GEOLOGICAL SURVEY OF CANADA COMMISSION GÉOLOGIQUE DU CANADA

DEPARTMENT OF ENERGY, MINES AND RESOURCES
MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES

GEOPHYSICAL SERIES (AIRBORNE GAMMA-RAY SPECTROMETRIC)

SYDNEY

NOVA SCOTIA

11K

AIRBORNE GAMMA-RAY SPECTROMETRIC MAP

Airborne gamma-ray spectrometric data collected in the area of Sydney, Nova Scotia during the summer of 1979, are presented:

(1) as contour maps of the total count, the potassium, equivalent uranium and equivalent thorium concentrations, and the eU/eTh, eU/K and eTh/K ratios; and

The airborne measurements were made using a 256 channel spectrometer, with twelve 102x102x406 mm (4x4x16 in.) NaI(Tl) detectors, flown at a mean terrain clearance of 123 metres (400 ft.) and 190 km/hr. East-west flight lines were at 5 km line spacing and the numbered flight lines are plotted on each of the contour maps.

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

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

Total count, uranium, thorium and potassium counts were measured over 1 second intervals. 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. For portions of the survey where the terrain clearance exceeded 800 feet the data was considered unreliable and was not used for compilation purposes. The computer programs used to produce the contour maps and profiles are modified from G.S.C. Open File No. 109 "Airborne Gamma Spectrometry Data Processing Manual", by R.L. Grasty, 1972.

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. However, the radioelement distribution shown by the contour maps reflects the relative distribution of the elements in the bedrock.

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

The conversion factors used are those listed below:

Total Count	1 Ur	≃	161 cps
	1% K	≃	91 cps
	1 ppm eU	≃	9 cps
	1 ppm eTh	≃	7 cps

Total count measurements are presented as units of radioelement concentration (Ur), as defined in International Atomic Energy Agency Technical Report Series No. 174, 1976.

Airborne Gamma-Ray Spectrometric Survey
by
Resource Geophysics and Geochemistry Division
Geological Survey of Canada

Base map material supplied by Surveys and Mapping Branch.

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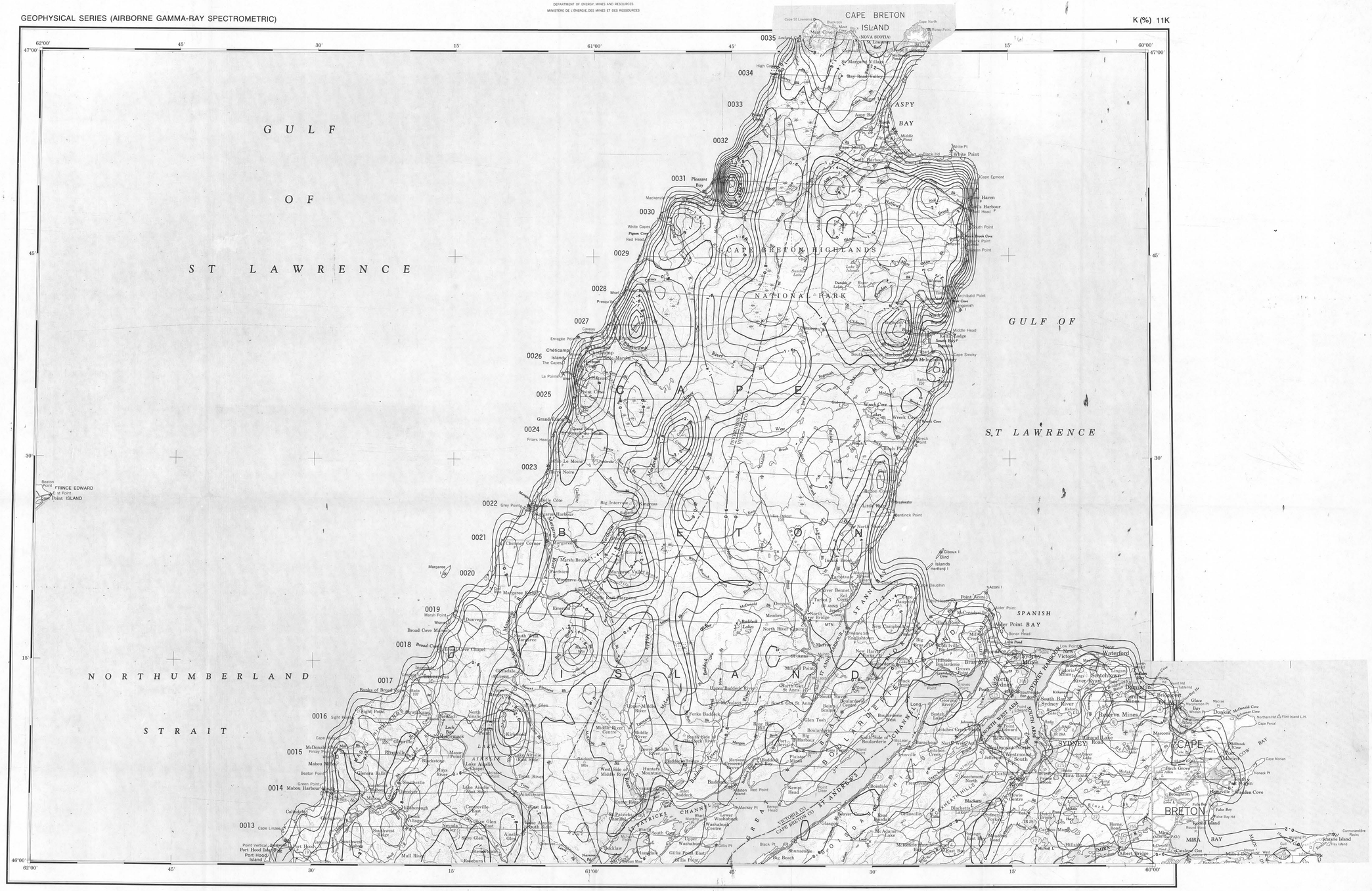

POTASSIUM %

SYDNEY

NOVA SCOTIA

Scale 1:250 000

Flight Line and Fiducial
Contour Interval 0.2

Kilometres 6 0 6 12 18 Kilometres
Miles 4 0 4 8 Miles

Universal Transverse Mercator Projection

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