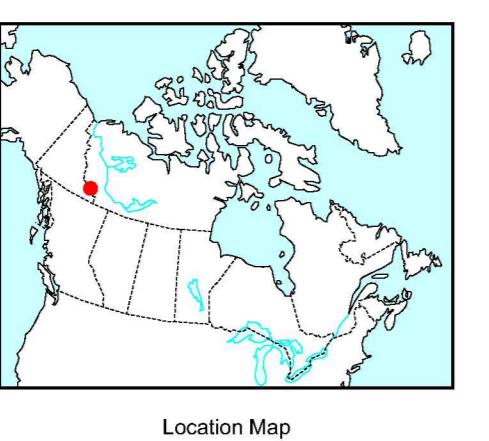


This airborne geophysical survey and the production of this map were funded by Parks Canada through the Mineral and Energy Resource Assessment Project.

GEOPHYSICAL SERIES - NTS 105 H/15 and 105 H/16 - TUNGSTEN
NORTHWEST TERRITORIES

TERNARY RADIODELEMENT IMAGE MAP



Parks
Canada

Natural Resources
Canada

Canada

Scale 1 : 50 000 - Échelle 1 / 50 000

Universal Transverse Mercator
North American Datum 1983
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Digital Topographic Data provided by Geomatics Canada, Natural Resources Canada

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GEOLOGICAL SURVEY OF CANADA COMMISSION GÉOLOGIQUE DU CANADA
2007
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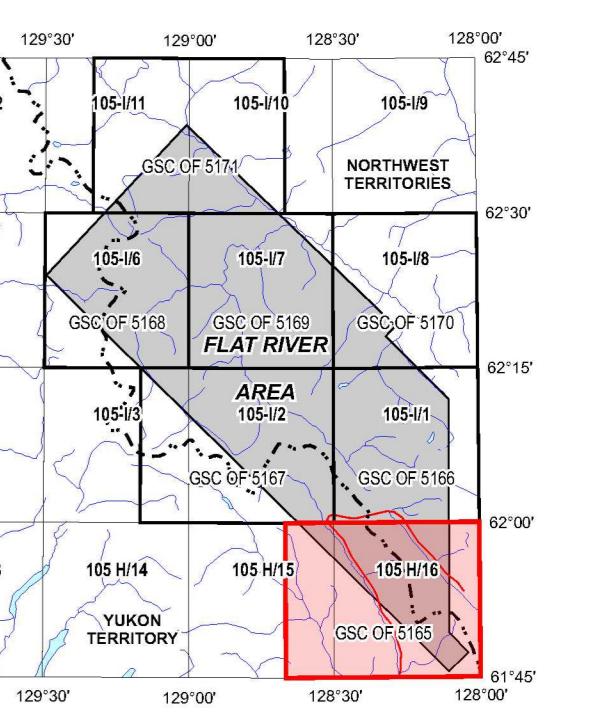
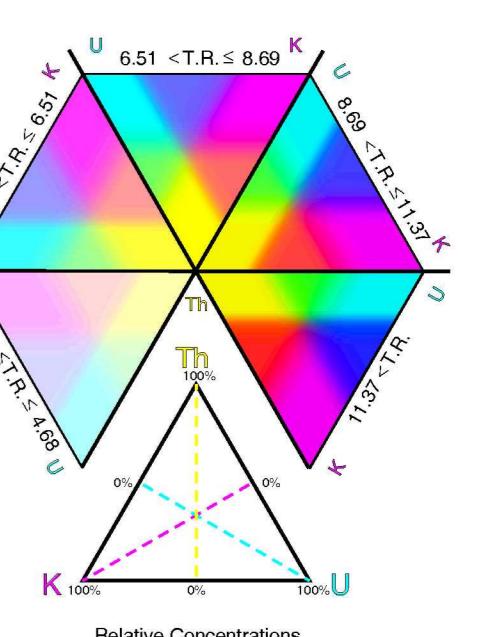
Recommended citation:
Carson, J.M., Dunn, R., Povip, J., Buckle, J., Shives, R.B.K., and Harvey, B.,
2007. Geophysical Series - NTS 105 H/15 and 105 H/16 - Tungsten, Northwest Territories;
Geological Survey of Canada, Open File 5165;
scale 1:50 000.

TERNARY RADIODELEMENT IMAGE MAP

TUNGSTEN
NORTHWEST TERRITORIES
NTS 105 H/15 and 105 H/16

PLANEIMETRIC SYMBOLS

Topographic Contour	
Drainage	
Wetland	
Permanent Ice	
Roads	
Trails	
Flight Line	



NATIONAL TOPOGRAPHICAL SYSTEM REFERENCE AND GEOGRAPHICAL MAP INDEX
SYSTÈME NATIONAL DE RÉFÉRENCE CARTOGRAPHIQUE ET INDEX DES CARTES GÉOGRAPHIQUES

In 2004 and 2005, Sander Geophysics Limited completed four multi-sensor airborne geophysical surveys in the Nahanni River area of the Northwest Territories for Parks Canada (Prarie Creek, Caribou River and Flat River) and the Government of the Northwest Territories (Selkwi Range). The Geological Survey of Canada provided survey supervision and quality control. The purpose of the survey was to obtain quality-controlled geophysical data for mineral and energy resource surveys over two years, from August 26 to October 3, 2004 and the second phase from June 13 to August 20, 2005 using the SGL Astro 350-B helicopter. C-GSGH.

Gamma-ray Spectrometric Data
The airborne gamma-ray measurements were made with an Exploranium GR820 gamma-ray spectrometer using nine 102 x 102 x 406 mm NaI (Tl) crystals. The main detector array contains eight crystals (total mass 33.6 litres). Other crystals contain 4.2 litres, shielded by the main crystals. The detector assembly is housed in a lead-lined lead box (lead equivalent thickness 10 cm). The system constantly monitors the natural thorium peak for each crystal, and using a Gaussian least squares algorithm, adjusted the gain for each crystal.

Thorium is measured directly from the 1460 keV gamma-ray photons emitted by ^{40}K , whereas uranium and thorium are measured indirectly from gamma-ray photons emitted by daughter products (^{40}Bi for uranium and ^{228}Ra for thorium). Although these daughters are down their respective decay chains, they are assumed to be in equilibrium with their parent, thus gamma-ray spectrometric measurements of uranium and thorium are referred to as equivalent uranium and equivalent thorium, i.e. U_{eq} and Th_{eq} . The energy windows used to measure potassium, uranium and thorium are:

Potassium ("K")	1360 - 1560 keV
Uranium ("U")	1660 - 1860 keV
Thorium ("Th")	2410 - 2810 keV

Gamma-ray spectra were recorded at a rate of 100 Hz and a window of 100 ms. Noise-adjusted singular value decomposition (NASVD) analysis was carried out on the full spectrum 256 channel data to reduce statistical noise in the windowed data. During processing, the spectra were energy calibrated, and counts were accumulated into the windows described above. Counts from the radon detectors were recorded in a 1660 - 1860 keV window and radiation at energies greater than 3000 keV were recorded in the count window. Corrections for atmospheric absorption and atmospheric radon decay products were applied. The window data were then corrected for scattering in the ground, air and detectors. Corrections for deviations of altitude from the planned terrain clearance and for variation of temperature and pressure were made prior to conversion to ground concentrations of potassium, uranium and thorium, using factors determined from flights over a calibration range near Ottawa.

Corrected data were filtered and interpolated to a 100 m grid for both the 1:50 000 scale and 1:250 000 scale maps. The resulting airborne gamma-ray spectrometric survey represents the average surface concentration and amount of potassium, overburden, overburden correction, soil type and elevation. As a result the measured concentrations are usually lower than the actual bedrock concentration. The total air absorbed dose rate in nanograys per hour was produced from measured counts between 400 and 2810 keV.

Magnetic Data
The helicopter was equipped with a Sonime CS-2 cesium vapour magnetic sensor mounted in a bird suspended 30 m below the aircraft. The system recorded readings every 0.1 seconds with a noise level of less than 0.02 nT. Magnetic interferences caused by aircraft maneuvers were compensated using an RMS AACII magnetic compensator. Diurnal variations and GPS fluctuations were recorded using a Sander Geophysics Global Recording System. The International Geomagnetic Reference Field was calculated daily and removed for each flight. The airborne magnetometer data was IGRF corrected, using the location, altitude and date of each point. The IGRF was calculated using the IGRF 2000 model.

The corrected magnetic data was interpolated to a 100 m grid using a minimum curvature algorithm. The first vertical derivative grid was calculated from the corrected total magnetic intensity grid using a FFT-based frequency domain filtering algorithm.

Positional Data
Survey line spacing of 500 m and control line spacing of 4000 m was used for the Prairie Creek, Caribou River and Flat River survey blocks. Survey line spacing of 400 m and control line spacing of 2400 m was used for the Selkwi Range survey block. Survey lines were oriented NW-SE and for the Selkwi Range survey lines were oriented SW-NE. Survey and control line positions were pre-planned using Sander Geophysics Limited, Smooth Drape software. Terrain clearance was monitored by radar altimeter. Positional data were recorded using a dual frequency Novatel Millimeter system. GPS ground station data were combined with airborne GPS data to produce differentially corrected positional data with an accuracy of +/- 5 m.

Data Presentation
Colour levels and contours were calculated for each grid and combined with map surround information to create HP RTL plot files, which were plotted using SGL HP DesignJet colour plotters.

Project Funding
The Prairie Creek, Caribou River and Flat River surveys were funded by Parks Canada through the Mineral and Energy Resource Assessment Project. The Selkwi Range survey was funded by the Northwest Territories Geoscience Office. Technical expertise and contract administration were provided by the Radiation Geophysics and Regional Geophysics Sections of the Geological Survey of Canada.

TUNGSTEN
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