

82°40'

46°25'



ELLIOT LAKE AREA

Airborne Gamma-Ray Spectrometry Survey

1977

EQUIVALENT URANIUM/EQUIVALENT THORIUM

Data collected with the Geological Survey of Canada high sensitivity airborne gamma-ray spectrometer, June 9, 1977, are presented as contours of the total count, the potassium, equivalent uranium and equivalent thorium concentrations, and the eU/eTh, eU/K and eTh/K ratios. The spectrometer, with 50,000 c.c. of sodium iodide detectors was flown at 122 metres terrain clearance, with mean aircraft speed of 190 k/h, and north-south flight lines at a spacing of 122 metres.

Potassium is measured directly from the 1.46 MeV gamma-ray photons emitted by potassium-40; uranium and thorium are measured indirectly using gamma-ray photons emitted by daughter products in their decay chains, 1.76 MeV photons from bismuth-214, and 2.62 MeV photons from thallium-208, respectively. The energy windows used are as follows:

Total Count	0.41-2.81 MeV
Potassium $^{40}\text{K}$	1.37-1.57 MeV
Uranium $^{214}\text{Bi}$	1.66-1.86 MeV
Thorium $^{208}\text{Tl}$	2.41-2.81 MeV

The data have been corrected for dead time, ambient temperature changes, background radiation, spectral scattering and deviations of terrain clearance from the planned survey altitude. The computer programs used to produce the contour maps are described by R.L. Grasty, 1972 "Airborne Gamma Spectrometry Data Processing Manual", G.S.C. Open File 109.

The values for the radioelement concentrations shown on the contour maps are "average surface concentrations", that is, an average of the area on the ground viewed by the spectrometer, an area which may contain varying amounts of outcrop, overburden and surface waters. As a result the concentrations as shown on the contoured maps are usually considerably lower than the concentrations in the bedrock.

The sensitivity factors are approximately those listed below.

Total Count	1 ur	= 170 c.p.s.
	1 %K	= 83 c.p.s.
	1 ppm eU	= 9 c.p.s.
	1 ppm eTh	= 6 c.p.s.

Total count measurements are presented as units of radioelement concentration (ur), as defined in International Atomic Energy Agency Technical Report Series No. 174 (1976). A downward continuation process was used in the compilation of the total count contour map. This process is explained by J.K. Tannenmaa and R.L. Grasty, 1977 "Upward and Downward Continuation of Airborne Gamma-Radiation Fields", Geophysics - Global Relections: the 47th Annual Meeting of the S.E.G. (Abstract) p. 61-62.

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Cartography by Geological Survey of Canada



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