



Geophysical compilation by J.M. Carson, P.B. Holman, K.L. Ford, J.A. Grant, and R.B.K. Shives

Digital cartography by J.A.Y. Pratt, Earth Sciences Sector Information Division (ESS Info)

This map was produced from processes in conformance with the Cartographic Services Section Quality Management System, Ottawa, registered to the Quality System ISO 9001:1994 standards

Any revisions known to the user would be welcomed by the Geological Survey of Canada

Digital base map at the scale of 1:1 000 000 from the Digital Chart of the World (DCW) from Environment Systems Research Institute (ESRI), with modifications by ESS Info

equivalent Thorium  
OPEN FILE 4119  
AIRBORNE GAMMA RAY SPECTROMETRY COMPILATION SERIES  
**THELON RIVER**  
NUNAVUT-NORTHWEST TERRITORIES  
Scale 1:1 000 000/Échelle 1/1 000 000

Kilomètres 25 0 25 50 75 Kilomètres

Lambert Conformal Conic Projection  
Standard Parallels 64°40'N and 67°20'N  
North American Datum 1927  
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Projection conique conforme de Lambert  
Parallèles d'échelle conservée: 64°40' N et 67°20' N  
Système de référence géodésique nord-américain, 1927  
© Sa Majesté la Reine en chef du Canada, 2001

These new radioactivity maps were produced from the digital archives of the National Gamma Ray Spectrometry Program (NAT/GAM), from data collected between 1969 and 2000. The surveys were flown by the Geological Survey of Canada (GSC) and contracted aircraft, using Federal and joint Federal-Provincial government funding. All data were originally published in black line contour and stacked profile formats, as 1:250 000 GSC Open Files or Geophysical Series Maps.

The data were collected using 50 litres of sodium iodide detectors, at a nominal terrain clearance of 120 m, along flight lines spaced at 500-m intervals. Potassium is measured directly from the 1460 keV gamma ray photons emitted by <sup>40</sup>K, uranium and thorium, however, are determined indirectly from gamma ray photons emitted by daughter products <sup>214</sup>Bi and <sup>214</sup>Pb, respectively, assuming equilibrium between daughter and parent isotopes. For this reason, gamma ray spectrometry measurements of uranium and thorium are referred to as equivalent uranium (eU) and equivalent thorium (eTh).

Standard energy windows were used to record the gamma ray counts. These are 1370-1570 keV for potassium, 1660-1860 keV for uranium, 2410-2810 keV for thorium and 400-2810 keV for total radioactivity. Several corrections are applied to the raw window counts prior to conversion to standard concentration units, including: system dead time; background activity from cosmic radiation, the aircraft and atmospheric radon decay products; spectral scattering in the ground, air and detectors; deviations of altitude from the planned terrain clearance; and temperature and pressure variations.

The Open File consists of eight 1:1 000 000 colour maps of three measured variables (potassium, equivalent uranium and equivalent thorium) and five derived products (the natural air absorbed dose rate derived from a linear combination of K, eU and eTh, and eU/eTh, eU/K, eTh/K and ternary radiocesium map).

These maps depict radioactivity emanating from the upper 50 cm of the earth's surface. The data represent average surface concentrations, influenced by varying amounts of outcrop, overburden, vegetation cover, soil moisture and surface water. As a result, measured concentrations are usually lower than underlying bedrock concentrations. The variations shown on these colour interval maps support regional interpretations. More detailed applications possible through the use of the original line data, available from the Geological Survey of Canada.

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