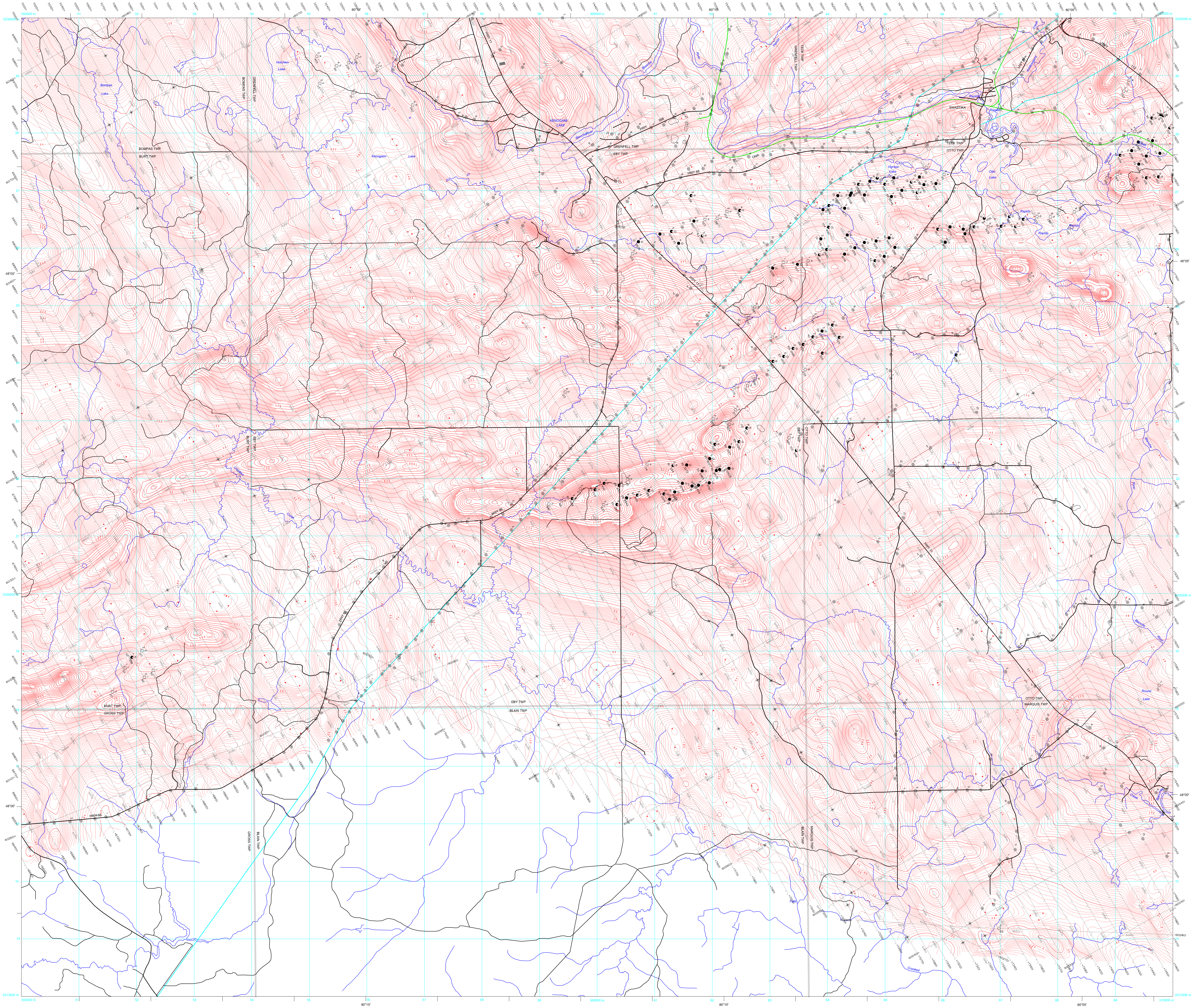


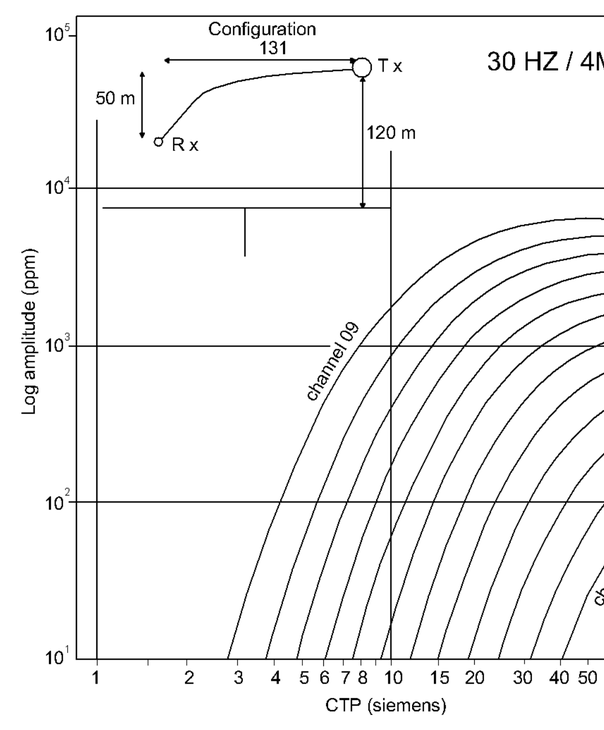
LEGEND

ELECTROMAGNETIC ANOMALY SYMBOLS

Anomaly	Conductance Classification
●	> 50 siemens
◕	30 - 50 siemens
◒	20 - 30 siemens
◔	10 - 20 siemens
⊕	5 - 10 siemens
○	1 - 5 siemens
✳	surficial conductor
⊞	cultural response

Line number — 12701
Line direction
Number of channels deflected — 10
Channel 10 amplitude (ppm) — 1800
Anomaly number — 26
Apparent depth (m) from vertical plate model — 37
Fiducial — 76150 / 76120

VERTICAL PLATE NOMOGRAM



MAGNETIC CONTOURS

- 5 nT contour
- 20 nT contour
- 100 nT contour
- 500 nT contour
- Magnetic depression

OTHER SYMBOLS

(Some symbols may not apply to this map)

- Drainage
- Hydroelectric power line
- Railway line
- Highway or main road
- Trail
- Township or Provincial Park boundary
- Cultural features

SURVEY PARAMETERS

AIRCRAFT
Type: CASA 212-200
Registration: C-GDPP and C-FDKM

MAGNETOMETER
Type: Scintrex CS-2 cesium-vapour
Sensitivity: 0.01 nT
Noise level: 0.20 nT
Sample interval: 10 readings/second
Bird location: 45 m below and 80 m behind centre of aircraft

ELECTROMAGNETIC SYSTEM
Type: GEOTEM® III
Base frequency: 30 Hz
Current waveform: half-sine
Peak dipole moment: 696 000 A.m.m.
Pulse width: 4,080 μsec
Off-time: 12,486 μsec
Pulse repetition: 60 per second
Measured parameters: X, Y and Z-components of the B-field and dB/dT
Noise levels: X-coil - 3500 pT/s, Z-coil - 2000 pT/s
Sample interval: 4 readings/second (384 per pulse for half-wave data)
Bird location: 51 m below and 131 m behind centre of aircraft

NAVIGATION SYSTEM
GPS receiver: Sercel NR 103
GPS sample interval: 1 reading/second
Radar altimeter: King KRA405
Radar sample interval: 2 readings/second
Barometric altimeter: Rosemount 1241M
Barometric sample interval: 1 reading/second
Video flight path recorder: Panasonic WV-CL302
Digital acquisition system: GeoDAS
Analog chart recorder: RMS GR33

BASE STATION
Magnetometer: Scintrex CS-2 cesium-vapour
Magnetometer sample interval: 2 readings/second
GPS receiver: Sercel NR 103
GPS sample interval: 1 reading/second

SURVEY SPECIFICATIONS

Survey date: November 9, 1999 to January 18, 2000
Nominal aircraft terrain clearance: 120 m
Traverse line spacing: 200 m
Control line spacing: 1500 m
Traverse line direction: Block A - 030°
Block B - 150°
Block C - 0°
Block D - 130°
Control line direction: Block A - 120°
Block B - 060°
Block C - 090°
Block D - 040°

COORDINATE SYSTEM

Projection: Universal Transverse Mercator
Datum: NAD27 (NTv2)*
Central meridian: 81°00' W (UTM zone 17N)
Central scale factor: 0.9996
False easting: 500 000 m
False northing: 0 m
* The geophysical data was collected using the UTM NAD83 datum (WGS84 ellipsoid), then reprojected to the NAD27 datum (Manitoba, Ontario mean) and finally shifted 2.0 m east and 5.1 m south to best approximate the OBM topographic base.

Ontario

Ontario Geological Survey

MAP 82 039

AIRBORNE MAGNETIC AND ELECTROMAGNETIC SURVEYS

KIRKLAND LAKE AREA

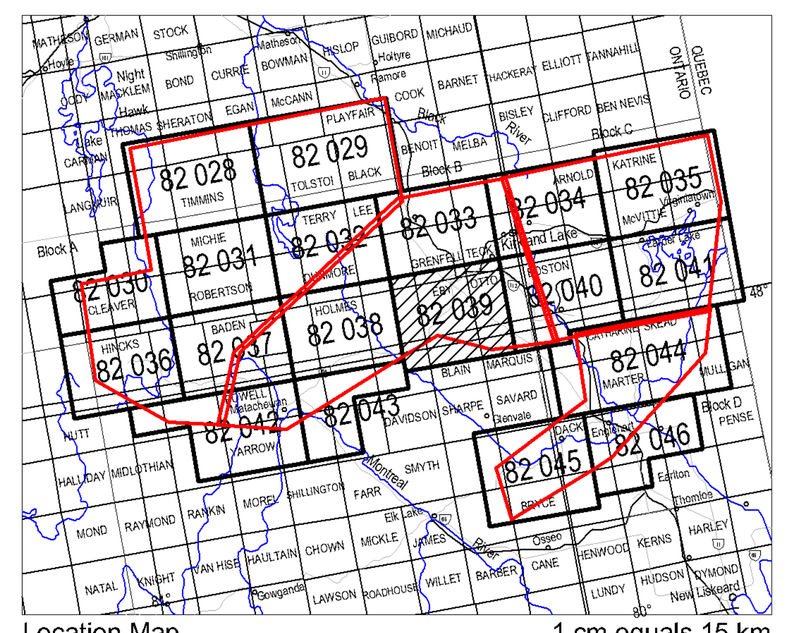
Scale 1:20 000

500 m 0 0.5 1 km

OBM References: 20 17 5500 53100, 20 17 5500 53200, 20 17 5600 53100, 20 17 5600 53200.

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Location Map 1 cm equals 15 km

DESCRIPTIVE NOTES

Introduction

The aircraft is equipped with the Fugro Airborne Surveys (formerly Geoterrex) GEOTEM®III airborne EM system, a cesium-vapour magnetometer, a GPS navigation system and a GeoDAS digital data acquisition system. GEOTEM® is a high-power, time-domain EM system with a vertical-axis transmitter loop centred on the airplane. A three-axis (X, Y and Z) electromagnetic receiver and the magnetometer trail the aircraft in separate towed birds.

Residual Magnetic Field Map

The contours of residual magnetic intensity were generated from digitally recorded data. The magnetic data were corrected for diurnal variations, levelled to the control lines and interpolated onto a regular 40 m grid, using the minimum curvature algorithm. An International Geomagnetic Reference Field (IGRF) correction was applied to the total magnetic field data at survey altitude using the 1995 model year extrapolated to 1999.96 (December 14, 1999).

EM Anomalies

The quantitative interpretation of the GEOTEM® data is accomplished by comparing the resultant EM responses with type-curves obtained from mathematical model studies. The channel amplitude ratios of a given response are mainly a function of the conductance of its source. The response magnitude varies with conductor depth and geometry. The reference nomogram for the survey is a vertical plate, produced from a thin sheet model with 600 m strike length and 300 m depth extent, located at ground surface. If the shape of a geological conductor significantly differs from a vertical plate, all estimates become inaccurate or, in extreme situations, meaningless. Therefore, caution should be exercised when making recommendations for drilling or other follow-up activities based on quantitative interpretation of airborne electromagnetic data. Different results will be obtained using other models for quantitative interpretation.

The GEOTEM® system will respond to conductive overburden, near-surface horizontal conducting layers, man-made sources and bedrock conductors. Identification of natural conductors is based on the rate of transient decay, magnetic correlation and response shape, together with the response pattern and topography. Man-made responses are identifiable by examining the power line monitor and the flight track video.

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CREDITS

Data acquisition, data compilation and map production by Fugro Airborne Surveys, Ottawa, Ontario.

Contract management, base maps and map surrounds by the Ministry of Northern Development and Mines, Sudbury, Ontario.

Project management and quality assurance by Paterson, Grant & Watson Limited, Toronto, Ontario.

To enable the rapid dissemination of information, this map has not received a technical edit. Every possible effort has been made to ensure the accuracy of the information presented; however, the Ontario Ministry of Northern Development and Mines does not assume liability for any errors that may occur. Users can verify critical information from the corresponding digital profile, gridded and EM anomaly data distributed by the Ontario Geological Survey.

Where will you find your next mine?

This survey is part of the Operation Treasure Hunt geoscience initiative, funded by the Ontario Government.

Magnetic declination in 2000 for the centre of the map area is 11°59' W, with an annual variation of 1' E. Magnetic inclination in 2000 for the centre of the map area is 74°37' N.

Issued 2000.

Information from this publication may be quoted if credit is given. It is recommended that reference be made in the following form:

Ontario Geological Survey 2000. Airborne magnetic and electromagnetic surveys, Kirkland Lake area; Ontario Geological Survey, Map 82 039, scale 1:20 000.