

Helicopter-borne Gamma-Ray Spectrometric and Magnetic Surveys, Central British Columbia, 2004: Status Report

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INTRODUCTION

Helicopter-borne multisensor (gamma-ray spectrometer, magnetometer) geophysical surveying continued in central British Columbia in 2004, funded by the Rocks to Riches Program and a consortium of industry partners. Surveys were completed in the Mount Milligan (Area 1 in Figure 1) and Horsefly – Little Fort areas of the Quesnel mineral belt. Results of these surveys will be released to the public in the late spring of 2004. Additional surveying was planned but was not completed, and has been rescheduled for completion in summer 2005. The industry-funded survey locations are also indicated in Figure 1, generalized to respect confidentiality.

Fugro Airborne Surveys carried out the work under contract to the Geological Survey of Canada. The overall purpose of the surveys is to provide modern, high-definition radiometric and magnetic data that can be used in the assessment and development of targets for mineral exploration, and to assist future bedrock and surficial mapping.

RATIONALE

These areas lie within the Quesnel Terrane and are highly prospective for discovery of alkalic porphyry copper-gold and related deposits, but exploration and mapping have been inhibited by subdued topography, tree cover and extensive glaciofluvial deposits. The surveys will provide new geochemical-geophysical information to support improved geological knowledge and mineral exploration, by fingerprinting geological units and defining new targets within and beneath the locally thick cover. A summary of the regional geology, exploration history and mineral potential of the central Quesnel trough is provided by Cathro *et al.* (2004).

The combined radiometric and magnetic data are useful in identifying potassic alteration and magnetite enrichment or depletion zones, which commonly accompany copper-gold porphyry systems. The same geophysical information can be a valuable tool in geological mapping and identifying rock types and structures. The overall goal is to provide new, high-quality geophysical data that will stimulate exploration investment.

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METHODS

The surveys are flown using an Aerospatiale AS350 helicopter. Flight-path information is recovered using a postflight differential Global Positioning System. A vertically mounted video camera is used for verification of the flight path. Traverse lines are flown at various line spacings, from 150 to 500 m, with magnetic control lines every 1500 to 4000 m. Helicopter altitude is maintained at an average ground clearance of 135 m. The gamma-ray spectrometry data are recorded at a 1.0 second sample rate using a 256-channel Exploranium GR820 spectrometry system with 33.6 litres of downward-looking and 4.2 litres of upward-looking sodium-iodide detectors. The aeromagnetic data are recorded at a 0.1 second sample rate using a 0.01 nT split beam line cesium-vapour magnetometer housed in a forward mounted stinger.

Measured and computed data include eight radiometric parameters (ternary, total count, K, eU, eTh, and ratios eU/eTh, eU/K, eTh/K) and two magnetic parameters (total field and calculated magnetic vertical gradient). The contractor will process the data and prepare final maps and digital data to NATGAM standards. Where appropriate, the new data will be merged with the existing NATGAM surveys in the Mount Polley, Horsefly and Mount Milligan areas.

RESULTS TO DATE

The airborne survey contract was awarded to Fugro Airborne Surveys, Mississauga, Ontario, following a competitive bidding process through Public Works and Government Services Canada (PWGSC). The Radiation Geophysics Section (RGS), Geological Survey of Canada, is providing the technical expertise and contract supervision for this project.

A total of 14 090 line km of surveying have been planned, based on a total of \$786 000 (\$280 000 Rocks to Riches and \$506 000 combined industry funding). Approx-

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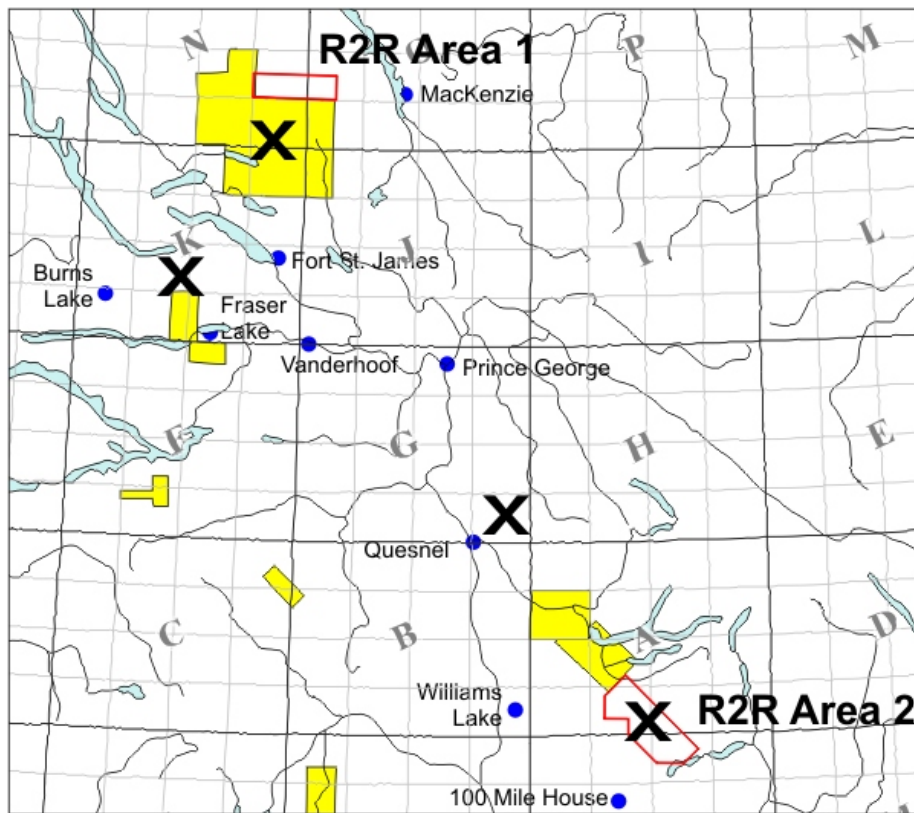


Figure 1: Location of Rocks to Riches funded survey blocks (open polygons in R2R Areas 1 and 2). The black “x”s indicate only generalized locations of industry partner surveys.

imately one-third of the total surveying was completed in the 2004 field season, in three of several survey blocks. The data collected will be released in various formats, similar to the Toadogone and Horsefly surveys flown in 2003: a) on MapPlace on April 1, 2005, as grid images; b) as paper map Open Files in spring or early summer of 2005; c) as digital images of those maps in PDF format, in spring or summer of 2005.

Surveying will recommence under the same Fugro contract in late June or early July 2005, depending on field conditions. This startup period will support completion of all flying before the end of the summer. These results from

this portion of the survey program will follow a similar publication schedule and format as above, in 2006.

REFERENCES

- Cathro, M.S., Lane, R.A., Shives, R.B.K. and McCandless, P.M. (2004): Airborne multisensor geophysical surveys in the central Quesnel mineral belt; in *Geological Fieldwork 2003, BC Ministry of Energy and Mines*, Paper 2004-1, pages 185–188.