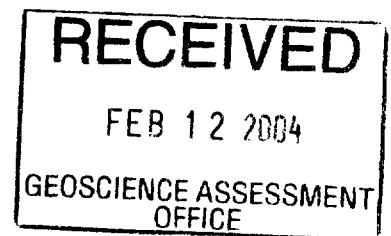


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**REPORT ON AN AIRBOURNE MAGNETIC SURVEY OF  
THE COPPERCORP PROPERTY, RYAN TOWNSHIP,  
SAULT STE. MARIE MINING DIVISION, ONTARIO**

Amerigo Resources Ltd.



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February 9, 2004



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## 1. Summary

This report on the Coppercorp Property was prepared following the completion of fieldwork for 2003. It describes the results of an airborne magnetic survey, undertaken on behalf of Amerigo Resources Ltd. (Amerigo) by Fugro Airborne during February 2003.

The Coppercorp property is located approximately 85 kilometres north of Sault Ste. Marie, Ontario. The Trans-Canada Highway (Highway 17) crosses the westernmost part of the property. Amerigo Resources Ltd. (Amerigo) has a 100% interest in five claim blocks on the western side of the property, and has the right to earn a 100% interest in the remaining claims from a group of prospectors.

The target of exploration on the property is iron oxide copper-gold mineralization of the Olympic Dam style. Previous work outlined copper mineralization with associated gold and silver, hosted by altered, hematite-rich basalt of Proterozoic (Keeweenawan) Age.

The copper mineralization consists dominantly of chalcocite with minor malachite and chalcopyrite associated with pyrite and hematite. The dominant alteration type in basalt is calcite-epidote, with lesser potassic feldspar and tremolite. Felsic volcanic and intrusive rocks are variably sericitized.

Historical work on the property included exploration for, and subsequent mining of, copper mineralization at the Coppercorp mine. Mining was discontinued in 1972 and little exploration has been performed on the mining lease since that time. More recent work undertaken by Cominco Ltd., on the northern portion of the property, included detailed geology, surface sampling, and magnetic and electromagnetic geophysical surveys.

Since signing the option agreement Amerigo has carried out mapping, prospecting, rock sampling, and an airborne magnetic survey. Results of this initial work are sufficiently encouraging to proceed with further surface work in order to advance the property to a first stage drill program.

## **2. Introduction and Terms of Reference**

This report describes the results of the airborne magnetic survey undertaken by Fugro Airborne Services on behalf of Amerigo. Amerigo's exploration programme was supervised by Dr. Roger Moss, Vice President of Exploration for Amerigo, and the qualified person for the project. He has been involved in exploration on the property since September 2002 and directly supervised all of Amerigo's work. This report is based largely on this experience, prior technical reports, and current and historical data. Sections three through ten of this report are summarized from the report by Tortosa and Moss (2003). Dr. Moss developed Amerigo's model for IOCG exploration in the Sault Ste. Marie area and has been active in the investigation of Proterozoic iron-oxide copper-gold deposits for the past three years.

## **3. Disclaimer**

The use of the term 'ore reserve' in this report should be viewed strictly in its historical context and should not be correlated with the categories set out in sections 1.3 and 1.4 of National Instrument 43-101.

The historical pre-production estimated ore reserve figures for the Coppercorp Mine were obtained from Source Mineral Deposit Records (SMDR000852) of the Sault Ste. Marie District Geologist's Office, Ministry of Northern Development and Mines and a Coppercorp Mine report dated November 12, 1965. Although there are a few underground plans and drill holes showing mineralized intersections related to the mineralized zones, no known reports or records indicate official ore reserve calculations for the Coppercorp Mine. As such it is not possible to determine the reliability of the historical estimates or whether they are in accordance with the categories set out in sections 1.3 and 1.4 of National Instrument 43-101. In addition, no records have been found which document any remaining reserves in the mine when it ceased operation in 1972.

For the purposes of this technical report, production figures for the Coppercorp Mine are based on data from Source Mineral Deposit Record 000852 (Sault Ste. Marie District Geologist's Office, Ministry of Northern Development and Mines).

#### **4. Property Description and Location**

The property is located in Ryan Township, Sault Ste. Marie Mining Division, Sault Ste. Marie, Ontario, Canada (Figure 1). It consists of 28 unpatented, contiguous claims consisting of 225 claim units (Table 1, Figure 2). One claim (1235019) was staked in February 2001, but most of the claims (16) occur within the Montreal Mining Company Sand Bay Location, ground that was closed for staking until June 1, 2002. At this time, the 16 claims were staked together with 6 others to the east of the Sand Bay Location.

Amerigo entered into an option agreement dated September 11, 2003 to earn a 100% interest in these claims from a group of three prospectors. In order to earn the 100% interest, Amerigo agreed to:

- 1) Pay \$30,000 cash and issue 200,000 common shares on approval of an option agreement, (Completed)
- 2) Issue a further 400,000 common shares and pay a further \$70,000 cash over 4 years, provided that, Amerigo may at its option, issue shares of equivalent value in lieu of cash for all but the initial cash payment,
- 3) Spend \$200,000 on exploration over 4 years, and
- 4) Provide the prospectors with a net smelter return royalty of 3% from any future production from the property. Amerigo retains an option to buy back 1.5% of the royalty for \$1,500,000.00.

The terms relating to cash payments, share issuances and exploration expenditures in the option agreement were amended in May 2003 to the following:

Cash payments of \$75,000 and issuance of 300,000 shares for a total of 500,000 shares and \$105,000 over 4 years and exploration expenditures of \$400,000 over 4 years.

Subsequent to the option agreement, Amerigo staked 5 additional claims along the western boundary of the property (Table 1). These claims are owned 100% by Amerigo.



Figure 1: General Location Map of the Coppercorp Property

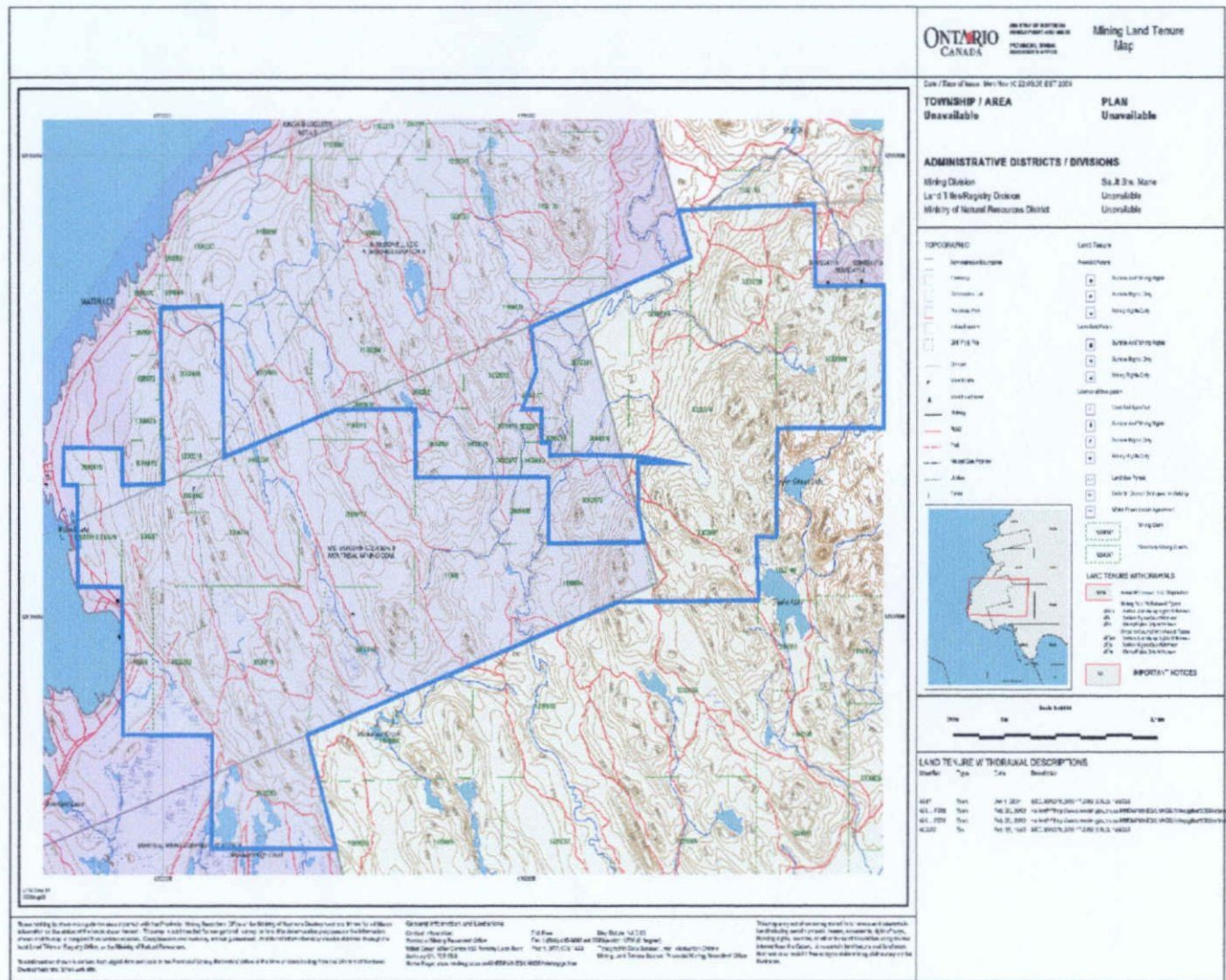


Figure 2. Claim map of the Coppercorp Property as at 10 November, 2003. Outline of the property is shown in blue



Table 1. Claims comprising the Coppercorp Property

| Claim Number | Number of units | Approximate Area (ha) | Due date         | Expenditure Required |
|--------------|-----------------|-----------------------|------------------|----------------------|
| 3000714      | 11              | 176                   | June 26, 2004    | \$4,400              |
| 3000715      | 15              | 240                   | June 26, 2004    | \$6,000              |
| 3000716      | 13              | 208                   | June 26, 2004    | \$5,200              |
| 3000717      | 16              | 256                   | June 26, 2004    | \$6,400              |
| 3002392      | 8               | 128                   | June 26, 2004    | \$3,200              |
| 3002393      | 11              | 176                   | June 26, 2004    | \$4,400              |
| 3000720      | 15              | 240                   | June 26, 2004    | \$6,000              |
| 3000719      | 5               | 80                    | June 26, 2004    | \$2,000              |
| 1199911      | 15              | 240                   | June 26, 2004    | \$6,000              |
| 3000666      | 4               | 64                    | June 26, 2004    | \$1,600              |
| 1199912      | 4               | 64                    | June 26, 2004    | \$1,600              |
| 1199984      | 14              | 224                   | June 26, 2004    | \$5,600              |
| 3002319      | 2               | 32                    | June 26, 2004    | \$800                |
| 3002697      | 13              | 208                   | June 26, 2004    | \$5,200              |
| 3000718      | 1               | 16                    | June 26, 2004    | \$400                |
| 3002341      | 11              | 176                   | June 26, 2004    | \$4,400              |
| 3002310      | 15              | 240                   | June 26, 2004    | \$6,000              |
| 3002398      | 16              | 256                   | June 26, 2004    | \$6,400              |
| 3002698      | 6               | 96                    | June 10, 2004    | \$2,400              |
| 1235019      | 3               | 48                    | Feb 26, 2004     | \$231                |
| 3002577      | 1               | 16                    | July 15, 2004    | \$400                |
| 3002320      | 3               | 48                    | June 10, 2004    | \$1,200              |
| 3002342      | 1               | 16                    | June 10, 2004    | \$400                |
| 3002616*     | 2               | 32                    | December 5, 2004 | \$800                |
| 3002570*     | 3               | 48                    | December 5, 2004 | \$1,200              |
| 3002571*     | 6               | 96                    | December 5, 2004 | \$2,400              |
| 11922284*    | 3               | 48                    | June 25, 2005    | \$1,200              |
| 1192285*     | 8               | 128                   | June 25, 2005    | \$3,200              |
| Total        | 225             | 3584                  |                  |                      |

\*Claims staked by Amerigo Resources subsequent to the option agreement

## 5. Accessibility, Climate, Local Resources, Infrastructure and Physiography.

The property is located in the Batchawana Bay area on the east shore of Lake Superior (Figure 3). Access to the property is by paved highway (Highway 17) about 80 kilometres north of Sault Ste. Marie, followed by a gravel road. A system of logging roads provides further access to different parts of the property.

The western portion of the Coppercorp Property is characterized by moderate to low relief. Drainage and topography are influenced by the northwest trending strike of the volcanic and sedimentary strata of the Mamainse Point Formation. The eastern part of the property has moderate to high relief and partly overlies the metavolcanic rocks of the Batchawana Greenstone Belt. Separating these physiographic areas is the Pancake River and river valley, which runs southerly through the central part of the property (Figure 3).

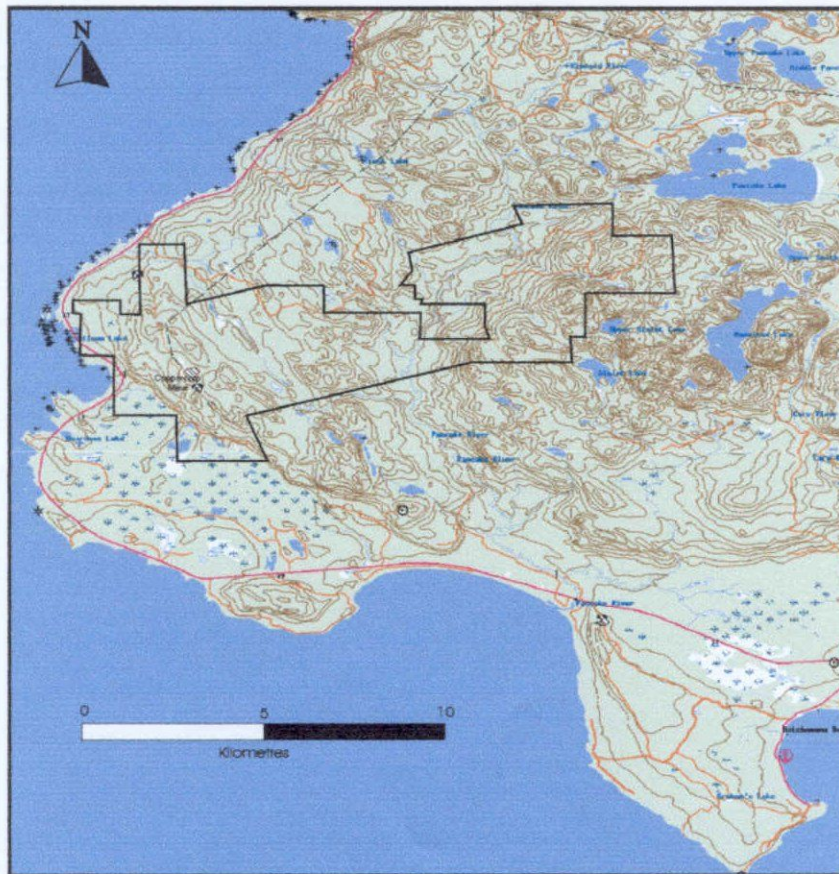


Figure 3: Topographic Map of the Mamainse Point Area

Elevation ranges from 700 - 1000 feet a.s.l. in the western portion and 700 to 1700 feet a.s.l. in the eastern section. Vegetation consists of mixed hardwoods and softwoods, and there are several logging companies active in the area.

An industrial electric transmission corridor was constructed by Great Lakes Power Company to serve the Coppercorp Mine, and crosses the western part of the property. Water is available from Lake Superior and in limited quantities from small creeks throughout the property.

## 6. History

The Amerigo Property has a history of prospecting, mineral exploration and mining activity that dates back to the late 1800's. The history of ownership of the Montreal Mining Company Sand Bay Location is summarized in Table 2.

In 1948-49 old copper showings in the area were examined and drilled by Macassa Mines who later optioned the property to C.C. Houston and Associates. Subsequent drilling of 33,400 feet by the end of 1952 had outlined several mineralized zones in the Coppercorp Mine area, including the C Zone, D Zone, SB Zone and Silver Creek Zone.

Table 2. History of Ownership of Montreal Mining Sand Bay Location

| <b>Years</b> | <b>Ownership</b>                                                               |
|--------------|--------------------------------------------------------------------------------|
| 1856-1857    | Montreal Mining Co.                                                            |
| 1871         | Ontario Mineral Lands Co.                                                      |
| 1882-1884    | Silver Islet Consolidated Mining and Lands Co.                                 |
| 1890         | Canada Lands Purchase Synd.                                                    |
| 1892         | Nipigon Mining Co.                                                             |
| 1906-1908    | Calumet and Hecla Co.                                                          |
| 1948         | Macassa Mines Ltd.                                                             |
| 1951         | C.C. Huston and Associates                                                     |
| 1955         | Coppercorp Ltd.                                                                |
| 1964         | Part of Property leased by Vauze Mines Ltd.<br>North Canadian Enterprises Ltd. |
| 2002         | Terry Nicholson & William Gibbs                                                |

Source: Ontario Division of Mines Source Mineral Deposit Record 000852.

A new company, Coppercorp Limited, was created and in 1954 proceeded to sink a shaft to 550 feet with levels at 250, 375, and 500 feet (Coppercorp Annual Report

1965). During the underground development, 14,000 feet of lateral development were completed and 60,000 tons of ore were stockpiled. Operations ceased in 1957 due to falling copper prices.

From 1962 to 1964 Vauze Mines Limited (controlled by Sheridan Geophysics Limited) completed additional drilling along with a surface exploration program that included geophysical surveys and geological and geochemical examinations.

A decision was made in 1965 to bring the Coppercorp deposit into production and the original shaft was de-watered and deepened to 629 feet. Underground development resumed at a production rate of 500 tons per day producing copper concentrate (approximately 50% copper) with a recovery in excess of 90%. Concentrates from the Coppercorp deposit contained copper, silver, and gold (example: 1087 short tons of concentrate contained 50.18% copper, 7.72 oz/ton silver, and .222 oz/ton gold; Heslop, 1970, pg. 63). Some of the available historical statistics on underground development, drilling, pre-production ore reserve estimates and production figures are provided in Tables 3, 4 and 5.

Table 3: Historical statistics on underground development and drilling at the Coppercorp Mine.

| <b>Exploration Activity</b> | <b>Type of Activity</b>  | <b>Information Source</b> |
|-----------------------------|--------------------------|---------------------------|
| Underground Development     | Drifting : 34,882 feet   | SMDR 000852               |
|                             | Crosscuts: 3,628 feet    | SMDR 000852               |
| Drilling                    | Surface: 16,000 feet     | SMDR 000852               |
|                             | Underground: 20,000 feet | SMDR 000852               |

Table 4: Historical Pre-Production Ore Reserve Estimates\* at the Coppercorp Mine

| <b>Mineralized Zone</b>                               | <b>Ore Reserve Estimate</b> | <b>Information Source</b>                                    |
|-------------------------------------------------------|-----------------------------|--------------------------------------------------------------|
| C Zone and C Zone South**                             | 400,000 tons @ 2.3% Cu      | SMDR 000852; Coppercorp Report for 1965                      |
| Silver Creek South Zone                               | 490,000 tons @ 1.9% Cu      | SMDR 000852; Coppercorp Report for 1965                      |
| SB and Silver Creek North Zones                       | 650,000 tons @ 2.1% Cu      | SMDR 000852; Coppercorp Report for 1965                      |
| Total Ore Reserve Estimate for the Coppercorp Deposit | 1,540,000 tons @ 2.1% Cu    | SMDR 000852; Coppercorp Report for 1965; Northern Miner 1965 |

\* Ore reserve estimates were given to the 500 foot level. See Note below on the use of 'ore reserve' terminology.

\*\* C Zone South was also referred to as the C2 Zone.

Table 5: Coppercorp production (Source: SMDR 000852)

| Year            | Tons Hoisted   | Tons Milled      | Au (Oz)      | Ag (Oz)        | Cu (lbs)          |
|-----------------|----------------|------------------|--------------|----------------|-------------------|
| 1957*           | 60,000         |                  |              |                |                   |
| 1965            | 14,882         | 38,919           | 386          | 30,069         | 832,928           |
| 1966            | 118,848        | 149,691          | 390          | 37,296         | 3,716,325         |
| 1967            | 146,601        | 146,441          | -            | 35,500         | 3,557,000         |
| 1968            | 142,986        | 142,986          | 268          | 33,622         | 3,175,730         |
| 1969            | 161,488        | 161,488          | 249          | 55,761         | 4,769,452         |
| 1970            | 141,055        | 140,830          | 231          | 1,785          | 2,447,500         |
| 1971            | 155,811        | 156,111          | 440          | 33,570         | 3,109,758         |
| 1972**          | 83,519         | 84,892           | ?            | ?              | 2,173,235         |
| <b>Total***</b> | <b>965,190</b> | <b>1,021,358</b> | <b>1,964</b> | <b>237,603</b> | <b>23,782,028</b> |

\* From 1955-1957 development ore was stockpiled by Coppercorp; not included in total.

\*\* Copper grade was reported to be 1.28%.

\*\*\* From 1969 to 1972 the Coppercorp Mine had disputed accounting for ore production (Northern Miner Handbook, 1972-73, pg.97). For the purposes of this technical report a production figure of 1,021,358 tons milled at 1.16% Cu is used based on data from Source Mineral Deposit Record , Sault Ste. Marie District Geologist's Office, MND&M).

**NOTE: The use of the term 'ore reserve' in this report should be viewed strictly in its historical context and should not be correlated with the categories set out in sections 1.3 and 1.4 of National Instrument 43-101 (See item 2).**

## 6.1 Recent Exploration

### 6.1.1 Coppercorp Limited

Much of the Amerigo Property was closed to staking up to June 1, 2002, and so only those parts of the property outside of the Montreal Mining Company Sand Bay Location have received the recent attention of prospectors and explorationists. Recent exploration activity has focused on the area of the Lutz vein and L zone, situated approximately 3 kilometres north-northwest of the Coppercorp Shaft. An adit was driven into the Lutz vein, but historical records are unavailable. Both mineralized zones are located on the northwestern strike extension of the Coppercorp Mine workings.

In the mid-1960's, Coppercorp Limited completed induced potential, magnetic, electromagnetic and geochemical surveys in this area as part of a surface exploration program on their property holdings. The magnetometer surveys were considered useful in delineating geological contacts and geologic structure. The electromagnetic survey

identified several intermediate to poor conductors that appeared to coincide with superficial clay deposits (altered felsite). The geochemical survey was useful in identifying strong copper anomalies. The IP survey was useful in outlining known copper occurrences and identifying similar anomalies not previously explored.

Results from the surface exploration program (Burns, 1965; Disler, 1967) identified several geochemical and geophysical anomalies in the Lutz vein and L zone area and elsewhere on the Coppercorp property to the south for follow-up drill testing.

#### 6.1.2 J. F. Paquette

More recently, in 1991-92, the property containing the Lutz vein and L zone was explored by J.F. Paquette who completed a self-potential survey along with prospecting, and sampling (Rupert, 1991 and 1993). Results from the self-potential survey identified a number of anomalies. However it was concluded that there was no clear correspondence between known zones of mineralization and the SP anomalies (Rupert, 1993). Assays for gold taken from the mineralized areas of the Lutz vein and L zone returned values ranging from 1 to 7.19 gm/tonne from 8 of the samples. Although gold values occur with copper, there is no apparent correlation between copper and gold concentration (Rupert, 1991).

#### 6.1.3 Cominco Limited

In 1993, Cominco Limited optioned the property containing the Lutz vein and L zone and completed geological mapping, surficial geochemistry, electromagnetic (UTEM) and magnetic surveys (Lum, 1994; Smith, 1995).

The magnetic survey identified several magnetic highs that were interpreted as geological units offset by cross-cutting faults. The UTEM survey, designed to identify deep-seated conductors, showed no significant anomalies. Several narrow zones of low resistivity are associated with magnetic lows and with some known copper showings (Lum, 1994).

Geochemical surveys using soil and humus samples identified copper anomalies over the L zone, but not the Lutz vein. A broad area of above average copper and gold

values was identified north and south of an exposed felsic porphyry intrusion that is situated approximately 300 metres west of the mineral occurrences (Smith, 1995).

Chip samples taken by Cominco across a mineralized section of the Lutz vein adit contained up to 6000 ppb gold and 28,000 ppm copper from a chalcocite-bearing, quartz-carbonate breccia. Chip samples taken across a mineralized section of the L zone contained up to 19,500 ppb gold and 50,500 ppm copper in a chalcocite-chalcopyrite vein (Smith, 1995, Assessment File Records, Ryan Township, Sault Ste. Marie District Geologist's Office).

## **7. Geological Setting**

The area of interest is situated on the eastern edge of the Mid-Continental Rift (MCR) which underlies what is now Lake Superior and was active during the mid-Proterozoic, Keweenawan period (1100-1200 Ma). The Keweenawan rocks of the MCR are characterized by regionally extensive gravity and magnetic anomalies, and by large-scale crustal structures throughout the Lake Superior region.

The western three-quarters of the Amerigo Property covers Keweenawan-age (1100-1200 Ma) volcanic and sedimentary rocks of the Mamainse Point Formation. This rock formation unconformably overlies Archean-age metavolcanic rocks of the Batchawana Greenstone Belt that cover the eastern quarter of the property (Figure 4).

## **8 Geophysical Setting**

Regional airborne magnetic and electromagnetic surveys were flown over the Batchawana area at a 200 metre line spacing by the Ontario Geological Survey (OGS, 1992). In the Mamainse Point area there is a dramatic increase in the regional magnetic intensity of the rocks for the Mamainse Point Formation, primarily due to the mafic volcanic lavas in the sequence (Figure 5). The volcanic stratigraphy is partly outlined by the aeromagnetic survey due to the higher magnetic susceptibility of some of the volcanic flows. Segmentation of the magnetic horizons can be correlated with lateral displacement along faults.

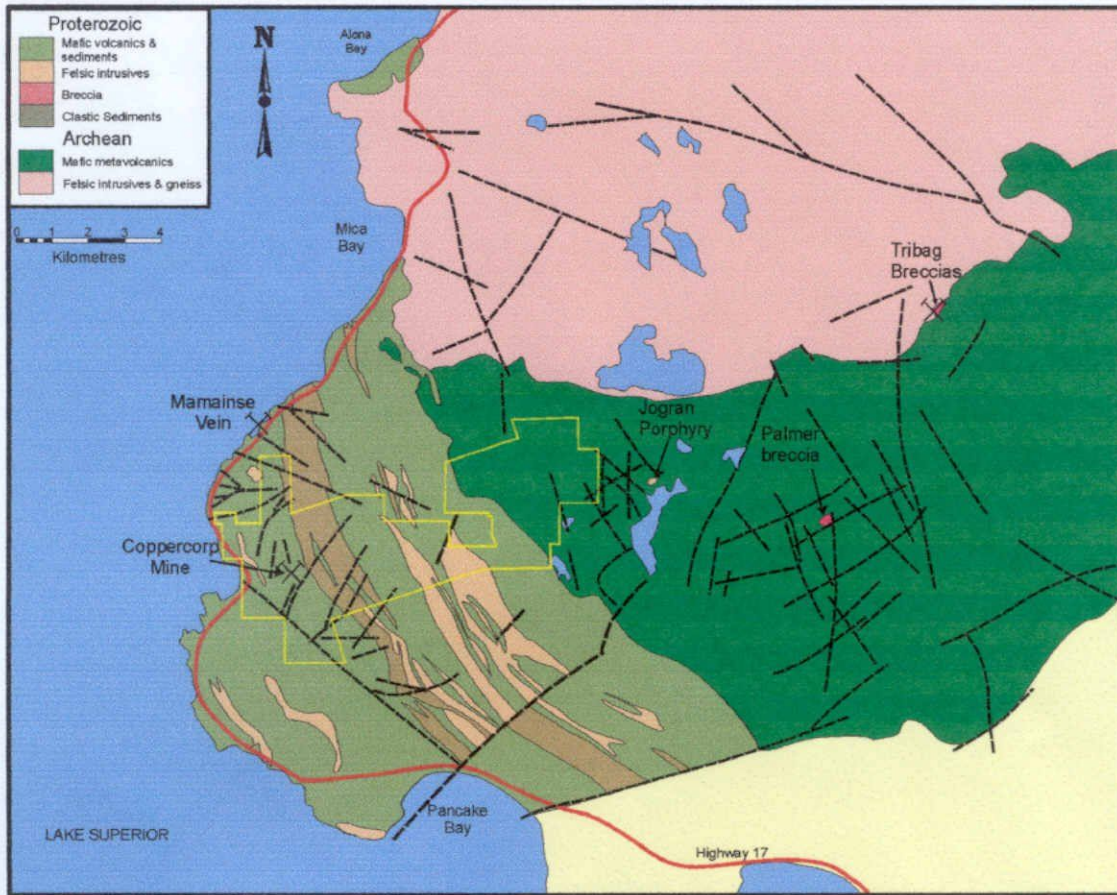


Figure 4. Regional geology of the Batchawana - Mamainse area, showing outline of the Coppercorp Property. (after Giblin, 1973; Richards, 1995).



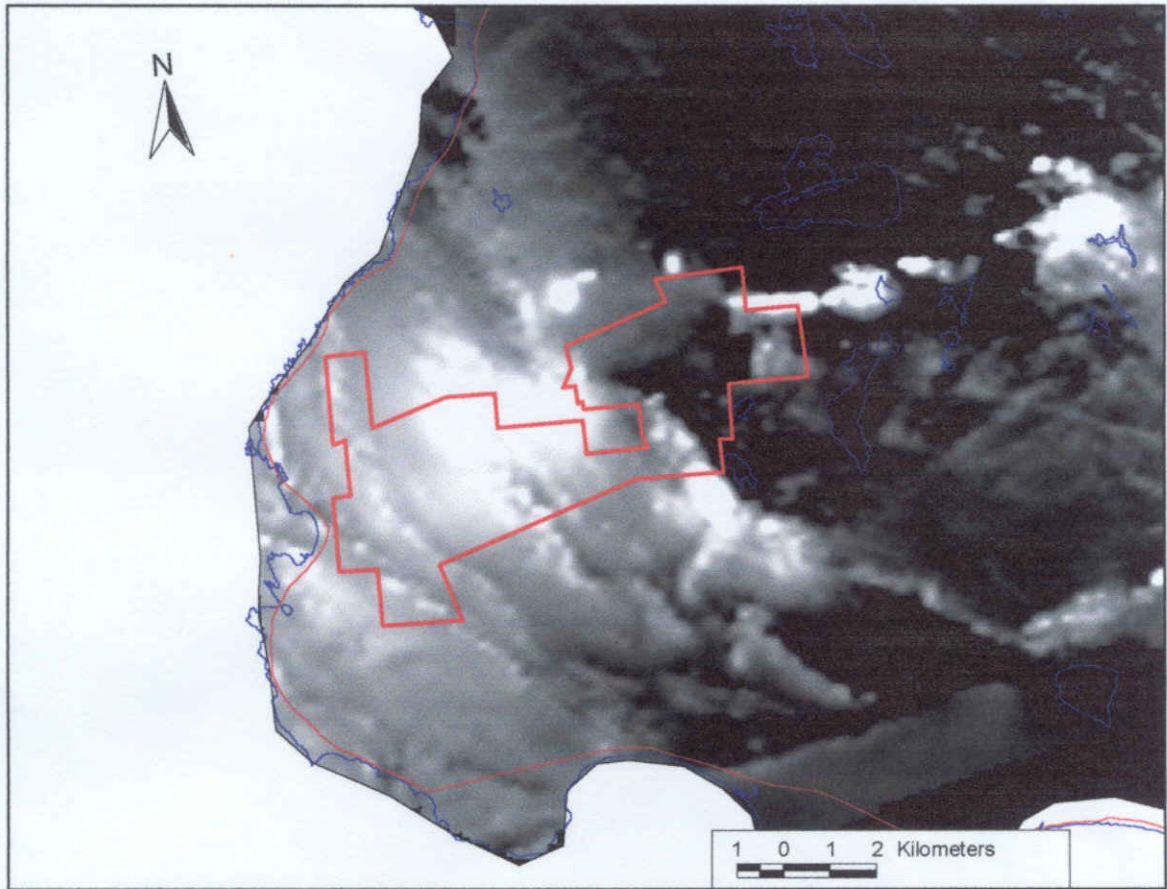


Figure 5. Aeromagnetic Map of the Mamainse Point area displaying the Amerigo Property outline; whiter areas represent areas of higher magnetic intensity.

An area of high magnetic intensity occurs in the north-central part of the Amerigo Property (Figure 5). The magnetic anomaly has a broad east-west trend and is segmented by regional faults. Mapped geological units in this area follow a northwest trend and do not coincide with the orientation of the magnetic feature.

An east-west trending linear magnetic high occurs at the northeast end of the property and can be attributed to the Pancake Lake Iron Formation. There are a number of circular to elliptical magnetic features in areas near the property that cannot be easily explained.

Airborne electromagnetic anomalies have low conductance, are irregularly distributed and appear to reflect areas of conductive overburden (Pancake River valley).

## **9. Deposit Type**

### *9.1 Introduction*

An iron oxide copper-gold (IOCG) deposit of the Olympic Dam-type is the target of exploration on the Coppercorp Property. The tectonic setting, the geology of the region and the presence of several copper deposits with significant associated iron oxide suggest that this area has potential for Olympic Dam-type deposits.

Iron oxide copper-gold deposits are attractive exploration targets due to their common large size and multi-metal nature. Exploration for these deposit types, especially among junior explorers, has suffered from the lack of rigorously defined models, both empirical and genetic, and well documented case histories. Several recent publications (Vancouver Mining Exploration Group, 2000; Porter, 2000; 2002) have however provided a broad framework of models and case histories that may be used in targeting areas for IOCG potential, and for designing follow-up exploration programs. However, as pointed out by Pollard (2000), IOCG deposits are part of a broad spectrum of copper-gold deposits that include both porphyry and skarn-type deposits and rigid application of deposit specific characteristics to exploration should be avoided.

## *9.2 Characteristics of IOCG deposits*

While IOCG deposits range in age from the Archean to the Neogene, many of the deposits, including most Australian examples such as Olympic Dam and Ernest Henry, are Proterozoic in age. There are many inferred tectonic settings for the deposits, with an anorogenic or rift-related setting being most widely postulated (Barton and Johnson, 1996). However, it appears that regardless of the specific setting, an extensional environment is of fundamental importance (Gandhi and Bell, 1995). A strong structural control is noted in most deposits, with mineralization emplaced along major regional faults or fracture systems, at intersections of faults or in axes of major fold systems (Oreskes & Hitzman, 1993).

Typically IOCG deposits show spatial and temporal links with igneous rocks, including alkalic granitoids and volcanic rocks, calc-alkalic mafic, intermediate and felsic suites, continental flood basalts and rift-related basalts (Barton & Johnson, 1996). Many deposits are directly associated with the emplacement of high level felsic plutons (Ghandi & Bell, 1995; Wall, 2000), typically occurring in the roof zones of the pluton (Ethridge & Bartsch, 2000). Mineralization is commonly hosted by hydrothermal intrusive breccias or diatreme breccias (Reeve et al., 1990; Pollard, 2000).

IOCG mineralization consists of Ti-poor iron oxide, with lesser phosphates, Cu- and Cu-Fe sulphides, and variable Au, U, Ag and Co (Barton & Johnson, 1996). To some degree it is the low Ti nature of the iron oxide that ties otherwise disparate mineral deposits of the IOCG class together. The most common iron oxides are hematite and magnetite. Magnetite is typically early and occurs in the deeper or more proximal parts of the hydrothermal system, whereas hematite is later, more distal and may overprint the earlier magnetite (Barton & Johnson, 1996; Oreskes & Hitzman, 1993). The magnetite may be accompanied by apatite (e.g. Kiruna) and Cu-Fe-Sulfides (e.g. Ernest Henry, Candelaria) and widespread sodic alteration. Gold and Cu-Fe sulphides are associated with hematite-stage mineralization at Olympic Dam (Reeves et al., 1990; Barton & Johnson, 1996).

A broad range of elements may be associated with the mineralization. Apart from the Fe, Cu and in some cases Au and Ag, comprising the mineralization, deposits may be

anomalous in Ba, P, F, Cl, Mn, B, K, REE, U and Na and have elevated Co, Ni, Te, As, Mo and Nb abundances, whereas Ti and Cr tend to be depleted (Foose & Grauch, 1995).

Exploration for IOCG deposits relies heavily on gravity and magnetic surveys, with coincident gravity and magnetic anomalies being the preferred target (Gow et al., 1994). Detailed aeromagnetic surveys are recommended to map structure in the area of interest with likely dilational sites targeted for further follow up using alteration and geochemistry to site drillholes (Etheridge & Bartsch, 2000).

### *9.3 Application to the Coppercorp Property*

The following features, considered to be key exploration criteria for IOCG deposits, are relevant to the Mamainse-Batchawana area:

1. A continental rift-related tectonic setting on the eastern margin of the Mid Continent Rift system.
2. The Keweenawan basalts represent a significant volume of potential copper source rocks. A thickness of 14,300 to 19,900 feet (4.3 to 6 kilometres) has been estimated for the flows (Giblin, 1974).
3. The presence of a massive magnetite vein grading 3.9% copper over 1.05 metres at Jogran (Rupert, 1997) and fluorite associated with the Breton Breccia at Tribag (Blecha, 1974) and with Coppercorp ore (Rupert, 1997).
4. The presence of numerous faults some of which are splays off major crustal faults such as the Mamainse Point Fault to the south of the property.
5. The apparent high level emplacement of the felsic intrusives (Richards, 1985)
6. The presence of dilational sites along active structures (Heslop, 1970).
7. The presence of a high temperature saline brine (350°C to 450°C), 15-20 eq. wt. % CaCl<sub>2</sub> believed to be magmatic in origin and a lower temperature fluid (<100°C to 350°C, 0 to 15 eq. wt. %) believed to be a mixture of magmatic and meteoric fluid (Richards, 1985).
8. The occurrence of widespread Cu mineralization in the area as both low tonnage medium grade deposits (e.g. Coppercorp) and high tonnage low-grade deposits (e.g. East Breccia zone of Tribag mines).

9. The presence of a broad, regional aeromagnetic anomaly over the property (Figure 9) and the presence of several gravity anomalies (Mackie, 2003)
10. The production of limited amounts of gold and silver along with the copper at the Coppercorp Mine and the anomalous concentrations of gold and silver found in the outlying copper occurrences.

## **10. Mineralization**

Copper mineralization in the area occurs in two forms:

- Disseminated sub-economic native copper in amydules and veins
- Vein-hosted copper sulphide deposits

While it was the first of these that apparently brought the initial explorers to the area, only the second type of mineralization has been mined. The Coppercorp mine produced 1,021,358 tons grading 1.16% Cu plus approximately 237,603 ounces of silver and 1,964 ounces of gold from such veins between 1965 and 1972 (Source Mineral Deposit Record 000852).

Mineralized veins occur in fault-related breccia zones typically with a gradation from high-grade sulphide veins to barren oxide cemented breccias. The wallrock to the veins are commonly chloritized and sericitized and may contain epidote. The copper sulphides, dominantly chalcocite with lesser chalcopyrite and bornite, are usually accompanied by specular hematite.

Several other copper-dominant systems occur in the Mamainse Point - Batchawana area and are summarized in Table 6.

Table 6: Copper deposits in the Mamainse Point – Batchawana Area

| Deposit               | Deposit Type       | Production Years | Production             | Reserves                                         | Source |
|-----------------------|--------------------|------------------|------------------------|--------------------------------------------------|--------|
| Coppercorp            | Copper-quartz vein | 1965 to 1972     | 1.02 M tons @ 1.16% Cu | ?                                                | 4      |
| Mamainse              | Copper-quartz vein | 1882 to 1884     | ?                      | ?                                                | 2      |
| Tribag                | Breccia Pipes      | 1967 to 1973     | 1.1 M tons @ 1.65 % Cu | ?                                                | 1      |
| <i>Breton Breccia</i> |                    |                  |                        | 40M tons @0.2% Cu above 300m                     | 1      |
| <i>East Breccia</i>   |                    |                  |                        | 125M tons @0.13% Cu and 0.04% MoS <sub>2</sub>   | 3      |
| <i>West Breccia</i>   |                    |                  |                        | 0.1M tons @ 0.6 to 1.0% WO <sub>3</sub>          | 1      |
| Jogran                | porphyry           | N/A              |                        | 18M tonnes @ 0.19% Cu and 0.05% MoS <sub>2</sub> | 1      |

Sources: 1 Rupert, 1997; 2 Moore, 1926; 3. EM&R, 1989; 4. SMDR 000852

## 11. Exploration

Since optioning the property in September of 2002, Amerigo has carried out a detailed airborne magnetic survey, reconnaissance mapping and sampling, line cutting and detailed geological mapping and sampling. Dr. Roger Moss, the qualified person for the project, supervised all the work on the property.

### 11.1 Airborne Magnetic Survey

#### 11.1.1. Introduction

Fugro Airborne Surveys (Fugro) completed an airborne magnetic survey covering the Coppercorp property in February 2003. The survey consisted of 825 line kilometers flown at a 100-metre line spacing along a 060° traverse direction. Mr. Mouhamed Moussaoui, P.Eng. was Fugro's manager for the survey. The survey information is summarized in Table 7, and full details of the survey are given in the Fugro Airborne Surveys report included as Appendix 1. The instruments installed in the aircraft are listed in Table 8 and described in Appendix 1.

Table 7. Airborne magnetic survey information

|                                        |                                                            |
|----------------------------------------|------------------------------------------------------------|
| Survey name:                           | Sault Ste-Marie survey (Aeromagnetic survey)               |
| Contractor:                            | Fugro Airborne Surveys Quebec Limited                      |
| Contractor's job number:               | 03712                                                      |
| Mobilization dates:                    | February 1 <sup>st</sup> , 2003                            |
| Survey dates-start/finish:             | February 5 <sup>th</sup> - February 7 <sup>th</sup> , 2003 |
| Aircraft type and model:               | fixed-wing Cessna 208-B Grand Caravan, C-GNCA              |
| Base of Operations:                    | Sault Ste-Marie Airport (Ontario)                          |
| Total line-km flown:                   | 1,997.51 km                                                |
| Transect line direction for North blk: | N 60° E                                                    |
| Transect line spacing for North blk:   | 100 m                                                      |
| Tie line direction for North blk:      | S 150° E                                                   |
| Tie line spacing for North blk:        | 1000 m                                                     |
| Transect line direction for South blk: | N 40.5° E                                                  |
| Transect line spacing for South blk:   | 100 m                                                      |
| Tie line direction for South blk:      | S 145.5° E                                                 |
| Tie line spacing for South blk:        | 1500 m                                                     |
| Magnetometer (make & model):           | Scintrex CS-2                                              |
| Configuration:                         | Stinger                                                    |
| Aircraft altitude:                     | 100 m mean terrain clearance (contour)                     |
| Magnetometer altitude:                 | 100 m                                                      |
| Aircraft velocity:                     | 70 m/sec                                                   |
| Sample rate:                           | 0.1 sec                                                    |
| Magnetometer Sensitivity:              | 0.001 nT                                                   |

Table 8. Instruments in the survey aircraft.

| Aircraft | Magnetometer  | Compensator | Digital Acquisition system | GPS                    | Navigation         | Camera | Radar Altimeter | Barometer Altimeter |
|----------|---------------|-------------|----------------------------|------------------------|--------------------|--------|-----------------|---------------------|
| C-GNCA   | Scintrex CS-2 | RMS AADC-II | Geodas                     | Novatel Dual Frequency | Picodnas Pnav 2100 | CDS    | TRT AHV-8       | Rosemount           |

### 11.1.2. Survey Results

The results of the aeromagnetic survey indicate that the area of the property underlain by Keweenawan-aged rocks is characterized by moderate to high magnetic intensity (Figure 6). Several magnetic highs greater than 59,800 nanoTesla occur on the property and on claims immediately north of the Amerigo property. A large (three by three kilometre) magnetic anomaly (referred to as the “regional mag high”) encompasses these smaller highs and straddles the northern boundary of the Coppercorp property (Figure 6). Areas underlain by conglomerate are typically characterized by lower magnetic intensity than are those areas underlain by volcanic or intrusive rocks. The unconformity between the Keweenawan rocks and the Archean rocks to the west is

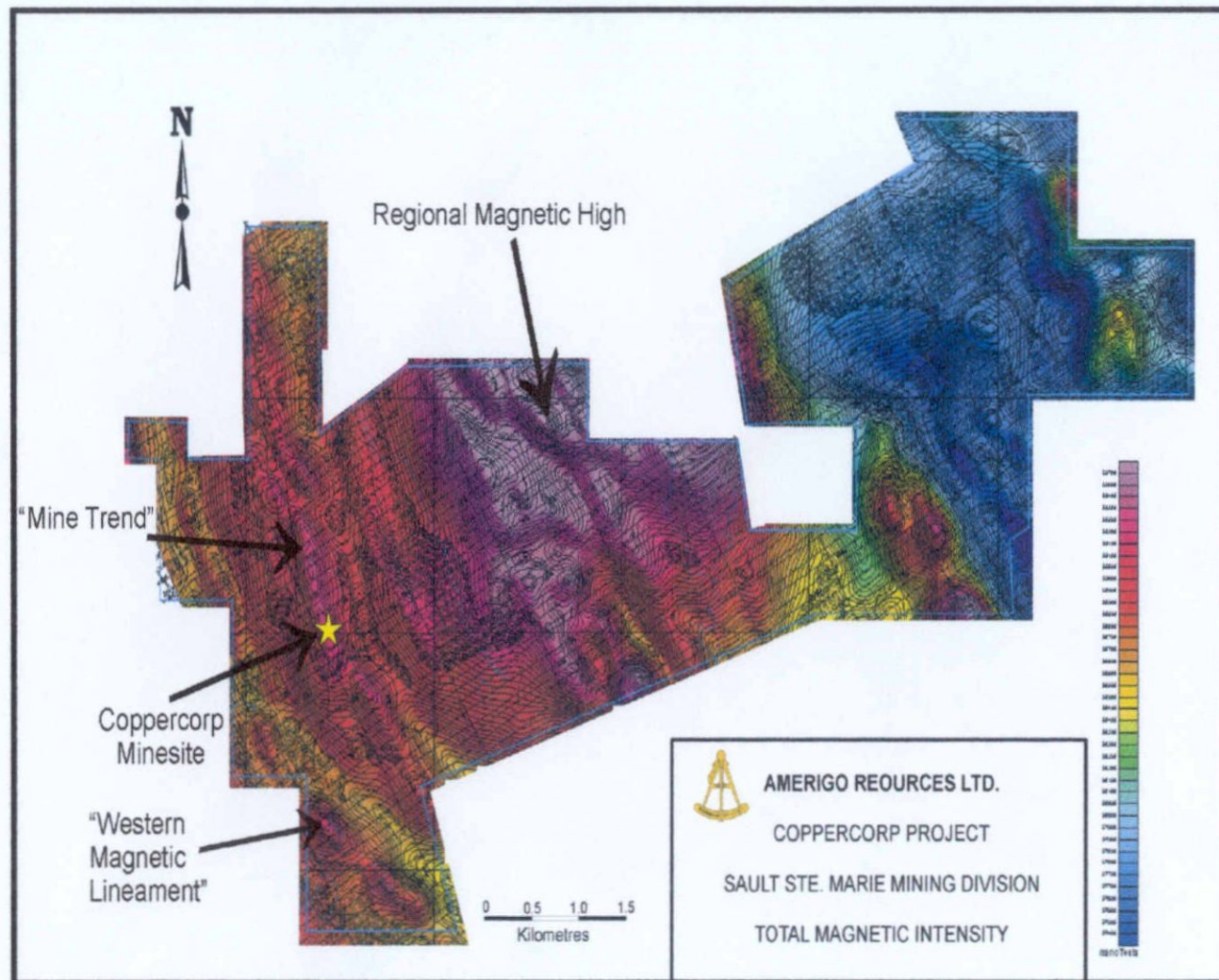


Figure 6. Total Magnetic Intensity: Coppercorp Property.



characterized by a steep magnetic gradient, with the Archean rocks generally having a much lower magnetic intensity.

A north-northeast trending magnetic lineament passes through the area of the old Coppercorp mine. This “mine trend” lineament approximately encompasses known mineralized occurrences to the north of the mine workings. The lineament appears to be offset by northeast and northwest trending faults at several locations along its length. A sub-parallel, lower intensity magnetic lineament (“western magnetic lineament”) occurs approximately one kilometre to the west of the “mine trend” lineament (Figure 6).

Several magnetic highs that occur in the Archean rocks in the eastern portion of the property are of interest, since copper-rich breccia pipe/porphyry occurrences, believed to be Proterozoic in age, occur to the east of the Coppercorp property (see Table 6).

## **12. Conclusions and Recommendations**

The airborne magnetic survey was successful in identifying several anomalies, and providing better resolution of previously known anomalies. Two distinct linear anomalies (“mine trend” and western magnetic lineament”) occur in the vicinity of the past producing Coppercorp mine. The lineaments are sub-parallel to stratigraphy and are offset in places, presumably by faults. Many of the copper occurrences that occur in this area appear to be associated with the lineaments, suggesting that magnetic surveys are a useful exploration tool in the region.

The most striking anomaly in the area is the three kilometre by three kilometre magnetic high, defined approximately by the 59,100 nanoTesla contour, that straddles the northern boundary of the claim block. Within this regional magnetic high, several discrete magnetic anomalies appear to be elongated in a northwest –southeast direction, sub-parallel to stratigraphy. These elongate anomalies are offset in places by west-northwest trending structures.

Mineralization in the vicinity of the Coppercorp mine site appears to be associated with linear magnetic highs. As such, it is recommended that magnetic highs elsewhere on the property continue to be followed up. A first phase follow up program of regional mapping and sampling is recommended as follows:

1. Further reconnaissance scale mapping and sampling should be undertaken in the Coppercorp west area to identify possible mineralization associated with the “western magnetic lineament”.
2. Further prospecting should be undertaken to the northeast and southwest of the Coppercorp mine area along the “mine trend”.
3. Reconnaissance mapping and sampling should continue east of the mine area towards the Pancake River and in the area of the Keweenawan/Archean unconformity, in the eastern part of the property. In particular, the magnetic high north of Upper Gimlet Lake should be investigated for Jogren-like chalcopyrite-magnetite mineralization.
4. Reconnaissance mapping, sampling and prospecting should continue in the area of the Regional Magnetic High to locate any mineralization associated with altered volcanic rocks and to assess the significance of the WNW trending magnetic lineament/fault.

Following completion of this first phase program, results should be reviewed and any prospective areas identified for detailed follow up.

Table 9. Budget for proposed exploration program on the Coppercorp Property

| Item                 | Total           |
|----------------------|-----------------|
| Crew Mob + Demob     | \$1,500         |
| Geologist            | \$15,000        |
| Assistant            | \$6,000         |
| Truck Rental & Gas   | \$4,100         |
| Accommodation & Food | \$4,500         |
| Analyses             | \$14,500        |
| Field Supplies       | \$300           |
| Contingency (~10%)   | 4,100           |
| <b>Total</b>         | <b>\$50,000</b> |

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## Certificate of Author

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I, Roger Moss, P.Geo. do hereby certify that:

1. I am President of Moss Exploration Services, 326 Rusholme Rd., Toronto, ON. M6H 2Z5
2. I graduated with a Ph.D. degree in Geology from the University of Toronto in 2000. In addition, I have obtained a M.Sc. degree in Geology from the University of Toronto in 1995 and a B.Sc. in Geology from the University of the Witwatersrand in 1988.
3. I am a member in good standing of the Association of Professional Geoscientists of Ontario (Registration Number 0192), the Canadian Institute of Mining, Metallurgy and Petroleum, and of the Society of Economic Geologists.
4. I have worked as a geologist for a total of six years since my graduation from university.
5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
6. I am responsible for the preparation of report titled "Report of an Airbourne Magnetic Survey of the Coppercorp Property, Ryan Township, Sault Ste. Marie Mining Division, Ontario" and dated 9 February, 2004 (the "Assessment Report") relating to the Coppercorp property. I last visited the Coppercorp property on 9 September, 2003 for 17 days.
7. I have had prior involvement with the property that is the subject of the Technical Report. The nature of my prior involvement is carrying out management of the exploration program on behalf of the Amerigo Resources Ltd.
8. I am not aware of any material fact or material change with respect to the subject matter of the Assessment Report that is not reflected in the Report, the omission to disclose which makes the Report misleading.
9. I am not independent of the issuer applying all of the tests in section 1.5 of National Instrument 43-101, since I am an insider of the issuer, I hold securities of the issuer, and I have received the majority of my income over the past two years from the issuer.
10. I have read National Instrument 43-101 and Form 43-101F1, and this Report has been prepared in compliance with that instrument and form.

Dated this Ninth Day of February, 2004.

\_\_\_\_\_  
Roger Moss



Appendix 1.

**HIGH SENSITIVITY AEROMAGNETIC SURVEY FINAL TECHNICAL REPORT**

# AMERIGO RESOURCES LIMITED

## HIGH SENSITIVITY AEROMAGNETIC SURVEY

Sault Sainte-Marie, Ontario

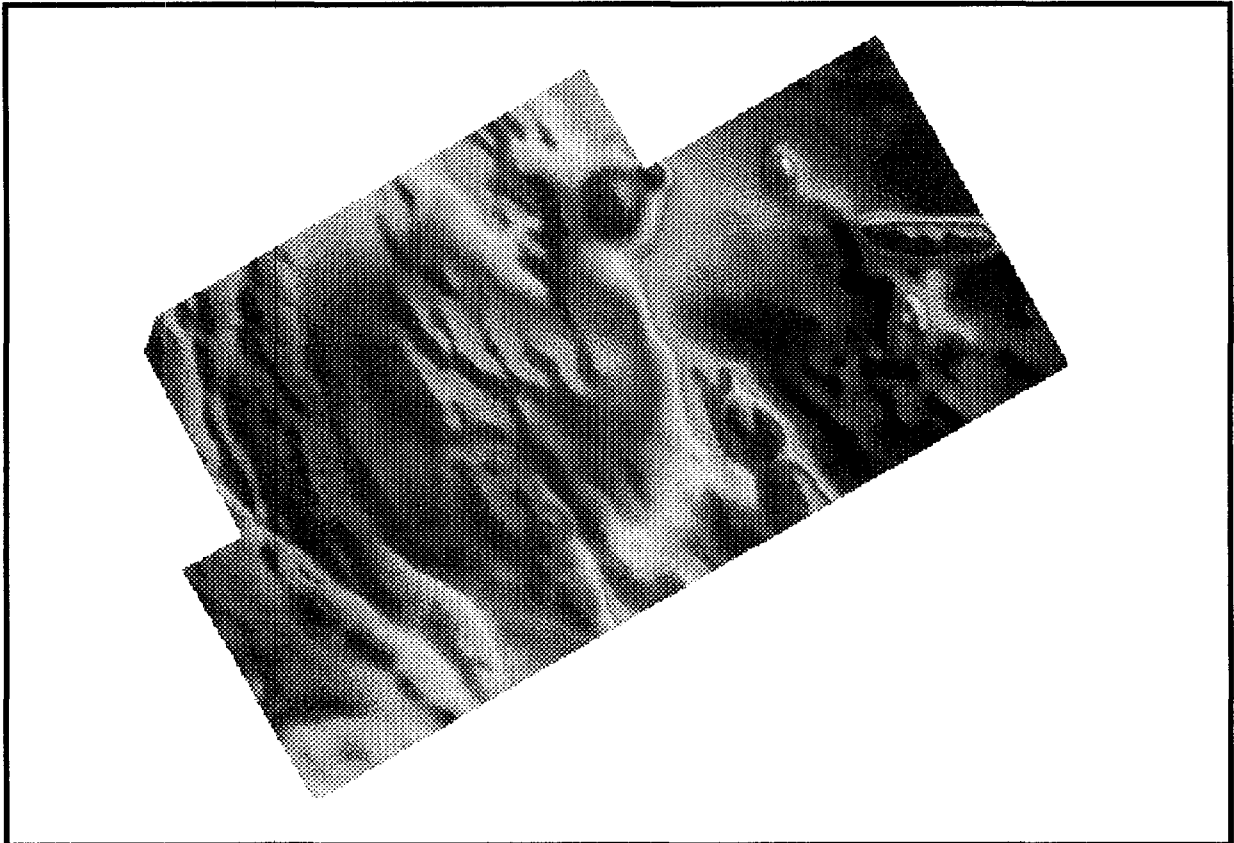
Project Ref. 03712

NTS Map Sheets : 41K/09-10-15-16 and 41N/01-02

FINAL TECHNICAL REPORT

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February 2003



**AMERIGO RESOURCES LIMITED**

**HIGH SENSITIVITY AEROMAGNETIC SURVEY  
SAULT SAINTE-MARIE AREA, ONTARIO**

**Project Ref. 03712**

**by**

**FUGRO AIRBORNE SURVEYS QUEBEC LTD.**

**February 2003**



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## FUGRO AIRBORNE SURVEYS

### 1.0 INTRODUCTION

From February 5<sup>th</sup> to February 7<sup>th</sup>, 2003, FUGRO Airborne Surveys Quebec Ltd. (FASQ) had flown a high-resolution aeromagnetic survey on two blocks located in Sault Sainte-Marie, Ontario.

The Northern block (figure 1) was flown with traverse lines spaced at 100 meters and oriented N 60° E. The spacing between traverse lines never varied by more than 50% from the nominal spacing over a distance of more than 2 km. Control lines were oriented S 150° E with a spacing of 1,000 meters and presented the same absolute horizontal deviation tolerance. The traverse lines spacing of the Southern block (figure 1) was flown at 100 meters and oriented N 40.5° E. The control lines were spaced at 1,500 meters with an orientation of S 145.5° E. Table 1 presents the specifications of the survey blocks and table 2 outlines the survey area. The nominal survey height was 120 meters above the surface of the ground. The topographic relief in the survey area presented no significant challenge in meeting altitude specifications.

The base of operation was located in the small town of Sault Ste-Marie, Ontario. The field quality control and data processing were performed at the main office in Montreal.

The primary goal of this project was to provide high quality digitally recorded and processed geophysical data in order to assist geological mapping to indicate structures potentially favourable to mineral explorations.

This report describes the survey procedures and data verification, which were carried out in the field, and the data processing, which followed at the office.

**FUGRO AIRBORNE SURVEYS**

| <b>Table 1: Survey Specifications</b> |                              |                            |                              |                             |                      |
|---------------------------------------|------------------------------|----------------------------|------------------------------|-----------------------------|----------------------|
| <b>BLOCK</b>                          | <b>TIE-LINE SPACING (m.)</b> | <b>TIE-LINE DIRECTIO N</b> | <b>TRAVERSE SPACING (m.)</b> | <b>TRAVERS E DIRECTIO N</b> | <b>TOTAL LINE-KM</b> |
| <b>Northern</b>                       | 1,000                        | 150°                       | 100                          | 60°                         | 825                  |
| <b>Southern</b>                       | 1,500                        | 145.5°                     | 100                          | 40.5°                       | 2,708                |

| <b>Table 2: Survey Areas (UTM WGS 84, Zone 16)</b> |           |                       |            |
|----------------------------------------------------|-----------|-----------------------|------------|
| <b>Southern Block</b>                              |           | <b>Northern Block</b> |            |
| <b>X</b>                                           | <b>Y</b>  | <b>X</b>              | <b>Y</b>   |
| 709369.5                                           | 5165399.2 | 670811.73             | 5205570.83 |
| 705037.3                                           | 5172117.0 | 668917.00             | 5208901.00 |
| 706508.2                                           | 5173853.2 | 669773.00             | 5209385.00 |
| 708069.4                                           | 5176044.2 | 668376.00             | 5212026.00 |
| 710224.2                                           | 5178782.7 | 668540.88             | 5212526.99 |
| 712143.5                                           | 5181030.5 | 674652.72             | 5216063.06 |
| 714414.9                                           | 5177480.6 | 675515.00             | 5214608.00 |
| 717556.8                                           | 5181207.5 | 678823.00             | 5216542.00 |
| 719896.0                                           | 5177727.0 | 681560.14             | 5211831.00 |
| 709369.5                                           | 5165399.2 | 670811.73             | 5205570.83 |

FUGRO AIRBORNE SURVEYS

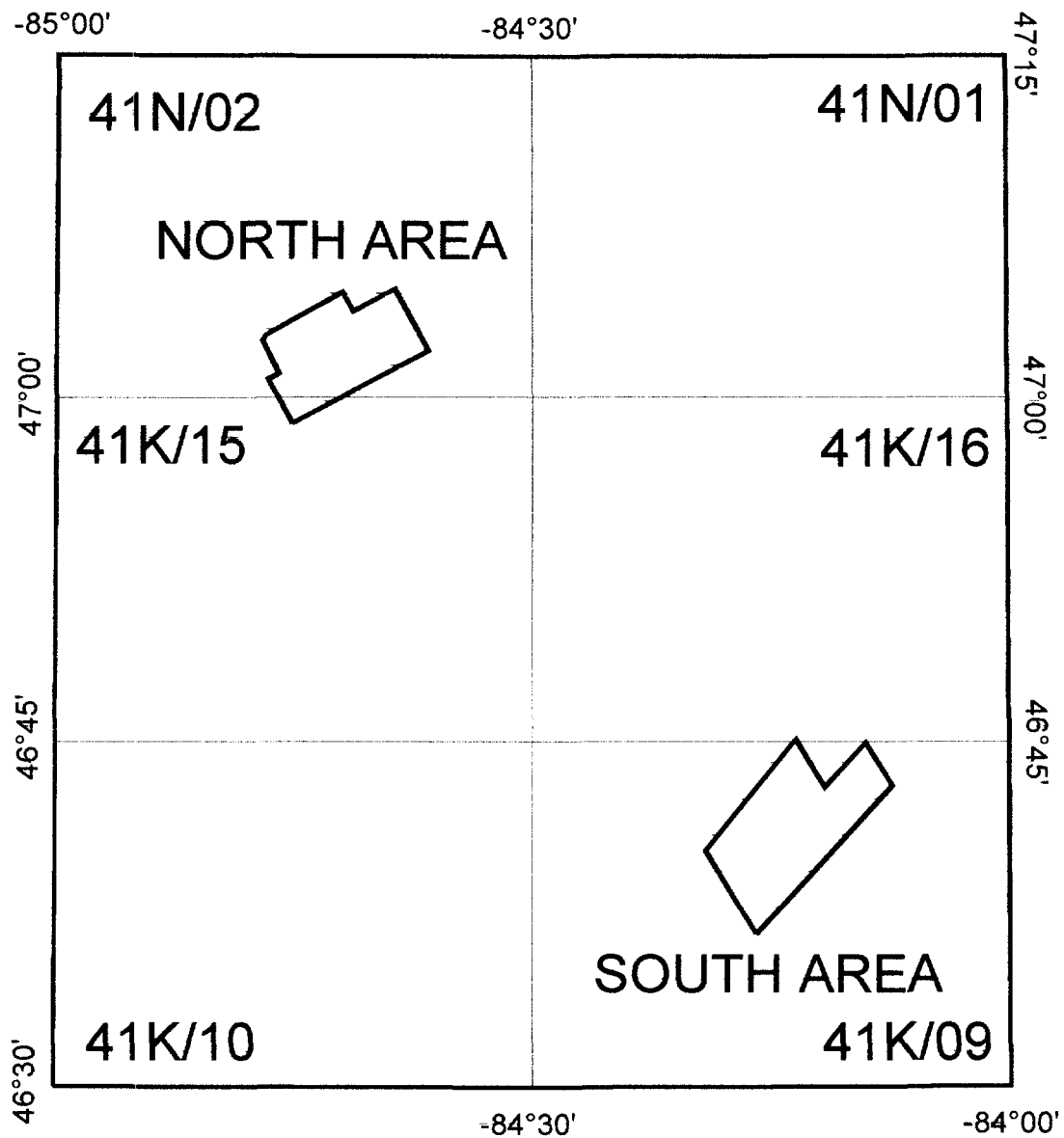


Figure 1: Survey Area

## **FUGRO AIRBORNE SURVEYS**

### **2.0 SURVEY OPERATIONS**

Crew mobilization, from Ottawa to Sault Sainte-Marie, Ontario, with equipment and survey aircraft, occurred on February 1<sup>st</sup>, 2003. Test flights were carried out from January 28<sup>th</sup> to February 5<sup>th</sup>, 2003. The first production flight started on February 5<sup>th</sup> and the last production flight was flown on February 7<sup>th</sup>, 2003.

The aircraft's base of operation was located at Sault Ste-Marie Airport, Ontario. The field quality control and data processing was performed at the main office in Montreal.

Preliminary processed data was sent at the end of February 2003. The final processed database, on CD-ROM, was delivered in March 2003.

### **3.0 CALIBRATION AND TESTS**

#### **3.1 Bourget/Heading Test**

Before survey production starts, a Heading Test was performed over the Bourget calibration range at the nominal survey altitude in two directions. The pre-survey test was flown parallel to the roads (roughly N-S and E-W). The maximum value to be tolerated in each of the two headings is expected to be less than 5 nT. The average difference from the predicted Total Field magnetic absolute value is expected to be less than 10 nT. The test results are presented in appendix A and summarised in Table 3.

## FUGRO AIRBORNE SURVEYS

| <b>Table 3: Bourget / Heading Test</b> |                     |                 |
|----------------------------------------|---------------------|-----------------|
| <b>Date</b>                            | <b>Results (nT)</b> | <b>Location</b> |
| January 30 <sup>th</sup> , 2003        | -1.41               | Ottawa          |

### 3.2 Figure of Merit

Aircraft movements induce spurious magnetic fields, which are removed from the magnetic data by the compensator (section 5.2.2). The efficiency of this removal can be evaluated by conducting a test called a Figure of Merit (F.O.M.). The aircraft flies a series of three manoeuvres of  $\pm 10^\circ$  rolls,  $\pm 5^\circ$  pitches and  $\pm 5^\circ$  yaws in each of the traverse and control line directions in a magnetically quiet zone (low gradient) at high altitude. The peak-to-peak amplitudes of the responses obtained on the magnetometer compensated channel are determined for each of the three manoeuvre types and for each of the four directions. The twelve values are then summed giving a total called the Figure of Merit. This F.O.M. must be less than 2.0 nT or corrective action must be taken to minimise these spurious magnetic fields on the survey aircraft. The F.O.M. is determined at the beginning of the survey and repeated monthly or if a major change in aircraft or magnetometer equipment has occurred. The F.O.M. test performed prior to the survey is presented in appendix A and summarised in Table 4.

| <b>Table 4: F.O.M. Test</b>     |                     |                 |
|---------------------------------|---------------------|-----------------|
| <b>Date</b>                     | <b>Results (nT)</b> | <b>Location</b> |
| February 5 <sup>th</sup> , 2003 | 0.454               | On site         |

## FUGRO AIRBORNE SURVEYS

### 3.3 Lag Test

In order to ascertain the lag between the navigational data (i.e. X-Y co-ordinates) and the total magnetic field, radar and barometric altimeter data, a lag test is performed before the survey begins. For the magnetic data, this was done by flying in two opposite directions over a body creating a sharp magnetic anomaly. Results are presented in Appendix A and summarised in table 5.

| <b>Table 5: Results of the Lag Test</b> |                          |                 |
|-----------------------------------------|--------------------------|-----------------|
| <b>Date</b>                             | <b>Lag Mag. (second)</b> | <b>Location</b> |
| January 30 <sup>th</sup> , 2003         | 0.20                     | Ottawa          |

### 3.4 Altimeter Tests

The barometer and radar altimeter calibration was performed in Ottawa. Results are presented and graphed in Appendix A.

| <b>Table 6: Altimeter Test</b>  |                 |
|---------------------------------|-----------------|
| <b>Date</b>                     | <b>Location</b> |
| January 28 <sup>th</sup> , 2003 | Ottawa          |



## FUGRO AIRBORNE SURVEYS

### 4.0 PERSONNEL

Mr. Mouhamed Moussaoui, Operation Manager for FASQ, carried out co-ordination and general management of the project. Ms. My Phuong Vo was responsible for the field and office data quality control and processing. Mr. Camille St-Hilaire was responsible for the final report write-up. The survey crew and office personnel are presented in table 9.

| <b>Table 7: Field and Office Crew</b>  |                                             |
|----------------------------------------|---------------------------------------------|
| <b>Position</b>                        | <b>Name</b>                                 |
| Project Manager                        | Mr. Mouhamed Moussaoui, P.Eng.              |
| Field Operator & Electronic Technician | Mr. Olivier Ayotte                          |
| Pilot                                  | Mr. Martin Novak                            |
| Data Verification & data processing    | Ms. My Phuong Vo                            |
| Survey Report                          | Mr. Camille St-Hilaire and Ms. My Phuong Vo |

### 5.0 SURVEY EQUIPMENT

#### 5.1 Aircraft

The survey was completed using one aircraft. The characteristics of the aircraft are given below.

|                           |                     |
|---------------------------|---------------------|
| Type:                     | Grand Caravan 208-B |
| Registration:             | C-GNCA              |
| Range (km):               | 1750                |
| Survey speed (knots):     | 135                 |
| Sea Level Climb Gradient: | 11%                 |
| Aviation Fuel:            | Jet A               |
| Fuel consumption (L/hr):  | 175                 |
| Oil Consumption:          | Negligible          |

## FUGRO AIRBORNE SURVEYS

### 5.2 Instruments

Table 8 shows the instruments installed in the aircraft and the following sections outlined their technical specifications.

| <b>Aircraft</b> | <b>Airborne Mag.</b> | <b>Compensator</b> | <b>Digital Acq. System</b> | <b>GPS</b>             | <b>Navigation</b> | <b>Camera</b> | <b>Radar Alt.</b> | <b>Baro. Alt.</b> |
|-----------------|----------------------|--------------------|----------------------------|------------------------|-------------------|---------------|-------------------|-------------------|
| C-GNCA          | Scintrex CS-2        | RMS AADC-II        | Geodas                     | Novatel Dual Frequency | Picodas Pnav 2100 | CDS           | TRT AHV-8         | Rosemount         |

#### 5.2.1 Airborne Magnetometer

A Scintrex CS-2 high sensibility magnetometer was mounted within the “tail stinger” of the aircraft (figure 2). The following table describes the technical characteristics of the airborne magnetometer:

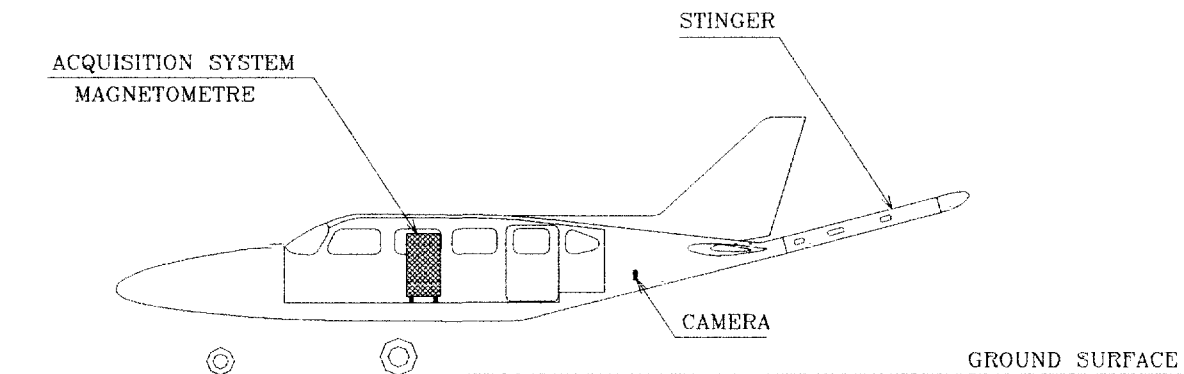
|                        |                                |
|------------------------|--------------------------------|
| Manufacturer           | Scintrex CS-2                  |
| Type and Model         | Optically pumped cesium vapour |
| Ambiant Range (nT)     | 10 000 - 100 000               |
| Sensitivity (nT)       | ± 0.001                        |
| Absolute Accuracy (nT) | ± 5                            |
| Noise Envelope (nT)    | 0.01                           |
| Sampling Rate (Hz)     | 10                             |
| Sampling Interval      | 6.5 m at typical survey speed  |
| Heading Effect         | < 2                            |

## FUGRO AIRBORNE SURVEYS

### 5.2.2 Compensator

A RMS Automatic Aeromagnetic Digital Compensator (AADC-II) was used to correct the magnetic response from the aircraft for the changes in flight attitude (i.e. Pitch, Roll and Yaw). The system includes a tri-axial fluxgate magnetometer installed in the stinger to monitor the aircraft's orientation within the earth's magnetic field and the compensator digitally corrects the input magnetic signal from the airborne magnetometer. The technical specifications of the compensator are given in the following table:

|                   |                     |
|-------------------|---------------------|
| Manufacturer      | RMS or Picodas      |
| Resolution        | 0.001 nT            |
| Absolute Accuracy | $\pm 10$ nT         |
| Noise Level       | 0.015 nT            |
| Range             | 20,000 – 100,000 nT |
| Sampling          | 10/second           |
| Standard F.O.M.   | $<2.0$ nT           |



**Figure 2: Data Acquisition System Configuration on C-GNCA**

## FUGRO AIRBORNE SURVEYS

### 5.2.3 Base stations

#### 5.2.3.1 Base station magnetometers

One Gem System GSM 19 Overhauser magnetic base station was deployed on this project. The base station was located at Sault Ste-Marie Airport, at magnetic noise-free location, away from magnetic objects, vehicles and DC electrical power lines.

The following table summarizes the technical specifications of the GEM base station magnetometer:

|                          |                  |
|--------------------------|------------------|
| Manufacturer             | GEM Systems      |
| Type                     | Overhauser       |
| Model                    | GSM-19           |
| Dynamic Range (nT)       | 10 000 – 100 000 |
| Sensitivity (nT)         | $\pm 0.001$      |
| Sampling Rate per second | 2                |

The synchronization with the GPS time was made manually, using base or aircraft GPS units as reference.

#### 5.2.3.2 GPS base station

A Trimble 4000 GPS base station and its antenna, located at Sault Ste-Marie Airport, was used during the survey in order to provide data for post flight differential correction of the airborne GPS positional data.

## **FUGRO AIRBORNE SURVEYS**

### **5.2.4 Digital acquisition System**

The Digital Data Acquisition installed in the aircraft was a Geodas system. This system presents a sampling rate of 10 readings/second and can be programmed to accept a wide variety of input types. Analogs were plotted on a GR33A chart recorder. The data acquisition system was synchronized to GPS time through a 1-second GPS pulse. Since the GPS position and UTC are related to the GPS pulse (while data acquisition timing is controlled by the 100-Hz system clock) a precise correlation was maintained.

The GR33A-1 can plot multiple types of analog and digital signals in programmable, multi-channel strip-chart format complete with alphanumeric annotation of information such as signal identification, operating parameters, header messages, fiducial numbers and time. The advantage of an onboard chart recorder is that it is a valid record of the actual recorded data. The horizontal scale was 2 cm per 1 km of ground distance (1:50 000). The vertical scales for the total field magnetometer were 20 nT/cm (fine) and 100 nT/cm (coarse). The vertical scales for the radar and barometric altimeters traces were 100 feet/cm.

### **5.2.5 Positioning Cameras, Navigation and Flight Path Systems**

#### *5.2.5.1 Video System*

The video system installed in the aircraft was a CDS video surveillance camera connecting to a VHS cassette recorder, model AG-7. The camera lateral field of view was slightly larger than the terrain clearance. The system recorded both video and data. The data, which was displayed alphanumerically in the bottom portion of each frame, included:

- GPS time in hh:mm:ss format
- Fiducial (seconds)
- Flight and line numbers

## FUGRO AIRBORNE SURVEYS

Data and video were available for review immediately after each flight with no further processing.

### *5.2.5.2 Global Positioning System (GPS)*

Global Positioning System consists (at present) of a constellation of 24 active satellites orbiting the earth. The orbital period for each satellite is approximately 12 hours with an altitude of approximately 20,000 km. Each satellite contains a very accurate cesium clock that is synchronized to a common clock by the ground control stations (operated by the U.S. Air Force).

Each satellite transmits individually coded radio signals that are received by the user's GPS receiver. Along with timing information, each satellite transmits ephemerides (astronomical almanac or table) information that enables the receiver to compute the satellite's precise spatial position. The receiver decodes the timing signals from the satellites in view (4 satellites or more for a 3-dimensional fix) and, knowing their respective locations from the ephemerides information, the GPS system computes a latitude, longitude and altitude for the user. These position solutions are continuous and are updated once per second.

The airborne differential GPS receiver used on the aircraft was a Novatel OEM4. This receiver had an accuracy of  $\pm 5$  metres and positions were real-time differentially corrected with the Omni-Star system. The GPS receiver was used in conjunction with a Picodas PNAV-2100 navigation system. The main features were:

- Real-time graphical and numerical display of flight path with survey-area and grid-line overlay
- Distance-from-line and distance-to-go indicators
- Operation in survey-grid or waypoint navigation mode
- Recording of raw range-data for all satellites from both the aircraft-borne and base-station GPS receivers, for post-flight refinement of GPS position

## FUGRO AIRBORNE SURVEYS



### 5.2.5.3 Altimeters

Two altimeters were used to record aircraft terrain clearance or altitude: radar and barometric altimeters. The outputs from the altimeters are a linear function of altitude. The radar is pre-calibrated by the manufacturer and is checked after installation using an internal calibration procedure and also by performing calibration test flights. The altimeter calibration test flight performed is presented in Appendix A.

#### a) Radar Altimeter

The following table describes the radar altimeter that was installed in the aircraft:

|                         |           |
|-------------------------|-----------|
| Manufacturer            | TRT       |
| Model                   | AHV-8     |
| Range (ft)              | 0 to 4000 |
| Accuracy                | 2 %       |
| Sampling Interval (sec) | 0.1       |

#### b) Barometric Altimeter

The following table describes the barometric altimeter that was installed in the aircraft:

|              |             |
|--------------|-------------|
| Manufacturer | Rosemount   |
| Model        | PN 1241     |
| Range (ft)   | 0 to 25 000 |
| Accuracy     | 2 %         |
| Resolution   | 1 mV/ft     |

## **FUGRO AIRBORNE SURVEYS**

### **5.2.6 Office Data Plotting and Verification System**

#### *5.2.6.1 Hardware*

The office processing systems consisted of:

- A desktop computer with a high-resolution 15" screen
- A Iomega Zip drive
- A 56K modem
- A HP-5000 plotter

#### *5.2.6.2 Software*

The computer was equipped with custom and commercial software capable of providing preliminary compilation to confirm the validity of data collected on each flight. The software package included the Geosoft Montaj Oasis processing software.

## **6.0 DATA PROCESSING**

### **6.1 Field Quality Control Procedures**

Before each survey flight, all instruments were powered on for at least 30 minutes to ensure electronic stability.

#### **6.1.1 Positioning**

The GPS receivers, real-time differentially corrected through the Omni-Star systems, in conjunction with the navigation systems, provided in-flight navigation control. GPS data were post-processed daily. The raw GPS data from both the mobile (aircraft) and base station are recovered. Using Grafnav commercial software, positions are initially recalculated from the



## FUGRO AIRBORNE SURVEYS

recorded raw range data in flight. Post-flight recalculation of the fixes from the raw ranges rather than using the fixes which are recorded directly in flight, improves on the final accuracy, as it eliminates possible time tag errors that can result during the real-time processing required to get from the range data to the fixes directly within the receiver. Differential corrections are then applied to the aircraft fixes using the recorded base station data. The resulting differentially corrected latitudes and longitudes are then converted from the WGS-84 spheroid to UTM metres. A point-to-point speed calculation is then done from the final X, Y coordinates and reviewed as part of the quality control. The flight data is then cut back to the proper survey line limits and a preliminary plot of the flight path is done and compared to the planned flight path to verify the navigation.

After each flight, data, including GPS, were transferred to the field computer system and merged into the database. Navigational data were plotted in XY plan format. Errors were noted and re-flights called where necessary.

GPS data from the real-time and post-processed sources were compared with each other and with barometer data. This comparison resulted in the selection of real-time and/or post-processed GPS. A thorough verification of X, Y, Z velocities was then made and jump corrected on-site, producing the final flight path in the field. Jumps were generally inferior to 5 metres.

Lag corrections of TFM were applied in the field. The quality of the GPS and the effectiveness of the lag correction were verified through preliminary grids. Once GPS and lag were confirmed, the final flight path was determined by cutting the line segments at the appropriate control lines.

## **FUGRO AIRBORNE SURVEYS**

### **6.1.2 Maintenance of speed and sampling**

Despite the gentle to moderate terrain, the speed of the aircraft sometimes varied significantly due to prevalent strong winds during the survey. On the survey, the pilot maintained a slow economic cruising speed for the aircraft. This reduced fuel consumption and the time required for repositioning between survey lines. Lowering the speed also increased the sampling density. Figure 3 presents a histogram of the aircraft speed variations.

### **6.1.3 Maintenance of flight altitude**

The nominal survey altitude was 100 metres, except in the case of rugged topography where the pilot's judgement prevailed. The aim was to maintain the altitude difference at the intersections of traverse/control lines below 30 metres.

### **6.1.4 Diurnal monitoring**

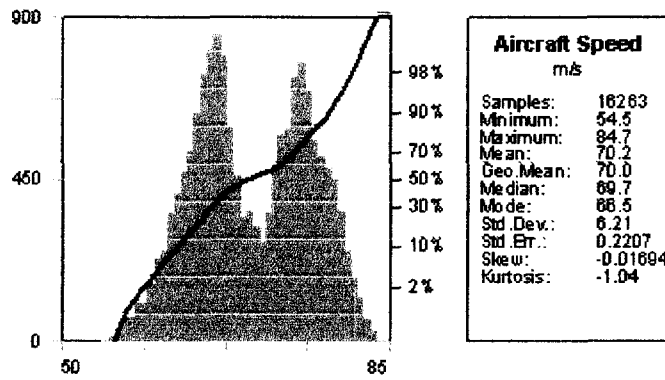
Diurnal magnetic variations were monitored and recorded using the base station at Sault Ste-Marie airport. Base station time and aircraft acquisition time were synchronized. The record of variation for the magnetic base was examined for intervals where the variation has exceeded 3.0 nT (peak to peak) from a long chord equivalent to fly the average distance between control lines. This specification was verified in the field prior to demobilisation. Any line or section of line not meeting the specifications were noted for reflight.

## FUGRO AIRBORNE SURVEYS

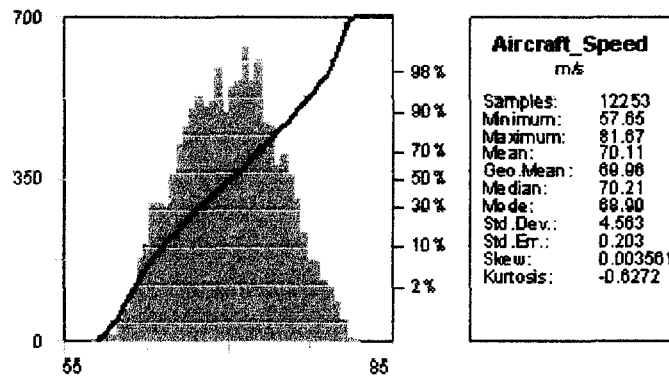
**Figure 3: Histogram of the aircraft speed (m/s)**

| SUMMARY        |       |       |       |      |
|----------------|-------|-------|-------|------|
|                | Min.  | Max.  | Mean  | Dev. |
| Southern block | 54.5  | 84.7  | 70.00 | 6.21 |
| Northern block | 57.65 | 81.67 | 70.11 | 4.56 |

Southern Block



Northern Block



## FUGRO AIRBORNE SURVEYS



### 6.1.5 Magnetic data

Compensation of the observed magnetic data for heading and aircraft effects was accomplished in real time by software controlled digital processing of the raw. Both the raw and compensated data were recorded so that post-flight processing could be performed, if required.

All magnetic data recorded in flight was checked for noise by an inspection of the fourth difference trace. The fourth difference is defined as:

$$4D_I = X_{I+2} - 4X_{I+1} + 6X_I - 4X_{I-1} + X_{I-2}$$

Where  $X_I$  is the  $I^{\text{th}}$  total field sample. In this form, the fourth difference has units of nT. High frequency noise should be such that the fourth differences divided by 16 are generally less than  $\pm 0.1$  nT. The fourth difference was displayed on analog at scales of 0.1 nT/cm.

The close inspection of the filtered mag., the 4<sup>th</sup> difference and noise channel allowed the correction of remaining spikes. To ensure the completeness and veracity of the magnetic data, grids and preliminary magnetic contours were produced, without control line levelling, in the field.

## 6.2 Office Data Processing

Essentially the office processing system represents the same capabilities of the field system, plus additional presentation and colour plotting facilities. With the increased capacity, personnel and time available, editing and compilation procedures were carried out to detect and correct any remaining isolated errors, to refine the positioning, carry out levelling and gridding through to final contours. The processing stage was monitored closely by the Project Leader.

## **FUGRO AIRBORNE SURVEYS**



### **6.2.1 Positioning**

All GPS post-processing and jump corrections made in the field were verified.

### **6.2.2 Compilation of magnetic data**

A diurnal correction was applied prior to control line levelling. To obtain the diurnally-corrected TMI channel, the long wavelength component was subtracted from the lag-corrected TMI channel. The long wavelength component was deduced by subtracting the average value of the magnetic base from each of the magnetic base value and a 90-second low-pass filter was applied.

Also prior to levelling, flight path trimming was verified and finalised. The efficiency of the mag filtering and de-spiking made on-site was verified.

Intersection levelling was performed in three iterative cycles. Each cycle included:

- 1) computation of intersections from raw controls and corrected lines
- 2) mistie correction model for controls
- 3) computation of intersections from corrected controls and raw traverses
- 4) mistie correction model for traverses.

Each cycle used increasingly precise (or with higher frequencies) mistie correction models and greater care in removing erratic intersections (high gradient) through visual inspection.

The first cycle used polynomial (Oasis TREND) model for the controls and the traverses. The second cycle used careful levelling method for the controls. The third and last cycle used the radar intersection errors as a guide to determine intersection removal or edition and to introduce higher frequency content in the correction models. High frequency line-to-line noise was reduced further by using in-house proprietary micro levelling technique.

## FUGRO AIRBORNE SURVEYS



### 7.0 DELIVERABLES

All final products required by the technical specifications of the contract were delivered early in March 2003. M. Albert Sayegh prepared all CAD map layouts and digital mapping files.

#### 7.1 Map Products

All maps were made at a scale of 1:20,000 using the WGS 84 Datum with the following parameters:

- |   |                  |         |
|---|------------------|---------|
| - | Central Meridian | 87°W    |
| - | Zone:            | 16      |
| - | Projection       | UTM     |
| - | Datum            | WGS 84  |
| - | False Easting    | 500,000 |
| - | False Northing   | 0       |
| - | Scale factor     | 0.9996  |

Three black & white paper-prints of the following final maps were produced:

- Flight Path
- Total-Magnetic-Field contours
- Calculated Vertical-Magnetic-Gradient contours

Three paper-prints of the following final maps were produced in full colour:

- Total-Magnetic-Field contours (shadow)
- Calculated Vertical-Magnetic-Gradient contours (shadow)

#### 7.2 Digital Data Products

All the digital files of the above maps, suitable for plotting on a HP 750 ink jet plotter, were delivered. All geophysical, positional and ancillary digital data were provided in standard formats (e.g. ASCII) on CD ROM. Positional data were provided in latitudes and longitudes and UTM WGS 84, zone 16.

## **FUGRO AIRBORNE SURVEYS**



Three copies of CD-ROM containing the ASCII digital profile and Grid (Geosoft Format) archives were produced. Appendix C presents the structure of this CD-ROM.

### **7.3 Miscellaneous Items**

The following miscellaneous items were finally produced:

- Analogue records
- Flight path videocassettes
- This survey report in three copies

## FUGRO AIRBORNE SURVEYS



### 8.0 CONCLUSION

Started on January 28<sup>th</sup> and ended on February 7<sup>th</sup>, 2003, the survey was completed inside the estimated time frame.

The noise levels for the measured Total Magnetic Field were well within the accepted limits, as shown by the fourth difference of the lagged, edited airborne magnetic data.

The flight path was surveyed accurately and the speed checks showed no abnormal jumps in the data. The aircraft were able to remain within the  $\pm 30$  metre elevation differences at the traverse/control line intersections, except in rugged terrain, which was subject to pilot's judgement.

The calculation of the digital elevation model from the Z-GPS values, provided by the Real Time OMNI Star system, showed that the elevation errors were located in the 5-7 meter range.

It is hoped that the information presented in this report, and on the accompanying products, will be useful both in planning subsequent exploration efforts and in the interpretation of related exploration data.

Respectfully Submitted,

Camille St-Hilaire, P.Geo.  
Senior Geophysicist

My Phuong Vo  
Senior Geophysicist



## **FUGRO AIRBORNE SURVEYS**



## **APPENDIX A**

### **TESTING AND CALIBRATIONS**

# FUGRO AIRBORNE SURVEYS



## Sault Ste-Marie Aeromagnetic Survey

**Altimeter test for C-GNCA  
January 28th, 2003**

Ground altitude:

The test was flown over the Armprior airport runway  
The runway altitude is 378 feet (115 m)

| Nominal terrain clearance (ft) | zgps (m) | radarO | baroO  | clearance theo (m) | clearance zgps (m) | radarm   | calculated topo | barom    | diff barom-zgps |
|--------------------------------|----------|--------|--------|--------------------|--------------------|----------|-----------------|----------|-----------------|
| 200                            | 171.3    | 95.1   | 657.2  | 61.0               | 56.3               | 55.43318 | 115.9           | 167.5019 | -3.8            |
| 300                            | 198.0    | 139.3  | 753.4  | 91.5               | 83.0               | 82.5914  | 115.4           | 193.9982 | -4.0            |
| 400                            | 233.2    | 195.9  | 896.3  | 122.0              | 118.2              | 117.3687 | 115.8           | 233.357  | 0.2             |
| 500                            | 277.1    | 269.3  | 1058.6 | 152.4              | 162.1              | 162.4685 | 114.6           | 278.0591 | 1.0             |
| 600                            | 312.3    | 326.2  | 1191.1 | 182.9              | 197.3              | 197.4301 | 114.9           | 314.5535 | 2.3             |
| 900                            | 399.8    | 470.5  | 1514.7 | 274.4              | 284.8              | 286.0937 | 113.7           | 403.6823 | 3.9             |
| 1200                           | 489.6    | 614.9  | 1834.5 | 365.9              | 374.6              | 374.8187 | 114.8           | 491.7645 | 2.2             |
| 1500                           | 584.8    | 770.3  | 2176.5 | 457.3              | 469.8              | 470.3026 | 114.5           | 585.9612 | 1.2             |
| 2000                           | 732.6    | 1009.2 | 2709.8 | 609.8              | 617.6              | 617.0922 | 115.5           | 732.8475 | 0.2             |
| 3000                           | 1016.9   | 1471.9 | 3730.4 | 914.6              | 901.9              | 901.3932 | 115.5           | 1013.95  | -2.9            |

115.1

0.0

equations: radar

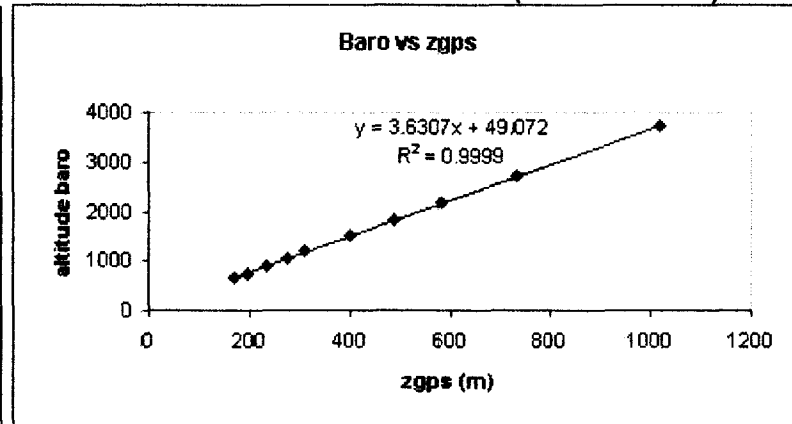
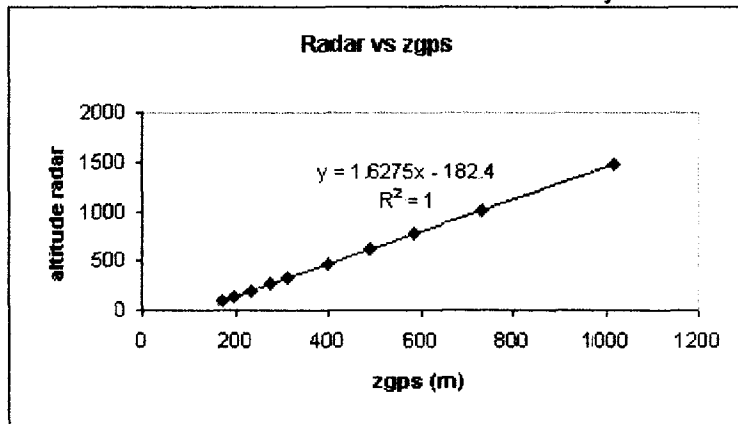
$$y = 1.6275x + 182.4$$

$$\text{radarm} = (\text{radarO}/1.6275) - 3$$

baro

$$y = 3.6307x + 49.072$$

$$\text{barom} = (\text{baroO}/3.6307) - 13.51$$



## FUGRO AIRBORNE SURVEYS

### HEADING TEST

Project #: 03712

Client: Amerigo Resources Ltd.

Pilot: Martin Novak

Date: January 30, 2003

Location: Ottawa (Ontario)

Aircraft: C-GNCA

Configuration:

magnetic

Operator: Olivier Ayotte

Geophysicist: My Phuong Vo

#### Pass 1:

| LINE # | HEADING | FIDUCIAL<br>HEADING POINT<br>(sec) | GPS<br>ALTITUDE<br>(m) | Latitude<br>(dec. deg.) | Longitude<br>(dec. deg.) | MAGLCB<br>(m/sec) | HEADING<br>CORRECTED<br>MAGLCB (nT) |
|--------|---------|------------------------------------|------------------------|-------------------------|--------------------------|-------------------|-------------------------------------|
| 1111   | North   | 69961.2                            | 176.35                 | 45.443628               | -75.126752               | 55293.08          | 55292.43                            |
| 3331   | South   | 69678.1                            | 168.71                 | 45.443602               | -75.126829               | 55291.70          | 55292.32                            |
| 2221   | East    | 70088.9                            | 177.45                 | 45.443587               | -75.126771               | 55292.50          | 55292.58                            |
| 4441   | West    | 69832.2                            | 179.81                 | 45.443613               | -75.126796               | 55292.64          | 55292.59                            |

#### Pass 2:

| LINE # | HEADING | FIDUCIAL<br>HEADING POINT<br>(sec) | GPS<br>ALTITUDE<br>(m) | Latitude<br>(dec. deg.) | Longitude<br>(dec. deg.) | MAGLCB<br>(m/sec) | HEADING<br>CORRECTED<br>MAGLCB (nT) |
|--------|---------|------------------------------------|------------------------|-------------------------|--------------------------|-------------------|-------------------------------------|
| 1112   | North   | 70588.0                            | 175.66                 | 45.443628               | -75.126802               | 55293.34          | 55292.69                            |
| 3332   | South   | 70262.6                            | 173.73                 | 45.443520               | -75.126858               | 55292.17          | 55292.79                            |
| 2222   | East    | 70750.2                            | 169.62                 | 45.443563               | -75.126748               | 55292.45          | 55292.53                            |
| 4442   | West    | 70441.4                            | 180.74                 | 45.443661               | -75.126765               | 55292.58          | 55292.53                            |

### RESULTS:

| Direction | Average<br>MAGLC<br>B<br>(nT) | Average<br>of all<br>directions<br>(nT) | Heading<br>correction<br>values<br>(nT) | Average<br>N-S<br>difference<br>(nT) | Average<br>E-W<br>difference<br>(nT) | Mean<br>orthogonal<br>difference<br>(nT) |
|-----------|-------------------------------|-----------------------------------------|-----------------------------------------|--------------------------------------|--------------------------------------|------------------------------------------|
| North     | 55293.21                      | 55292.56                                | -0.65                                   | 1.28                                 |                                      | -1.41                                    |
| South     | 55291.94                      |                                         | 0.62                                    |                                      |                                      |                                          |
| East      | 55292.48                      |                                         | 0.08                                    | -0.14                                |                                      |                                          |
| West      | 55292.61                      |                                         | -0.05                                   |                                      |                                      |                                          |

Mean magnetometer base value = 48681.64 nT

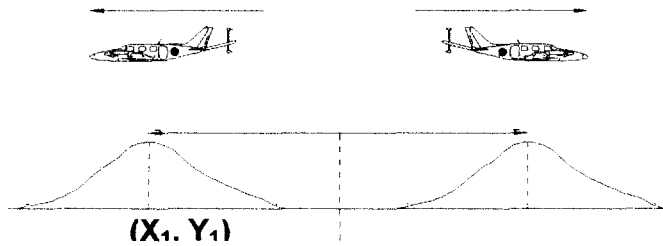
**MAGLCB** mag values have been diurnally and lag corrected

**FUGRO AIRBORNE SURVEYS**

**MAG LAG TEST**

**Project #:** 03712  
**Client:** Amerigo Resources Ltd.  
**Pilot:** Martin Novak  
**Operator:** Olivier Ayotte  
**Geophysicist:** My Phuong Vo

**Date:** January 30, 2003  
**Location:** Ottawa, Ontario  
**Aircraft:** C-GNCA (Grand Caravan 208-B)  
**Configuration:** Aeromagnetic



Bridge

| LINE # | HEADING (°) | FIDUCIAL (sec) | Z (metres) | X (m)    | Y (m)     | SPEED (m/sec) | MAGNETIC FIELD (nT) |
|--------|-------------|----------------|------------|----------|-----------|---------------|---------------------|
| L55    | 84          | 71523.8        | 166.20     | 491769.6 | 5032799.5 | 75.2          | 55320.79            |
| L56    | 84          | 71802.9        | 176.60     | 491787.1 | 5032798.6 | 76.1          | 55324.07            |
| L65    | 264         | 71661          | 172.7      | 491755.8 | 5032816.9 | 70.4          | 55320.28            |
| L66    | 264         | 71944.8        | 174.2      | 491758.1 | 5032820.5 | 70.6          | 55321.48            |

|            | 55 & 65 | 55 & 66 | 56 & 65 | 56 & 66 |
|------------|---------|---------|---------|---------|
| MEAN SPEED | 72.8    | 72.9    | 73.3    | 73.4    |
| DISTANCE   | 22.21   | 23.94   | 36.26   | 36.34   |
| LAG        | 0.15    | 0.16    | 0.25    | 0.25    |

**RESULT:** LAG = +0.2

## FUGRO AIRBORNE SURVEYS

### F. O. M. TEST

**Project #:** 03712

**Date:** February 5, 2003

**Client:** Amerigo Resources Ltd.

**Location:** Sault Ste-Marie, Ontario

**Pilot:** Martin Novak

**Aircraft:** C-GNCA (Grand Caravan 208-B)

**Operator:** Olivier Ayotte

**Configuration:** magnetics

**Compiled By:** My Phuong Vo

**UMAG1 = UNCOMPENSATED MAG, CMAG1 = COMPENSATED MAG**  
**VALUES DETERMINED USING 6 SECONDS ( 6 FIDUCIALS) HIGH PASS FILTER**  
**VALUES DETERMINED USING MAXIMUM PEAK TO PEAK OF EACH MANEUVER**

| NORTH ( 360°) | LINE NUMBER | UMAG1 | CMAG1 |
|---------------|-------------|-------|-------|
| PITCH         | L102        | 0.336 | 0.087 |
| ROLL          |             | 0.141 | 0.033 |
| YAW           |             | 0.057 | 0.033 |
| TOTAL         |             | 0.534 | 0.153 |

| EAST ( 90°) | LINE NUMBER | UMAG1 | CMAG1 |
|-------------|-------------|-------|-------|
| PITCH       | L104        | 0.061 | 0.025 |
| ROLL        |             | 0.097 | 0.041 |
| YAW         |             | 0.024 | 0.022 |
| TOTAL       |             | 0.182 | 0.088 |

| SOUTH ( 180°) | LINE NUMBER | UMAG1 | CMAG1 |
|---------------|-------------|-------|-------|
| PITCH         | L103        | 0.191 | 0.026 |
| ROLL          |             | 0.045 | 0.037 |
| YAW           |             | 0.034 | 0.012 |
| TOTAL         |             | 0.270 | 0.075 |

| WEST ( 270°) | LINE NUMBER | UMAG1 | CMAG1 |
|--------------|-------------|-------|-------|
| PITCH        | L101        | 0.138 | 0.061 |
| ROLL         |             | 0.228 | 0.038 |
| YAW          |             | 0.032 | 0.039 |
| TOTAL        |             | 0.398 | 0.138 |

| TOTAL VALUES | UMAG1        | CMAG1        |
|--------------|--------------|--------------|
|              | <b>1.384</b> | <b>0.454</b> |

## **FUGRO AIRBORNE SURVEYS**



## **APPENDIX B**

### **PRODUCTION REPORTS**

# FUGRO AIRBORNE SURVEYS

| FUGRO                          |        |                 |                                 |       |        |                           |          |           |        |         |    |                               |
|--------------------------------|--------|-----------------|---------------------------------|-------|--------|---------------------------|----------|-----------|--------|---------|----|-------------------------------|
| WEEKLY OPERATIONS REPORT       |        |                 |                                 |       |        |                           |          |           |        |         |    |                               |
| Job #: 3712                    |        |                 | Base: Sault Ste-Marie           |       |        | Week Ending: Feb. 7, 2003 |          |           |        |         |    |                               |
| Client: Amerigo Resources Ltd. |        |                 | Aircraft: C-GMCA (Cessna 200-B) |       |        |                           |          |           |        |         |    |                               |
| Area: Sault Ste-Marie          |        |                 |                                 |       |        |                           |          |           |        |         |    |                               |
| Date                           | FR #   | Area            | Flight Time                     |       |        | Production                |          | Down Time |        |         |    | Comments                      |
|                                |        |                 | Total                           | Ferry | Survey | Flown                     | Accepted | AFC       | Equip. | Diurnal | VX |                               |
| Feb. 1                         |        | Sault Ste-Marie |                                 |       |        | 0.00                      | 0.00     |           |        |         |    | Crew mobilization             |
| Feb. 2                         |        | Sault Ste-Marie |                                 |       |        | 0.00                      | 0.00     |           |        |         |    | Base mag. and base GPS set up |
| Feb. 3                         |        | Sault Ste-Marie |                                 |       |        | 0.00                      | 0.00     |           |        |         |    | Bad weather                   |
| Feb. 4                         |        | Sault Ste-Marie |                                 |       |        | 0.00                      | 0.00     |           |        |         |    | Bad weather                   |
| Feb. 5                         | 1      | Sault Ste-Marie |                                 |       |        | 477.66                    | 477.66   |           |        |         |    |                               |
| Feb. 6                         | 12 & 1 | Sault Ste-Marie |                                 |       |        | 428.80                    | 412.69   |           |        |         |    |                               |
| Feb. 7                         | 22     | Sault Ste-Marie |                                 |       |        | 1107.28                   | 1107.36  |           |        |         |    |                               |

|                  | Days on site | FLIGHT TIME |       |        | PRODUCTION |          | DOWN TIME |        |         |      |
|------------------|--------------|-------------|-------|--------|------------|----------|-----------|--------|---------|------|
|                  |              | Total       | Ferry | Survey | Flown      | Accepted | AFC       | Equip. | Diurnal | VX   |
| Weekly Totals    | 7            | 10.00       | 0.00  | 0.00   | 2013.64    | 1997.51  | 0.00      | 0.00   | 0.00    | 0.00 |
| Previous Totals  | 0            | 0.00        | 0.00  | 0.00   | 0.00       | 0.00     |           |        |         |      |
| Job Totals       | 7            | 10.00       | 0.00  | 0.00   | 2013.64    | 1997.51  | 0.00      | 0.00   | 0.00    | 0.00 |
| Monthly Totals   | 7            | 10.00       | 0.00  | 0.00   | 2013.64    | 1997.51  | 0.00      | 0.00   | 0.00    | 0.00 |
| Est. days remain |              |             |       |        |            |          |           |        |         |      |

| SUMMARY |        |
|---------|--------|
| km/hour | km/day |
| #DM/01  | 285.36 |
| #DM/02  | #DM/02 |
| #DM/03  | 285.36 |
| #DM/04  | 285.36 |

|                  |               |           |              |                            |               |
|------------------|---------------|-----------|--------------|----------------------------|---------------|
| Crew Chief:      | Oliver Agotte | Pilot:    | Martin Novak | Operator:                  | Oliver Agotte |
| Data Processor:  | Mg Phuong Yo  | Engineer: |              | Operations Mg M. Moussaoui |               |
| Total km to fly: | 1997.51 km    |           |              |                            |               |
| km remaining:    | 0.00 km       |           |              |                            |               |
| Percent Done:    | 100.00 %      |           |              |                            |               |

**APPENDIX C**

**CHANNELS DESCRIPTIONS AND CD-ROM STRUCTURE**



**AMERIGO RESOURCES LIMITED  
SAULT STE-MARIE, ONTARIO (#03712)**

| <b>Channel Name</b> | <b>Description</b>                                | <b>Units</b>    |
|---------------------|---------------------------------------------------|-----------------|
| fid                 | Fiducial                                          | seconds         |
| line                | Line number                                       |                 |
| date                | ddmmyy                                            |                 |
| flight              | Flight number                                     |                 |
| timegps             | Time G.P.S.                                       | seconds         |
| lat_WGS84           | Latitude (WGS84 - Zone 16N, Local [WGS84] World)  | decimal degrees |
| lon_WGS84           | Longitude (WGS84 - Zone 16N, Local [WGS84] World) | decimal degrees |
| x                   | Easting (WGS84 -zone 16N, Local [WGS84] World)    | metres          |
| y                   | Northing (WGS84 -zone 16N, Local [WGS84] World)   | metres          |
| zrt                 | G.P.S. elevation (MSL)                            | metres          |
| umagH               | Raw uncompensated total magnetic field            | nT              |
| cmagH               | Raw compensated total magnetic field              | nT              |
| xdev                | Fluxgate in the x-direction                       |                 |
| ydev                | Fluxgate in the y-direction                       |                 |
| zdev                | Fluxgate in the z-direction                       |                 |
| basemag             | Base station diurnal variation                    | nT              |
| DIFF4_H             | Fourth difference of cmagH                        | nT              |
| barom               | Barometric altimeter                              | metres          |
| radarm              | Radar altimeter                                   | metres          |
| DTM                 | Digital Terrain Model                             | metres          |
| magHcb              | Diurnally and lagged corrected T.M.I.             | nT              |
| magfin              | Leveled and micro-leveled T.M.I.                  | nT              |

## CD-ROM STRUCTURE

**CD\_structure.doc** contains the following :

|                          |                                                   |
|--------------------------|---------------------------------------------------|
| survey_info_Amerigo.rtf  | Survey information summary                        |
| Amerigo_report.doc       | Final Report                                      |
| <br>                     |                                                   |
| <b>...\ASCII_XYZMAG\</b> |                                                   |
| NBLK_AME.xyz             | Digital profile archive in ASCII format for block |
| NORTH.                   |                                                   |
| SBLK_AME.xyz             | Digital profile archive in ASCII format for block |
| SOUTH.                   |                                                   |
| <br>                     |                                                   |
| <b>...\Boundary\</b>     |                                                   |
| BoundN.PLY               | Oasis Montaj polygon file for the                 |
|                          | <b>Northern</b> block                             |
| BoundS.PLY               | Oasis Montaj polygon file for the                 |
|                          | <b>Southern</b> block                             |
| <br>                     |                                                   |
| <b>...\GRIDS\</b>        |                                                   |
| block.                   |                                                   |
| Mag1.grd                 | Total Magnetic Intensity grid for the Northern    |
|                          |                                                   |
| Mag1.zon                 | Colour bar used for Northern block's TMI grid.    |
|                          |                                                   |
| Mag2.grd                 | Total Magnetic Intensity grid for the Southern    |
| block.                   | Colour bar used for Southern block's TMI grid.    |
| Mag2.zon                 |                                                   |
|                          |                                                   |
| Grd1.grd                 | First Vertical Derivative of Total                |
|                          | Magnetic Intensity grid for Northern block.       |
| Grd1.zon                 | Colour bar used for first vertical                |
|                          | derivative of Total Magnetic Intensity grid for   |
|                          | Northern block.                                   |
|                          |                                                   |
| Grd2.grd                 | First Vertical Derivative of Total                |
|                          | Magnetic Intensity grid for Southern block.       |
| Grd2.zon                 | Colour bar used for first vertical                |
|                          | derivative of Total Magnetic Intensity grid for   |
|                          | Southern block.                                   |

**...\PRINT\**

**Oasis Montaj print files**

**...\PRINT\FLIGHT\_PATH\**

BFPAM20N.PRN

Oasis Montaj .prn flight path for Northern block

BFPAM20S.PRN

Oasis Montaj .prn flight path for **Southern** block

**...\PRINT\MAG\**

BTMAM20N.prn

Oasis Montaj .prn black and white TMI for **Northern** block

BTMAM20S.prn

Oasis Montaj .prn black and white TMI for **Southern** block

TMIAM20N.prn

Oasis Montaj .prn colour TMI for **Northern** block

TMIAM20S.prn

Oasis Montaj .prn colour TMI for **Southern** block

**...\PRINT\GRADIENT\**

1VDAM20N.prn

Oasis Montaj .prn black and white 1<sup>st</sup> V.G. for **Northern** block

1VDAM20S.prn

Oasis Montaj .prn black and white 1<sup>st</sup> V.G. for **Southern** block

BVDAM20N.prn

Oasis Montaj .prn colour 1<sup>st</sup> V.G. for **Northern** block

BVDAM20S.prn

Oasis Montaj .prn colour 1<sup>st</sup> V.G. for **Southern** block

**Work Report Summary**

Transaction No: W0450.00256 Status: APPROVED  
 Recording Date: 2004-FEB-12 Work Done from: 2003-FEB-05  
 Approval Date: 2004-APR-02 to: 2003-FEB-07

Client(s):  
 400979 AMERIGO RESOURCES LTD.

Survey Type(s):  
 AMAG

Work Report Details:

| Claim#      | Perform  | Perform Approve | Applied  | Applied Approve | Assign   | Assign Approve | Reserve | Reserve Approve | Due Date    |
|-------------|----------|-----------------|----------|-----------------|----------|----------------|---------|-----------------|-------------|
| SSM 1199911 | \$1,490  | \$1,490         | \$0      | \$0             | \$1,490  | 1,490          | \$0     | \$0             | 2004-JUN-26 |
| SSM 1199912 | \$397    | \$397           | \$0      | \$0             | \$397    | 397            | \$0     | \$0             | 2004-JUN-26 |
| SSM 1199984 | \$1,390  | \$1,390         | \$0      | \$0             | \$1,390  | 1,390          | \$0     | \$0             | 2004-JUN-26 |
| SSM 1235019 | \$298    | \$298           | \$231    | \$231           | \$67     | 67             | \$0     | \$0             | 2005-FEB-26 |
| SSM 3000666 | \$397    | \$397           | \$0      | \$0             | \$397    | 397            | \$0     | \$0             | 2004-JUN-26 |
| SSM 3000714 | \$1,092  | \$1,092         | \$0      | \$0             | \$1,092  | 1,092          | \$0     | \$0             | 2004-JUN-26 |
| SSM 3000715 | \$1,490  | \$1,490         | \$0      | \$0             | \$1,490  | 1,490          | \$0     | \$0             | 2004-JUN-26 |
| SSM 3000716 | \$1,291  | \$1,291         | \$0      | \$0             | \$1,291  | 1,291          | \$0     | \$0             | 2004-JUN-26 |
| SSM 3000717 | \$1,589  | \$1,589         | \$0      | \$0             | \$1,589  | 1,589          | \$0     | \$0             | 2004-JUN-26 |
| SSM 3000718 | \$99     | \$99            | \$0      | \$0             | \$99     | 99             | \$0     | \$0             | 2004-JUN-26 |
| SSM 3000719 | \$496    | \$496           | \$1,527  | \$1,527         | \$0      | 0              | \$0     | \$0             | 2004-JUN-26 |
| SSM 3000720 | \$1,490  | \$1,490         | \$6,000  | \$6,000         | \$0      | 0              | \$0     | \$0             | 2005-JUN-26 |
| SSM 3002310 | \$1,490  | \$1,490         | \$6,000  | \$6,000         | \$0      | 0              | \$0     | \$0             | 2005-JUN-26 |
| SSM 3002319 | \$199    | \$199           | \$0      | \$0             | \$199    | 199            | \$0     | \$0             | 2004-JUN-26 |
| SSM 3002320 | \$298    | \$298           | \$0      | \$0             | \$298    | 298            | \$0     | \$0             | 2004-JUN-10 |
| SSM 3002341 | \$1,092  | \$1,092         | \$0      | \$0             | \$1,092  | 1,092          | \$0     | \$0             | 2004-JUN-26 |
| SSM 3002342 | \$99     | \$99            | \$0      | \$0             | \$99     | 99             | \$0     | \$0             | 2004-JUN-10 |
| SSM 3002392 | \$794    | \$794           | \$0      | \$0             | \$794    | 794            | \$0     | \$0             | 2004-JUN-26 |
| SSM 3002393 | \$1,092  | \$1,092         | \$0      | \$0             | \$1,092  | 1,092          | \$0     | \$0             | 2004-JUN-26 |
| SSM 3002398 | \$1,589  | \$1,589         | \$6,400  | \$6,400         | \$0      | 0              | \$0     | \$0             | 2005-JUN-26 |
| SSM 3002577 | \$99     | \$99            | \$0      | \$0             | \$99     | 99             | \$0     | \$0             | 2004-JUL-19 |
| SSM 3002697 | \$1,291  | \$1,291         | \$0      | \$0             | \$1,291  | 1,291          | \$0     | \$0             | 2004-JUN-26 |
| SSM 3002698 | \$596    | \$596           | \$0      | \$0             | \$596    | 596            | \$0     | \$0             | 2004-JUN-10 |
|             | \$20,158 | \$20,158        | \$20,158 | \$20,158        | \$14,862 | \$14,862       | \$0     | \$0             |             |

External Credits: \$0  
 Reserve: \$0 Reserve of Work Report#: W0450.00256  
 \$0 Total Remaining

Status of claim is based on information currently on record.



Date: 2004-APR-06

GEOSCIENCE ASSESSMENT OFFICE  
933 RAMSEY LAKE ROAD, 6th FLOOR  
SUDBURY, ONTARIO  
P3E 6B5

AMERIGO RESOURCES LTD.  
FOUR BENTALL CENTRE, P.O. BOX 49298  
1055 DUNSMUIR ST. SUITE 2684  
VANCOUVER, BRITISH COLUMBIA  
V7X 1L9 CANADA

Tel: (888) 415-9845  
Fax: (877) 670-1555

**Submission Number:** 2.27181  
**Transaction Number(s):** W0450.00256

Dear Sir or Madam

**Subject: Approval of Assessment Work**

We have approved your Assessment Work Submission with the above noted Transaction Number(s). The attached Work Report Summary indicates the results of the approval.

At the discretion of the Ministry, the assessment work performed on the mining lands noted in this work report may be subject to inspection and/or investigation at any time.

The revisions outlined in the Notice dated February 17, 2004 have, in part, been corrected. Accordingly, assessment work credit has been approved as outlined on the Declaration of Assessment Work Form that accompanied this submission.

NOTE: On future airborne submissions show the individual claim boundaries and claim numbers in relation to the flight lines.

If you have any question regarding this correspondence, please contact BRUCE GATES by email at [bruce.gates@ndm.gov.on.ca](mailto:bruce.gates@ndm.gov.on.ca) or by phone at (705) 670-5856.

Yours Sincerely,



for Ron C. Gashinski  
Senior Manager, Mining Lands Section

**Cc:** Resident Geologist

Roger Moss  
(Agent)

Amerigo Resources Ltd.  
(Assessment Office)

Assessment File Library

Amerigo Resources Ltd.  
(Claim Holder)

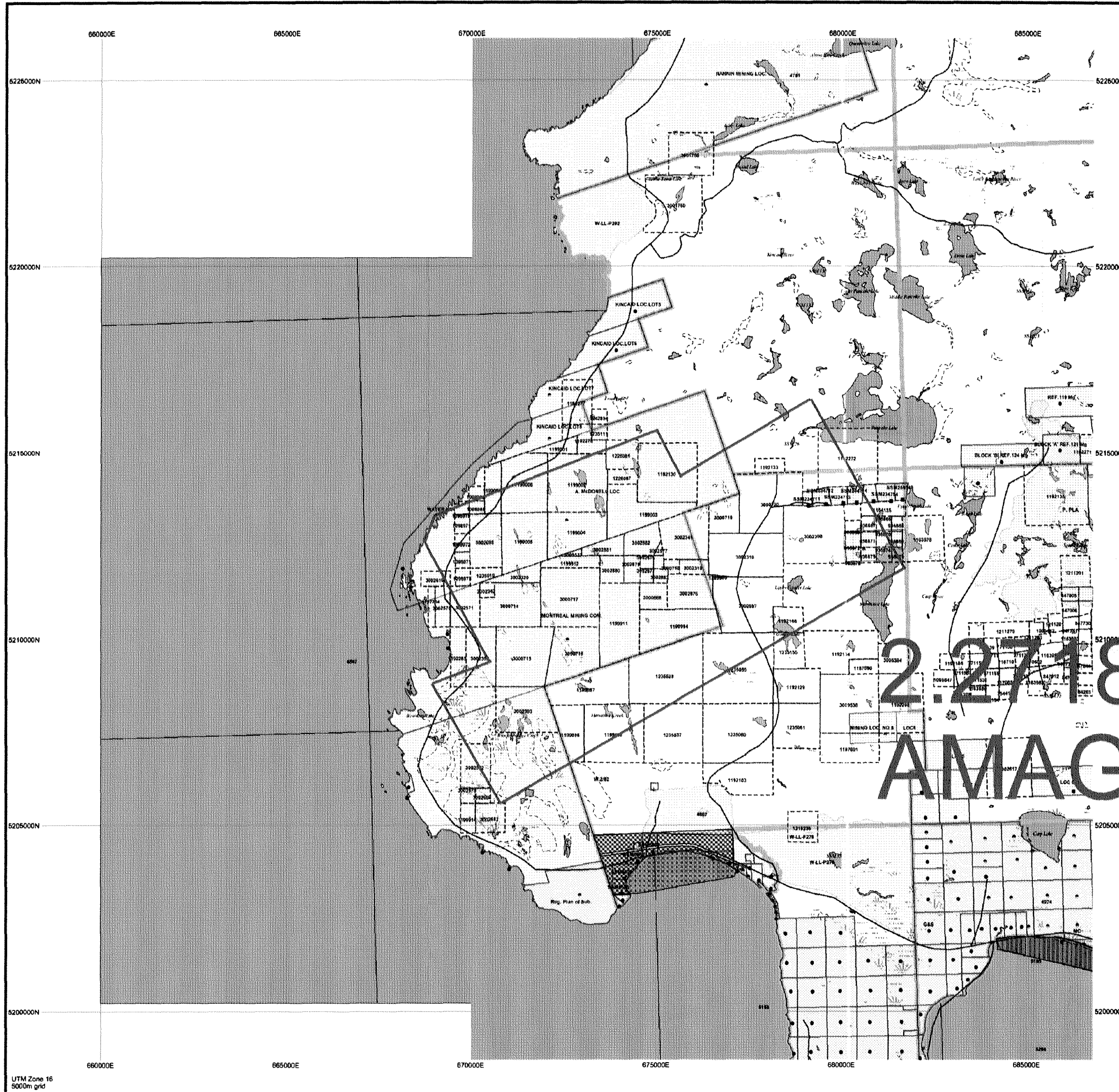
Date / Time of Issue: Tue Apr 06 12:52:44 EDT 2004

TOWNSHIP / AREA Unavailable

PLAN Unavailable

ADMINISTRATIVE DISTRICTS / DIVISIONS

Mining Division Sault Ste. Marie
Land Titles/Registry Division Unavailable
Ministry of Natural Resources District Unavailable

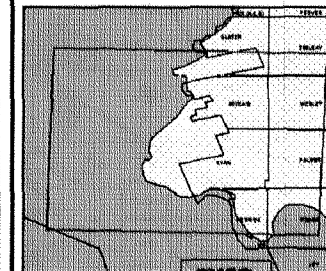


TOPOGRAPHIC

- Administrative Boundary
Township
Concession Lot
Provincial Park
Indian Reserves
CLIP Fee Fee
Contour
Main Roads
New Highways
Railway
Forest
Tie
Natural Gas Pipeline
Utility
Tower

Land Tenure

- Freehold Patent
Surface And Mining Rights
Surface Rights Only
Mining Rights Only
Leasehold Patent
Surface And Mining Rights
Surface Rights Only
Mining Rights Only
Licence of Occupation
Uses Not Specified
Surface And Mining Rights
Surface Rights Only
Mining Rights Only
Land Use Permit
Order to Council (Not open for bidding)
Water Power Lease Agreement
Mining Claim
Filed Only Mining Claims



LAND TENURE WITHDRAWALS

- 1234 Areas Withdrawn From Disposition
Mining Act Withdrawal Types
Wm Surface And Mining Rights Withdrawal
Wm Surface Rights Only Withdrawal
Wm Mining Rights Only Withdrawal
Wm Order to Council Withdrawal Types
Wm Surface And Mining Rights Withdrawal
Wm Surface Rights Only Withdrawal
Wm Mining Rights Only Withdrawal

IMPORTANT NOTICES



LAND TENURE WITHDRAWAL DESCRIPTIONS

Table with columns: Type, Date, Description. Contains detailed descriptions of land tenure withdrawals, including references to mining acts and specific land parcels.

2.2718 AMAG



This map is for informational purposes only. It is not intended for use in legal proceedings or for the determination of rights. The Ministry of Northern Development and Mines is not responsible for any errors or omissions on this map.

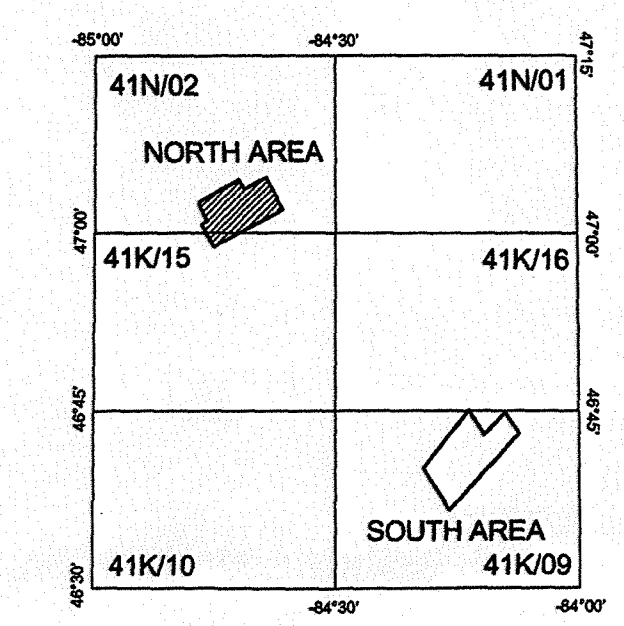
General Information and Limitations

Contact Information: Provincial Mining Recorder's Office, 1000 Highway 104, Sault Ste. Marie, Ontario P6A 1K1. Tel: 800-387-5444

This map may not show unimproved land tenure and interests in land including certain patents, leases, easements, rights of way, flooding, etc. It is not intended for use in legal proceedings or for the determination of rights.

Aeromagnetic Survey  
North Area  
Sault Ste-Marie, Ontario

Flight Path Recovery



41K/15 & 41N/02

Survey Specifications

|                       |                   |
|-----------------------|-------------------|
| Total Line Kilometres | 861 Km Total      |
| Survey Line Spacing   | 100m              |
| Survey Line Azimuth   | 145° E            |
| The-Line Spacing      | 1000m             |
| The-Line Azimuth      | N 150° E          |
| Survey Type           | Airborne Magnetic |

Aircraft Specifications

|                        |                              |
|------------------------|------------------------------|
| Survey Aircraft        | Cessna 208 B (C-GNCA)        |
| Aircraft Elevation     | 120m Mean Terrain Clearance  |
| Average Aircraft Speed | 70m/sec                      |
| GPS Receiver           | Novatel Dual Frequency 10 Hz |
| GPS Sample Rate        | 1.0s                         |

Magnetic Specifications

|                           |                           |
|---------------------------|---------------------------|
| Magnetometer              | Schmox CS-2 Cesium Vapour |
| Magnetometer Installation | Stinger                   |
| Magnetometer Sensitivity  | 0.001nT                   |
| Sample Rate               | 0.1s                      |
| Base Station Magnetometer | GEM GSM-15                |

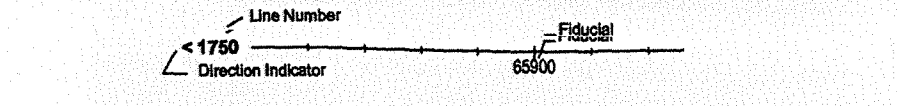
GEODAS Data Acquisition System with the Following Instruments Installed on Board

|                 |                  |
|-----------------|------------------|
| Bero Altimeter  | Rosemount        |
| Mag Compensator | RMS AADC         |
| Radar Altimeter | TRT AHV-5        |
| RealTime        | Tremble Omnistar |

Geodetic Specifications

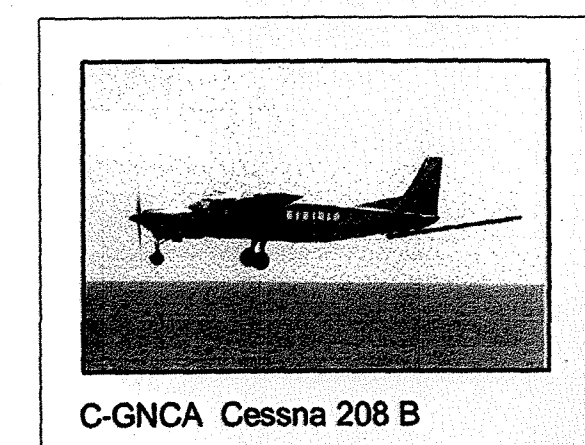
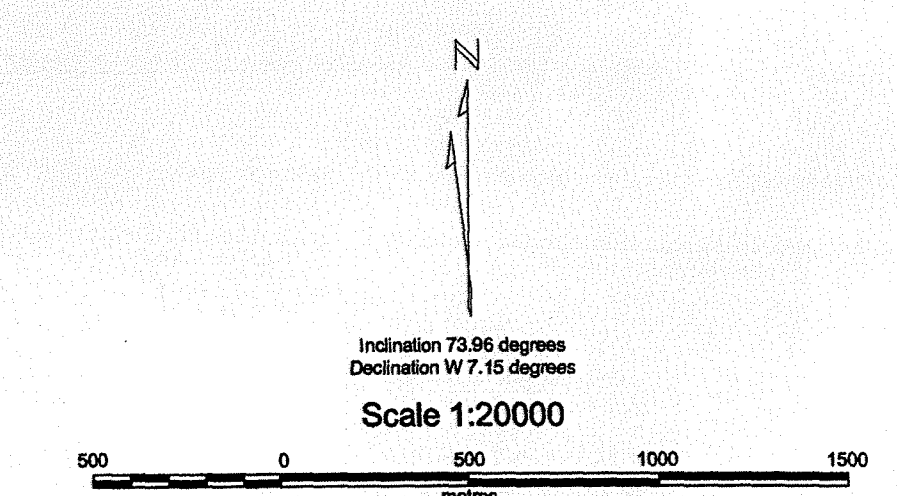
|                   |                        |
|-------------------|------------------------|
| Map Projection    | UTM                    |
| Datum             | WGS84                  |
| UTM Zone          | 18 North               |
| Local Datum Shift | (dx, dy, dz) = 0, 0, 0 |
| Central Meridian  | 87° West               |
| False Easting     | 500000                 |
| False Northing    | 0                      |
| Scale Factor      | 0.9998                 |

Flight Path  
GPS Data Recorded During The Flight Has Been Differentially Corrected

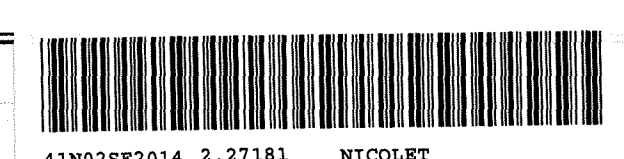
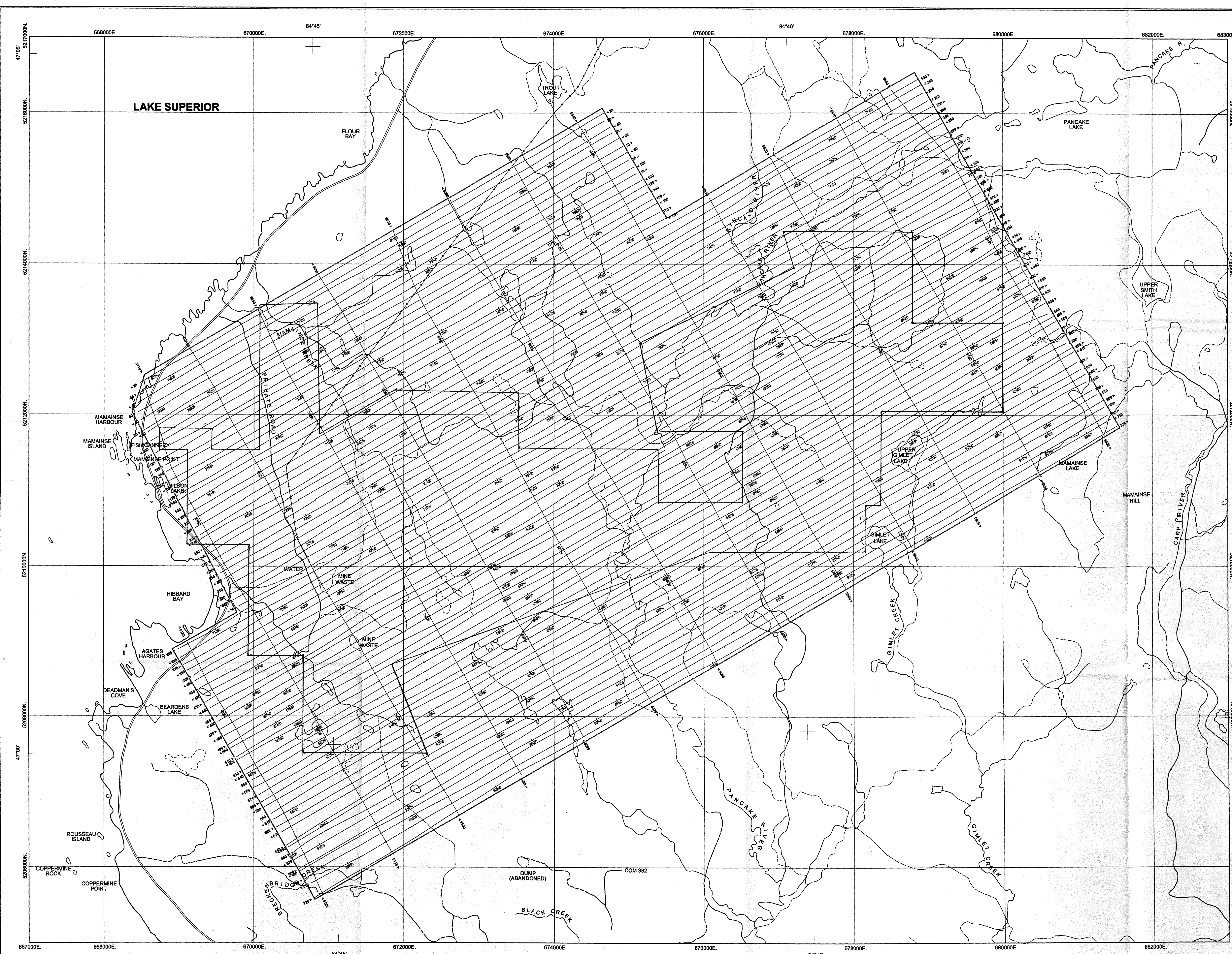


Notes  
Magnetic Data Was Corrected for Diurnal Drift. The Line Levelling And Microlevelling Was Then Applied To The Magnetic Data.

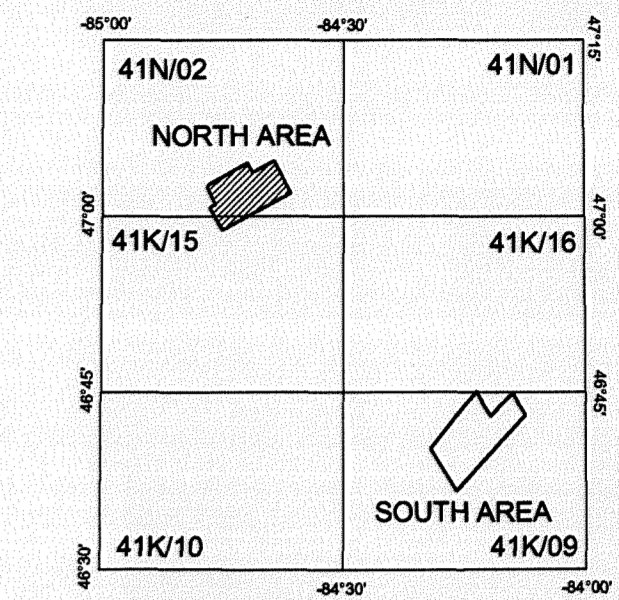
Location Map  
Cartographic Details (Rivers and Roads) were Digitized from the UTM Map Number 41N02 and 41K15 Scale 1:50 000



C-GNCA Cessna 208 B



**Aeromagnetic Survey**  
North Area  
Sault Ste-Marie, Ontario  
(Contours)  
**Total Magnetic Intensity**  
Contoured at 5nT intervals



41K/15 & 41N/02

**Survey Specifications**

|                       |                   |
|-----------------------|-------------------|
| Total Line Kilometres | 861 Km Total      |
| Survey Line Spacing   | 100m              |
| Survey Line Azimuth   | N 60° E           |
| Tie-Line Spacing      | 1000m             |
| Tie-Line Azimuth      | N 150° E          |
| Survey Type           | Airborne Magnetic |

**Aircraft Specifications**

|                        |                              |
|------------------------|------------------------------|
| Survey Aircraft        | Cessna 208 B (C-GNCA)        |
| Aircraft Elevation     | 120m Mean Terrain Clearance  |
| Average Aircraft Speed | 70m/sec                      |
| GPS Receiver           | Novatel Dual Frequency 10 Hz |
| GPS Sample Rate        | 1 Hz                         |

**Magnetic Specifications**

|                           |                             |
|---------------------------|-----------------------------|
| Magnetometer              | Sointrex CS-2 Cesium Vapour |
| Magnetometer Installation | Slings                      |
| Magnetometer Sensitivity  | 0.00 nT                     |
| Sample Rate               | 5 Hz                        |
| Base Station Magnetometer | GEM GSM-19                  |

**GEODAS Data Acquisition System with the Following Instruments Installed on Board**

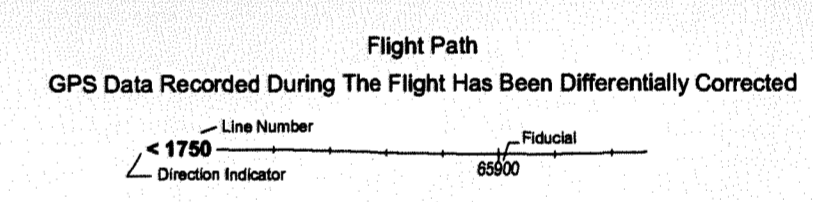
|                 |                  |
|-----------------|------------------|
| Baro Altimeter  | Rosemount        |
| Mag Compensator | RMS AACD         |
| Radar Altimeter | TRT AM14-4       |
| Real Time       | Trimble Omnistar |

**Geodetic Specifications**

|                   |                        |
|-------------------|------------------------|
| Map Projection    | UTM                    |
| Datum             | WGS84                  |
| UTM Zone          | 18 North               |
| Local Datum Shift | (dx, dy, dz) = 0, 0, 0 |
| Central Meridian  | 87° West               |
| Falco Easting     | 500000                 |
| Falco Northing    | 0                      |
| Scale Factor      | 0.9996                 |

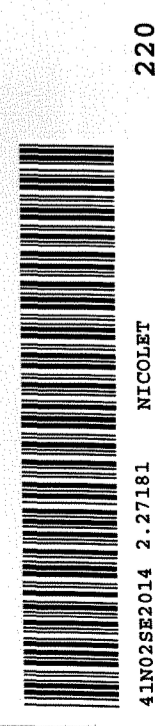
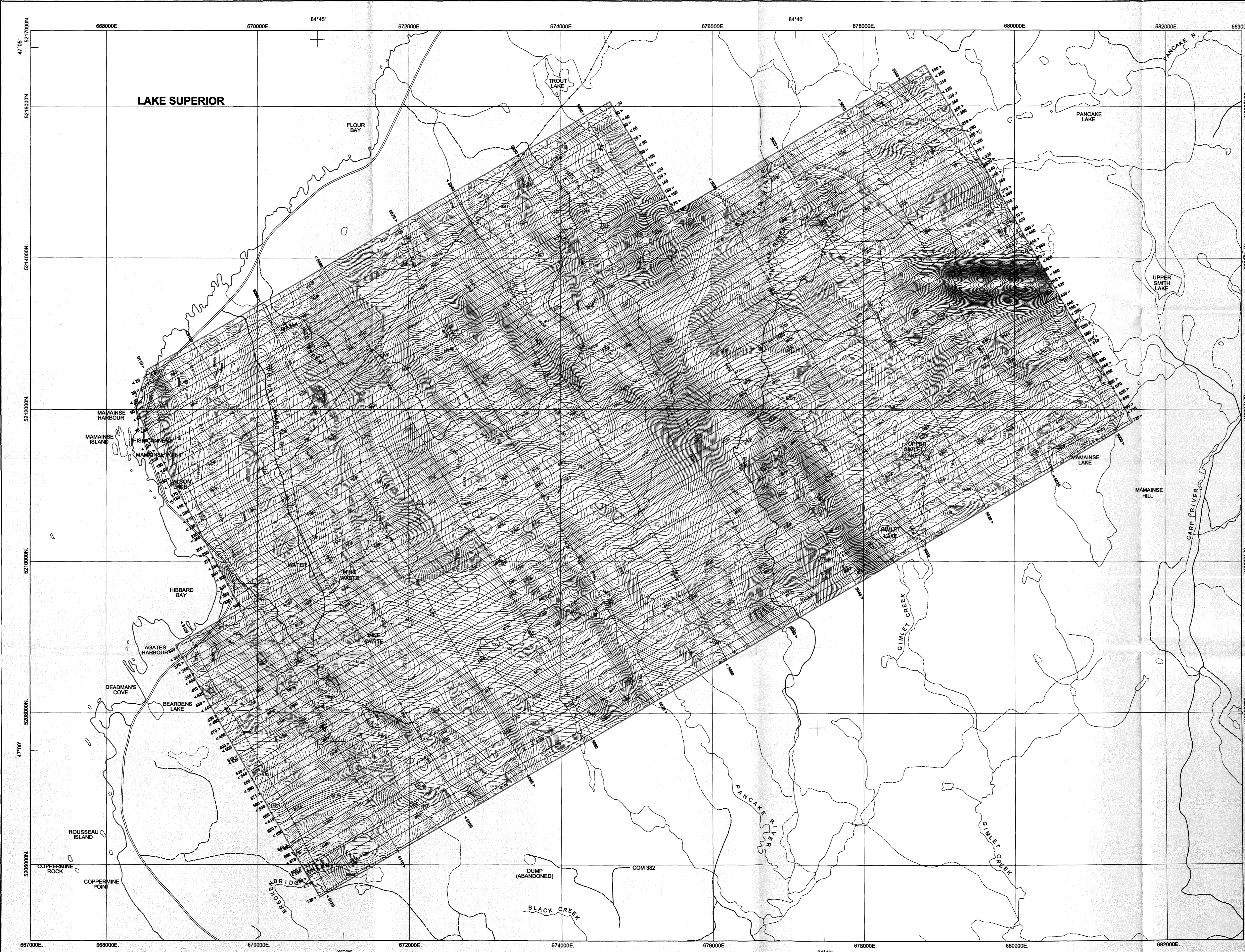
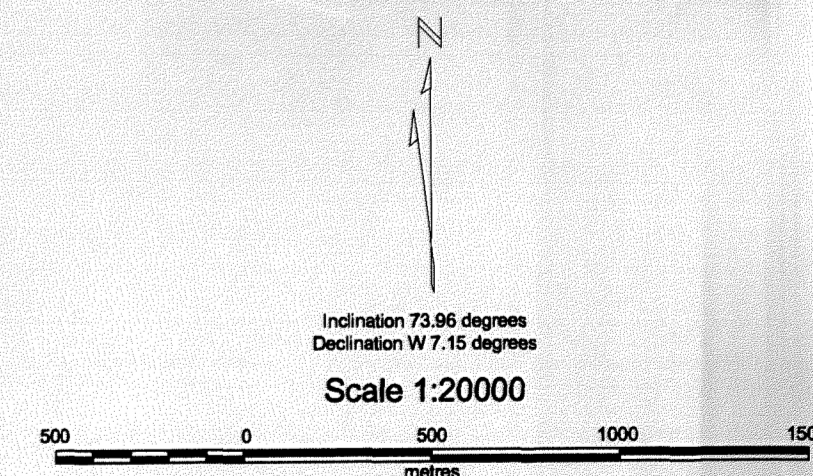
**Map Contours Are In NanoTesla**

|                         |       |
|-------------------------|-------|
| 5 nT                    | ..... |
| 25 nT                   | ..... |
| 50 nT                   | ..... |
| 100 nT                  | ..... |
| Data Gridding Cell Size | 25 m  |



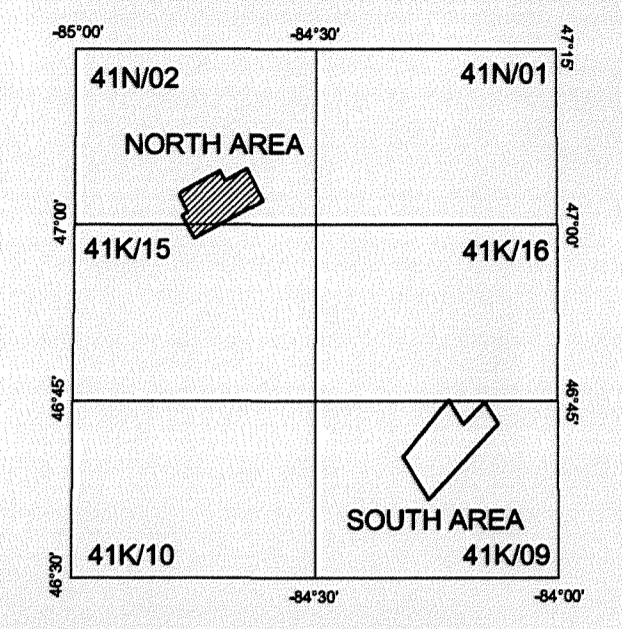
**Notes**  
Magnetic Data Was Corrected for Diurnal Drift. Tie Line Levelling And Microlevelling Was Then Applied To The Magnetic Data.

**Location Map**  
Cartographic Details (Rivers and Roads) were Digitized from the UTM Map Number 41N/02 and 41K15 Scale 1:50 000





**Aeromagnetic Survey**  
 North Area  
 Sault Ste-Marie, Ontario  
 (Contours)  
**First Vertical Derivative of Total Magnetic Intensity**  
 Contoured at 0.01nT/m intervals



41K/15 & 41N/02

Survey Specifications

|                       |                   |
|-----------------------|-------------------|
| Total Line Kilometres | 861 Km Total      |
| Survey Line Spacing   | 100m              |
| Survey Line Azimuth   | N 60° E           |
| Tie-Line Spacing      | 1000m             |
| Tie-Line Azimuth      | N 150° E          |
| Survey Type           | Airborne Magnetic |

Aircraft Specifications

|                        |                              |
|------------------------|------------------------------|
| Survey Aircraft        | Cessna 208 B (C-GNCA)        |
| Aircraft Elevation     | 120m Mean Terrain Clearance  |
| Average Aircraft Speed | 70m/sec                      |
| GPS Receiver           | Novatel Dual Frequency 10 Hz |
| GPS Sample Rate        | 1.0s                         |

Magnetic Specifications

|                           |                            |
|---------------------------|----------------------------|
| Magnetometer              | Sintrex CS-2 Cesium Vapour |
| Magnetometer Installation | Singer                     |
| Magnetometer Sensitivity  | 0.001nT                    |
| Sample Rate               | 0.1s                       |
| Base Station Magnetometer | GEM GSM-19                 |

GEODAS Data Acquisition System with the Following Instruments Installed on Board

|                 |                  |
|-----------------|------------------|
| Berni Altimeter | Rosemount        |
| Mag Compensator | RMS AACD         |
| Radar Altimeter | TRT AN-8         |
| RealTime        | Trimble Omnistar |

Geodetic Specifications

|                   |                          |
|-------------------|--------------------------|
| Map Projection    | UTM                      |
| Datum             | WGS84                    |
| UTM Zone          | 16 North                 |
| Local Datum Shift | ( dx, dy, dz ) = 0, 0, 0 |
| Central Meridian  | 87° West                 |
| False Easting     | 500000                   |
| False Northing    | 0                        |
| Scale Factor      | 0.9996                   |

Map Contours Are in NanoTesla/metre

|                         |       |
|-------------------------|-------|
| 0.01 nT/m               | _____ |
| 0.05 nT/m               | _____ |
| 0.10 nT/m               | _____ |
| 0.50 nT/m               | _____ |
| Data Gridding Cell Size | 25 m  |

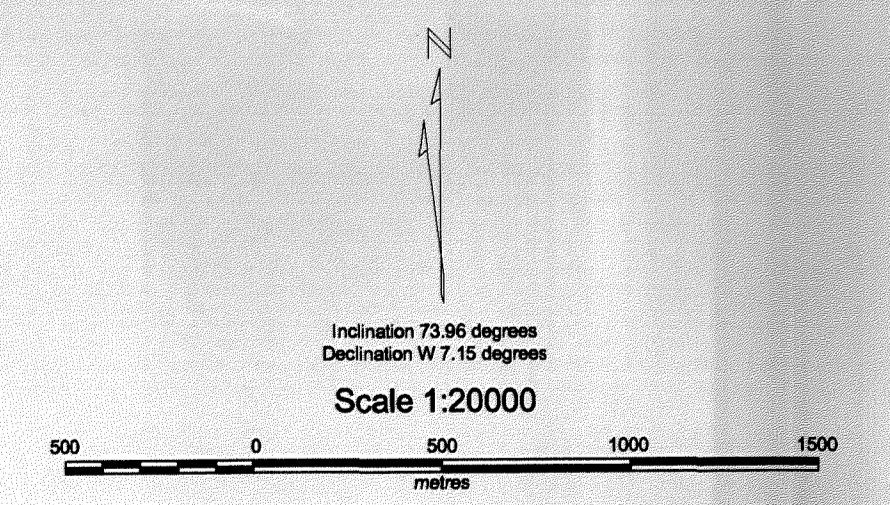
Flight Path

GPS Data Recorded During The Flight Has Been Differentially Corrected

|                     |      |
|---------------------|------|
| Line Number         | 1750 |
| Direction Indicator | 6350 |

Notes  
 Magnetic Data Was Corrected for Diurnal Drift. Tie Line Levelling And Microlevelling Was Then Applied To The Magnetic Data.

Location Map  
 Cartographic Details ( Rivers and Roads ) were Digitalized from the UTM Map Number 41N/02 and 41K/15 Scale 1:50 000



C-GNCA Cessna 208 B

