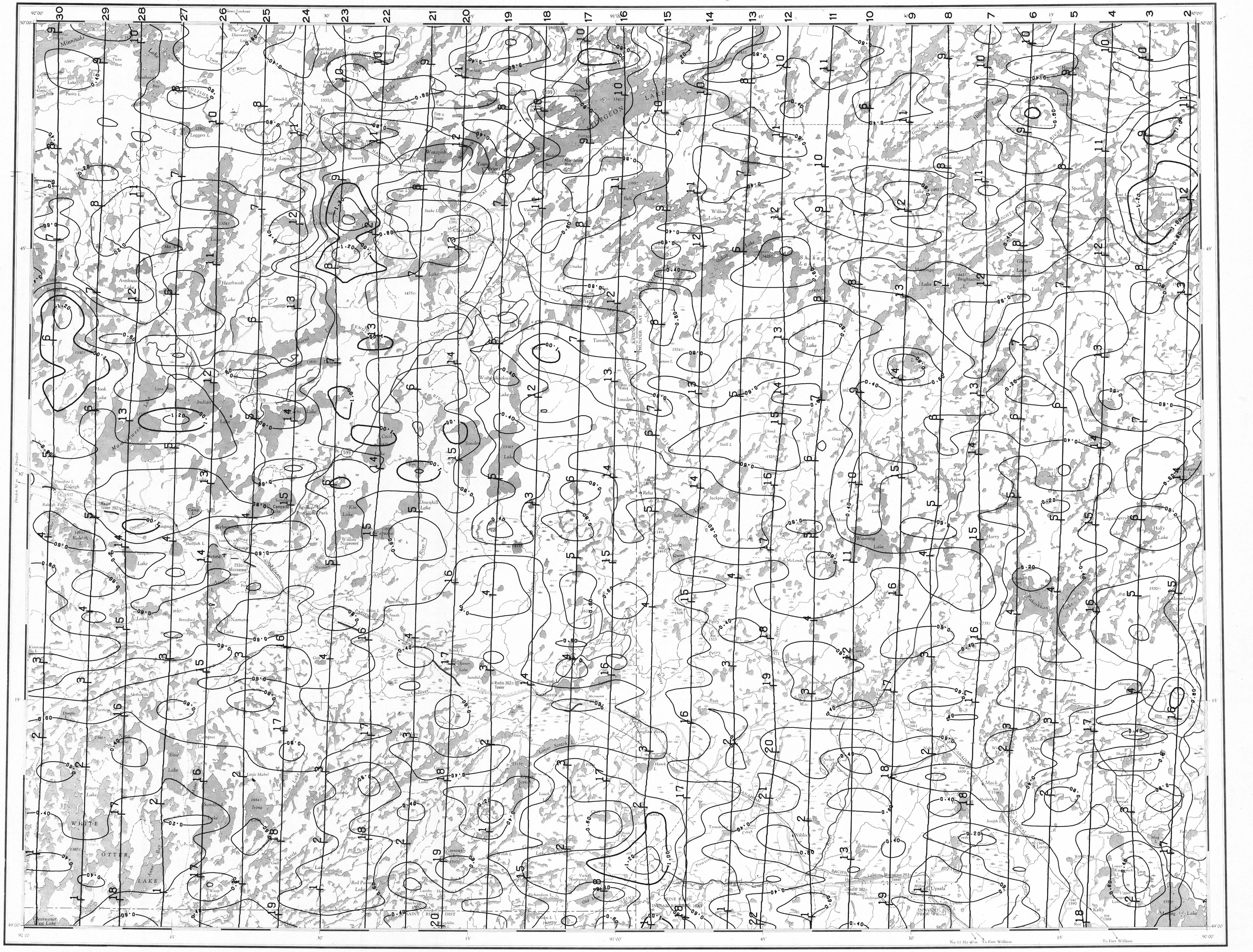
In order to produce the contour maps, data along the flight lines were averaged over seventeen 2.5-second counting intervals (approximately 2.2 km) and the effect of background count rates over the lakes were removed. This degree of averaging or smoothing is selected in order to (i) keep the smoothing to a minimum, i.e. have the smoothed values as close as possible to the original unsmoothed data, yet (ii) make the contouring grid dimension along the flight lines as close as possible, to the spacing between flight lines. Compromise between (i) and (ii) results in a rectangular grid (approximately 5 km E-W and 2 km N-S of data used for contouring. As a result of these compilation procedures, contours in some cases may be distorted in the direction perpendicular to the flight lines. This sort of imperfection is difficult to avoid in contouring data on widely spaced flight lines. It does not detract from the value of the map as the product of a reconnaissance survey, indicating the regional radioelement distribution pattern, but one should not attempt to use these contour maps to pinpoint the precise location of exploration targets. More accurate locations of anomalies can be made using the data on the profiles.

This cost-shared project was carried out under the terms of the Federal-Provincial Uranium Reconnaissance Program.

Airborne Gamma-Ray Spectrometry Survey 1975
by
Resource Geophysics & Geochemistry Division
Geological Survey of Canada

Base map material supplied by Surveys and Mapping Branch.

Cartography by Geological Survey of Canada.



(EQUIVALENT URANIUM / POTASSIUM) 10^4

IGNACE

ONTARIO

52G

Scale 1:250,000

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