Questor Surveys Limited
200 Grand River Ave., Brantford, Ontario, Canada N3T 4X9 Tel.:(519) 753-1600 Fax.:(519)753-5533

31C13SE0043 2.13590 TUDOR

010

2.13590

AIRBORNE MAGNETIC/VLF-EM SURVEY

NORANDA EXPLORATION COMPANY LIMITED

MADOC AREA, ONTARIO

RECEIVED

OCT 17 1990

MINING LANDS SECTION

PROJECT # 90067

OCTOBER, 1990

31C13SE0043 2.13590 TUDOR

010C

TABLE OF CONTENTS

1. INTRODUCTION

This report details the logistics of a fixed-wing airborne magnetic VLF-EM/survey flown for Noranda Exploration Company, Limited.

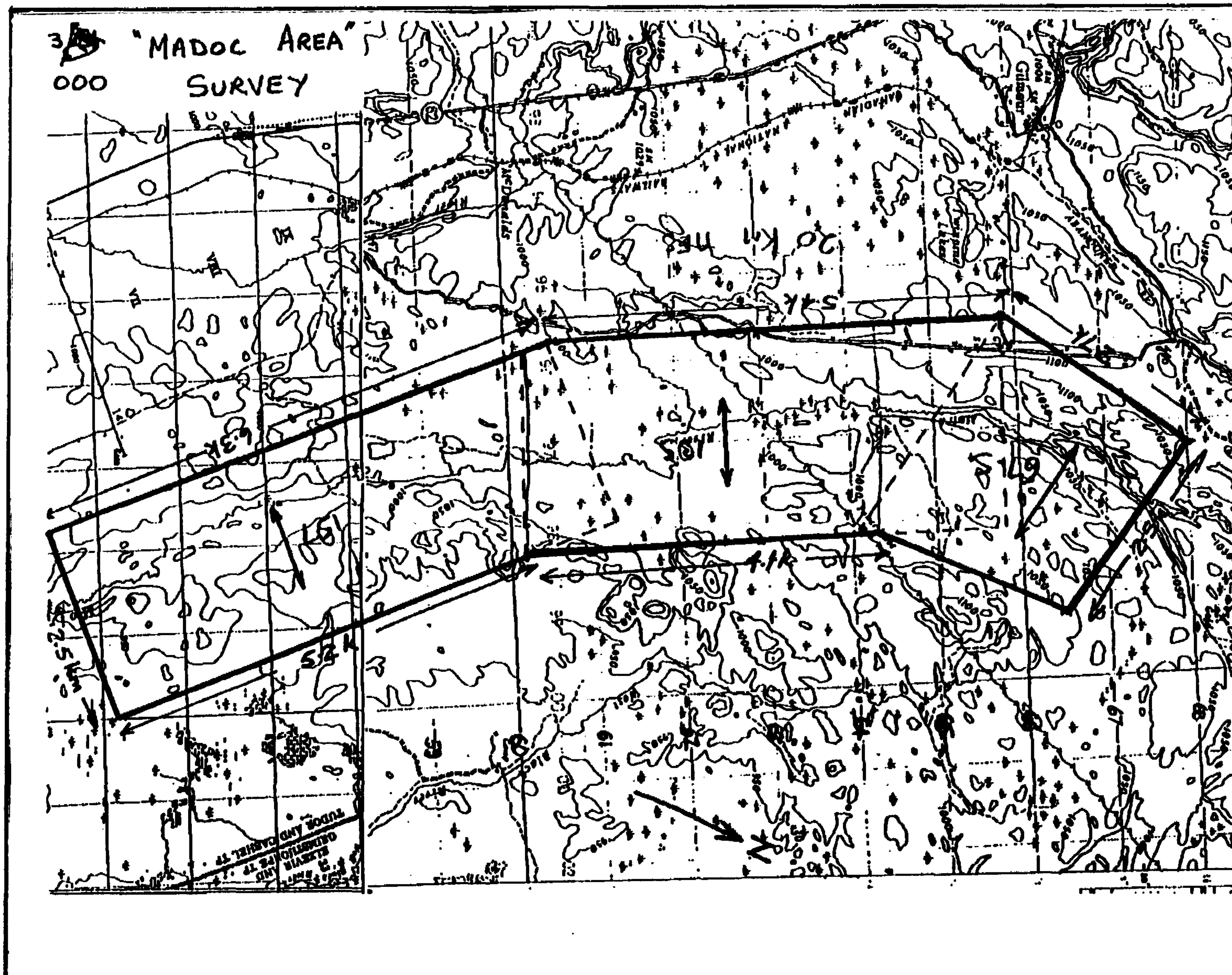
The survey was commissioned by Mr. B. Groves of Noranda.

Terence J. McConnell, Geophysicist for Questor, supervised the data compilation through to the completion of the project in October, 1990.

The survey area consists of three contiguous blocks, comprising 425 kilometers of traverse and control lines. These were flown between the dates of September 24 and September 27, 1990 using Belleville, Ontario as a base of operations. The three blocks have been merged to form one continuous data set.

The project is located 32 km north of Madoc, Ontario. N.T.S. Map sheets 31C 12 and 31C 13 include the survey site (see location maps).


Bancroft 6m
Bancroft 7m
To York River
MAYO
Apsley 17m
Apsley 4½ m
HALIBURTON
Faraday
Rose Island
WOLLASTON
Coe Hill
Glen Alda
Owenbrook
Lake
Lasswade
The Ridge
Murphy Corners
Ormsby
Ormsby Jct
Marina Landing
St Olav
St Olav Sta
Gilmour
Turriff
Egan Creek Siding
Millbridge
Millbridge Sta
Hogan
Jordan
Bannockburn
Keller Bridge
Vansickle
Oak Lake
Shanick
Cordova
BLUE MTN
HASTINGS
PETERBOROUGH CO
CANADIAN NATIONAL


"MADOC AREA"
SURVEY
000
20 Km
5.4k
4.1k
5.2k
6.3k
2.5 km
Gilmour
Twin Lakes
McDonalds
N

2. OPERATIONS

2a. Personnel

The survey crew was made up of experienced Questor employees:

Crew Manager/Geophysicist	T. McConnell
Pilot/Captain of Aircraft	J. Monsalve
Equipment Technician/Navigator	M. Barrett

The digital flight path records were checked for completion at the base of operation, in Belleville, Ontario. Final data compilation and drafting were carried out by Questor at its Brantford, Ontario office. The magnetic and electromagnetic processing was carried out using Questor software and the results were computer drafted.

2b. Equipment

A Cessna 206, C-FAQD, equipped with the following instruments was used for the survey:

1. Scintrex H-8 Cesium Vapour optical pumped Magnetometer;
2. Herz Industries Totem 2A VLF/EM Receiver;
3. Picodas PDAS 1000 Digital Data Acquisition System;
4. RMS GR 33 Analogue Recorder;
5. Geocam 75 SF 35 mm. Camera;
6. TRT Radar Altimeter;
7. Rosemount Barometric Altimeter;
8. Trimble TANS GPS Satellite Navigation System with cross-track indicator for pilot.

Regular calibrations of the equipment were performed at the beginning and end of each survey. Details of the calibration procedures are given in Appendix C.

A GEM Systems GSM-19 digitally recording base station was used to monitor the diurnal variations.

2c. Production

The flight line spacing over the three contiguous blocks was 100 meters. Table 1 summarized the kilometers flown during the survey operation.

TABLE 1

Traverse lines	(km)	397.0
Control lines	(km)	28.0
Total lines	(km)	425.0

The survey was completed in five production flights.

2d. Survey Procedure

During the survey, the aircraft maintained a terrain clearance as close to 60 meters as possible. In areas of substantial topographic relief or large population, the aircraft height may exceed 60 meters for safety reasons. The aircraft's air speed was maintained at 120 knots while on survey.

The details of each production flight are documented on the digital flight logs produced on each analogue record. The logs include the survey times, line numbers and fiducial intervals, as well as a record of equipment irregularities and atmospheric conditions. One may refer to these logs in order to relate the flight path film to the geophysical data.

During the course of the survey the following data were recorded:

1. airborne magnetometer data;
2. secondary VLF signals (both total field and quadrature components) from two stations:
   - Cutler, Maine (NAA - 24.0 kHz)
   - Seattle, Washington (NLK - 24.8 kHz)
3. a record of the terrain clearance as provided by radar altimeter;
4. a record of height above sea level as provided by a barometric altimeter;
5. a photographic record of the terrain passing below the aircraft as obtained from a 35 mm camera;
6. time markers impressed synchronously on the photographic and geophysical records to facilitate positioning on photomosaics;
7. digital satellite positioning information as provided by GPS receiver; and
8. ground base station magnetometer data.

All signals except GPS positions were sampled at a 5 Hz (~12m) interval. GPS position was sampled at a nominal rate of 1 Hz.

2e. Magnetic Diurnal

Diurnal variations in the earth's magnetic field had been recorded to an accuracy of 0.1 nT using a base station equipped with a Gem Systems GSM-19 Overhauser Proton Precession Magnetometer. It was monitored periodically during the day for severe diurnal changes (magnetic storms). A variation of 30 nT over a 3 minute time period was considered to be a magnetic storm. During such an event, the survey would normally have been discontinued or postponed and any survey data would have been scrubbed.

The base station magnetometer was set up in a magnetically quiet area near the crew quarters.

2f. Data Recovery

Navigation for the survey was performed using a Trimble TANS GPS satellite receiver. On-board computers acquired and recorded positional information once per second from the GPS receiver. This information was then compared with a suite of pre-programmed flight lines and area co-ordinates to provide the pilot with a real time display of his position relative to a selected flight line. Both traverse lines and control lines were navigated in this fashion. The Equipment Technician/Navigator also confirmed relative position using ortho photomosaics carried on board.

The flight path of the aircraft was also recorded by strip camera on black and white, 125ASA, 35 mm film which was exposed continuously while on line. The aperture setting on the camera can be manually adjusted by the operator during flight, assuring the proper exposure of the film. The camera is fitted with a wide angle 18 mm lens. Fiducial numbers are imprinted on the film, marked onto the analogue records and recorded digitally at the same instant.

For each line, the equipment operator enters the flight details information into the digital data system where they are recorded and verified (read-after-write). The information includes line number, time, fiducial range, and other pertinent flight information. This information is compared to the film analogue records and the magnetic base station recording at the completion of the survey flight.

The film and all records are developed, edited and checked at the completion of each flight. All analogue records are inspected for coherence with specifications.

The procedures are performed on the survey site daily by the Equipment Technician so that the data quality and progress may be measured objectively. Reflights for covering navigational gaps and other deficiencies are usually flown on the following day.

3. DATA COMPILATION

3a. Products

The survey consisted of three contiguous surveys blocks. The data from the three blocks was merged to form one continuous data base. The data are presented on two 1:10,000 scale map sheets, for each one of the parameters.

The products delivered by Questor to Noranda Exploration Company Limited along with three copies of the report include:

1. Unscreened master topographic base map, scale 1:10,000;
2. Clear overlay of the flight path, 1:10,000 scale;
3. Contours of the magnetic total field, scale 1:10,000;
4. Stacked profiles of magnetic total field, scale 1:10,000
5. Contours of the total field VLF with stacked profiles of quadrature VLF superimposed thereon, scale 1:10,000;
6. One colour contour map of magnetic total field;
7. Ortho photomosaic of the area at 1:10,000 scale;
8. Four slides of enhanced images of total magnetic intensity;
9. The digital flight logs;
10. The negative of the flight path film;
11. Archive digital data containing both raw and processed (gridded) data.

3b. Flight Path

The recorded flight path was plotted and verified at the base of survey operations. It was then shipped back to the main office where it was routinely verified by a computer programme 'speed check', which flags any abnormalities in the distance per fiducial unit on a line. As a final check, the rough magnetic contour maps were examined for contour irregularities that could be attributed to positional errors.

3c. Magnetics

A Gem Systems GSM-19 Proton Precession Magnetometer was operated at the survey base to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to permit removal of diurnal drift. Any subsequent leveling changes can be made utilizing control line crossing differences.

The corrected data was then interpolated onto a regular grid using a cubic spline technique. The resulting grid provides the basis for presenting the magnetic contours. The total field magnetic data were presented as contours on a 1:10,000 scale base map.

Remarks on the Magnetic Results:

The aeromagnetic data over the Madoc area is dominated by a magnetic package consisting of several discrete linear strongly magnetic units, The units trend N to NNE in the northern part of the survey area, curving round to a NNW trend in the south of the area. Weakly to moderately magnetic units are also evident sub-parallel to these central units. This package probably comprises interbedded metasedimentary and mafic metavolcanic units of varying magnetic character.

The dominant structural trend is 030°, defined by either a change in magnetic character along the fractures or by offsets to the magnetic units. Through most of the area movement along these structures is minor, but shows sinistral offset when evident. In the northwest of the survey area, lithological units are discordant across one of these 030° trending structures. To the west of the feature, magnetic linear units trend 045° in contrast to the NNW orientation of the units to the east.

The prominent linear magnetic units are truncated in the south by a 330° trending structure. Within this southern corner of the survey area, the rocks display a 'flat' magnetic signature relative to the remainder of the survey area, and probably represents non-magnetic sedimentary or felsic volcanic units.

3d. VLF/EM

The VLF maps of the survey area record the total field component of the secondary VLF signals from the station at Cutler, Maine (NAA - 24.0 kHz). The results have been plotted as filtered total field contours and quadrature profiles.

The VLF method is sensitive to the angle of coupling between the conductor and the propagated EM field. As such, conductors which strike towards the VLF station will usually yield a stronger response than conductors which are nearly orthogonal to it. VLF/EM anomalies are not EM anomalies in the conventional sense. EM anomalies normally reflect the eddy currents induced in a conductive body by the primary field. VLF/EM anomalies, however, reflect the effects of current gathering, which is a non-conductive phenomenon. The primary field from the transmitting station sets up weak currents which flow in the bedrock and overburden. These currents tend to gather in low resistivity zones such as massive sulfides, faults, shears, river valleys or zones of conductive overburden.

The total field yields peaks over VLF/EM current concentrations, while the quadrature component yields crossovers. VLF anomalies which appear to transect the magnetic data, and those VLF trends which appear to be truncated of offset, are often due to fault or shear zones.

The dominant N - S trending units defined from the magnetic data are also evident on displays of the VLF - EM data. Structures determined from the magnetic data and discussed above are generally detected in the VLF - EM data through offsets to the responsive units. Faults and fractures in the survey area are not strongly conductive. WNW and NE trends are also evident in the VLF - EM data.

The prominent NE oriented linear is attributed to cultural effects.

Respectively Submitted
QUESTOR SURVEYS LIMITED

Terence J. McConnell
President
Geophysicist.

Qual 2.9262

APPENDIX A: MAGNETOMETER

Scintrex H8 Cesium Magnetometer

The airborne magnetometer is a Scintrex H8 Cesium sensor which operates on the principle of optical pumping to produce a measurement of the total magnetic intensity. It has a sensitivity of 0.001 gamma and an operating range of 17,000 gammas to 99,000 gammas. The H8 incorporates fully automatic tuning over its entire range with manual selection of the ambient field starting point for quick startup. The instrument can accurately track field changes exceeding 25,000 nT, and for this survey has an absolute accuracy of 0.1 nT at a 0.2 second sample rate. The sensor is oriented to optimize results in a low ambient magnetic field. The sensor housing is mounted at the tip of the tail boom. A 3-term flux gate is used to counteract the effects of permanent, induced and eddy magnetic fields in the aircraft.

APPENDIX A: VLF-EM RECEIVER

Herz Industries Ltd. Totem 2A

The Totem 2A VLF electromagnetic airborne receiver measures the total field and vertical quadrature components of the magnetic field radiated from VLF radio transmitters (one or two stations can be recorded simultaneously). The output of the receiver is $\pm$ 1.0 volt for a change in field strength of $\pm$ 100%.

These components are digitally recorded with a sensitivity of 0.0125%. The frequency range of the receiver is from 15 kHz to 26 kHz, selectable in 100 Hz steps. A built-in spherics filter reduces the noise contribution of impulse type interference. General noise levels depend on the availability of a suitable station of reasonable signal strength. Ambient noise exceeds the internal noise of the system and generally is in the neighbourhood of 1% or better when in the presence of a strong station.

The total field tends to yield peaks in field strength over VLF current concentrations of the elected frequency. The quadrature component tends to yield crossovers. The quadrature polarity is defined by the direction of flight, relative to the field.

One obvious advantage of dual frequency operations is that primary transmitter sources can be selected to ensure good coupling with conductors in any orientation. Stations are usually selected so as to measure one primary magnetic field which is parallel to the flight lines (in LINE station), and one field which is orthogonal to the flight line direction (ORTHO station). Using this convention, it is found that the LINE channel response best delineates conductors which parallel the line direction.

This can be simply summed up by noting that conductors which strike towards a VLF station will usually yield a stronger response than conductors which are nearly orthogonal to it.

The sensor itself is housed in the wing tip of the aircraft.

APPENDIX C: CALIBRATION PROCEDURE

Calibration of survey equipment was usually performed at the beginning and end of each survey flight.

The continuous chart speed of the RMS Analogue Recorder was set at 6.0 cm/minute (1 mm/sec).

The VLF-EM receiver output is manually calibrated during the ferry flight to the survey area. At altitude and out of ground effect, the receiver response reflects only the primary field strength. Using potentiometers, the output voltage for each channel is set to 1.0 volts. Any subsequent variation in field strength due to secondary sources is measured as a percentage of the primary field. A 10% variation is represented by an output change of 100 mV.

APPENDIX D: THE FLIGHT RECORDS

ANALOGUE PROFILES

Channel Name	Parameter	Sensitivity per cm.
MAG	Magnetics	50 nT
LTOT	VLF-Total: Cutler	25%
LQUA	VLF-quad: Cutler	25%
OTOT	VLF-total: Seattle	25%
OQUA	VLF-quad: Seattle	25%
RAD	Radar Altimeter	50 feet
BARO	Barometric Altimeter	50 feet
4th Mag (FDD1)	4th Difference (noise monitor)	100 pT
LAT	GPS Latitude	0.02 degrees
LONG	GPS Longitude	0.02 degrees

Rec. Geo. Tuned

Ministry of Northern Development and Mines

Ontario

DOCUMENT No. W9009 • 50

Mining Act

Report of Work 2.1359

(Geophysical, Geological and Geochemical Sur

31C13SE0043 2.13596 TUDOR

900

Type of Survey(s)	Mining Division	Township or Area
Airborne Magnetometer & VLF-EM	Southern Ont.	Tudor Twp.

Recorded Holder(s)	Prospector's Licence No.
Noranda Exploration Company, Limited (no personal liability)	A-34387

Address	Telephone No.
4 King St. W., Suite 1300, Toronto, Ontario M5H 1B6 P.O. Box 1205, 60 Shirley St. So., Timmins, Ontario P4N 7J5	(416) 982-7187 (705) 268-9600

Survey Company

Questor Surveys Limited, 200 Grand River Ave., Brantford, Ontario N3T 4X9

Name and Address of Author (of Geo-Technical Report)	Date of Survey (from & to)
519-753-1600 Terry McConnell, 200 Grand River Ave., Brantford, Ontario N3T 4X9	From: Day 29 Mo. 07 Yr. 90 To: Day Mo. Yr.

Credits Requested per Each Claim in Columns at right

Special Provisions		Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	Geophysical - Other	
	Geophysical	
	Geochemical	
Man Days Complete reverse side and enter total(s) here	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
	Geophysical - Other	
	Geophysical	
	Geochemical	
Airborne Credits Note: Special provisions credits do not apply to Airborne Surveys	Electromagnetic	40
	Magnetometer	40
	Other	
Total miles flown over claim(s).		

RECEIVED
AUG 23 1990
MINING LANDS SECTION

Date	Recorded Holder or Agent (Signature)
Aug. 17/90	

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Mining Claim Prefix	Mining Claim Number	Mining Claim Prefix	Mining Claim Number
SO	748125	SO	1037876	SO	1037891
	748126		1037877		1037892
	748127		1037878		1037893
	748128		1037879		1040406
	748129		1037880		1040424
	748130		1037881		1040425
	748131		1037882		1040426
	748132		1037883		1040427
	748133		1037884		1040429
	748134		1037885		1104352
			1037886		1104395
	1037870		1037887		1104396
	1037871		1037888		
	1037872		1037889		
	1037873		1037890		
	1037874				
	1037875				

Total number of mining claims covered by this report of work: 43

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in this Report of Work, having performed the work or witnessed same during and/or after its completion and annexed report is true.

Name and Address of Person Certifying	Telephone No.	Date	Certified By (Signature)
G.J. Koleszar, P.O. Box 1205, Timmins, Ontario P4N 7J5	268-9600	Aug. 17, 1990	

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
3440	Aug 21/90	
	Date Approved as Recorded	Provincial Manager, Mining Lands
	Dec 18/90	

Received Stamp

SOUTHERN ONTARIO MINING DIVISION
RECEIVED
AUG 21 1990
AM 7 8 9 10 11 12 1 2 3 4 5 6 PM

1382 (89/06)

Res. Geo. Tweed

Ministry of Northern Development and Mines

Ontario

DOCUMENT No. W9009 • 53

Instructions ~~Sept. 27~~ October 28 M.L.S.

- Please type or print.
- Refer to Section 77, the Mining Act for assessment work requirements and maximum credits allowed per survey type.
- If number of mining claims traversed exceeds space on this form, attach a list.
- Technical Reports and maps in duplicate should be submitted to Mining Lands Section, Mineral Development and Lands Branch.

Mining Act — Report of Work (Geophysical, Geological and Geochemical Surveys) 13590

Type of Survey(s)	Mining Division	Township or Area
Airborne Magnetometer & VLF-EM	Southern Ontario	Tudor M-156

Recorded Holder(s)	Prospector's Licence No.
Noranda Exploration Co., Ltd (no personal liability)	A-34387

Address	Telephone No.
1300-4 King St. W., Toronto, Ontario, M5H 1B6 P.O. Box 1205, 60 Shirley St, Timmins, Ontario P4N 7J5	(416) 982-9600 (705) 268-9600

Survey Company: Questor Surveys Ltd., 200 Grand River Ave., Brantford, Ont. N3T 4X9

Name and Address of Author (of Geo-Technical Report): Terry McConnel, 200 Grand River Ave., Brantford, Ont.

Date of Survey (from & to): 29 07 90 (Day | Mo. | Yr.) — (Day | Mo. | Yr.)

Credits Requested per Each Claim in Columns at right

		Days per Claim
Special Provisions For first survey: Enter 40 days. (This includes line cutting) For each additional survey: using the same grid: Enter 20 days (for each)	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
	Geophysical - Other	
	Geological	
	Geochemical	
Man Days Complete reverse side and enter total(s) here	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
	Geophysical - Other	
	Geological	
	Geochemical	
Airborne Credits Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Other	

Total miles flown over claim(s).

Date: Aug. 27/90 — Recorded Holder or Agent (Signature)

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Mining Claim Prefix	Mining Claim Number	Mining Claim Prefix	Mining Claim Number
SO	1017355				
	1017356				

RECEIVED 1990 MINING LANDS SECTION

Total number of mining claims covered by this report of work: 2

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in this Report of Work, having performed the work or witnessed same during and/or after its completion and annexed report is true.

Name and Address of Person Certifying: G.J. Koleszar, P.O. Box 1205, Timmins, Ontario P4N 7J5

Telephone No.: 268-9600 — Date: Aug. 27/90 — Certified By (Signature)

For Office Use Only

Received Stamp: SOUTHERN ONTARIO MINING DIVISION RECEIVED AUG 29 1990

Total Days Cr. Recorded	Date Recorded	Mining Recorder
160	Aug 29/90	
	Date Approved as Recorded: Dec 18/90	Provincial Manager, Mining Lands

Ontario

Ministry of Northern Development and Mines

Geophysical-Geological-Geochemical Technical Data Statement

File 2.13590

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Airborne Magnetometer and VLF-EM

Township or Area Tudor Twp.

Claim Holder(s) Noranda Exploration Company, Limited

Survey Company Questor Surveys Limited

Author of Report Terry McConnell

Address of Author c/o 200 Grand River Avenue, Brantford, Ontario N3T 4X9

Covering Dates of Survey 29/07/90 (linecutting to office)

Total Miles of Line Cut N/A

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

DAYS per claim

Geophysical
- Electromagnetic
- Magnetometer
- Radiometric
- Other

Geological

Geochemical

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer 40 Electromagnetic 40 Radiometric (enter days per claim)

DATE: Oct 17, 90 SIGNATURE: Author of Report or Agent

Res. Geol. Qualifications 2.926Z

Previous Surveys

File No.	Type	Date	Claim Holder

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)
SO	748125
	748126
	748127
	748128
	748129
	748130
	748131
	748132
	748133
	748134
	1037870
	1037871
	1037872
	1037873
	1037874
	1037875
	1037876
	1037877
	1037878
	1037879
	1037880

TOTAL CLAIMS 43

If space insufficient, attach list

OFFICE USE ONLY

837 (85/12)

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS – If more than one survey, specify data for each type of survey

Number of Stations _____ Number of Readings _____

Station interval _____ Line spacing _____

Profile scale _____

Contour interval _____

MAGNETIC

Instrument _____

Accuracy – Scale constant _____

Diurnal correction method _____

Base Station check-in interval (hours) _____

Base Station location and value _____

_____

ELECTROMAGNETIC

Instrument _____

Coil configuration _____

Coil separation _____

Accuracy _____

Method: ☐ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency _____
(specify V.L.F. station)

Parameters measured _____

GRAVITY

Instrument _____

Scale constant _____

Corrections made _____

_____

Base station value and location _____

_____

Elevation accuracy _____

INDUCED POLARIZATION
RESISTIVITY

Instrument _____

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time _____ Frequency _____

– Off time _____ Range _____

– Delay time _____

– Integration time _____

Power _____

Electrode array _____

Electrode spacing _____

Type of electrode _____

MINING CLAIMS TRAVERSED

SO	1037881
	1037882
	1037883
	1037884
	1037885
	1037886
	1037887
	1037888
	1037889
	1037890
	1037891
	1037892
	1037893
	1040406
	1040424
	1040425
	1040426
	1040427
	1040429
	1104352
	1104395
	1104396

SELF POTENTIAL

Instrument _____ Range _____

Survey Method _____

_____

Corrections made _____

_____

RADIOMETRIC

Instrument _____

Values measured _____

Energy windows (levels) _____

Height of instrument _____ Background Count _____

Size of detector _____

Overburden _____

(type, depth – include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey _____

Instrument _____

Accuracy _____

Parameters measured _____

_____

Additional information (for understanding results) _____

_____

_____

AIRBORNE SURVEYS

Type of survey(s) Magnetic, VLF-EM

Instrument(s) Scintrex H-8 Cesium Vapor Magnetometer, Herz Totem IIA VLF

(specify for each type of survey)

Accuracy Magnetics: 0.01 nT, VLF: 1.0%

(specify for each type of survey)

Aircraft used Cessna 206, C-FAQD

Sensor altitude Mag: 60 meters, VLF: 60 meters

Navigation and flight path recovery method Trimble TANS GPS Satellite Navigation

_____

Aircraft altitude 60 meters Line Spacing 100 meters

Miles flown over total area 425 km Over claims only 43.3 Miles
69.7 Line Km

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken_____

Total Number of Samples_____

Type of Sample_____
(Nature of Material)

Average Sample Weight_____

Method of Collection_____

Soil Horizon Sampled_____

Horizon Development_____

Sample Depth_____

Terrain_____

Drainage Development_____

Estimated Range of Overburden Thickness_____

SAMPLE PREPARATION
(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis_____

General_____

ANALYTICAL METHODS

Values expressed in: per cent ☐
p. p. m. ☐
p. p. b. ☐

Cu, Pb, Zn, Ni, Co, Ag, Mo, As,-(circle)

Others_____

Field Analysis (_____ tests)

Extraction Method_____

Analytical Method_____

Reagents Used_____

Field Laboratory Analysis

No. (_____ tests)

Extraction Method_____

Analytical Method_____

Reagents Used_____

Commercial Laboratory (_____ tests)

Name of Laboratory_____

Extraction Method_____

Analytical Method_____

Reagents Used_____

General_____

Limerick Twp.(M.114)

Lake Twp. (M.110)

Grimsthorpe Twp.(M. 97)

Madoc Twp.(M.120)

THE TOWNSHIP OF TUDOR

COUNTY OF HASTINGS

MINING DIVISION

SCALE: 1-INCH=40 CHAINS

LEGEND

PATENTED LAND	● or (P)
CROWN LAND SALE LEASES	C.S. (L)
LOCATED LAND	Loc.
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	MRO.
SURFACE RIGHTS ONLY	SRO
ROADS	
IMPROVED ROADS	
KING'S HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES CANCELLED	C
TRAILS	
PATENTED S.R.O	(P)

NOTES

This Map Is Not To Be Used FOR SURVEY PURPOSES.

Lot And Concession Lines Shown Hereon Are Projected From The Best Informations Available But Their True Position Is Not Guaranteed. For Official Survey Purposes Consult The Original Survey Plans And Field Notes Of Records In The Ministry of Natural Resources

400' Surface rights reservation along the shores of all lakes and rivers.

DATE OF ISSUE

SEP 1 0 1990

SOUTHERN ONTARIO MINING DIVISION

THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES AND ACCURACY IS NOT GUARANTEED. THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING RECORDER, MINISTRY OF NORTHERN DEVELOPMENT AND MINES FOR ADDITIONAL INFORMATION ON THE STATUS OF THE LANDS SHOWN HEREON

PLAN NO.-M.156

ONTARIO

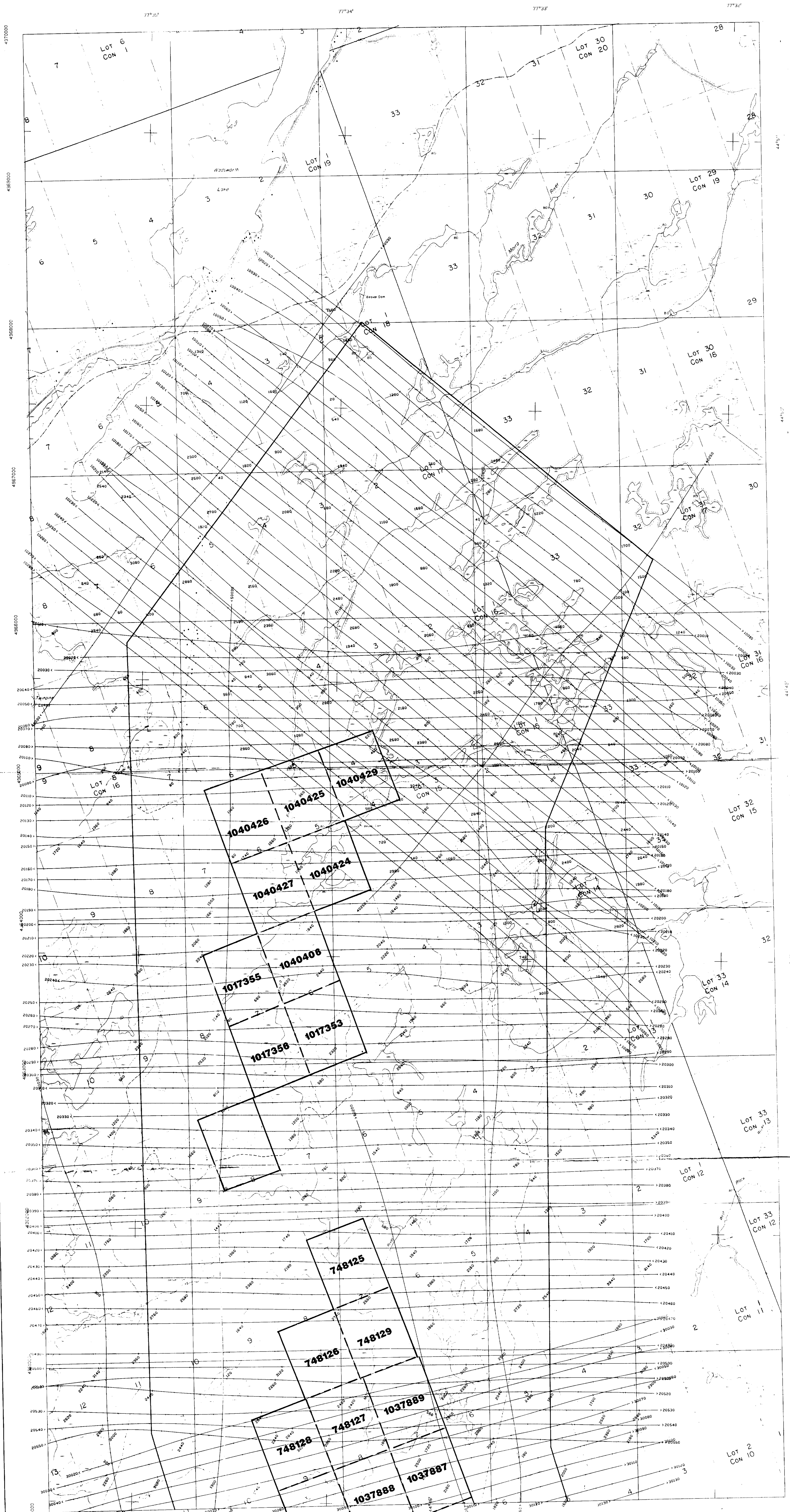
MINISTRY OF NATURAL RESOURCES

SURVEYS AND MAPPING BRANCH

2.13590

31C13SE0043 2.13590 TUDOR

200



MADOC
AIRBORNE GEOPHYSICAL SURVEY
NORANDA EXPLORATION COMPANY LIMITED

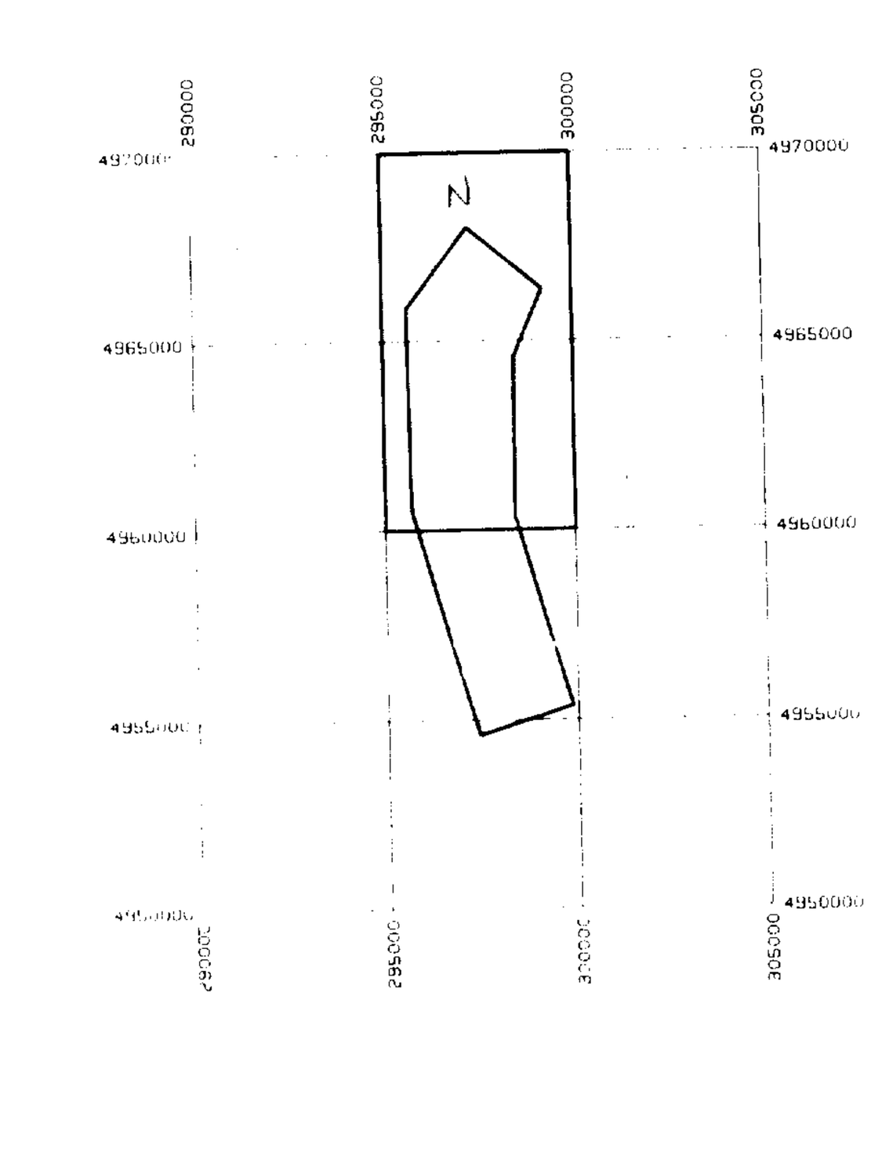
Surveyed and compiled by QUESTOR SURVEYS LIMITED
September - October 1990
Job No. 90067

2.13590

AIRCRAFT
[illegible] CESSNA STATIONAIR [illegible]
MAGNETOMETER
SCINTREX H6 CESIUM VAPOUR
RESOLUTION 0.001 nanoTesla
CYCLE RATE 0.2 seconds
SAMPLE INTERVAL 12 metres
DATA ACQUISITION
PICODAS P1000 DIGITAL ACQUISITION SYSTEM
FLIGHT LINE SPACING
TRAVERSE LINES 100 metres
TIE LINES 2 lines per block
FLIGHT LINE DIRECTION
BLOCK 1
TRAVERSE LINES 135 - 315 degrees
TIE LINES 045 - 225 degrees
BLOCK 2
TRAVERSE LINES 090 - 270 degrees
TIE LINES 000 - 180 degrees
BLOCK 3
[illegible] LINES 075 - 255 degrees
[illegible] LINES 345 - 165 degrees
SURVEY HEIGHT
[illegible] metres - MEAN CANOPY CLEARANCE
NAVIGATION
Using Trimble TANS GPS Navigation System

CLAIM LOCATIONS + [FLIG]HT PATH MAP N BLOCK

LEGEND
5 fiducial interval
20 fiducial interval



Scale 1:10 000
200 0 400 600 800 1000 metres
TRANSVERSE MERCATOR MAP GRID

31C13SE0043 2.13590 TUDOR

210

MADOC

AIRBORNE GEOPHYSICAL SURVEY

NORANDA EXPLORATION COMPANY LIMITED

Surveyed and compiled by QUESTOR SURVEYS LIMITED
September – October 1990
Job No. 90067

2.13590

AIRCRAFT
C-FADQ CESSNA STATIONAIR 206G

MAGNETOMETER
SCINTREX H8 CESIUM VAPOUR
RESOLUTION 0.01 nanoTesla
CYCLE RATE 0.2 seconds
SAMPLE INTERVAL 12 metres

DATA ACQUISITION
PICODAS P1000 DIGITAL ACQUISITION SYSTEM

FLIGHT LINE SPACING
TRAVERSE LINES 100 metres
TIE LINES 2 lines per block

FLIGHT LINE DIRECTION
BLOCK 1
TRAVERSE LINES 135 - 315 degrees
TIE LINES 045 - 225 degrees
BLOCK 2
TRAVERSE LINES 090 - 270 degrees
TIE LINES 000 - 180 degrees
BLOCK 3
TRAVERSE LINES 075 - 255 degrees
TIE LINES 145 - 325 degrees

SURVEY HEIGHT
200 metres MEAN TERRAIN CLEARANCE

NAVIGATION
Using Trimble TRANS GPS Navigation System

FLIGHT PATH MAP

5 Block

LEGEND
5 Fiducial Interval
20 Fiducial Interval

UNIVERSAL TRANSVERSE MERCATOR MAP GRID

31C135E0043 2.13590 TUDOR

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AIRBORNE GEOPHYSICAL SURVEY

NORANDA EXPLORATION COMPANY LIMITED

Surveyed and compiled by QUESTOR SURVEYS LIMITED
September - October 1990
Job No 90067

AIRCRAFT
C-FAQD CESSNA STATIONAIR 206G

MAGNETOMETER
SCINTREX H8 CESIUM VAPOUR
RESOLUTION 0.001 nanoTesla
CYCLE RATE 0.2 seconds
SAMPLE INTERVAL 12 metres

DATA ACQUISITION
PICODAS P1000 DIGITAL ACQUISITION SYSTEM

FLIGHT LINE SPACING
TRAVERSE LINES 100 metres
TIE LINES 2 lines per block

FLIGHT LINE DIRECTION

BLOCK 1
TRAVERSE LINES 135 - 315 degrees
TIE LINES 045 - 225 degrees

BLOCK 2
TRAVERSE LINES 090 - 270 degrees
TIE LINES 000 - 180 degrees

BLOCK 3
TRAVERSE LINES 075 - 255 degrees
TIE LINES 145 - 325 degrees

SURVEY HEIGHT
200 metres - MEAN CANOPY CLEARANCE

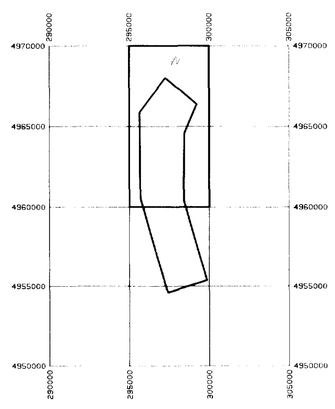
NAVIGATION
Using Trimble TANS GPS Navigation System

FLIGHT PATH MAP

LEGEND
5 fiducial interval
20 fiducial interval

2.13590

SHEET LOCATION



Scale 1:10 000

200 0 200 400 600 800 1000 metres

UNIVERSAL TRANSVERSE MERCATOR MAP GRID

31C135E0043 2.13590 TUDOR

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AIRBORNE GEOPHYSICAL SURVEY

NORANDA EXPLORATION COMPANY LIMITED

Surveyed and compiled by QUESTOR SURVEYS LIMITED
September - October 1990
Job No. 9006/7

AIRCRAFT
C-FRQD CESSNA STATIONAIR 206

MAGNETOMETER
SCINTREX MAGNETIC CESIUM VAPOUR
RESOLUTION 0.001 nanoTesla
CYCLE RATE 0.2 seconds
SAMPLE INTERVAL 12 metres

DATA ACQUISITION
PICODAS P1000 DIGITAL ACQUISITION SYSTEM

FLIGHT LINE SPACING
TRAVERSE LINES 100 metres
TIE LINES 2 lines per block

FLIGHT LINE DIRECTION

BLOCK 1
TRAVERSE LINES 135 - 315 degrees
TIE LINES 045 - 225 degrees

BLOCK 2
TRAVERSE LINES 090 - 270 degrees
TIE LINES 000 - 180 degrees

BLOCK 3
TRAVERSE LINES 075 - 255 degrees
TIE LINES 145 - 325 degrees

SURVEY HEIGHT
200 metres - MEAN CANOPY CLEARANCE

NAVIGATION
Using Trimble TANS GPS Navigation System

FLIGHT PATH MAP

LEGEND
5 Fiducial interval
20 Fiducial interval

2.13590

77°35' 77°34' 77°33' 77°32'
44°46' 44°45' 44°44' 44°43' 44°42' 44°41'
4960000 4959000 4958000 4957000 4956000 4955000 4954000 4953000 4952000 4951000
295000 296000 297000 298000 299000 300000

MADOC

AIRBORNE GEOPHYSICAL SURVEY

NORANDA EXPLORATION COMPANY LIMITED

Surveyed and compiled by QUESTOR SURVEYS LIMITED
September - October 1990
Job No. 900617

AIRCRAFT
C-FRQD CESSNA STATIONAIR 206G

MAGNETOMETER
SCINTREX H8 CESIUM VAPOUR
RESOLUTION 0.001 nanoTesla
CYCLE RATE 0.2 seconds
SAMPLE INTERVAL 12 metres

DATA ACQUISITION
PICODAS P1000 DIGITAL ACQUISITION SYSTEM

FLIGHT LINE SPACING
TRAVERSE LINES 100 metres
TIE LINES 2 lines per block

FLIGHT LINE DIRECTION

BLOCK 1
TRAVERSE LINES 135 - 315 degrees
TIE LINES 045 - 225 degrees

BLOCK 2
TRAVERSE LINES 090 - 270 degrees
TIE LINES 000 - 180 degrees

BLOCK 3
TRAVERSE LINES 075 - 255 degrees
TIE LINES 145 - 325 degrees

SURVEY HEIGHT
200 metres - MEAN CANOPY CLEARANCE

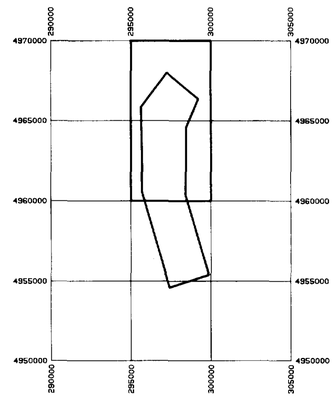
NAVIGATION
Using Trimble TANS GPS Navigation System

TOTAL FIELD MAGNETIC CONTOUR MAP

DATA PROCESSING
REGIONAL FIELD IGRF MODEL 1985 REMOVED
GRID CELL SIZE 25 metres
CONTOUR INTERVAL 20 nanoTeslas
PARALLAX CORRECTION 0.0 fiducials
BASE VALUE ADDED 57100 nanoTeslas

2.13590

SHEET LOCATION



Scale 1:10 000

200 0 200 400 600 800 1000 metres

UNIVERSAL TRANSVERSE MERCATOR MAP GRID

31C138E0043 2.13590 TUDOR

MADOC

AIRBORNE GEOPHYSICAL SURVEY

NORANDA EXPLORATION COMPANY LIMITED

Surveyed and compiled by GEOTECH SURVEYS LIMITED
September - October 1989
Job No. 8904-57

77°35' 77°34' 77°33' 77°32'

44°46' 44°45' 44°44' 44°43' 44°42' 44°41'

4960000 4959000 4958000 4957000 4956000 4955000 4954000 4953000 4952000 4951000 4950000

295000 296000 297000 298000 299000 300000

AIRCRAFT
C-FRQD (ESSNA STATIONAIR 206)

MAGNETOMETER
SCINTREX MP CESIUM VAPOUR
RESOLUTION 0.001 nanoTesla
CYCLE RATE 0.2 seconds
SAMPLE INTERVAL 12 metres

DATA ACQUISITION
PCODAS, P1000 DIGITAL ACQUISITION SYSTEM

FLIGHT LINE SPACING
TRAVERSE LINES 100 metres
TIE LINES 2 lines per block

FLIGHT LINE DIRECTION
BLOCK 1
TRAVERSE LINES 135 - 315 degrees
TIE LINES 045 - 225 degrees
BLOCK 2
TRAVERSE LINES 090 - 270 degrees
TIE LINES 000 - 180 degrees
BLOCK 3
TRAVERSE LINES 075 - 255 degrees
TIE LINES 145 - 325 degrees

SURVEY HEIGHT
200 metres MEAN CANOPY CLEARANCE

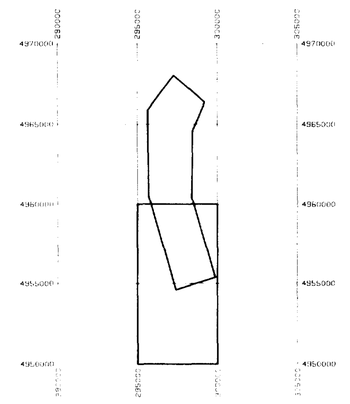
NAVIGATION
Using Trimble TANS GPS Navigation System

TOTAL FIELD MAGNETIC CONTOUR MAP

DATA PROCESSING
REGIONAL FIELD IGRF MODEL 1985 REMOVED
GRID CELL SIZE 25 metres
CONTOUR INTERVAL 20 nanoTeslas
PARALLAX CORRECTION 1.0 fiducials
BASE VALUE ADDED 57100 nanoTeslas

2.13590

INDEX LOCATION

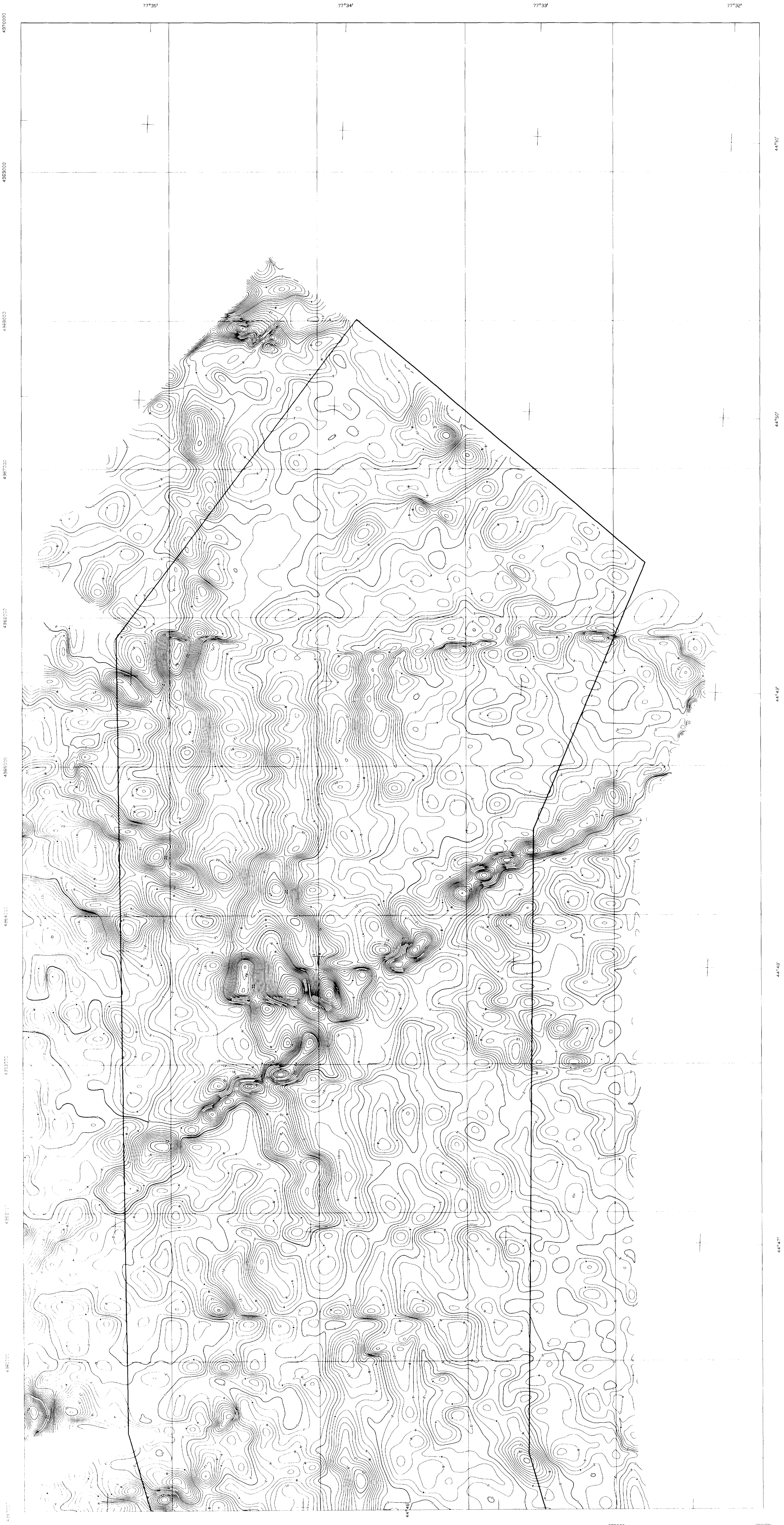


Scale 1 to 10 000

-400 0 200 400 600 800 1000 metres

UNIVERSAL TRANSVERSE MERCATOR MAP GRID

31C135E0043 2.13590 TUDOR



MADOC

AIRBORNE GEOPHYSICAL SURVEY

NORANDA EXPLORATION COMPANY LIMITED

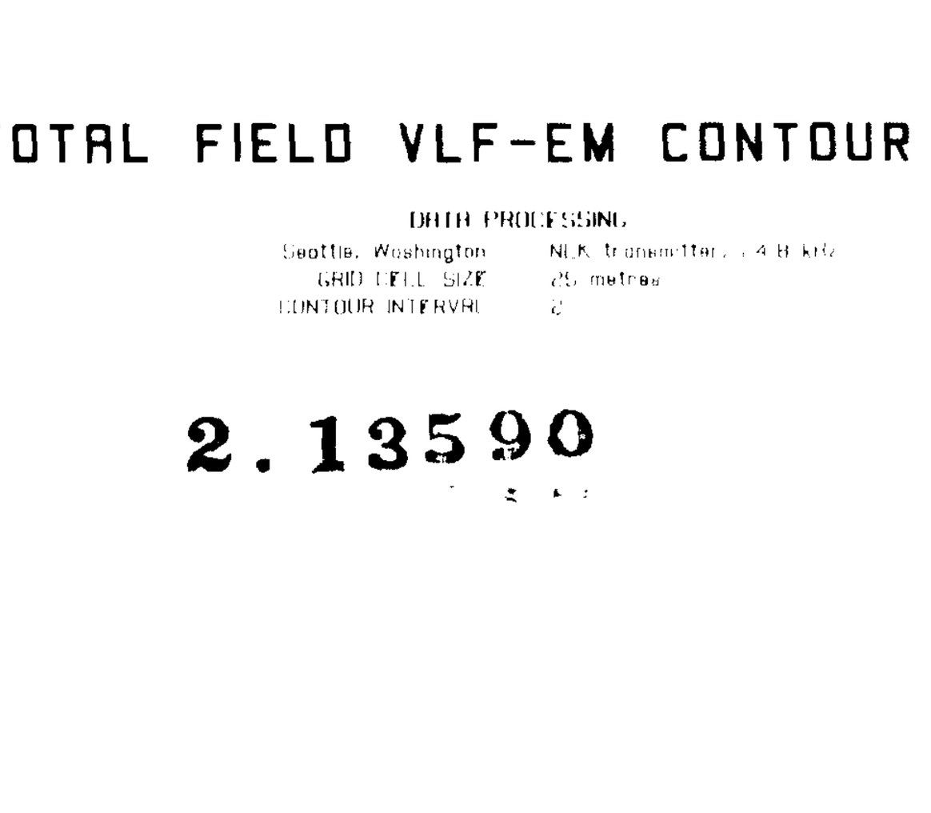
Surveyed and compiled by QUESTOR SURVEYS LIMITED
September – October 1990
Job No 90067

AIRCRAFT
C-FAQD CESSNA STATIONAIR 206G
MAGNETOMETER
SCINTREX H6 CESIUM VAPOUR
RESOLUTION 0.001 nanoTesla
CYCLE RATE 0.2 seconds
SAMPLE INTERVAL 12 metres metres
DATA ACQUISITION
PICODAS P1000 DIGITAL ACQUISITION SYSTEM
FLIGHT LINE SPACING
TRAVERSE LINES 100 metres metres
TIE LINES 2 lines per block metres
FLIGHT LINE DIRECTION
BLOCK 1
TRAVERSE LINES [illegible] degrees
TIE LINES 045 225 degrees
BLOCK 2
TRAVERSE LINES 090 270 degrees
TIE LINES 000 180 degrees
BLOCK 3
TRAVERSE LINES 075 255 degrees
TIE LINES 145 325 degrees
SURVEY HEIGHT
200 metres MEAN CANOPY CLEARANCE
NAVIGATION
Using Trimble TANS GPS Navigation System

TOTAL FIELD VLF-EM CONTOUR MAP

DATA PROCESSING
Seattle, Washington NLK transmitter 24.8 kHz
GRID CELL SIZE 25 metres
CONTOUR INTERVAL 2

2.13590



31C13SE0043 2.13590 TUDOR

270

MADOC

AIRBORNE GEOPHYSICAL SURVEY

NORANDA EXPLORATION COMPANY LIMITED

Surveyed and compiled by QUESTOR SURVEYS LIMITED
September - October 1989
Job No. 8909NE

77°35' 77°34' 77°33' 77°32'

44°46' 44°45' 44°44' 44°43' 44°42' 44°41'

4960000 4959000 4958000 4957000 4956000 4955000

296000 297000 298000 299000 300000

AIRCRAFT
C-FBQD (CESSNA CARAVAN 208A)

MAGNETOMETER
SCINTREX RESOLVEM VAPOUR
RESOLUTION 0.001 nanoTesla
CYCLE RATE 0.2 seconds
SAMPLE INTERVAL 14 metres metres

DATA ACQUISITION
PICODAS P1000 DIGITAL ACQUISITION SYSTEM

FLIGHT LINE SPACING
TRAVERSE LINES 100 metres metres
TIE LINES 2 lines per block metres

FLIGHT LINE DIRECTION
BLOCK 1
TRAVERSE LINES 135 - 315 degrees
TIE LINES 45 - 225 degrees
BLOCK 2
TRAVERSE LINES 090 - 270 degrees
TIE LINES 000 - 180 degrees
BLOCK 3
TRAVERSE LINES 075 - 255 degrees
TIE LINES 145 - 325 degrees

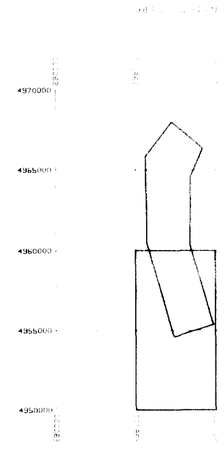
SURVEY HEIGHT
200 metres MEAN LINDSEY CLEARANCE

NAVIGATION
Using Trimble TANS GPS Navigation System

TOTAL FIELD VLF-EM CONTOUR MAP

DATA PROCESSING
Seattle, Washington NLK Transmitter 24.8 kHz
GRID CELL SIZE 25 metres
CONTOUR INTERVAL 2

2.13590



310133E8043 2.13590 TUDOR

MADOC

AIRBORNE GEOPHYSICAL SURVEY

NORANDA EXPLORATION COMPANY LIMITED

Surveyed and compiled by QUESTOR SURVEYS LIMITED
September - October 1990
Job No. 90067

AIRCRAFT
C-FAQD CESSNA STATIONAIR 206G

MAGNETOMETER
SCINTREX H6 CESIUM VAPOUR
RESOLUTION 0.001 nanoTesla
CYCLE RATE 0.2 seconds
SAMPLE INTERVAL 12 metres

DATA ACQUISITION
PICODAS P1000 DIGITAL ACQUISITION SYSTEM

FLIGHT LINE SPACING
TRAVERSE LINES 100 metres
TIE LINES 2 lines per block

FLIGHT LINE DIRECTION
BLOCK 1
TRAVERSE LINES 135 - 315 degrees
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BLOCK 2
TRAVERSE LINES 090 - 270 degrees
TIE LINES 000 - 180 degrees
BLOCK 3
TRAVERSE LINES 075 - 255 degrees
TIE LINES 145 - 325 degrees

SURVEY HEIGHT
200 metres - MEAN CANOPY CLEARANCE

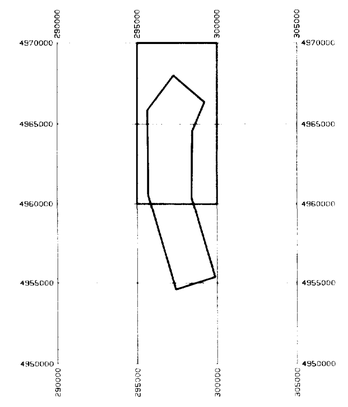
NAVIGATION
Using Trimble TANS GPS Navigation System

QUADRATURE VLF-EM STACKED PROFILES

DATA PROCESSING
Seattle, Washington NLK transmitter, 24.8 kHz
PROFILE BASE VALUE 0
PROFILE VERTICAL SCALE 20

2.13590

SHEET LOCATION



Scale 1:10 000

200 0 200 400 600 800 1000 metres

UNIVERSAL TRANSVERSE MERCATOR MAP GRID

31C13SE0043 2.13590 TUDOR

MADOC

AIRBORNE GEOPHYSICAL SURVEY

NORANDA EXPLORATION COMPANY LIMITED

Surveyed and compiled by QUESTOR SURVEYS LIMITED
September - October 1990
Job No. 90067

AIRCRAFT
C-FRQD CESSNA STATIONAIR 206G

MAGNETOMETER
SCINTREX H6 CESIUM VAPOUR
RESOLUTION 0.001 nanoTesla
CYCLE RATE 0.2 seconds
SAMPLE INTERVAL 12 metres

DATA ACQUISITION
PICODAS P1000 DIGITAL ACQUISITION SYSTEM

FLIGHT LINE SPACING
TRAVERSE LINES 100 metres
TIE LINES 2 lines per block

FLIGHT LINE DIRECTION

BLOCK 1
TRAVERSE LINES 135 - 315 degrees
TIE LINES 045 - 225 degrees

BLOCK 2
TRAVERSE LINES 090 - 270 degrees
TIE LINES 000 - 180 degrees

BLOCK 3
TRAVERSE LINES 075 - 255 degrees
TIE LINES 145 - 325 degrees

SURVEY HEIGHT
200 metres - MEAN CANOPY CLEARANCE

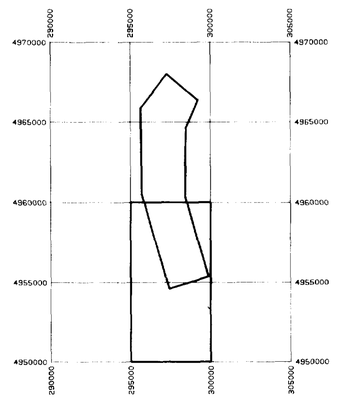
NAVIGATION
Using Trimble TANS GPS Navigation System

QUADRATURE VLF-EM STACKED PROFILES

DATA PROCESSING
Seattle, Washington NLK transmitter, 24.8 kHz
PROFILE BASE VALUE 0
PROFILE VERTICAL SCALE 20

2.13590

SHEET LOCATION



Scale 1:10 000

200 0 200 400 600 800 1000 metres

UNIVERSAL TRANSVERSE MERCATOR MAP GRID

31C13SE0043 2.13590 TUDOR

300