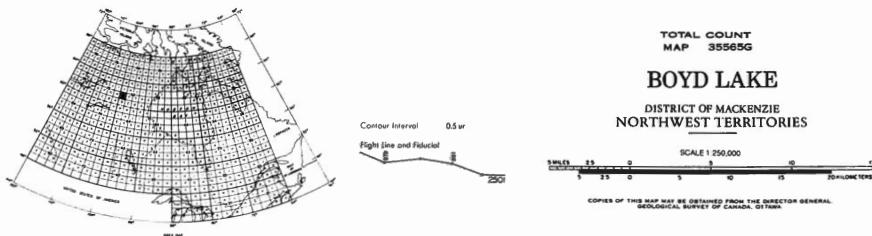


Published, 1977



Uranium Reconnaissance Program Airborne Gamma-Ray Spectrometer Survey, 1976. Sponsored and completed by the consortium of Terra Surveys Ltd., Ecorizon Inc., Kettle Valley Sciences Ltd., and Northwest Survey Consultants Inc.

The topography for this series of maps was reproduced from 1:250,000 topographical map sheets published by the Department of Energy, Mines and Resources, Ottawa.

This map was compiled from airborne gamma-ray spectrometer data recorded digitally along the flight lines shown. The spectrometer, with 50 litres of sodium iodide (NaI(Tl)) detectors, had a lifetime resolution in four channels, with the following energy ranges:

Channel 1 2.42 - 2.82 MeV
Channel 2 3.00 - 3.40 MeV
Channel 3 3.90 - 5.50 MeV
Channel 4 5.50 - 7.50 MeV

Channels 1 and 2 and 3 were recorded on the 62 MeV 1 mm² photo peak, the 1.78 MeV 50 meV peak and the 4.42 MeV 1 mm² photo peak. Channel 4 was recorded on these peaks and on the 4.42 MeV 1 mm² photo peak. Channels were averaged and recorded at one second intervals. The data were then binned statistically to increase signal-to-noise ratio. The data were then converted to counts per second per channel and a ground speed between 350 km/h and 250 km/h.

This map was corrected for atmospheric changes in temperature, background radiation, spectral scattering and deviations of terrain clearance from the planned survey altitude. The data were then converted to units of activity concentration in terms of equivalent thorium, equivalent uranium, and potassium using conversion factors determined by Kettle Valley Sciences Ltd. The data were then converted to units of activity concentration in terms of radon concentration. The conversion factors which were used during the 3-channel mode, are approximately as follows:

Channel 1 1 gpm.km⁻² = 6 cps
Channel 2 1 gpm.km⁻² = 140 cps
Channel 3 1 gpm.km⁻² = 70 to 80 cps
Channel 4 1 gpm.km⁻² = 140 to 160 cps

Data was smoothed using 40 data points along the flight lines. The data points were overlaid onto a 2.7 km by 2.7 km grid using each 9-kilometer interval as a block, and copied onto a 2.7 km by 2.7 km grid using each 9-kilometer interval as a block.

The contours show the surface concentrations generally including some open land, swamps and small bodies of water. Consequently the concentrations indicated by the contour map are generally lower than those indicated in reality.

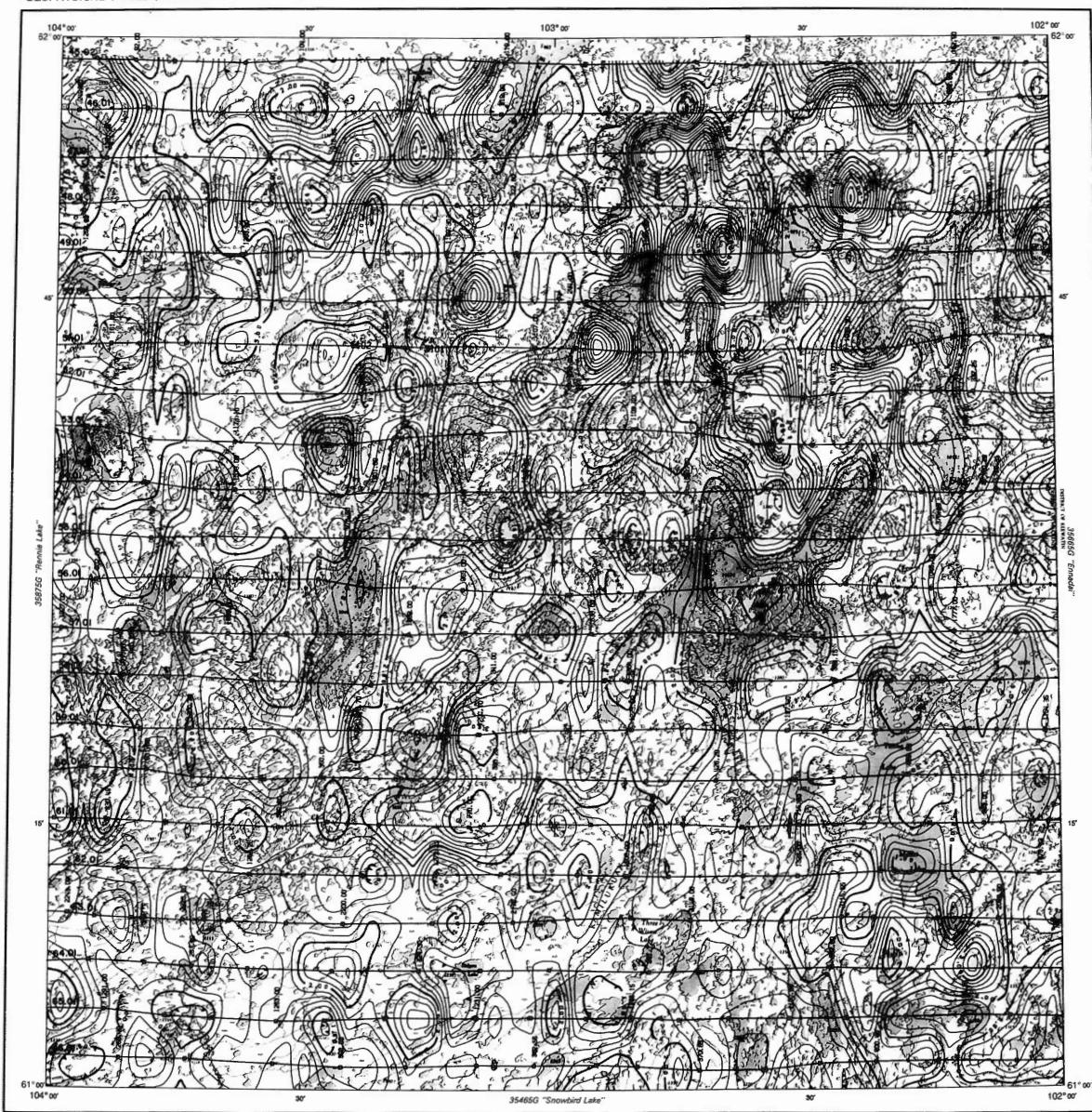
TOTAL COUNT
BOYD LAKE
MAP 35565G



GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES

GEOPHYSICAL SERIES (AIRBORNE GAMMA-RAY SPECTROMETRIC)

POTASSIUM (K) 65E



Published, 1977

POTASSIUM (K) MAP 3556G

BOYD LAKE DISTRICT OF MACKENZIE NORTHWEST TERRITORIES

SCALE 1:250,000
MILES 0 5 10 15 20
KILOMETERS 0 5 10 15 20

COPIES OF THIS MAP MAY BE OBTAINED FROM THE DIRECTOR GENERAL,
GEOLOGICAL SURVEY OF CANADA, OTTAWA.

Uranium Reconnaissance Program Airborne Gamma-Ray Spectrometer Survey, 1976, flown and compiled by the consortium of Terra Surveys Ltd., Icomincor Resources Inc., Geosciences Inc., and Northern Survey Corporation Ltd.

The topography for this series of maps was reproduced from 1:250,000 topographical map sheets published by the Department of Energy, Mines and Resources, Ottawa.

This map was compiled from airborne gamma-ray spectrometer data recorded digitally along the flight lines shown. The spectrometer has 30 lines of detectors covering a 70-deg sector. The central detector is the low energy channel, with the following energy ranges:

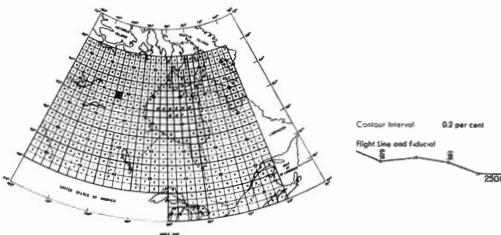
Channel 1 1.00 - 1.96 MeV
Channel 2 1.96 - 2.94 MeV
Channel 3 2.94 - 3.94 MeV

Channels 1, 2 and 3 were summed on the 2.94 MeV 1.00 MeV peak, the 1.96 MeV 0.94 MeV peak, and the 0.94 MeV 0.84 MeV peak, respectively. Counts recorded in these channels and recorded at one second intervals. The sensor clearance was averaged and resampled to a 1 km resolution. The data were then converted to counts per second per square kilometer per second of spectrum shift. The survey aircraft were flown at a planned survey altitude of 400 feet and at a ground speed of 100 km/hour.

The data were corrected for dead time, atmospheric changes in temperature, background, and sensor efficiency. The data were then converted to concentrations of equivalent thorium, equivalent uranium, and equivalent potassium using a digital computer program developed for the survey. The total count rates from channel 1 were converted to units of radon-equivalent concentration. The conversion factors which were used for the 3 channels are as follows:

Channel 1 0.000001 pCi/m³ 0.000001 pCi/m³
Channel 2 0.000001 pCi/m³ 0.000001 pCi/m³
Channel 3 0.000001 pCi/m³ 0.000001 pCi/m³

Data were smoothed using 40 data points along the flight lines (rejecting values over 3000 counts). The data were then converted to radon-equivalent concentrations averaged over areas of approximately 700,000 square meters. These areas generally include some outcrop, overburden, swamps and small lakes. The data are expressed in radon-equivalent concentrations indicated by the contour lines and generally lower than the concentration in outcrop.



POTASSIUM (K)
BOYD LAKE
MAP 3556G



Published, 1971

This map was compiled from airborne gamma-ray spectrometric data acquired digitally along the EK-1 survey track. The spectrum contains a large number of medium values (that is to determine the recorded gamma radiation in four channels, and the following energy ranges:

Channel 1 0.05 - 0.96 MeV
Channel 2 1.05 - 1.96 MeV
Channel 3 2.05 - 2.96 MeV
Channel 4 0.40 - 2.73 MeV

Channels 1 and 2 are centered on the 0.23 MeV 11 ppm photo peak, respectively. Channel 3 is centered in these channels and records one-half the intensity. The terrain clearance was averaged and resampled to a 1 km² area.

The topography for this series of maps was reproduced from 1:250,000 topographical map sheets published by the Department of Energy, Mines and Resources, Ottawa.

Uranium Reconnaissance Program Airborne Gamma-Ray Spectrometer Survey, 1976, Topen and compiled by the consortium of Terra Surveys Ltd., Icosimuris Inc., Geological Sciences Ltd., and Northwest Survey Corporation Ltd.

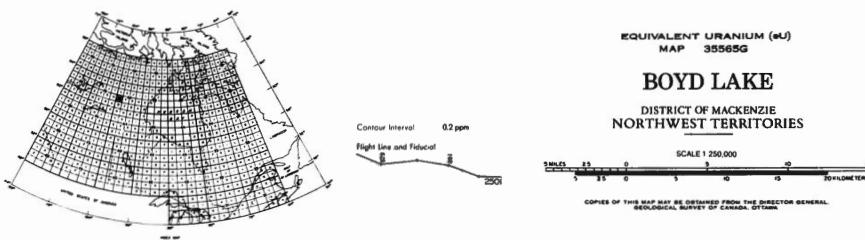
The data were corrected for dead time, atmospheric changes in temperature, barometric pressure, and the effects of the aircraft motion. The data were converted to count rates per second per square meter per second per channel. Corrected count rates from channels 1, 2 and 3 were converted to concentration rates of radon-equivalents per second per square meter per second per channel. The total count rates from channel 4 were converted to units of radon-equivalent concentration rates per second per square meter per second per channel. The spectral data were converted to units of radon-equivalent concentration rates per second per square meter per second per channel.

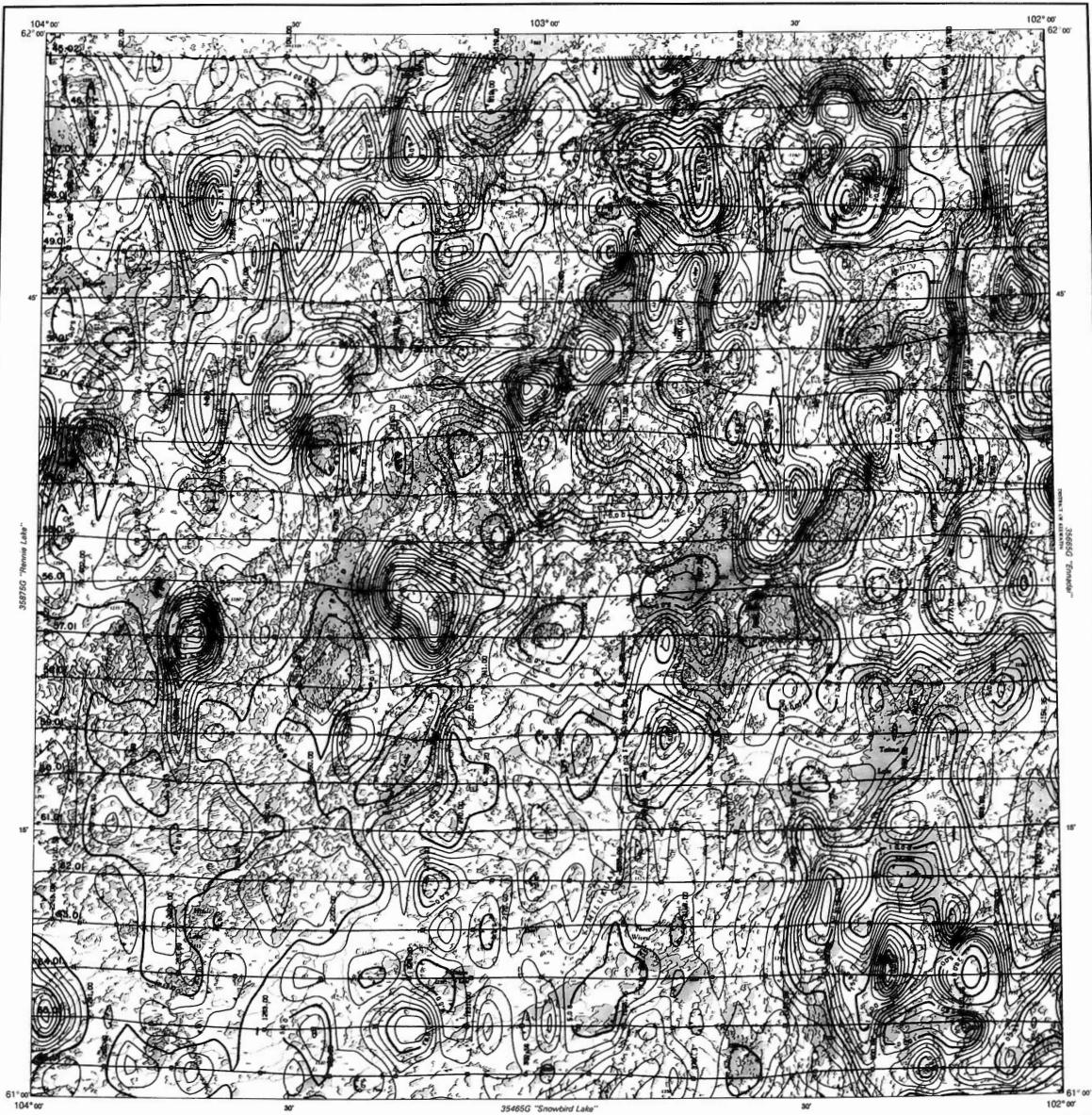
Channel 1 1 ppm eU - 8 to 10 cps
Channel 2 1 ppm eU - 8 to 10 cps
Channel 3 1 ppm eU - 8 to 10 cps
Channel 4 1 ppm eU - 70 to 80 cps

Data were smoothed using 20 data points along the flight lines (intercepting various areas over which the survey was conducted). The data were then converted to concentration rates per second per square meter per second per channel.

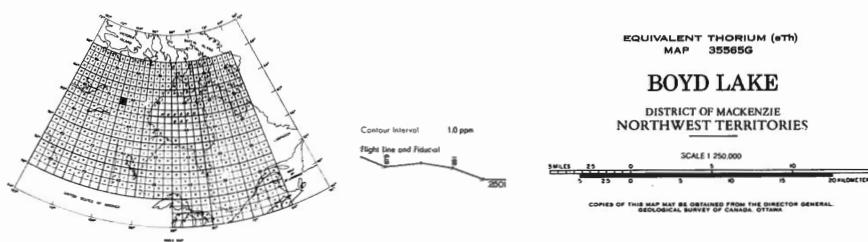
Note: The contour values are surface replacement concentrations averaged over areas of approximately 700,000 square meters. These areas generally include some outcrop overburden, swamps and other areas where the surface replacement concentrations indicated by the contour values are generally lower than the concentration - bedrock.

EQUIVALENT URANIUM (eU)
MAP 35985G
BOYD LAKE





Published, 1977



Uranium Reconnaissance Program Airborne Gamma-Ray Spectrometer Survey
Map 35565G

BOYD LAKE

DISTRICT OF MACKENZIE
NORTHWEST TERRITORIES

SCALE 1:250,000
MILES 25 0 3 6 9 12 15 18 20
25 0 3 6 9 12 15 18 20
20 METRES

COPIES OF THIS MAP MAY BE OBTAINED FROM THE DIRECTOR GENERAL,
GEOLOGICAL SURVEY OF CANADA, OTTAWA.

This map was compiled from airborne gamma-ray spectrometric data acquired originally along a series of flight lines. The data were collected in the course of a program of regional-scale radiometric surveys. Recorded gamma radiation in four channels, with the following energy ranges:

Channel 1 100 - 190 keV

Channel 2 190 - 280 keV

Channel 3 280 - 370 keV

Channel 4 370 - 460 keV

Channels 1 and 3 were centered on the 2.6 MeV γ photo peak and the 1.6 MeV γ photo peak, respectively. Counts were accumulated in these channels for approximately 10 seconds. Channels 2 and 4 were also centered and recorded at one second intervals. The detectors were thereby stabilized to minimize spectrum distortion. The total count rates from the four channels ranged between 400 and 500 counts per second between 1900 hours and 0400 hours.

The data were corrected for atmospheric absorption, detector efficiency, background, and for the effect of varying elevations and terrain clearance from the planned survey altitude. Corrected count rates from channels 1 and 3 were converted to concentration units by dividing by the product of the energy range and the count rate constants determined for each gamma-ray spectrometer used in the survey. The total count rates from channels 2 and 4 were converted to concentration units by dividing by the count rate factors which differed among the 3 aircraft used; are approximately those listed below:

Channel 1 1.0 ppm \pm 8 to 10 cps

Channel 2 1.0 ppm \pm 10 to 12 cps

Channel 3 1.0 ppm \pm 1 to 2 cps

Channel 4 1.0 ppm \pm 10 to 15 cps

Data were plotted using 40 data points along flight lines, 10 data points spaced over water, gridded at 2.2-kilometer intervals along tracks and 3-kilometer intervals across tracks, and contoured.

The contoured values are surfaceradiometric concentrations averaged over areas of approximately 7000 square kilometers. The values are expressed in terms of equivalent thorium concentration in parts per million. Concentrations indicated by the contour map are generally lower than the concentration indicated below.

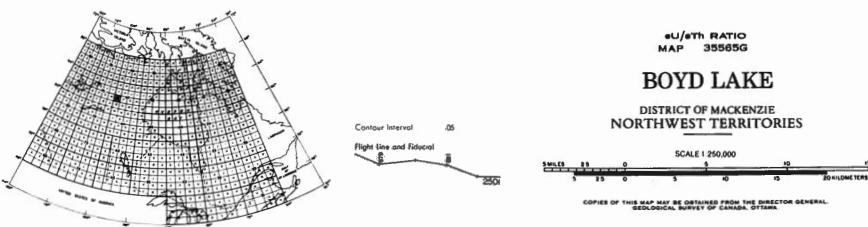
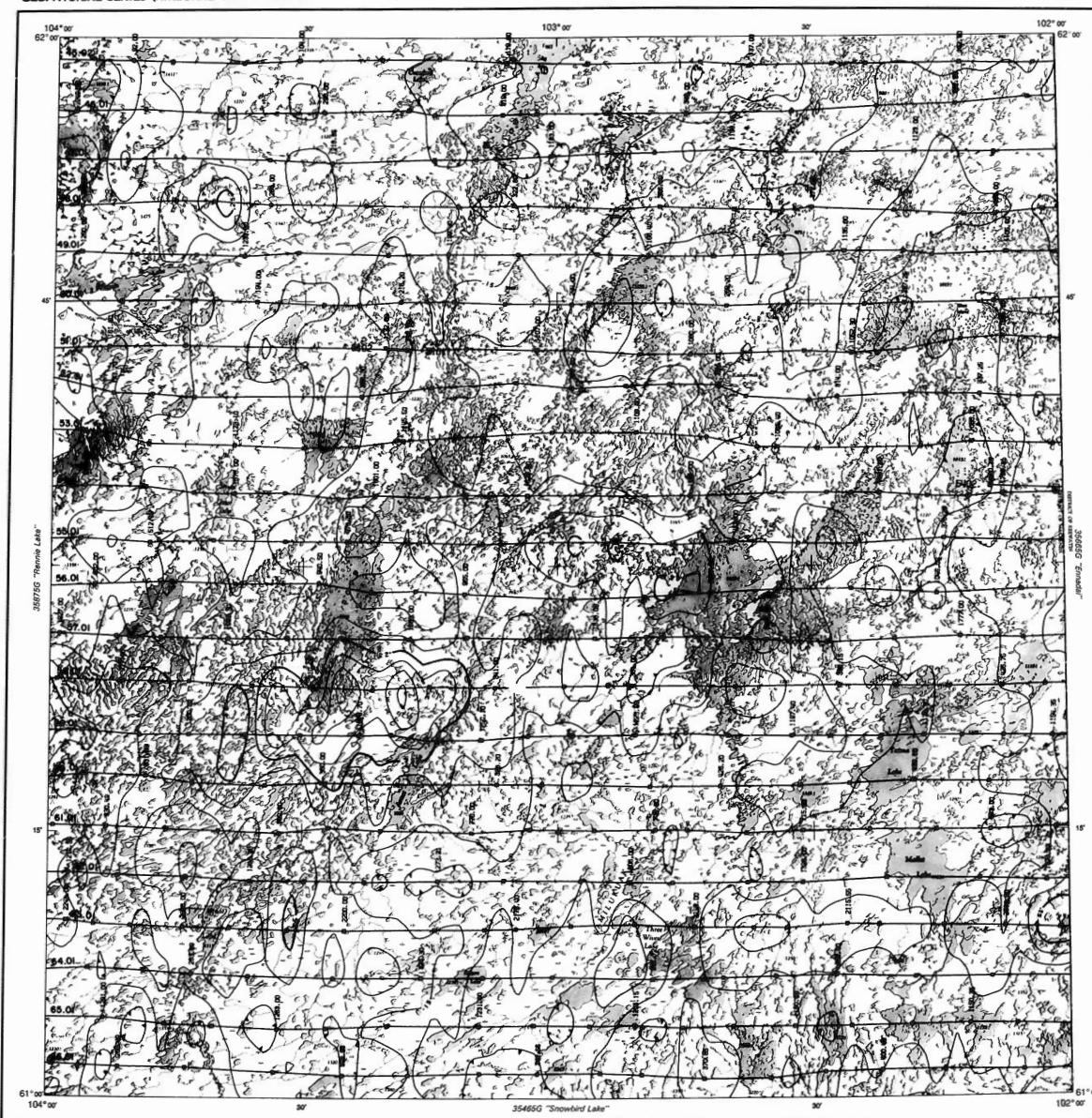
EQUIVALENT THORIUM (eTh)
BOYD LAKE
MAP 35565G



GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES

GEOPHYSICAL SERIES (AIRBORNE GAMMA-RAY SPECTROMETRIC)

SU/ETH RATIO 65E



Uranium Reconnaissance Program Airborne Gamma-Ray Spectrometer Survey, 1976, Drawn and compiled by the consortium of Terra Surveyors Ltd., Canadian Geosurveys, Environmental Resources Ltd., and Northern Survey Corporation Ltd.

The topography for this series of maps was reproduced from 1:250,000 topographical map sheets published by the Department of Energy, Mines and Resources, Ottawa.

This map was compiled from airborne gamma-ray spectrometer data recorded during the Uranium Reconnaissance Program Airborne Gamma-Ray Spectrometer Survey, 1976, using the following flight lines and detectors, recorded gamma radiation on four channels, with the following energy ranges:

Channel 1 0.0 - 0.5 MeV

Channel 2 0.6 - 1.0 MeV

Channel 3 1.1 - 1.5 MeV

Channel 4 1.6 - 2.0 MeV

Channels 1, 2 and 3 were recorded on the 62 MeV 1/4" diameter NaI(Tl) photopeak, and Channel 4 on the 16 MeV 1/4" photopeak. Counts were accumulated in these channels and recorded at one second intervals. The terrain was averaged over a 100 m by 100 m area, and the spectrum was averaged over a 100 m by 100 m area. The survey altitude was approximately 400 feet and at an air density of 1.02 kg/m³.

The data were corrected for dead time, atmospheric absorption, detector efficiency, and the effect of the change in the angle of incidence of the gamma rays from the planned survey altitude. Corrected count rates from channels 1, 2 and 3 were converted to normalized count rates, and the count rate for channel 4 was converted to a normalized spectrum. The survey altitude was determined by the normalized spectrum which differed among the 2 and 3 channels, the approximately those listed below:

Channel 1 1.0 m = 8.0 cps

Channel 2 1.0 m = 1.0 cps

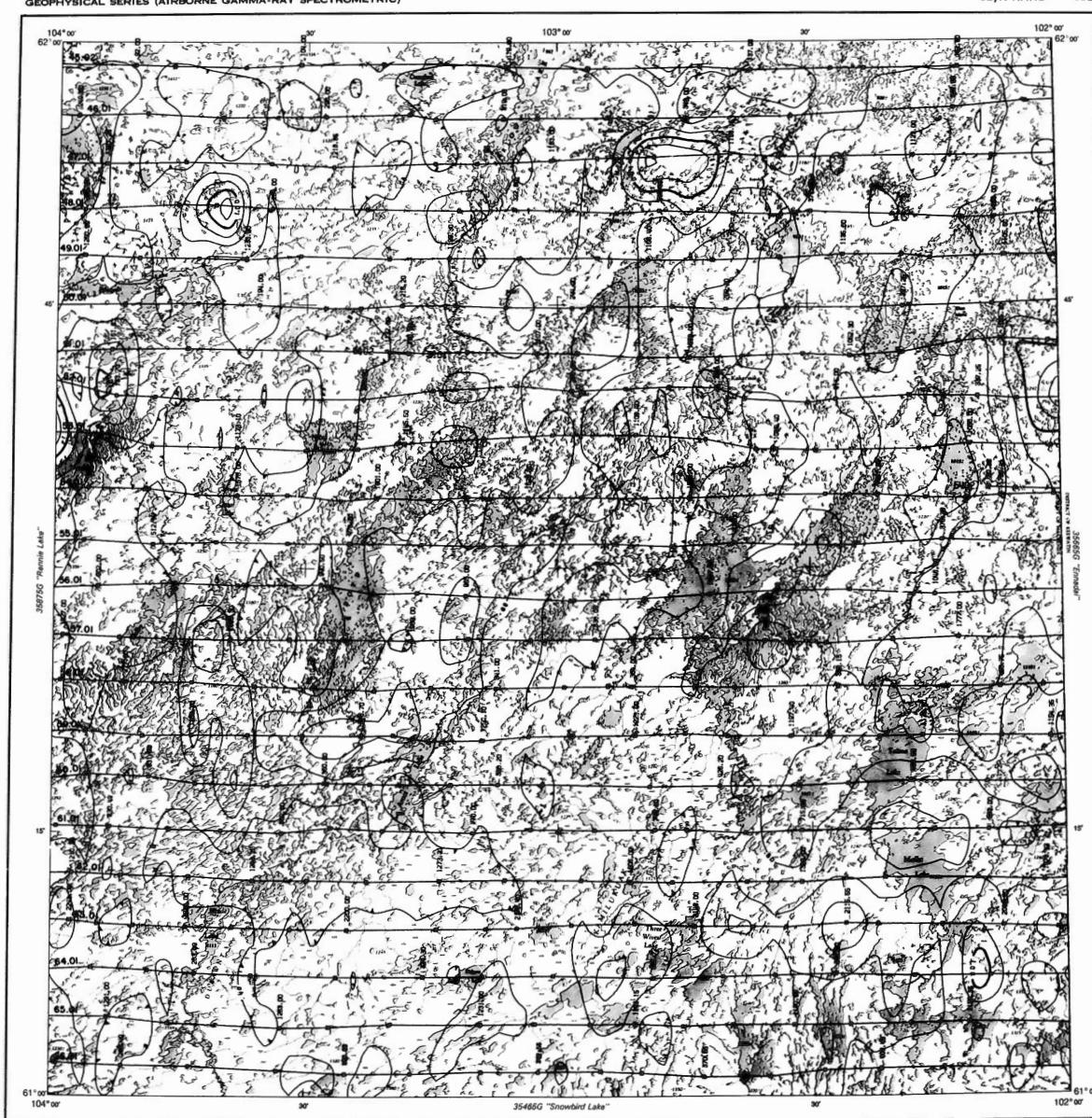
Channel 3 1.0 m = 14.0 cps

Channel 4 1.0 m = 140.0 cps

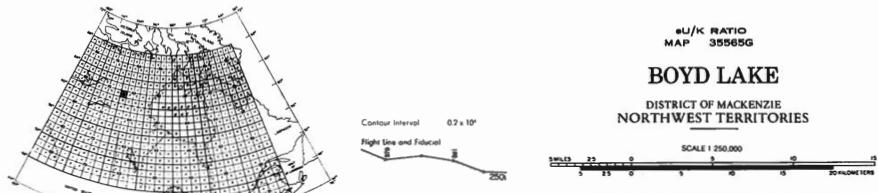
Data were collected during 40 data points along each flight line, generally within 100 m apart, and each point was taken at a different altitude.

The concentration values are surface replacement concentrations averaged over areas of approximately 70,000 square meters. These areas generally include some surface, soil, and bedrock. The concentration values are generally lower than the concentration indicated by the contour map.

SU/ETH RATIO
BOYD LAKE



Published: 1977



Uranium Reconnaissance Program Airborne Gamma-Ray Spectrometer Survey, 1976, Town and compiled by the consortium of Terra Surveys Ltd., Icosciences Incorporated, International Sciences Inc., and Northern Survey Corporation Ltd.

The topography for this series of maps was reproduced from 1:250,000 topographic maps sheets published by the Department of Energy, Mines and Resources, Ottawa.

This map was compiled from airborne gamma-ray spectrometer data recorded digitally along the right-hand contour. The spectrometer had 35 fixed energy channels and 35 linear energy ranges selected sequentially on four channels, with the following ranges:

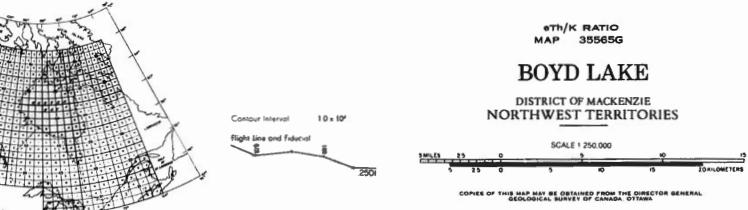
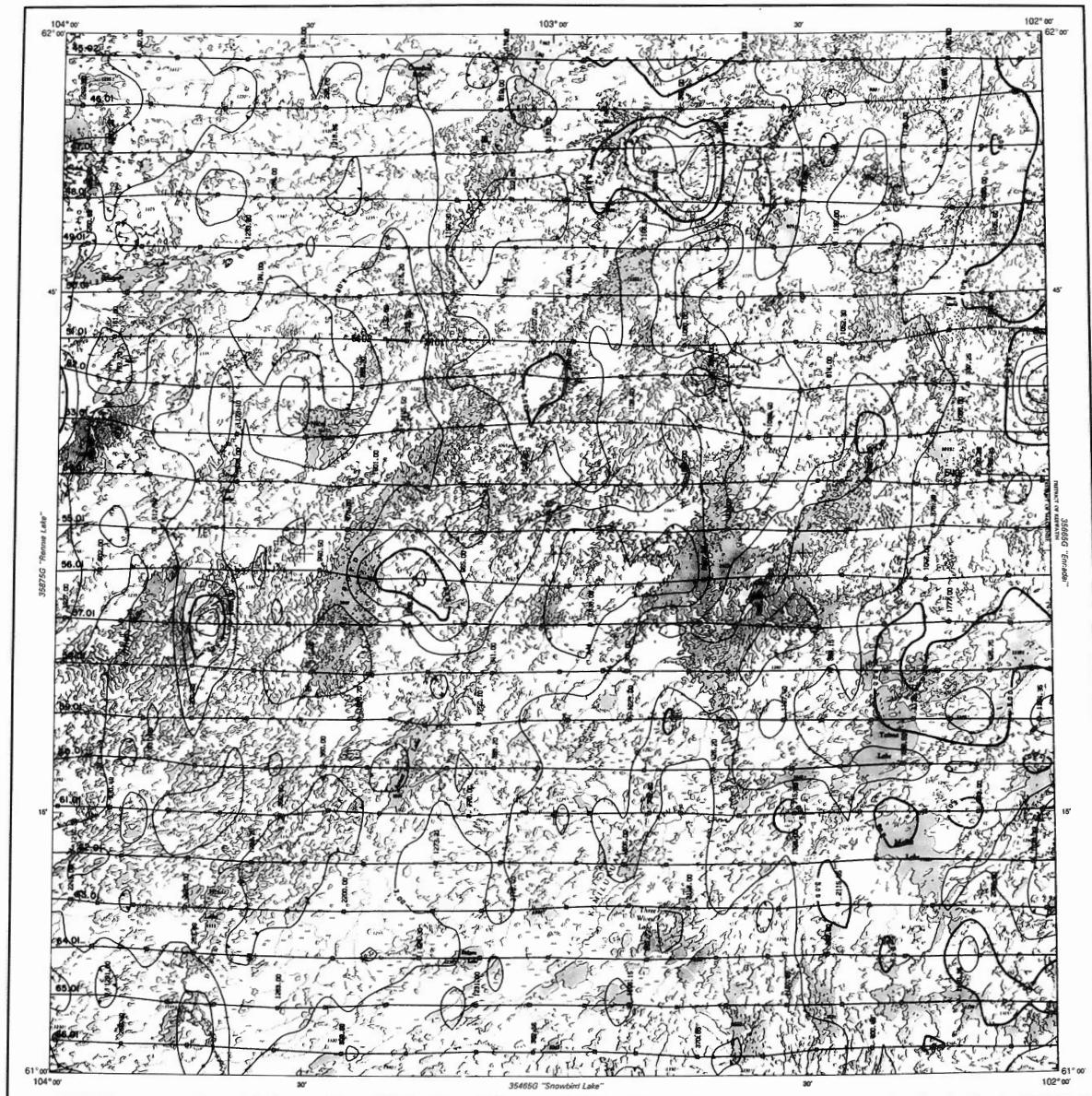
Channel 1 0.0 - 1.5 MeV
Channel 2 1.5 - 1.8 MeV
Channel 3 1.8 - 2.0 MeV
Channel 4 2.0 - 2.5 MeV

Channels 1, 2 and 3 were calibrated on the 2.0 MeV 1 MeV photo peak, the 1.7 MeV 0.8 MeV photo peak, and the 1.4 MeV 0.4 MeV photo peak, respectively. Calibration factors were determined in these channels and recorded at each sound interval. The sensor clearance was averaged and recorded at each sound interval. The sensor calibration was checked after each spectrum shift. The survey aircraft flew at a planned survey altitude of 400 feet and at a ground speed of 12.5 kilometers per hour.

The data were corrected for dead time, atmospheric changes in temperature, background, and sensor calibration. The data were converted to count rates using the survey altitude. Corrected count rates from channels 1, 2 and 3 were converted to concentrations of uranium using the calibration factors and the conversion factors determined for each gamma-ray spectrometer used in the survey. The total count rates from channel 4 were converted to units of radioactivity concentration using the conversion factors which were determined for the 1 MeV peak used in each channel.

Channel 1 1 ppp/ft² = .82 ppm
Channel 2 1 ppp/ft² = .72 ppm
Channel 3 1 ppp/ft² = .78 ppm
Channel 4 1 ppp/ft² = .80 ppm

Data were smoothed using a 7.2 kilometer radius along each 2-D contour lines impacting the survey altitude. The resulting values are surface enhancement concentrations averaged over areas of approximately 700,000 square meters. These areas generally include one or more ridges, depressions, streams and small lakes. The concentration values indicated by the contour map are generally lower than the concentration in bedrock.



This map was compiled from airborne gamma-ray spectrometer data recorded digitally along the flight lines shown. The spectrometer, with 50 lines of resolution (NETT II) detectors, was operated in three saturation in four channels, with the linear response detector.

2.42 - 2.82 MeV

3.04 - 3.44 MeV

3.66 - 4.06 MeV

4.28 - 4.68 MeV

Channels 1 and 3 were calibrated on the 2.42 MeV fission peak, the 1.78 MeV beta-particle peak, and the 1.33 MeV gamma-ray peak. The remaining channels were calibrated on the 3.66 MeV fission peak. The 3.66 MeV channel was used to correct for atmospheric absorption. The survey aircraft was flown at a constant altitude of 4000 feet and at a speed of approximately 190 km/h and 2400 m.s.⁻¹.

The maps were compiled using atmospheric changes in temperature, background radiation, spectral scattering and absorption due to the distance from the planned survey area. Corrections were made for the 1.33 MeV channel using conversion factors of equivalent thorium, equivalent uranium, and potassium using conversion factors determined by the U.S. Geological Survey. The remaining channels, except channel 4, were converted to units of radon-equivalent concentration. The conversion factors which are being used are approximately:

Channel 1 1 cm.⁻³ = 8 Bq

Channel 2 1 cm.⁻³ = 70 Bq

Channel 3 1 cm.⁻³ = 70 Bq

Channel 4 1 cm.⁻³ = 10 Bq

Data were smoothed using 40 data points along the flight lines (spacing values over each point at 2.2-kilometer intervals along track and 2-kilometer intervals across track).

The confidence values are surface concentrations expressed in units of picocuries per square meter. These areas generally include some surface overburden, swamps and small bodies of water. Correspondingly the concentrations indicated by the contour map are generally surface concentrations.