

AIRBORNE RADIOACTIVITY MAP
DISTRICT OF MACKENZIE
 NORTHWEST TERRITORIES
 85 N, O
 THORIUM-POTASSIUM RATIO

Airborne gamma-ray spectrometry data collected by the Geological Survey of Canada in the District of Mackenzie, N.W.T., in the summer of 1973 are presented as 7 contour maps and profiles along 24 flight lines, plotted at a scale of 1:250,000. A geological map of the area, compiled by J.C. McIlvinn accompanies this Open File release. The maps and profiles are divided at Longitude 114°W and presented as east and west halves of the survey.

Airborne radioactivity measurements were made using a four-window spectrometer, with twelve, 22.86 cm by 10.16 cm NaI(Tl) detectors, flown at a mean terrain clearance of 120 metres and 190 km/hour. East-west flight lines were at 5 kilometre spacing, and the numbered flight lines are plotted on each map.

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 Compton 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 maps and profiles represent counts per 0.5 seconds for the integral, and counts per 2.5 seconds for uranium, thorium and potassium. An appropriate ground concentration may be obtained using the relation:

1 ppm Uranium	28 counts
1 ppm Thorium	15 counts
1% Potassium	190 counts

The ratio maps represent the ratio of the counts of the respective elements multiplied by a factor of 1000. Thus uranium-to-thorium ratio values of 500 and 1000 represent count ratios of 0.5 and 1.0, or element concentration ratios of approximately 0.27 and 0.54, respectively.

With the wide flight line spacing, data along the flight lines were smoothed by averaging over 17 points (2.2 km), and the effect of background count rates over lakes was removed in order to produce coherent contour maps of Integral, Uranium, Thorium and Potassium distribution. Smoothing was performed for the ratio maps, by summing counts along the flight lines to accumulate a minimum of 1000 counts for each element before calculating the value of the ratio. As a result of these smoothing techniques, the contour maps show the regional radioelement distribution pattern, while more detailed information can be seen on the profiles.

The most prominent feature in the western half of the survey area is the integral, uranium, uranium-to-thorium and uranium-to-potassium anomaly near 63°30'N and 116°30'W over the Rayrock mine site. This anomaly is located on flight line 11, between fiducials 2 and 3.

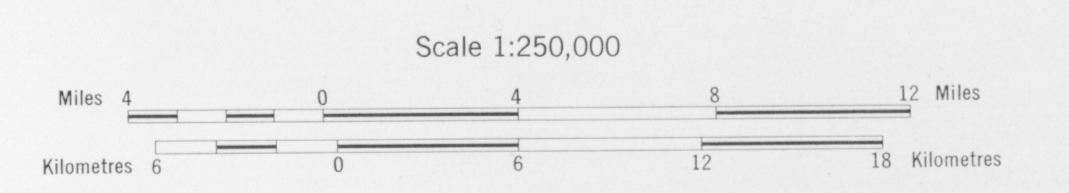
Line 4 shows a narrow zone of high uranium, uranium-to-thorium and uranium-to-potassium values between fiducials 3 and 4, near the intersection of the flight line with the road between Rayrock Mine and Marian Lake.

Other prominent uranium, and ratio anomalies can be seen on the profile for line 16, between fiducials 3 and 12, and in particular midway between fiducials 11 and 12, near 63°45'N and 116°58'W.

The results of this survey show that except for the anomaly at Rayrock, regional uranium levels in the area of the Bear Province covered by this survey are lower than those in the central part of map sheet 85 P in the Slave Province.

Airborne Radioactivity Survey 1973
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