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COGEMA CANADA LTD.

KAYORUM PROJECT

TISDALE AND DELORO TOWNSHIPS

PORCUPINE MINING DISTRICT, ONTARIO

OPERATIONS REPORT ON

TOTAL FIELD MAGNETIC, VLF-EM

AND HORIZONTAL LOOP EM SURVEYS

Michael C. Wilson
TechTerrex Inc.
Mississauga,Ontario

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1.0 INTRODUCTION

1.1 OBJECTIVES

In January of 1991 TechTerrex Inc. was awarded a contract by Cogema Canada Ltd. to conduct a geophysical survey programme over mining claims located in Tisdale and Deloro townships near Timmins, Ontario.

The present claim group reported herein is under option to Moneta Porcupine Mines Ltd.(Cogema's joint venture partner) from the various vendors.

Previous exploration on the claim group has been extensive with the exception of a portion of the property covered by the Hollinger (1910-1968) tailings pond.

The fact that the tailings obscure a large tract of land, as well as numerous cultural influences such as power lines resulted in the area being written off from a geophysical standpoint by others.

The main thrust of the present programme is to thoroughly map the area using modern geophysical methods in the search for gold and/or base metal mineralization. The possibility of finding splay faults coming from the main Porcupine-Destor fault located to the south, enhances the property further.

1.2 LOCATION

The Kayorum property is situated in Tisdale and Deloro townships within the Porcupine Mining Division of Ontario. (see figure 1)

The following schedule outlines the mining claims covered in this report:

1.2 cont'd....

TISDALE TOWNSHIP (surveyed)

QUARTER	HALF	LOT	CONCESSION	ACREAGE	PARCEL	
NE	S	12	2	40	2804	W&TExcept Tailings
SE	S	12	2	40	2804	W&T "
NE	N	12	1	40	2804	W&T "
NW	N	12	1	40	3193	W&T
SW	N	12	1	40	3193	W&T
NW	S	12	2	40	4585	W&T
SW	S	12	2	40	4586	W&T
Mining claim HR910 - Also unencumbered in Deloro Township				40	1266	SEC
NW	N	9	1	40	7633	W&T
SE	N	9	1	40	3590	W&T
SW	N	9	1	40	3588	W&T
SE	N	10	1	40	3589	W&T
NE	N	10	1	40	7632	W&T
SE	N	12	1	40	1730	W&T
NE	N	11	1	40	13438	W&T
SE	N	11	1	40	13438	W&T
NW	N	10	1	40	13438	W&T
NW	N	11	1	40	13436	W&T
SW	N	11	1	40	13437	W&T
SW	S	8	2	40	7078	W&T
NW	N	8	1	40	7078	W&T
NE	N	9	1	40	7078	W&T
SE	S	9	2	40	7078	W&T
SE	S	12	1	40	13439	W&T
SE,SW,NE,NW	S	11	1	160	13440	W&T
SE,SW,NE,NW	S	10	1	160	13440	W&T
SW	N	10	1	40	1346	L.C.
NE	S	12	1	40	1337	L.C.
Part NW	S	9	2	19 1/5	11166	W&T
Part NE	S	9	2	19 1/5	11167	W&T
Part NE	S	8	2	3.3	11168	W&T
Part NW	S	8	2	3.3	11169	W&T

DELORO TOWNSHIP (unsurveyed)

QUARTER	HALF	LOT	CONCESSION	ACREAGE	PARCEL
HR831				43	8096 SEC
ME39,ME40,TRP571				104.80	23080 SEC
P7962,P7963,ME2				131.0	23081 SEC
TRP170,TRP172,TRP175,HR911,HR912				218.15	5833 SEC

1.3 ACCESS

The property straddles Moneta Ave. connecting the downtown area of Timmins, Ontario to the town of South Porcupine, Ontario and is readily accessible by two wheel drive vehicles. The Aunor mine road south from Moneta Ave. allows access to the south-east portion of the grid while the Naybob road bounds the western limits of the property.

2.0 SURVEY PARAMETERS

2.1 GRID PARAMETERS

A series of grid lines were established in the fall of 1990 by Moneta Porcupine Mines Ltd. Lines having an azimuth of 340° and 70 ° respectively were established at 50m intervals. To ensure a maximum degree of accuracy an electronic measuring device (EMD) was used to survey the ENE-WSW lines at 100m intervals and at 500m intervals for the NNW-SSE lines. All chaining and picketing along these grid lines were established at 25m intervals.

Enclosed within this report, map # GP-1 produced by Northland Engineering Ltd. shows the true line positions and elevations with respect to the numerous topographic and cultural features found on the property.

2.2 GEOPHYSICAL PARAMETERS

(a) Magnetic Survey and Instrumentation

The total magnetic field was observed and recorded along all lines at 12.5 m intervals using the EDA Instruments Inc. Omni Plus proton magnetometer/VLF units. Readings have been corrected to a base value of 58,500 nT to account for the regional diurnal fluctuations of the earth's magnetic field. These corrections are made automatically by connecting and dumping the Omni Plus field unit with the Omni IV base station magnetometer.

During the course of the survey, the Omni IV base station observed and recorded the total field intensity at 15 second intervals. The base station was located on the grounds of the Trillium Motel,(25m west of cabin #1) situated just east of Porcupine, Ontario along provincial Hwy 101.

2.2 (a) cont'd...

The Omni Plus and Omni IV series of magnetometers have a sensitivity of 0.01nT. Refer to Appendix I and II for further instrument specifications.

(b) VLF-EM Survey and Instrumentation

The VLF-EM survey, using the EDA Instruments Inc. Omni Plus magnetometer/VLF units, measured the in-phase and quadrature components of the vertical magnetic field generated by the following transmitter stations:

(i) Cutler, Maine (NAA,24.0 KHz)
(ii) Annapolis, Maryland (NSS, 21.4 KHz)
(iii) Seattle, Washington (NLK, 24.8 KHz)

Measurements, expressed as a percentage of the horizontal primary field, were recorded at 12.5m intervals along lines spaced 50m apart. Initializing the Omni Plus for the survey or "facing" direction was consistent throughout the survey-namely, north for lines oriented NNW-SSE and east for lines oriented ENE-WSW.

This particular receiver has a reading accuracy of 0.1 %. Additional instrument specifications can be found in Appendix I.

(c) Horizontal Loop EM Survey and Instrumentation

The HLEM survey, utilizing the Apex Parametrics Ltd. MaxMin I-9 unit and MME digital logger was performed over lines separated by 100m, both in the NNW-SSE and ENE-WSW direction.

The MaxMin I-9 unit consists of separate receiver and transmitter coils which are held coplaner at a fixed separation and are maximum coupled. The electromagnetic field generated by the transmitter induces a flow of subsurface current called the secondary electromagnetic current. The MaxMin receiver measures the distortion to the primary field caused by the secondary fields. (ie. changes in phase,orientation and intensity of the EM fields) whereby information about subsurface conductors can be calculated.

Initially, test lines 200 W and 450 S were read at 25m intervals using a coil separation of 150m and 200m measuring 220, 440,880,1760,3520,7040 and 14080 Hz frequencies.

2.2 (c) cont'd...

From the test results, it was determined that the NNW trending lines would be measured using a 150m coil separation and 200m coil separation for lines oriented ENE. Frequencies measured include 440, 1760, 3520 and 7040 Hz. Appendix III outlines the specifications of the MaxMin I system.

3.0 SURVEY PRESENTATIONS

3.1 TOTAL FIELD MAGNETIC SURVEY

The survey results have been presented in plan view at 1:5000 scale as a two sheet layout using the Geosoft mapping software. The following presentations are enclosed with this report:

(i) Blackline postings and profiles - profile scale: 50nT/cm
(ii) Blackline contours - contour interval: 4nT.

3.2 VLF-EM SURVEY

As with the magnetics, the VLF results have been presented at 1:5000 scale. Enclosed with this report are two sheet layouts showing NNW-SSE and ENE-WSW survey results presented as:

(i) Blackline in-phase and quadrature postings
(ii) Blackline in-phase and quadrature profiles- profile scale: 20%/cm.

3.3 HORIZONTAL LOOP EM SURVEY

The MaxMin I EM results are plotted at 1:5000 scale for each of the frequencies measured.

(i) 440 Hz in-phase, quadrature postings and profiles - profile scale: 10% /cm.

(ii) 1760 Hz in-phase, quadrature postings and profiles - profile scale: 20% /cm.

(iii) 3520 Hz in-phase, quadrature postings and profiles - profile scale: 40% /cm.

(iv) 7040 Hz in-phase, quadrature postings and profiles - profile scale: 40% /cm.

During the course of the surveys, the numerous cultural influences such as transmission and pipe lines have created their own electromagnetic fields which have effected some of the measurements for all three surveys.

The in-phase component of the horizontal loop em survey has been corrected for short cable effects caused by rough topography.

4.0 INTERPRETATION

Interpretation of the results and recommendations are presently being reported by Cogema Canada Ltd. and are not included with this report.

Respectfully submitted,

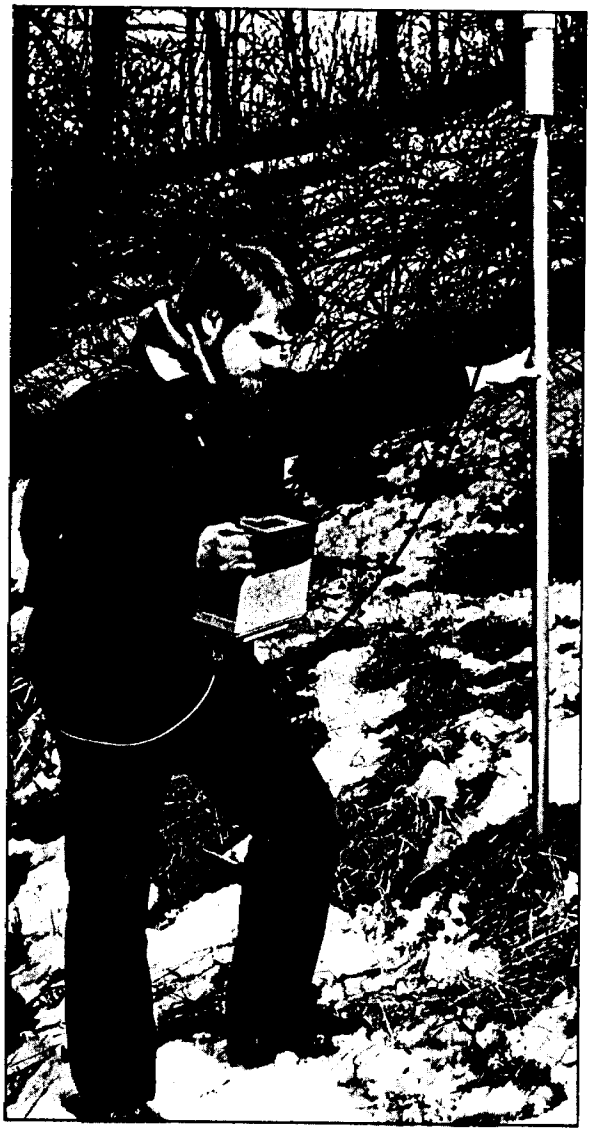
M.C. Wilson

Michael C. Wilson
TechTerrex Inc.

APPENDIX I

OMNI PLUS
VLF/Magnetometer System

EDA



Major Benefits of the OMNI PLUS

- Combined VLF/Magnetometer/Gradiometer System
- No Orientation Required
- Three VLF Magnetic Parameters Recorded
- Automatic Calculation of Fraser Filter
- Calculation of Ellipticity
- Automatic Correction of Primary Field Variations
- Measurement of VLF Electric Field

OMNI PLUS VLF/Magnetometer System

Description

The "OMNI PLUS" geophysical system combines the OMNI IV "Tie-Line" magnetometer and gradiometer together with a VLF measurement capability.

The OMNI PLUS VLF/Magnetometer System has been developed in co-operation with Geophysical Surveys Inc. of Quebec, Canada.

This brochure concentrates on the VLF magnetic and electric field parameters measured and recorded by the OMNI PLUS. More information on the OMNI PLUS magnetometer system and tie-line capability is available in the OMNI IV brochure.

Features

Each OMNI PLUS incorporates the following features:

- Measurement and recording in memory of the following VLF data for each field reading:
  - total field strength,
  - total dip,
  - vertical quadrature or, alternately, horizontal amplitude,
  - apparent resistivity,
  - phase angle,
  - time,
  - grid co-ordinates,
  - direction of travel along grid lines, and
  - natural and cultural features.
- Complete data protection for a number of years by an internal lithium backup battery.
- "Tie-Line" or "Looping" algorithm, unique only to EDA's OMNI IV and OMNI PLUS Series, for the self-correction of atmospheric variations and variations in the primary field from the VLF transmitter.
- Measurement of up to three VLF transmitting stations to provide complete coverage of an anomaly regardless of the orientation of the survey grid or of the anomaly itself.
- Display descriptors to monitor the quality of the VLF signal being measured.
- Choice of three data storage modes:
  - spot record, for readings without grid co-ordinates
  - multi record, for multiple readings at one station
  - auto record, for automatic update of station number
- Output of grid co-ordinates with the designated compass bearing, using N, S, E, W descriptors.

Major Benefits

- Combined VLF/Magnetometer/Gradiometer System

  The OMNI PLUS incorporates the capabilities of the OMNI IV "Tie-Line" Magnetometer and Gradiometer System with the ability to measure the VLF magnetic and electric fields.

  Only one OMNI PLUS is needed to record all of the following geophysical parameters:

  1. The total magnetic field
  2. The simultaneous gradient of the total magnetic field
  3. The VLF magnetic field, including:
     - the total dip
     - the total field strength of the VLF magnetic field
     - the vertical quadrature, or alternately, the horizontal amplitude
  4. The VLF electric field, including:
     - the phase angle
     - apparent resistivity

  As an example, at each location the OMNI PLUS can calculate and record in a matter of seconds, three VLF magnetic field and two VLF electric field parameters from two different transmitters, a magnetic total field reading and a simultaneous magnetic gradient reading.

- No Orientation Required

  The OMNI PLUS requires no orientation, by the operator, of the sensor head toward the transmitter station. This simplifies field procedures as well as saving considerable survey time. When two VLF transmitters are measured, the benefits of this time-saving feature are automatically doubled. There is no requirement for the operator to orient himself and the sensor head toward the first selected transmitting station and then re-orient towards the second transmitting station.

  Consistent high quality data is achieved in the OMNI PLUS due to the utilization of three orthogonal sensor coils rather than two sensor coils used in conventional systems. The quality of data is not then dependent on the operator's ability to correctly orient the sensor head for optimum coupling with the transmitting station.

  The OMNI PLUS compensates automatically for the direction of travel along the grid lines as well as for the angle of the sensors from the vertical plane through the use of tiltmeters.

- Three VLF Magnetic Parameters Recorded

  The OMNI PLUS calculates and records in memory the:
  - total dip
  - total field strength
  - vertical quadrature

  The operator has the option to substitute the horizontal amplitude for the vertical

quadrature. The OMNI PLUS calculates each of these parameters from the in-phase and quadrature measurements of all three components.

- **Automatic Calculation of Fraser Filter**

  The OMNI PLUS automatically calculates the Fraser Filter, from the dip angle data, regardless of the interval between the stations along the grid lines. The operator no longer has to manually perform this mathematical calculation thereby reducing the possibility of human error. The Fraser Filter algorithm follows established conventions.

  The operator can choose to output either the total dip or the Fraser filtered data, or both.

- **Calculation of Ellipticity**

  The OMNI PLUS calculates the true ellipticity of the VLF magnetic field from the measurement of the in-phase and quadrature of all three components. The ellipticity provides more interpretative information about the anomaly than the dip angle and is less influenced by overburden shielding.

- **Automatic Correction of Primary Field Variations**

  The OMNI PLUS can be used as a base station to monitor primary field changes from up to three VLF transmitters as well as alternately measuring the variations in the magnitude of the earth's magnetic field. Only **one** OMNI PLUS is needed to perform both functions.

  The OMNI PLUS base station can then automatically correct, by linear interpolation, the field units for these drift variations in the primary VLF and total magnetic fields.

- **Measurement of VLF Electric Field**

  The OMNI PLUS calculates and records the apparent resistivity and phase angle from the measurement of the VLF electric field. This VLF electric field measurement can be accomplished by using capacitively or resistively coupled electrodes at spacings of 5, 10 or 20 meters.

Other Benefits

- **Automatic Tuning**

  The OMNI PLUS automatically tunes up to three VLF transmitters within a frequency range of 15 to 30 kHz, once the operator has programmed in the specific frequencies.

- **Base Station Synchronization**

  The OMNI PLUS has a unique "count-down" feature which can be activated in the field unit upon synchronization with the base station. The field unit then displays and decrements the remaining time, in seconds, until the base station is scheduled to take a measurement. The operator can obtain a field reading at exactly the same time as the base station. The simultaneous field and base station measurements significantly improve the automatic correction accuracy.

- **Automatic "Tie-Line" Correction**

  The OMNI PLUS can automatically correct by **itself** the VLF field data for atmospheric variations and changes in the primary field originating from the VLF transmitter. By tieing-back into one or several tiepoints on the grid, the OMNI PLUS will automatically calculate and apply the drift measured to the field data previously recorded in memory. More information on this unique "tie-line" method can be obtained from page 3 of the OMNI IV brochure.

- **Notation of Natural and Cultural Features**

  The OMNI PLUS can record natural and cultural features unique to each grid location. This capability eliminates the need for a field notebook and provides additional information that can assist in interpreting recorded data.

- **Analogue Output**

  Since VLF as well as magnetic data is often easier to interpret as a profile plot, data collected by the OMNI PLUS can be represented in analogue format at a vertical scale best suited for data presentation. The operator can selectively output in analogue and/or digital format, up to 10 of the following parameters:

  - total dip
  - Fraser filtered data
  - ellipticity
  - VLF total field strength
  - vertical quadrature
  - horizontal amplitude
  - apparent resistivity
  - phase angle
  - magnetic total field strength
  - magnetic vertical gradient

- **Computer Interface**

  The OMNI PLUS can transfer uncorrected, corrected or filtered data to most computers with a RS232C port. In some cases, a DCA-100 Data Communications Adaptor may be required. Computers with collection packages including either "X-ON, X-OFF" or "ENQ/ACK" communications protocol formats are also compatible.

Specifications*

Frequency Tuning Range	15 to 30 kHz, with bandwidth of 150 Hz; tuning range accommodates new Puerto Rico station at 28.5 kHz
Transmitting Stations Measured	Up to 3 stations can be automatically measured at any given grid location within frequency tuning range
Recorded VLF Magnetic Parameters	Total field strength, total dip, vertical quadrature (or alternately, horizontal amplitude)
Standard Memory Capacity	800 combined VLF magnetic and VLF electric measurements as well as gradiometer and magnetometer readings
Display	Custom designed, ruggedized liquid crystal display with built-in heater and an operating temperature range from −40°C to +55°C. The display contains six numeric digits, decimal point, battery status monitor, signal strength status monitor and function descriptors.
RS232C Serial I/O Interface	2400 baud rate, 8 data bits, 2 stop bits, no parity
Test Mode	A. Diagnostic Testing (data and programmable memory) B. Self Test (hardware)
Sensor Head	Contains 3 orthogonally mounted coils with automatic tilt compensation
Operating Environmental Range	−40°C to +55°C; 0 − 100% relative humidity; Weatherproof
Power Supply	Non-magnetic rechargeable sealed lead-acid 18V DC battery cartridge or belt; 18V DC disposable battery belt; 12V DC external power source for base station operation only.
Weights and Dimensions	
Instrument Console	2.8 kg, 128 x 150 x 250 mm
Sensor Head	2.1 kg, 130 dia. x 130 mm
VLF Electronics Module	1.1 kg, 40 x 150 x 250 mm
Lead Acid Battery Cartridge	1.8 kg, 235 x 105 x 90 mm
Lead Acid Battery Belt	1.8 kg, 540 x 100 x 40 mm
Disposable Battery Belt	1.2 kg, 540 x 100 x 40 mm

*Preliminary

EDA Instruments Inc.,
4 Thorncliffe Park Drive,
Toronto, Ontario
Canada M4H 1H1
Telex: 06 23222 EDA TOR,
Cables: Instruments Toronto
(416) 425-7800

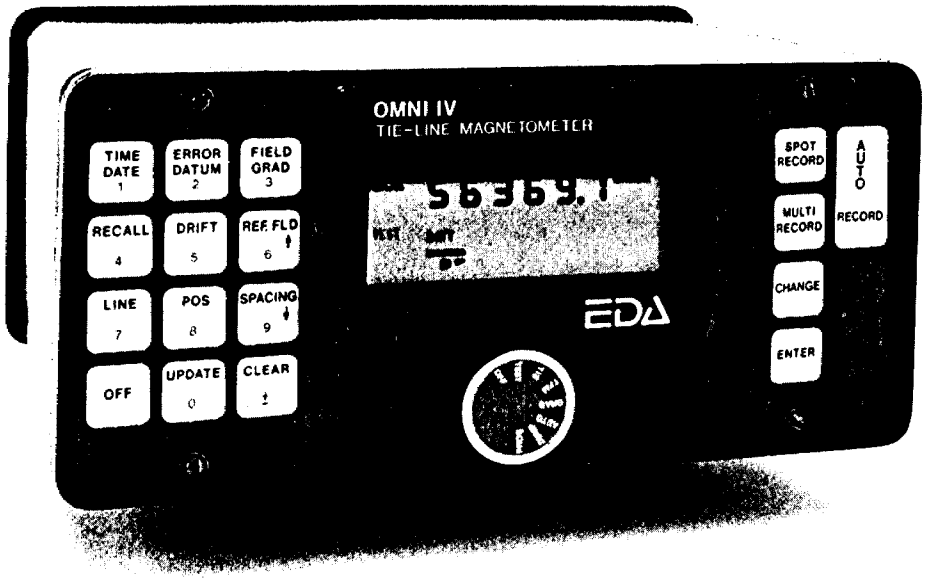
In USA,
EDA Instruments Inc.,
5151 Ward Road,
Wheat Ridge, Colorado
U.S.A. 80033
(303) 422-9112

Printed in Canada

APPENDIX II

OMNI IV "Tie-Line" Magnetometer

EDA



Major Benefits

- Four Magnetometers in One
- Self Correcting for Diurnal Variations
- Reduced Instrumentation Requirements
- 25% Weight Reduction
- User Friendly Keypad Operation
- Universal Computer Interface
- Comprehensive Software Packages

OMNI IV "Tie-Line" Magnetometer

The OMNI IV microprocessor-based "Tie-Line" Magnetometer incorporates a number of features designed to facilitate the storage, reduction and presentation of total field magnetic data.

Major Benefits

- **Four Magnetometers in One**

The OMNI IV has been designed to operate in four different operating modes:

1. As a self correcting or tie-line magnetometer (See page 3)
2. As a portable field magnetometer (See page 4)
3. As a recording base station magnetometer (See page 5)
4. As a true simultaneous gradiometer. (See page 6)

The standard OMNI IV incorporates the portable field magnetometer with "tie-line" capability, and the system may be upgraded to include the base station and/or the gradient configuration.

All of the data collected in any one of these four operating modes is stored and protected in a solid state memory.

- **Self Correcting for Diurnal Variations**

When used in the "tie-line" mode, the OMNI IV automatically corrects **itself** for variations in the earth's magnetic field. By tieing back into one tie-point or tie-line(s) on the grid over the day or over the duration of the survey, the OMNI IV automatically calculates and applies the drift measured to the data stored. Data is corrected using the linear interpolation method.

- **Reduced Instrumentation Requirements**

Only **one** OMNI IV is needed to measure, store total field and gradient data and automatically correct the total field magnetic data, when in the tie-line mode.

The flexibility of the OMNI IV allows the user to purchase one console and through the use of different sensors or software create their choice of four different magnetometers.

- **25% Weight Reduction**

The OMNI IV has been designed so that it is 25% lighter than EDA's existing PPM-350/375 OMNIMAG units for a total weight of 4 kg. This weight reduction has been achieved by the design of a smaller console and by the use of a lighter rechargeable or disposable power source.

- **User Friendly Keypad Operation**

The OMNI IV incorporates two keypads; one for programming the unit for time and grid co-ordinates and the other for the recording of data. Once the OMNI IV has been programmed for the day's survey, the operator need only use the recording keypad for data storage. Recording of data is accomplished by pressing only 2 recording keys sequentially. A "Clear" data key has been incorporated to edit the previous reading stored in memory.

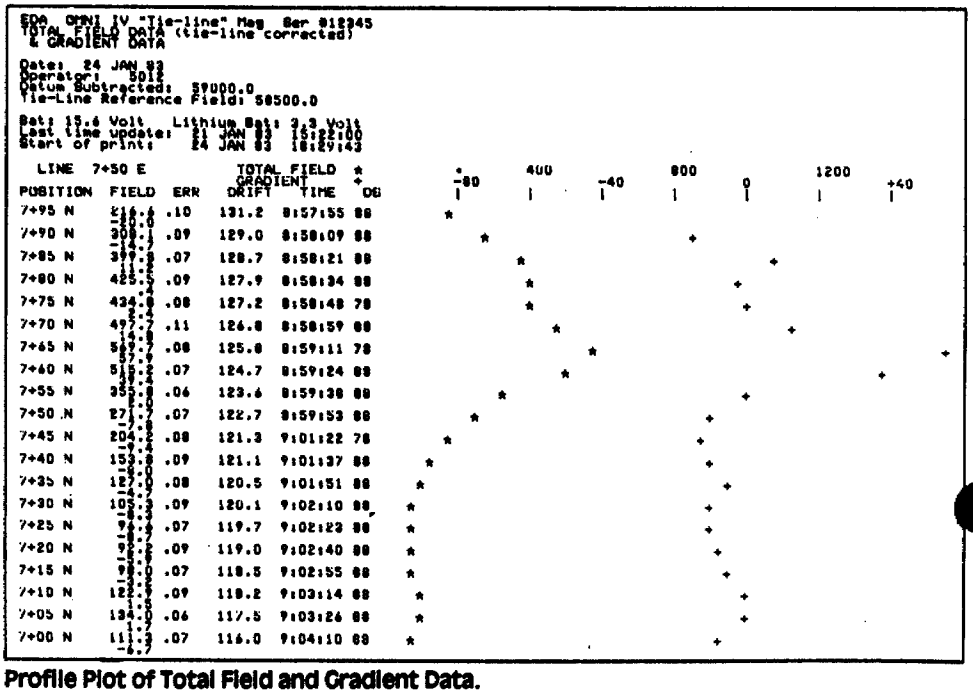
- **Universal Computer Interface**

A simple, low cost, communication interface between the OMNI IV or OMNIMAG Series and any microcomputer is now available. This communication interface provides the necessary handshake requirements for the OMNI IV to dump directly into any microcomputer with ASCII code, into any standard parallel printer, or into many available serial magnetic tape recorders.

- **Comprehensive Software Programs**

HP 85 and CP/M software packages for most computers such as IBM PC, APPLE, KAYPRO, OSBORNE, etc. are available to enable the user to edit the data, obtain line profiles and create plot files.

Many filtering programs are offered for further data analysis such as the Fast Fourier Transform, the Frequency Domain Filters or the Upward-Downward Continuation. Additional programs are also available to transfer the data from microcomputers to mainframes.



Profile Plot of Total Field and Gradient Data.

1. As a Self Correcting, "Tie-Line" Magnetometer...

The OMNI IV is able to store "looping" or "tie-line" data. This data is stored in a separate memory at the beginning of each survey. Total field readings are then subsequently stored in a second memory along with the field readings of the tie-point(s). At the end of each survey day, these two memories are merged to automatically correct the total field data for diurnal variations.

Features

The OMNI IV in the "tie-line" mode can:

- Store "looping" or "tie-line" data 3 ways:
  - using one "looping" base point,
  - using one "tie-line" comprised of a number of tie-points, or
  - using multiple "tie-lines".
- Store up to 100 tie-points in one survey area or divide these points into extensions of survey areas as needed.
- Store tie-points or tie-lines for the duration of the survey.
- Calculate the drift between established tie-points, to readily see variations in the earth's magnetic field.

Key Benefits

Eliminates Manual Correction of Data

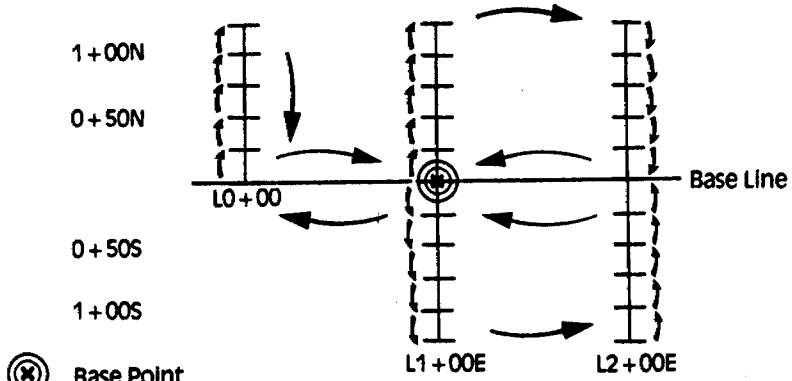
Diurnal corrections, using the tie-line method, can be done automatically by the OMNI IV, eliminating hours of manual and tedious calculations. Corrected data can then be directly transferred to a computer for further data processing.

Flexibility of "Tie-Line"

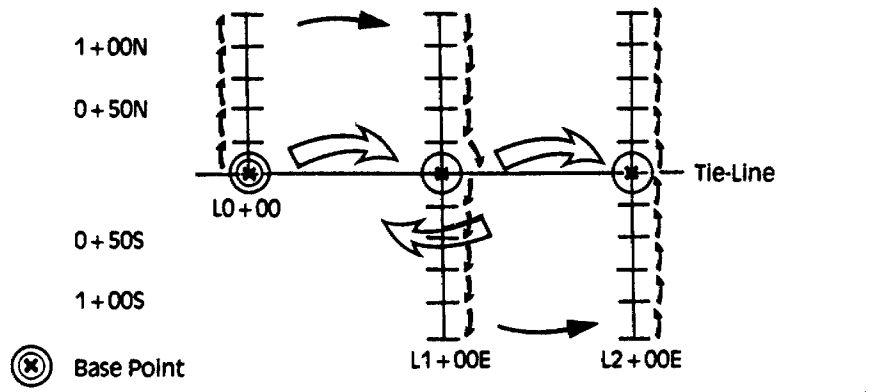
The OMNI IV "tie-line" system offers the operator the flexibility of choosing the most appropriate tie-line method best suited for the survey, depending upon the size and character of the grid. The operator can choose from:

- a single base point,
- a single tie-line,
- multiple tie-lines, or
- a random scattering of tie-points.

"Looping" Method



"Tie-Line" Method



Reduced Instrumentation Requirements

The self-correcting "tie-line" feature of the OMNI IV can remove base station requirements from some surveys.

Tie-Line Capability in Gradient Mode

The "tie line" capability is also applicable when used as a gradiometer. The operator can therefore obtain corrected total field data without requiring a base station magnetometer.

Programmable Datum

The OMNI IV can be programmed to automatically remove a designated datum from field data. Removal of this coarse, background value facilitates plotting and interpretation of data.

Automatic Drift Calculations

The OMNI IV can automatically calculate the desired diurnal drift measured between consecutive tie-point readings.

Data Recall

"Tie-line" data can be recalled, even if stored on different days.

OMNI IV "Tie-Line" Magnetometer

2. As a Portable Field Unit...

The OMNI IV is a portable proton precession magnetometer that measures and stores in memory the earth's magnetic field at the touch of a key. It identifies and stores the location, time of each measurement, computes the statistical error of the reading and stores the decay and strength of the signal being measured.

Features

- Packaged in a compact, lightweight and rugged housing, the OMNI IV measures and stores the following set of information:
  - total field magnitude
  - time of measurement
  - grid co-ordinates
  - direction of travel
  - statistical error of readings
  - signal strength and rate of decay
- Users have a choice of three data storage modes:
  - spot record
  - multi record
  - auto record
- Data stored in memory is completely protected by a lithium battery.
- Each reading is automatically assigned a record number which can also be used to identify readings measured off the grid.
- More than one reading can be taken at one point without updating the current station number.
- Characters shown on the LCD display are highly visible.

Key Benefits

Increased Productivity

Survey productivity is significantly increased with the OMNI IV because:
- a measurement can be read and stored in only 3 seconds.
- data is highly repeatable. A second measurement is usually not required.
- the statistical error is calculated for each measurement providing an indication of whether an additional reading may be required.
- the OMNI IV is up to 25% lighter and smaller.

This permits the operator to cover more ground and gather more data than would be otherwise possible.

Simplified Fieldwork

The OMNI IV makes surveys easier to conduct because:
- the need to write down field data is eliminated. Time, field measurement, grid co-ordinates, etc, are simultaneously stored when any one of the three record keys are pressed.
- the operator has the ability to clear the unwanted last reading
- the difference between the current reading and the previous one is calculated automatically
- the coarse magnetic field value or datum can be removed from the field data to simplify plotting of the field results
- diurnal corrections are automatically calculated.

System flexibility offers the following choices:
- if the OMNI IV is used as a field magnetometer or as a gradiometer, the total field data can be corrected by itself using the "tie-line" or "looping" capability.
- if the OMNI IV is used as a self-recording base station, it will correct the total field data in:

a. another OMNI IV, used as a field magnetometer
b. another OMNI IV, used as a gradiometer
c. an OMNIMAG PPM-350
d. an OMNIMAG PPM-375, used as a field magnetometer
e. an OMNIMAG PPM-500 Vertical Gradiometer

Unparalleled Repeatability of Data

The OMNI IV provides users with unparalleled data repeatability. This is a result of four leading-edge design features that eliminate the need for taking multiple readings:
- Patented Signal Processing Technique
- Constant Energy Polarization that maintains equal energy to the sensor
- Processing sensitivity to ± 0.02 gamma
- Automatic Fine Tuning which uses the previous reading as the base for the next

Other Benefits

- **Error Analysis**
  This unique feature is a great time saver because the calculation of the statistical error of each reading lets the operator make an on-the-spot decision whether that reading should be stored or not.
- **Higher Gradient Tolerance**
  Higher tolerance to local gradients of up to 6000 gammas per meter (field proven), is possible due to a patented signal processing method and to a miniature sensor design utilizing a highly optimized sensor geometry.
- **Complete Data Protection**
  Field data stored in memory is totally protected for a number of years by the lithium backup battery. This battery also provides power to the real-time clock.
- **Data Recall**
  Readings can be recalled either by record number or in sequence.
- **Decimal Spacing**
  A decimal digit is provided for intermediate station intervals of 12.5 meters.
- **Power Supply Versatility**
  Users can choose from:
  - non-magnetic rechargeable sealed lead-acid battery cartridge or belt
  - nickel cadmium (NiCad) battery cartridge or belt
  - disposable alkaline battery cartridge or belt

3. As a Base Station Magnetometer...

The OMNI IV in the base station mode effectively measures and stores in its memory the daily fluctuations of the earth's magnetic field. The OMNI IV will automatically correct total field data of other OMNI IV or OMNIMAG Series units in just a few minutes.

Features

The OMNI IV in the base station mode can:

- Automatically correct magnetic field data for both diurnal variations and reference field values.
- Record the magnetic field activity in the following format:
  - time of measurement
  - magnitude of total field
  - difference from the reference field value
  - difference from the previous reading
  - sequential record number
- Store up to 5,000 sets of readings, the equivalent to approximately 14 hours of continuous unattended monitoring at a 10 second sampling interval. Cycling time between 5 seconds and 60 minutes in 1 second increments can be programmed by the operator.
- Simultaneously outputs data in a digital or ASCII format to a choice of data collection units at the same time as it is being stored in memory.

Key Benefits

Automatic Diurnal Corrections

The OMNI IV in the base station mode will automatically correct total field data stored in:
- another OMNI IV, used as a field magnetometer or as a gradiometer
- a PPM-350 Total Field Magnetometer
- a PPM-375 Portable/Base Station
- a PPM-500 Vertical Gradiometer

This is ideal where close, detailed monitoring of the earth's magnetic field is required.

Programmable Reference Field

The reference field can be programmed by the operator. The OMNI IV then calculates automatically the drift in the magnetic field for every reading. If at the end of the first survey day the proper reference field has not been entered, the operator can re-select a new one and the drift can be automatically re-calculated.

Automatic Drift Calculation

The OMNI IV calculates automatically the difference between each reading and its programmed reference field. This can be presented in either digital and/or profile plot format. It can also be simultaneously output to a compatible printer for visual verification of the field's activity.

Calculates Differential Field Variations

The OMNI IV also calculates to 0.1 gamma, the difference between the current reading and the previous one. This assists the operator in ascertaining the degree of activity that is occurring i.e. magnetic storm or active conditions.

Programmable Cycling Interval

The OMNI IV can be programmed to cycle at any interval, in one second increments, from 5 seconds to 60 minutes.

Other Benefits

- **Stores & Prints Data Simultaneously**

  The OMNI IV can record and print out data simultaneously. Data is retained in memory.

- **Internal Real Time Clock**

  Real time clocks can be synchronized to the nearest second when using the OMNI IV with any other OMNI IV or OMNIMAG Unit.

```
EDA  OMNI IV "Tie-line" Mag  Ser #14015
TOTAL FIELD DATA (uncorrected)
Date:  4 AUG 83
Operator:  5012
Datum Subtracted:        0.0
Bat: 15.6 Volt    Lithium Bat: 3.3 Volt
Last time update:    1 AUG 83   15:22:00
Start of print:      4 AUG 83   18:29:43

   LINE 54+00 N    DATE   4 AUG 83      #1
POSITION   FIELD   ERR    DRIFT     TIME     DS
 31+00 E 57508.4  .10      0.0  15:00:35  88
 31+50 E 57506.3  .08      0.0  15:00:43  88
 32+00 E 57505.0  .08      0.0  15:00:47  88
 32+50 E 57501.9  .10      0.0  15:00:51  88
 33+00 E 57504.1  .08      0.0  15:00:56  88
 33+50 E 57503.1  .07      0.0  15:01:00  88
 34+00 E 57511.1  .07      0.0  15:01:05  88
 34+50 E 57514.9  .09      0.0  15:01:09  88
 35+00 E 57511.1  .08      0.0  15:01:17  88
```

Total Field Data (Uncorrected)

```
EDA  OMNI IV "Tie-line" Mag  Ser #31005
BASE STATION DATA
Date:  4 AUG 83
Operator:  4007
Reference Field: 57500.0
Line 20+00 N     Position 30+25 E
Bat: 12.1 Volt    Lithium Bat: 3.2 Volt
Last time update:    1 AUG 83   15:22:00
Start of print:      4 AUG 83   18:59:53

   TIME     FIELD    CHANGE    DRIFT   RECORD
15:00:33  57517.8       0.4     17.8        1
15:00:38  57508.6      -9.2      8.6        2
15:00:43  57511.7       3.1     11.7        3
15:00:48  57510.5      -1.2     10.5        4
15:00:53  57518.0       7.5     18.0        5
15:00:58  57525.9       7.9     25.9        6
15:01:03  57514.9     -11.1     14.9        7
15:01:08  57508.4      -6.4      8.4        8
15:01:13  57512.9       4.5     12.9        9
15:01:18  57512.7      -0.2     12.7       10
```

Base Station Data

```
EDA  OMNI IV "Tie-line" Mag  Ser #14015
TOTAL FIELD DATA (base stn. corrected)
Date:  4 AUG 83
Operator:  5012
Datum Subtracted:    57000.0
Bat: 15.6 Volt    Lithium Bat: 3.3 Volt
Last time update:    1 AUG 83   15:22:00
Start of print:      4 AUG 83   18:39:53

BASE STATION  Ser #31005
Date:  4 AUG 84
Operator:  5012
Reference Field: 57500.0
Line 20+00 N     Position 30+25 E
Bat: 12.1 Volt    Lithium Bat: 3.2 Volt
Last time update:    1 AUG 83   15:22:00
Start of print:      4 AUG 83   18:39:53

   LINE 54+00 N    DATE   4 AUG 83      #1
POSITION   FIELD   ERR    DRIFT     TIME     DS
 31+00 E   494.3  .10      14.1  15:00:35  88
 31+50 E   494.6  .08      11.7  15:00:43  88
 32+00 E   494.3  .08      10.7  15:00:47  88
 32+50 E   486.9  .10      15.0  15:00:51  88
 33+00 E   481.4  .08      22.7  15:00:56  88
 33+50 E   481.6  .07      21.5  15:01:00  88
 34+00 E   490.9  .07      18.2  15:01:05  88
 34+50 E   505.6  .09       9.3  15:01:09  88
 35+00 E   498.4  .08      12.7  15:01:17  88
```

Corrected Total Field Data

OMNI IV "Tie-Line" Magnetometer

4. As a True Gradiometer...

The OMNI IV provides the operator with an accurate means of measuring both the total field and the gradient of the total field. It reads and stores the measurements of both sensors simultaneously to calculate the true gradient measurement. The standard 0.5 meter gradient sensor staff, shown here, is made possible by this simultaneous measurement.

Features

The OMNI IV in the gradient mode provides:

- A visual readout and storage of the following information in an absolutely secure memory:
  - the gradient of the total field
  - the total magnetic field magnitude of upper sensor
  - the time of measurement
  - the grid co-ordinates where the measurement is taken
  - the statistical error of total field reading of lower gradient sensor
  - the signal strength and decay rate measurement of lower gradient sensor
- A simultaneous, not sequential, measurement of both sensors
- A choice of sensor lengths and configurations:
  - standard 0.5 meter sensor separation mounted on staff
  - optional one meter sensor separation mounted on staff
  - optional horizontal gradient sensors

  The staff length can be adjusted to achieve desired height of sensors from the ground.
- A choice of three data storage modes:
  - spot record, for readings without grid co-ordinates
  - multi-record, for many readings at one station
  - auto record, for automatic update of station number.

Key Benefits

Reads Both Sensors Simultaneously

The OMNI IV reads both sensors simultaneously and not sequentially. This type of measurement removes the effect of diurnal variations and magnetic storm interferences from the data. This is a true gradient measurement.

Improved Productivity

The need to take only **one** simultaneous gradient measurement instead of **two** sequential measurements cuts reading time substantially.

Improved Data During Magnetic Storms

Gradient surveys can be conducted during magnetic storms resulting in no lost survey time. This is another benefit of the simultaneous measurement of both sensors.

No Diurnal Corrections of the Gradient Required

The effect of diurnal magnetic variations on the gradient measurement is cancelled due to this simultaneous measuring technique. The total field measurement of the top sensor can be self-corrected by the OMNI IV when used with the "tie-line" mode or with another OMNI IV in the base station mode.

Better Resolution of Total Field Anomalies

The OMNI IV in the gradient mode more sharply defines the magnetic responses determined by total field data. Closely spaced anomalies are individually delineated rather than being identified collectively under one broad magnetic response.

Direct Delineation of Vertical Contacts

The OMNI IV is an ideal contact mapping tool especially in vertical to near-vertical contact or fault zones. These vertical contacts are expressed at the zero line of gradient contour or profile values. Vertical dyke-like bodies can also be mapped effectively.

Enhances Near-Surface Anomalies

Shallow, near-surface sources (higher frequency anomalies) are emphasized relative to deeper responses (lower frequency anomalies). This can provide an on-the-spot approximation of the depth of the anomalous source.

Automatically Removes Regional Gradient

The gradient measurements ability to differentiate between higher and lower frequency responses effectively removes background regional gradients from anomalous residual responses.

Gradient and Total Field Readings Stored Simultaneously

Data is enhanced by the ability of the OMNI IV to simultaneously record in memory both the gradient and total field measurements as well as the statistical error. Both types of data offer a unique alternative in the interpretation of magnetic field data i.e. gradient vector diagrams, dip and strike length of body, etc.

Gradient-Base Station Operation

The OMNI IV can cycle automatically every 5 seconds in the gradient mode. This option can be used in stationary or mobile applications.

Adjustable Sensor Heights

The OMNI IV gradient sensor is mounted onto a sectional aluminum staff in which sections can be added or subtracted. This enables the operator to adapt the OMNI IV to local ground noise conditions, terrain effects and survey logistics. In doing so, near surface effects can be selectively emphasized or diminished depending upon the survey target.

Choice of Sensor Separation

The use of the 0.5 meter standard and/or 1.0 meter optional sensor separation provides unique interpretative information especially useful in near surface anomalous conditions i.e. determining if the field has curvature or is linear.

Data Output Options

The OMNI IV universal communications interface enables the user to output and analyze data through a number of options and formats.

Any Computer with RS 232C

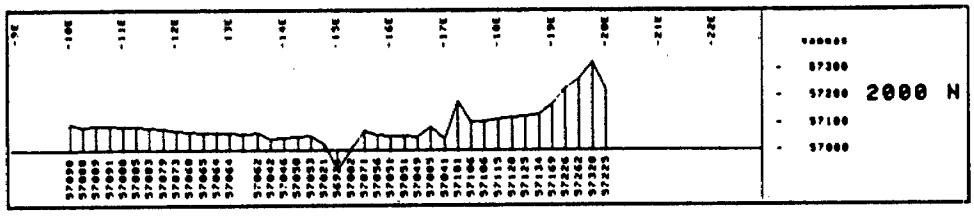
The OMNI IV can transfer uncorrected or corrected field data into any computer with an RS 232C port through the EDA universal communications interface. Computers with collection packages including either "X-ON, X-OFF" or "ENQ/ACK" communication protocol formats are also compatible.

Data transfer from the field to the office is also possible through the use of an optional modem interface.

Comprehensive Software Packages

Once the OMNI IV data has been transferred to a microcomputer, it can be further analyzed through a number of available software packages:

1. a CP/M software package adaptable to many microcomputers such as the IBM PC, APPLE, KAYPRO, TRS, OSBORNE, etc... This package enables the user to edit the data, obtain true line profiles and create plot files.
2. The above CP/M software package is also available plus the added capability of merging the base station data of GEOMETRICS G856 with the OMNI IV to calculate diurnal variations. This enables users to increase the flexibility of their existing magnetometers.
3. An HP 85 software package that edits the OMNI IV data, provides true line profiles and creates plot files. The package also permits the use of the G856 together with the OMNI IV to calculate for diurnal variations.
4. A Fast Fourier Transform program is available where space or time domain data is transformed to the frequency domain. From the examination of a power spectrum, filters may be customized to each data set.



Line Profile From HP-85

5. A Frequency Domain Filter program is also available. The multi pass filter program allows user control of the turn on/off frequencies and filter decay rates. These filters are useful for performing regional/residual separation or filtering of noise from data.
6. The Upward-Downward Continuation program computes a 2-dimensional upward or downward continuation transfer function and applies the operator to the input array in the wave-number domain.
7. A Micro-to-Mainframe Computer program enables the user to transfer the data from his field computer to a main frame where additional computation will be done.

Profile Plot Outputs

The OMNI IV can plot data as a profile through a printer. The operator can:

- select and program any gamma scale best suited for data presentation
- output the digital or plot formats simultaneously or separately
- choose a 40, 80, or 132 character printer paper width
- plot both the gradient and corrected total field data simultaneously
- transfer data plots to a printer as it is being stored in memory. This is ideal in base station applications.

Many Digital Recorder Options

The OMNI IV is compatible with many digital recorders with serial interface, such as MFE 2500, through its communications interface.

EDA's digital recorder, the DCU-200, can store 21,000 readings and has a "read-after-write" capability.

Variety of Printer Options

The OMNI IV can transfer data into any printer with a standard parallel (Centronics) interface, such as the Epson printer, through its communications interface.

The OMNI IV data can also be transmitted through two EDA printers:

- the DCU-040, which is a small 40 character AC only thermal printer.
- the DCU-400, which is a ruggedized 40 character thermal printer that is used either with its internal rechargeable batteries, a 12 volt DC power supply option or an AC power source.

With the external 12 volt DC power supply option linked directly to the DCU-400, data transfer and charging of internal batteries can be done simultaneously. There is now no dependence on a generator or AC power source for data transfer or battery charging. This is ideal where AC power is not available or where a back-up power source is required.

Data Output Capabilities

The OMNI IV outputs data in a choice of formats, depending upon the operating mode:

- corrected total field data
- uncorrected total field data
- base station data
- gradient field data
- corrected tie-line data
- tie-line data

Grid co-ordinates of the data can be output with their designated compass bearing, using N, S, E, W descriptors.

Direction of travel along each grid line is programmable and will be reflected with or without a minus sign (–). i.e. travelling south or west is negative (–), travelling north or east is positive.

Specifications

Dynamic Range	18,000 to 110,000 gammas. Roll-over display feature suppresses first significant digit upon exceeding 100,000 gammas.
Tuning Method	Tuning value is calculated accurately utilizing a specially developed tuning algorithm
Automatic Fine Tuning	± 15% relative to ambient field strength of last stored value
Display Resolution	0.1 gamma
Processing Sensitivity	± 0.02 gamma
Statistical Error Resolution	0.01 gamma
Absolute Accuracy	± 1 gamma at 50,000 gammas at 23°C ± 2 gamma over total temperature range
Standard Memory Capacity	
Total Field or Gradient	1,300 data blocks or sets of readings
Tie-Line Points	100 data blocks or sets of readings
Base Station	5,500 data blocks or sets of readings
Display	Custom-designed, ruggedized liquid crystal display with an operating temperature range from −40°C to +55°C. The display contains six numeric digits, decimal point, battery status monitor, signal decay rate and signal amplitude monitor and function descriptors.
RS 232 Serial I/O Interface	2400 baud, 8 data bits, 2 stop bits, no parity
Gradient Tolerance	6,000 gammas per meter (field proven)
Test Mode	A. Diagnostic testing (data and programmable memory) B. Self Test (hardware)
Sensor	Optimized miniature design. Magnetic cleanliness is consistent with the specified absolute accuracy.
Gradient Sensors	0.5 meter sensor separation (standard), normalized to gammas/meter. Optional 1.0 meter sensor separation available. Horizontal sensors optional.
Sensor Cable	Remains flexible in temperature range specified, includes strain-relief connector
Cycling Time (Base Station Mode)	Programmable from 5 seconds up to 60 minutes in 1 second increments
Operating Environmental Range	−40°C to +55°C; 0–100% relative humidity; weatherproof
Power Supply	Non-magnetic rechargeable sealed lead-acid battery cartridge or belt; disposable alkaline battery belt; or 12V DC power source option for base station operation.
Battery Cartridge/Belt Life	2,000 to 5,000 readings, for sealed lead acid power supply, depending upon ambient temperature and rate of readings
Weights and Dimensions	
Instrument Console Only	2.8 kg, 238 x 150 x 250mm
Alkaline Battery Belt	1.2 kg, 540 x 100 x 40mm
Lead-Acid Battery Cartridge	1.8 kg, 235 x 105 x 90mm
Lead-Acid Battery Belt	1.8 kg, 540 x 100 x 40mm
Sensor	1.2 kg, 56mm diameter x 200mm
Gradient Sensor (0.5 m separation - standard)	2.1 kg, 56mm diameter x 790mm
Gradient Sensor (1.0 m separation - optional)	2.2 kg, 56mm diameter x 1300mm
Standard System Complement	Instrument console; sensor; 3-meter cable, aluminum sectional sensor staff, power supply, harness assembly, operations manual.

EDA Instruments Inc.
4 Thorncliffe Park Drive
Toronto, Ontario
Canada M4H 1H1
Telex: 06 23222 EDA TOR
Cable: EDAINSTRMTS TORONTO
Telephone: (416) 425 7800
Fax: (416) 425 8135

In USA,
EDA Instruments Inc.
5151 Ward Road
Wheat Ridge, Colorado
U.S.A. 80033
Telephone: (303) 422 9112

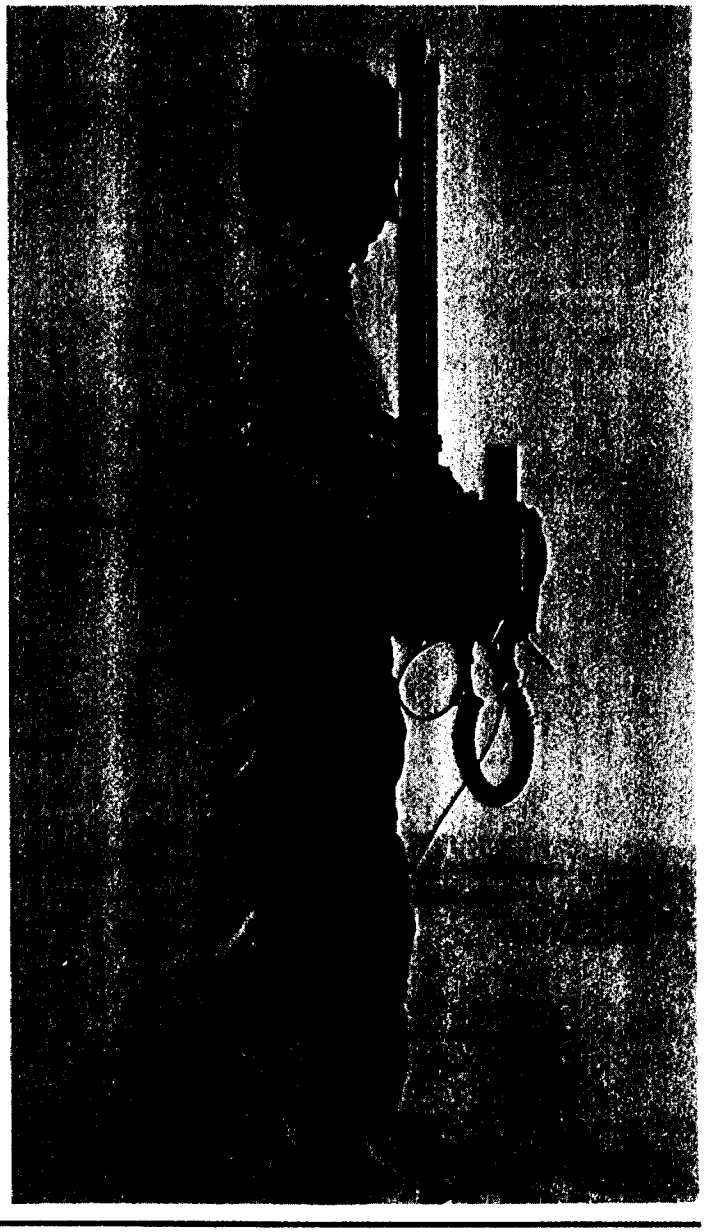
Printed in Canada

APPENDIX III

APEX MAXMIN I PORTABLE EM

The MaxMin I ground EM System is designed for mineral and water exploration and for geoengineering applications. It is an expansion of the highly popular MaxMin II and III EM System concepts. The frequency range is extended to seven octaves from four. The ranges and numbers of coil separations are increased and new operating modes are added. The receiver can also be used independently for measurements with powerline sources. The advanced spheric and powerline noise rejection is further improved, resulting in faster and more accurate surveys, particularly at larger coil separations. Several receivers may be operated along a single reference cable.

Mating plug in data acquisition computer and cassette unit are available for use with the MaxMin I for automatic digital data acquisition and processing. These units are covered in separate data sheet.



MAXMIN I SPECIFICATIONS:

Frequencies: 110, 220, 440, 880, 1760, 3520, 7040 and 14080 Hz, plus 50/60 Hz powerline frequency (receiver only).

Modes: MAX 1: Horizontal loop mode (Transmitter and receiver coil planes horizontal and coplanar).

MAX 2: Vertical coplanar loop mode (Transmitter and receiver coil planes vertical and coplanar).

MAX 3: Vertical coaxial loop mode (Transmitter and receiver coil planes vertical and coaxial).

MIN 1: Perpendicular loop mode 1 (Transmitter coil plane horizontal and receiver coil plane vertical).

MIN 2: Perpendicular loop mode 2 (Transmitter coil plane vertical and receiver coil plane horizontal).

Coil separations: 12.5, 25, 50, 75, 100, 125, 150, 200, 250, 300, & 400 metres (standard).

10, 20, 40, 60, 80, 100, 120, 160, 200, 240 & 320 metres (selected with grid switch inside of receiver).

50, 100, 200, 300, 400, 500, 600, 800, 1000, 1200 & 1600 feet (selected with grid switch inside of receiver).

Parameters measured: In-Phase and quadrature components of the secondary magnetic field, in % of primary (transmitted) field.

Field amplitude and/or tilt of 50/60 Hz powerline field.

Readouts: Analog direct readouts on edgewise panel meters for in-phase, quadrature and tilt, and for 50/60Hz amplitude. (Additional digital LED readouts when using the DAC, for which interfacing and controls are provided for plug-in).

Ranges of readouts: Analog in-phase and quadrature scales: 0±4%, 0±20%, 0±100%, switch activated. Analog tilt scale: 0±75% grade. (Digital in-phase and quad. 0±102.4%).

Readability: Analog in-phase and quadrature 0.05% to 0.5%, analog tilt 1% grade. (Digital in-phase and quadrature 0.1%).

Repeatability: ±0.05% to ±1% normally, depending on frequency, coil separation & conditions.

Signal filtering: Powerline comb filter, continuous spherics noise clipping, autoadjusting time constant and other filtering.

Warning lights: Receiver signal and reference warning lights to indicate potential errors.

Survey depth: From surface down to 1.5 times coil separation used.

Transmitter dipole moments:

110 Hz: 220 Atm²	1760 Hz: 160 Atm²
220 Hz: 215 Atm²	3520 Hz: 80 Atm²
440 Hz: 210 Atm²	7040 Hz: 40 Atm²
880 Hz: 200 Atm²	14080 Hz: 20 Atm²

Reference cable: Light weight unshielded 4/2 conductor teflon cable for maximum temperature range and for minimum friction. Please specify cable lengths required.

Intercom: Voice communication link provided for operators via the reference cable.

Receiver power supply: Four standard 9V batteries (0.5Ah, alkaline). Life 30 hrs continuous duty, less in cold weather. Rechargeable battery and charger option available.

Transmitter power supply: Rechargeable sealed gel type lead acid 12V-13Ah batteries (4x6V-6½Ah) in canvas belt. Optional 12V-8Ah light duty belt pack available.

Transmitter battery charger: For 110-120/220-240VAC, 50/60/400 Hz and 12-15VDC supply operation, automatic float charge mode, three charge status indicator lights. Output 14.4V-1.25A nom.

Operating temp: -40 to +60 deg.C.

Receiver weight: 8 kg, including the two integral ferrite cored antennas (9 kg with data acq. comp.)

Transmitter weight: 16 kg with standard 12V-13Ah battery pack.
14 kg with light duty 12V-8Ah pack.

Shipping weight: 59 kg plus weight of reference cables at 2.5 kg per 100 metres plus other optional items if any.

Standard spares: One spare transmitter battery pack, one spare transmitter battery charger, two spare transmitter retractile connecting cords, one spare set receiver batteries.

Specifications subject to change without notification.

APEX PARAMETRICS LIMITED

P.O. Box 818, Uxbridge
Ontario, Canada L0C 1K0

Telephones: 416-640-6102
416-852-5875

Cables: APEXPARA TORONTO

Telex: 06-966625 APEXPARA UXB

APPENDIX IV

Kayorum Property

Geophysical Contractor: TechTerrex Inc.
55A Port St.,E.,
Mississauga,Ont. L5G 4P3

Dates: Jan. 28, 1991 to March 1, 1991.

Total Line Km:

- Magnetics:	254.4
- VLF-EM:	254.4
- Horizontal Loop EM:	122.4

Survey Personnel:

- Michael Wilson, President, Oakville, Ontario
- Dan Lafortune, Crew Chief, St. Charles, Ontario
- Hugh Ainsworth, Geophysical Technician, Lindsay, Ontario
- Brian Moore, Geophysical Technician, Powassan, Ontario
- Norman Brisson, Geophysical Assistant, St. Charles, Ontario
- Claude Cyr, Geophysical Assistant, Rouyn, Quebec
- Peter Matthews, Geophysical Assistant, Timmins, Ontario
- Tom Kioke, Geophysical Assistant, Timmins, Ontario

Figure 1

Claim Location

Deloro Township

Porcupine Mining Division, Ontario

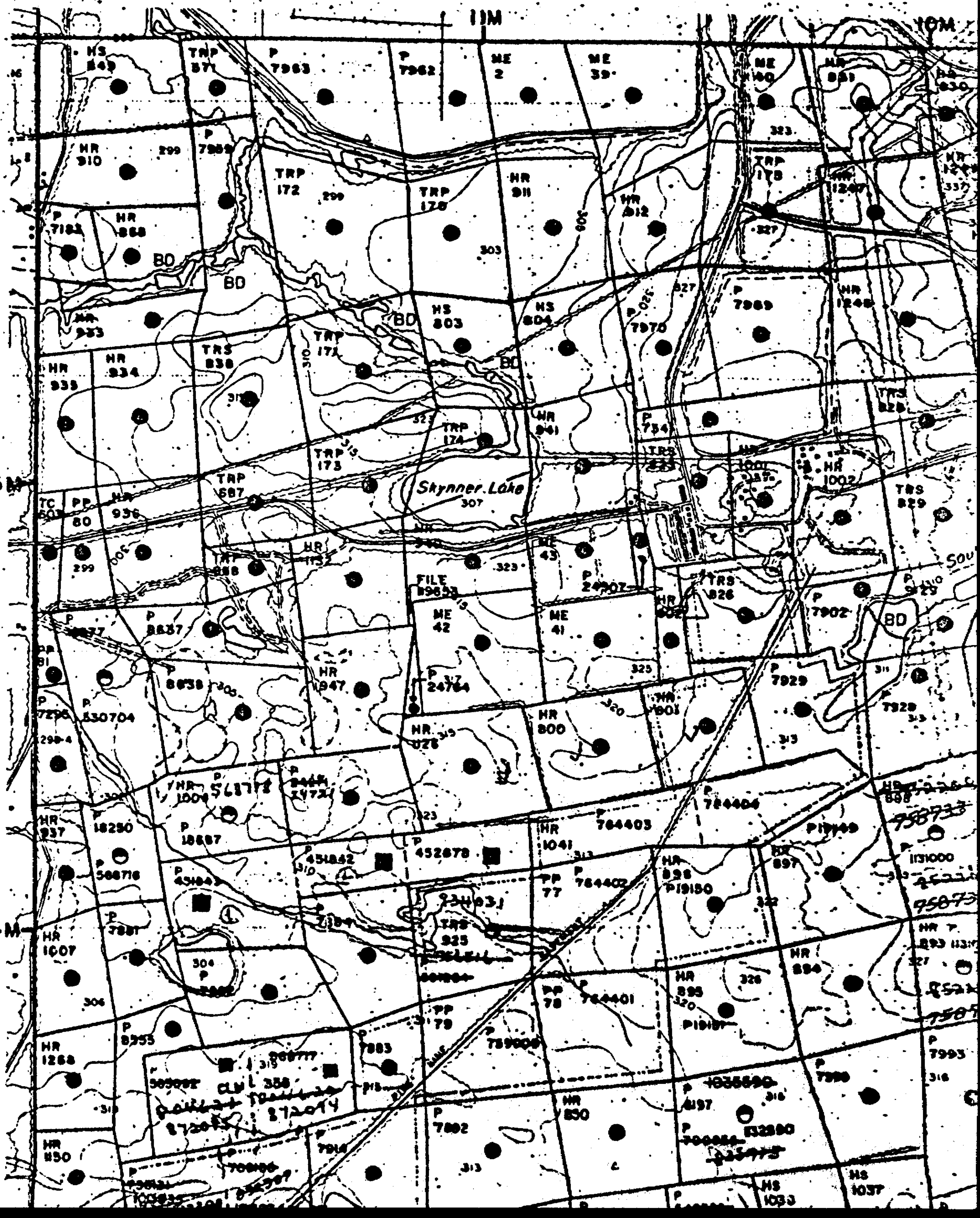


Figure la

Claim Location

Tisdale Township

Porcupine Mining Division, Ontario

TIMMINS

BLO,800E

ALL ELEVATIONS & LINES ARE DERIVED FROM TOP OF IB GIVEN ELEVATION OF 322.00

APP'D BY	DETAILS	DATE	No

REVISIONS

RECOMMENDED BY | APPROVED BY

MONETA MINES LTD

GEOPHYSICAL SURVEY

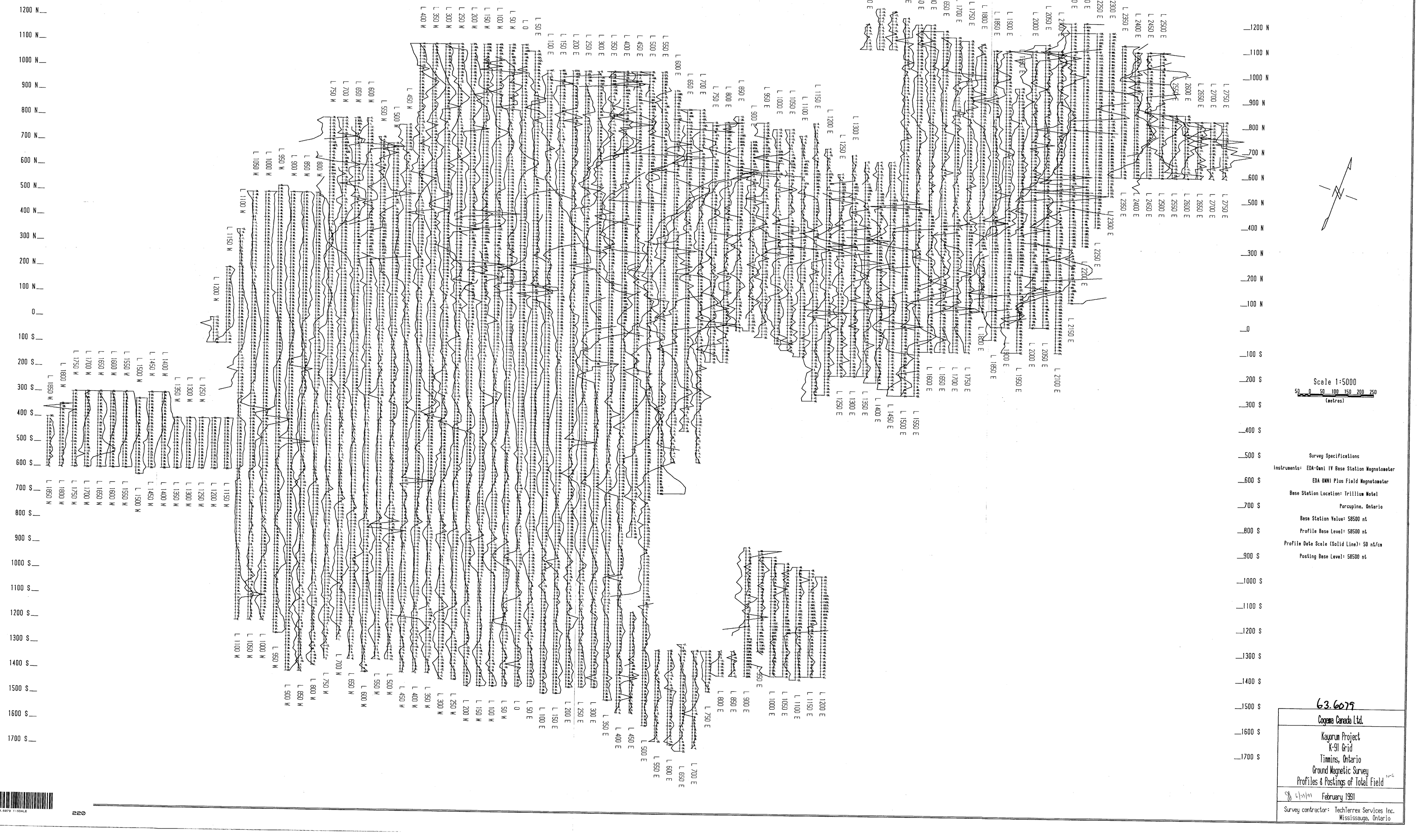
PLAN: GRID ELEVATIONS

northland engineering (1987) limited
Consulting Engineers and Planners
NORTH BAY SUDBURY TIMMINS

DRAWN BY: D.V. DUBE / D. CHARTRAND	DATE: JANUARY 1991		
CHECKED BY: D. CHARTRAND	SCALE: 1 : 5000		
FIELD BOOK T979-01, T979-02, T979-03, T979-04, & T979-05 T979-06			
OFFICE: TIMMINS	PROJECT No: TM979	DRAWING No: GP-1	REV.: 0

63.6079


Scale 1:5000
50 0 50 100 150 200 250
(metres)
Survey Specifications
Instruments: EDA-Omni IV Base Station Magnetometer
EDA OMNI Plus Field Magnetometer
Base Station Location: Trillium Motel
Porcupine, Ontario
Base Station Value: 58500 nt
Contour Interval: 4 nt
Cogema Canada Ltd.
Kayorum Project
K-91 Grid
Timmins, Ontario
Ground Magnetic Survey
Contours of Total Field
February 1991
Survey contractor: TechTerrex Services Inc.
Mississauga, Ontario
63.6079



Scale 1:5000

50 0 50 100 150 200 250 (metres)

Survey Specifications

Instruments: EDA-Omni IV Base Station Magnetometer
EDA OMNI Plus Field Magnetometer

Base Station Location: Trillium Motel
Porcupine, Ontario

Base Station Value: 58500 nt

Profile Base Level: 58500 nt

Profile Data Scale (Solid Line): 50 nt/cm

Posting Base Level: 58500 nt

63.6079

Copena Canada Ltd.

Kayorum Project
K-91 Grid
Timmins, Ontario
Ground Magnetic Survey
Profiles & Postings of Total Field

February 1991

Survey contractor: TechTerrex Services Inc.
Mississauga, Ontario

Scale 1:5000

50 0 50 100 150 200 250 (metres)

Survey Specifications

Instrument: EDA-OMNI Plus, VLF

VLF Station : NLK, Seattle, WA

Frequency : 21.4 Khz

Survey Direction: Facing North

In-Phase Profiles (Solid Line): 20 percent/cm

Quadrature Profiles (Dotted Line): 20 percent/cm

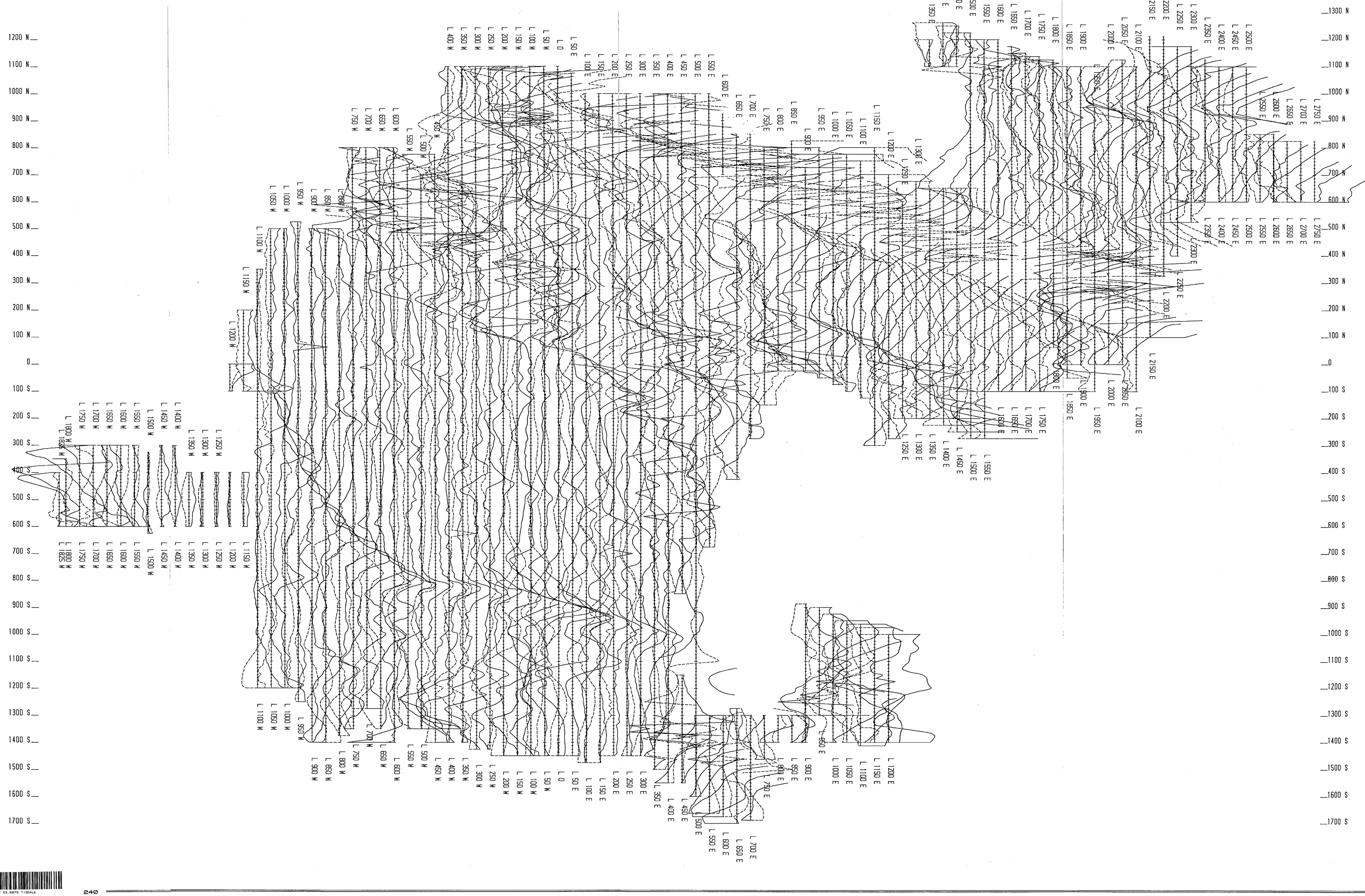
63.6079

Cogema Canada Ltd.

Kayorum Project
K-91 Grid
Timmins, Ontario
VLF EM Survey
Profiles of In-Phase and Quadrature

February 1991

Survey Contractor: Techterrex Services Inc.
Mississauga, Ontario



Scale 1:5000

50 0 50 100 150 200 250
(metres)

Survey Specifications

Instrument: EDA-OMNI Plus, VLF

VLF Station : NAA, Cuttler, ME

Frequency : 24.0 Khz

Survey Direction: Facing North

In-Phase Profiles (Solid Line): 20 percent/cm

Quadrature Profiles (Dotted Line): 20 percent/cm

63.6079

Cogema Canada Ltd.

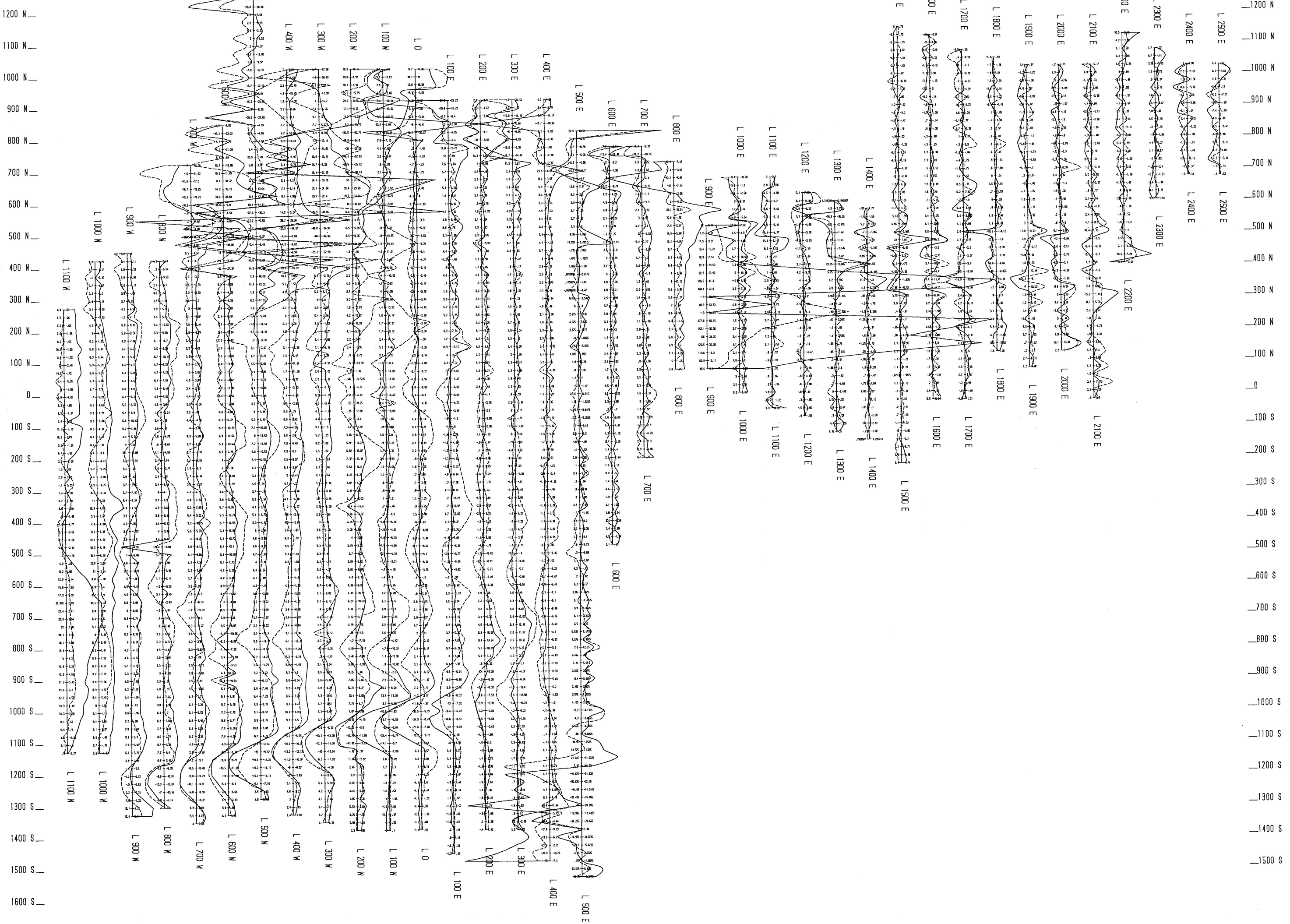
Kayorum Project
K-91 Grid
Timmins, Ontario
VLF EM Survey
Profiles of In-Phase and Quadrature

February 1991

Survey Contractor: TechTerrex Services Inc.
Mississauga, Ontario


63.6079
Cogema Canada Ltd.
Kayorum Project
K-91 Grid
Timmins, Ontario
VLF EM Survey
Postings of In-Phase and Quadrature
February 1991
Survey Contractor: TechTerrex Services Inc.
Mississauga, Onatrio
Survey Specifications
Instrument: EDA-OMNI Plus, VLF
VLF Station : NLK, Seattle, WA
Frequency : 21.4 Khz
Survey Direction: Facing North
Scale 1:5000
(metres)

C3.679
Cogema Canada Ltd.
Kayorum Project
K-91 Grid
Timmins, Ontario
VLF EM Survey
Postings of In-Phase and Quadrature
February 1991
Survey Contractor: TechTerrex Services Inc.
Mississauga, Onatrio
Survey Specifications
Instrument: EDA-OMNI Plus, VLF
VLF Station : NAA, Cutler, ME
Frequency : 24.0 Khz
Survey Direction: Facing North
Scale 1:5000
50 0 50 100 150 200 250
(metres)



Scale 1:5000

50 0 50 100 150 200 250

(metres)

Survey Date: February 1991

Instruments: Maxmin I-9 and WMC Data Recorder

In-Phase Profiles (Solid Line): 10 percent/cm

Quadrature Profiles (Dotted Line): 10 percent/cm

Coil Separation: 150 metres

63.6079

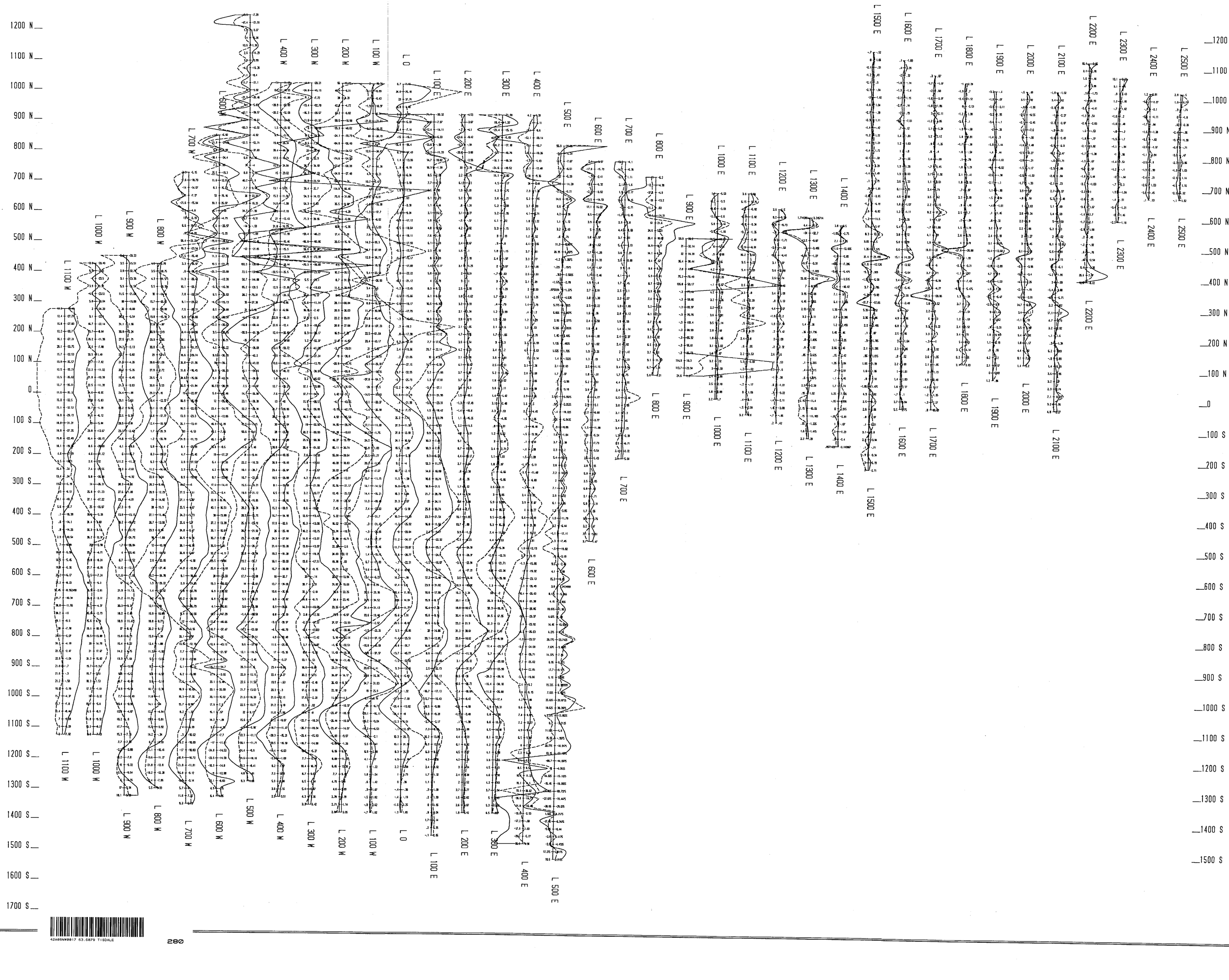
Cogema Canada Ltd.

Kayorum Project
Key-91 Grid
Timmins, Ontario
Horizontal Loop EM Survey
440 hz Postings and Profiles

6/03/91 February 1991

Survey Contractor: TechTerrex Services Inc.
Mississauga, Ontario

42A86NW0017 63.6079 T1SCALE



Scale 1:5000

50 0 50 100 150 200 250 (metres)

Survey Date: February 1991

Instruments: Maxmin I-9 and MMC Data Recorder

In-Phase Profiles (Solid Line): 20 percent/cm

Quadrature Profiles (Dotted Line): 20 percent/cm

Coil Separation: 150 metres

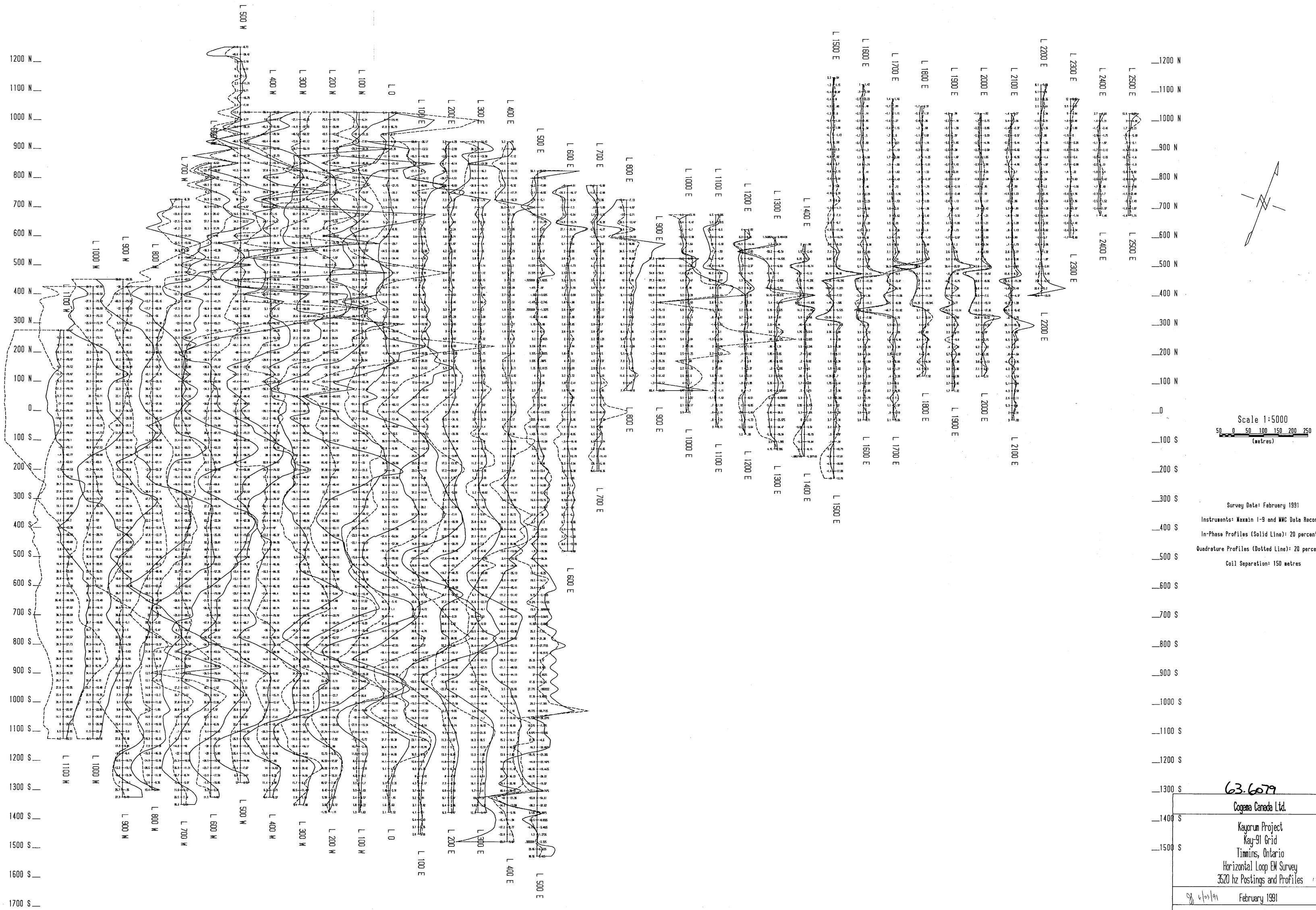
63.6079

Cogema Canada Ltd.

Kayorum Project
Kay-91 Grid
Timmins, Ontario
Horizontal Loop EM Survey
1760 hz Postings and Profiles

Drg. 6/03/91 February 1991

Survey Contractor: TechTerrex Services Inc.
Mississauga, Ontario



Scale 1:5000

50 0 50 100 150 200 250
(metres)

Survey Date: February 1991

Instruments: Maxmin I-9 and MMC Data Recorder

In-Phase Profiles (Solid Line): 20 percent/cm

Quadrature Profiles (Dotted Line): 20 percent/cm

Coil Separation: 150 metres

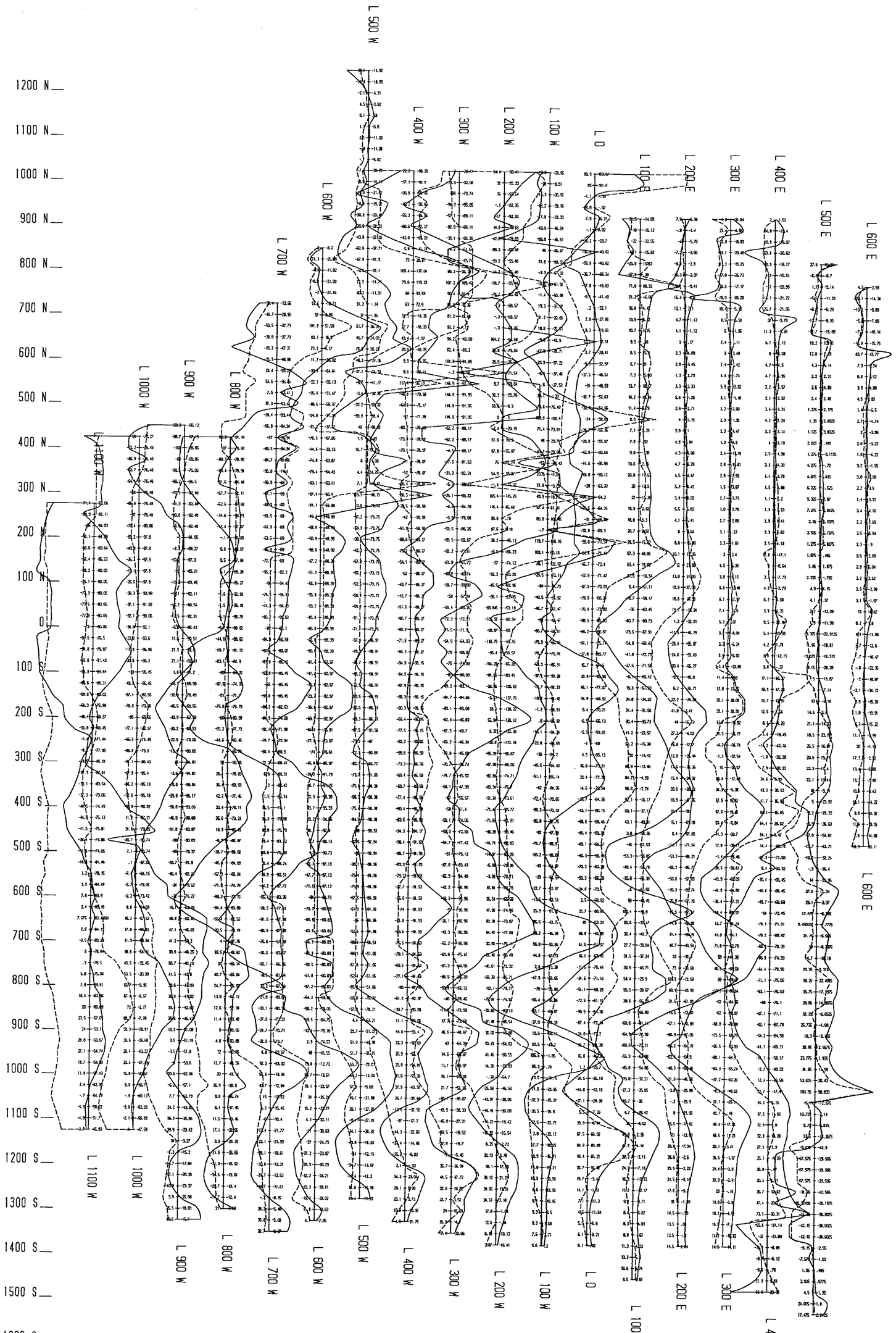
63.6079

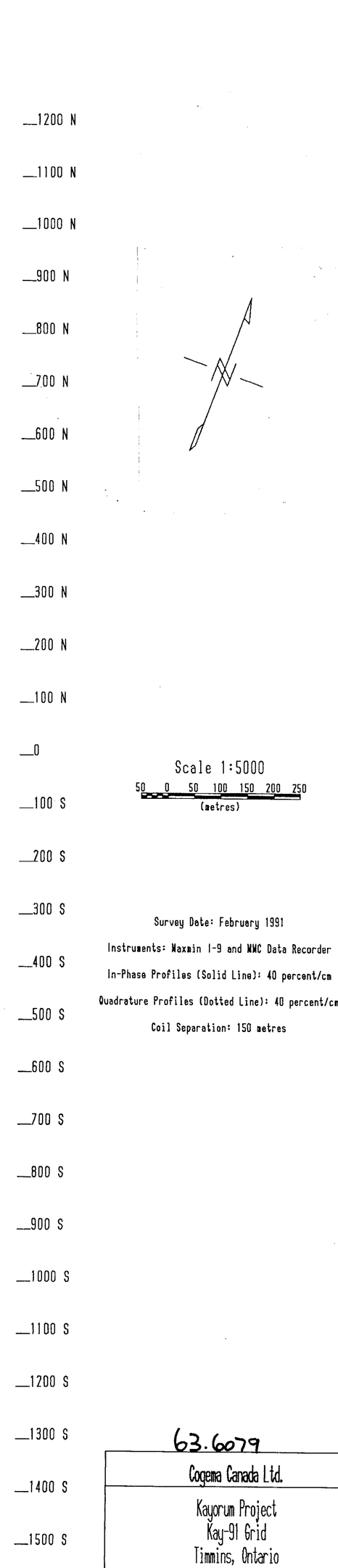
Cogema Canada Ltd.

Kayorum Project
Kay-91 Grid
Timmins, Ontario
Horizontal Loop EM Survey
3520 hz Postings and Profiles

SJB 6/03/91 February 1991

Survey Contractor: TechTerrex Services Inc.
Mississauga, Ontario





Scale 1:5000

50 0 50 100 150 200 250

(metres)

Survey Date: February 1991

Instruments: Maxmin I-9 and MMC Data Recorder

In-Phase Profiles (Solid Line): 40 percent/cm

Quadrature Profiles (Dotted Line): 40 percent/cm

Coil Separation: 150 metres

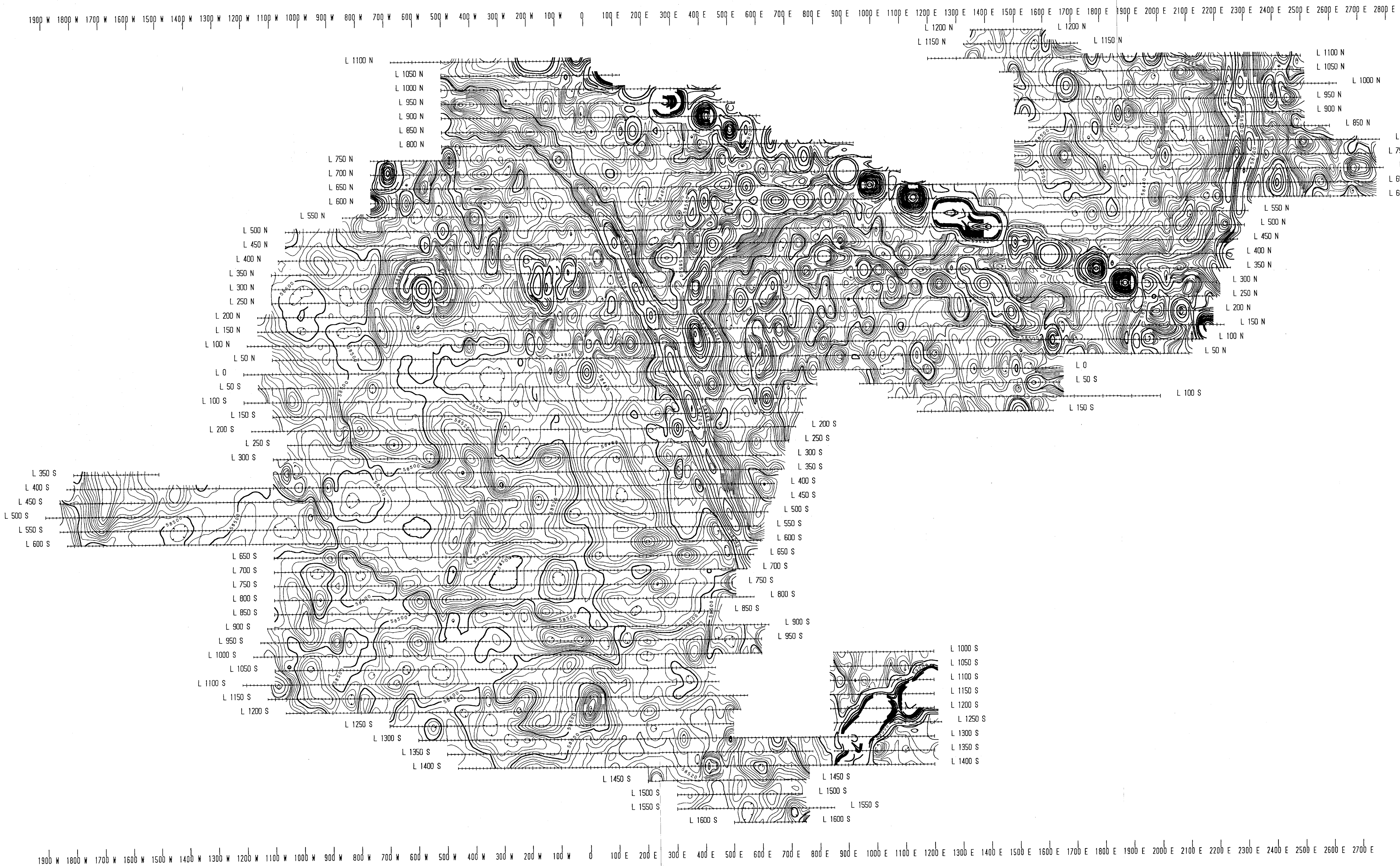
63.6079

Cogema Canada Ltd.

Kayorum Project
Kay-91 Grid
Timmins, Ontario
Horizontal Loop EM Survey
7040 hz Postings and Profiles

SB 6/25/91 February 1991

Survey Contractor: TechTerrex Services Inc.
Mississauga, Ontario



Scale 1:5000

50 0 50 100 150 200 250 (metres)

Survey Specifications

Instruments: EDA-OMNI IV Base Station Magnetometer

EDA-OMNI PLus Field Magnetometer

Base Station Location: Trillium Motel

Porcupine, Ontario

Base Station Value: 58500 nt

Contour Interval: 4 nt

Cogema Canada Ltd.

Kayorum Project

K91 Grid

Timmins, Ontario

Ground Magnetic Survey

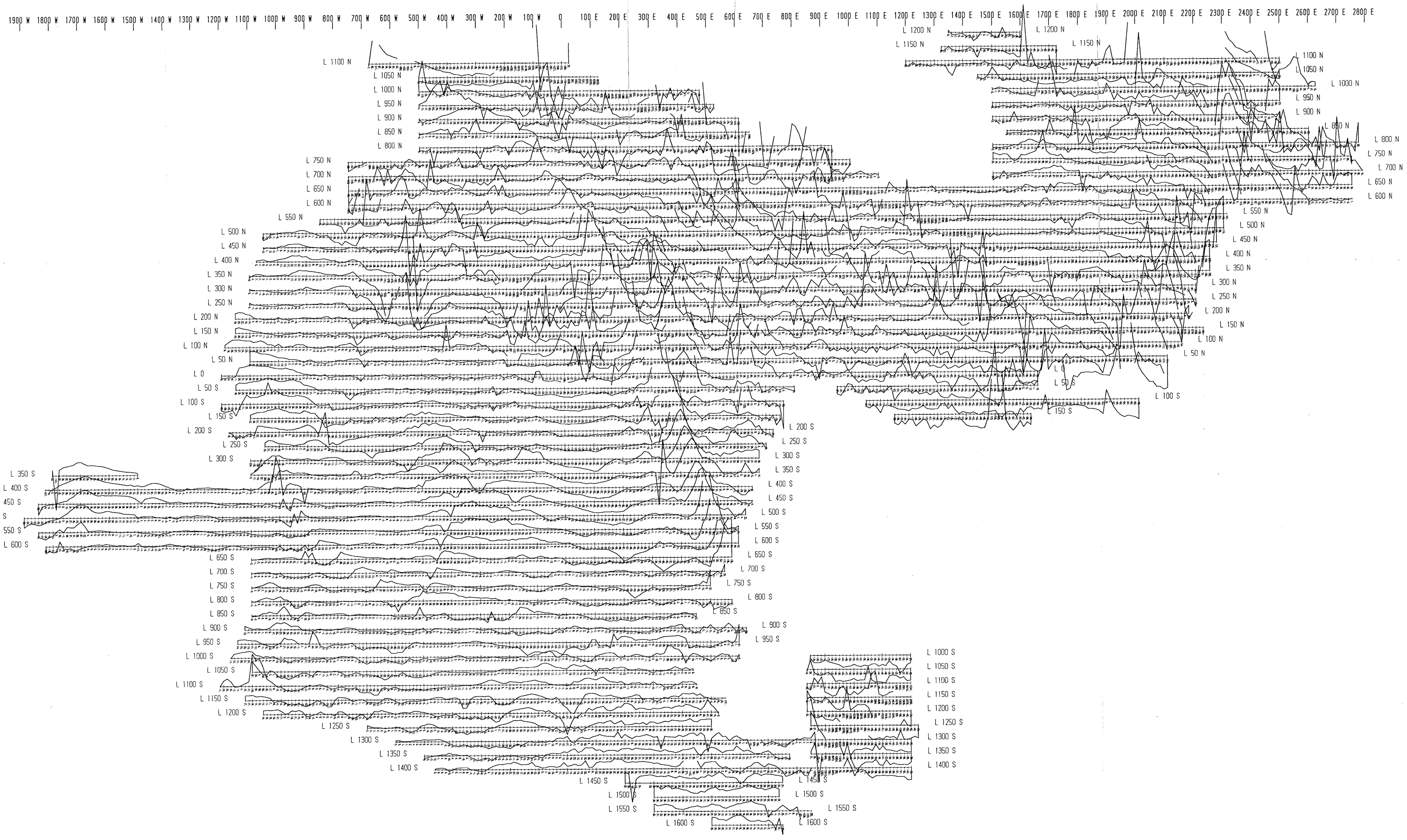
Contours of Total Field

February 1991

Survey contractor: TechTerrex Inc.
Mississauga, Ontario

63.6079

310



Survey Specifications

Instruments: EDA-OMNI IV Base Station Magnetometer
EDA OMNI Plus Field Magnetometer

Base Station Location: Trillium Motel
Porcupine, Ontario

Base Station Value: 58500 nt

Profile Base Level: 58500 nt

Profile Data Scale (Solid Line): 50 nt/cm

Posting Base Level: 58500 nt

Cogema Canada Ltd.

Kayorum Project
K-91 Grid
Timmins, Ontario
Ground Magnetic Survey
Profiles & Postings of Total Field

Date: February 1991

Survey contractor: TechTerrex Services Inc.
Mississauga, Ontario

63.6079

Loggerwa Canada Ltd.

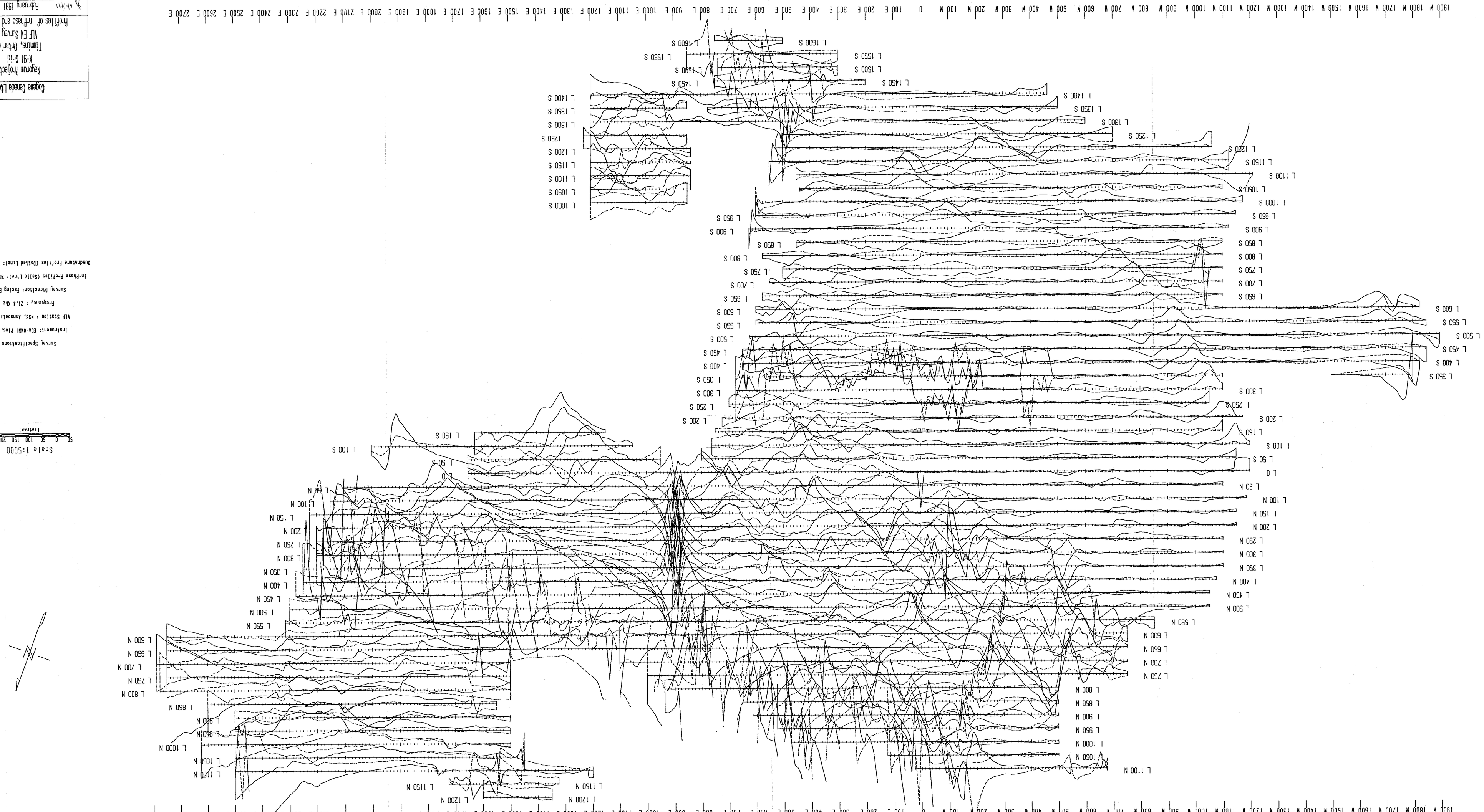
Kayonun Project
K-91 Grid
Timmins, Ontario
VLF EM Survey
Profiles of In-Phase and Quadrature

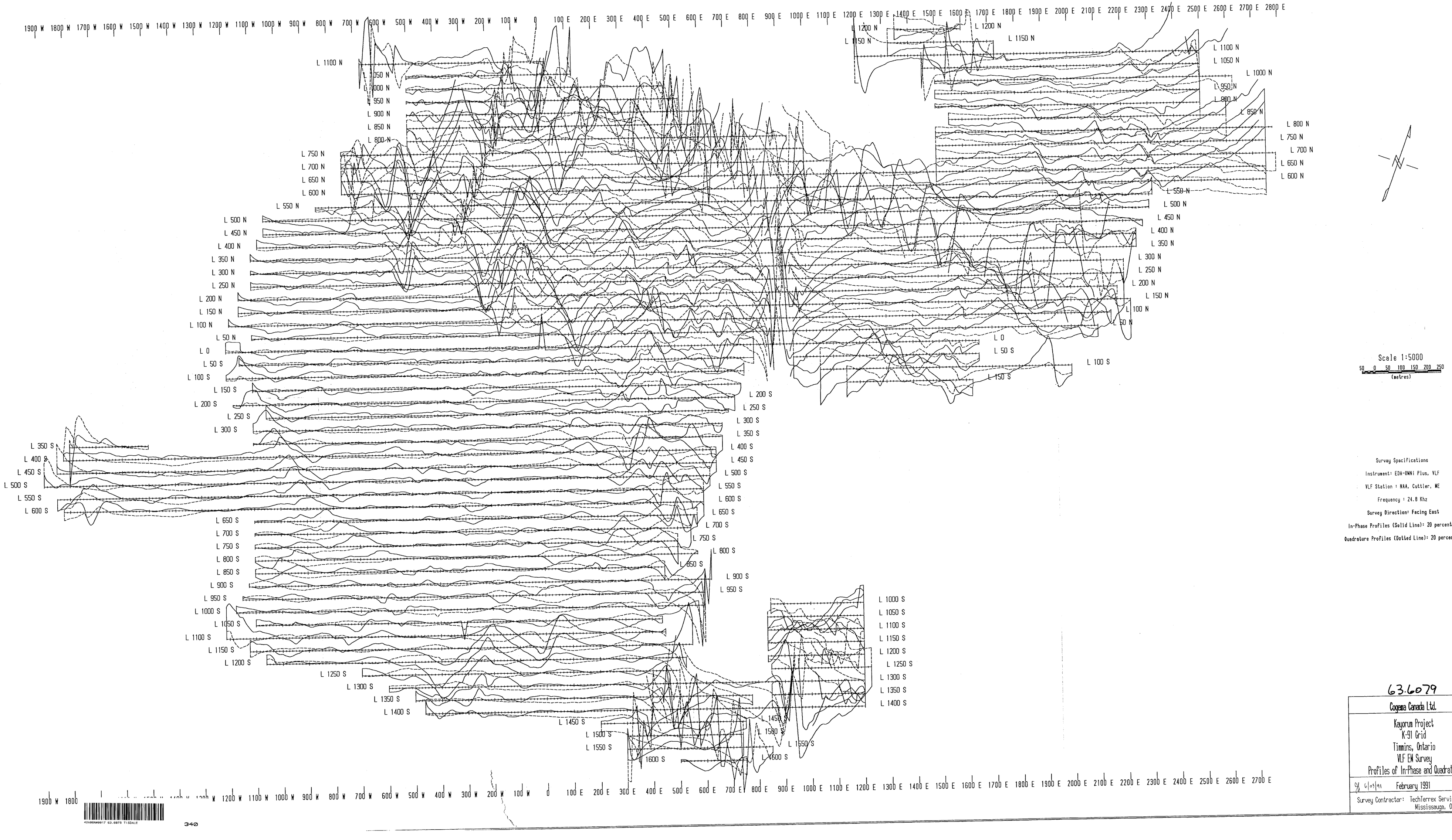
Survey Contractor: Technierex Services Inc.
Mississauga, Ontario

Date: February 1991

Survey Specifications
Instrument: EDA-OMNI Plus, VLF
VLF Station : NSS, Annapolis, MD
Frequency : 21.4 khz
Survey Direction: Facing East
In-Phase Profiles (Solid Line): 20 percent/cm
Quadrature Profiles (Dotted Line): 20 percent/cm

Scale 1:5000
(meters)
250 200 150 100 50 0 50





Scale 1:5000

50 0 50 100 150 200 250
(metres)

Survey Specifications

Instrument: EDA-OMNI Plus, VLF

VLF Station : NAA, Cuttler, ME

Frequency : 24.8 Khz

Survey Direction: Facing East

In-Phase Profiles (Solid Line): 20 percent/cm

Quadrature Profiles (Dotted Line): 20 percent/cm

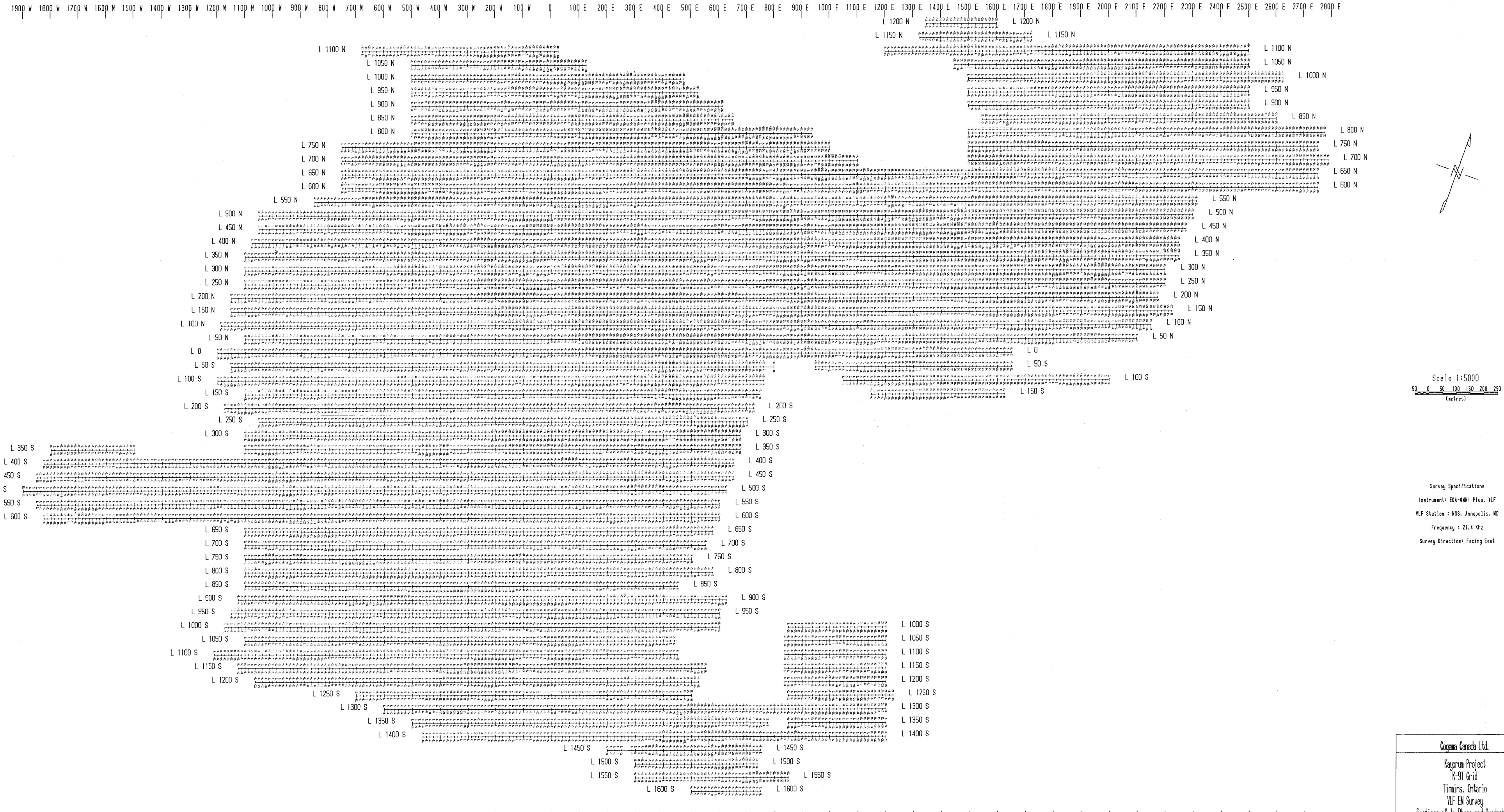
63.6079

Cogema Canada Ltd.

Kayorum Project
K-91 Grid
Timmins, Ontario
VLF EM Survey
Profiles of In-Phase and Quadrature

February 1991

Survey Contractor: TechTerrex Services Inc.
Mississauga, Ontario



Survey Specifications

Instrument: EDA-OMNI Plus, VLF

VLF Station : NSS, Annapolis, MD

Frequency : 21.4 Khz

Survey Direction: Facing East

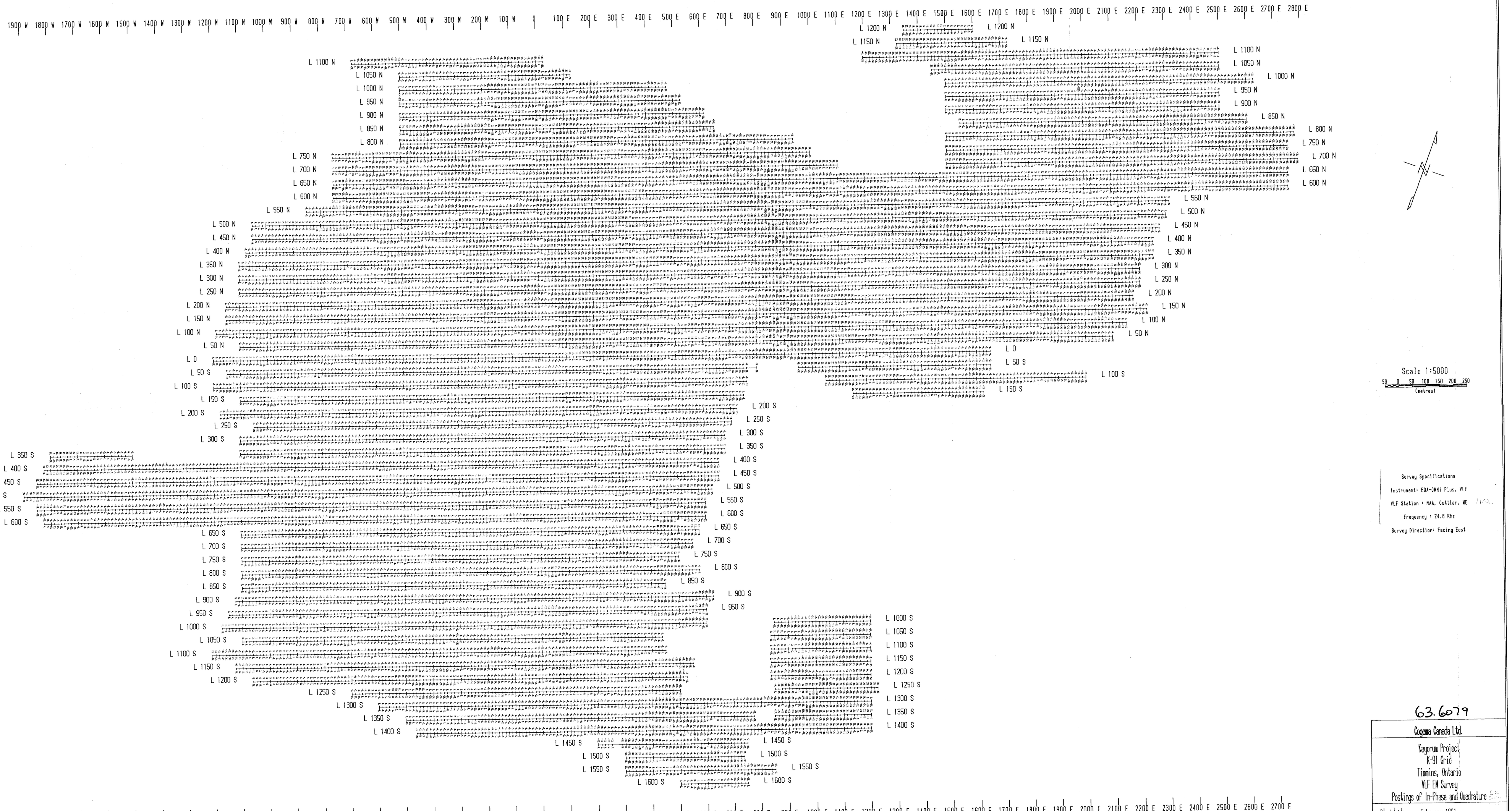
Cogema Canada Ltd.

Kayorun Project
K-91 Grid
Timmins, Ontario
VLF EM Survey
Postings of In-Phase and Quadrature

February 1991

Survey Contractor: TechTerrex Services Inc.
Mississauga, Ontario

63.6079



Survey Specifications

Instrument: EDA-OMNI Plus, VLF

VLF Station : NAA, Cuttler, ME

Frequency : 24.8 Khz

Survey Direction: Facing East

63.6079

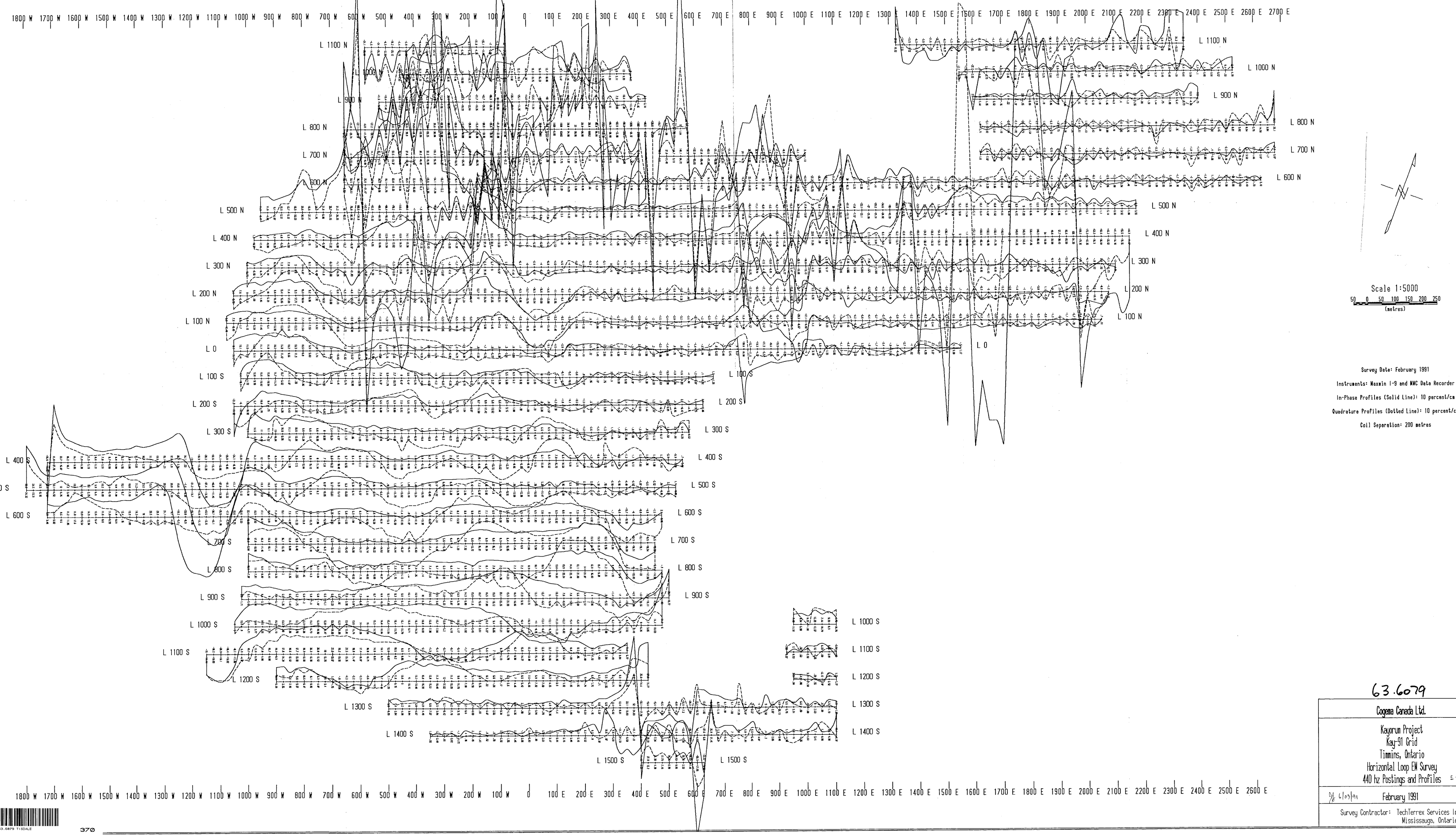
Cogema Canada Ltd.

Kayorum Project
K-91 Grid
Timmins, Ontario
VLF EM Survey
Postings of In-Phase and Quadrature

February 1991

Survey Contractor: TechTerrex Services Inc.
Mississauga, Ontario

360



Survey Date: February 1991

Instruments: Maxmin I-9 and MMC Data Recorder

In-Phase Profiles (Solid Line): 10 percent/cm

Quadrature Profiles (Dotted Line): 10 percent/cm

Coil Separation: 200 metres

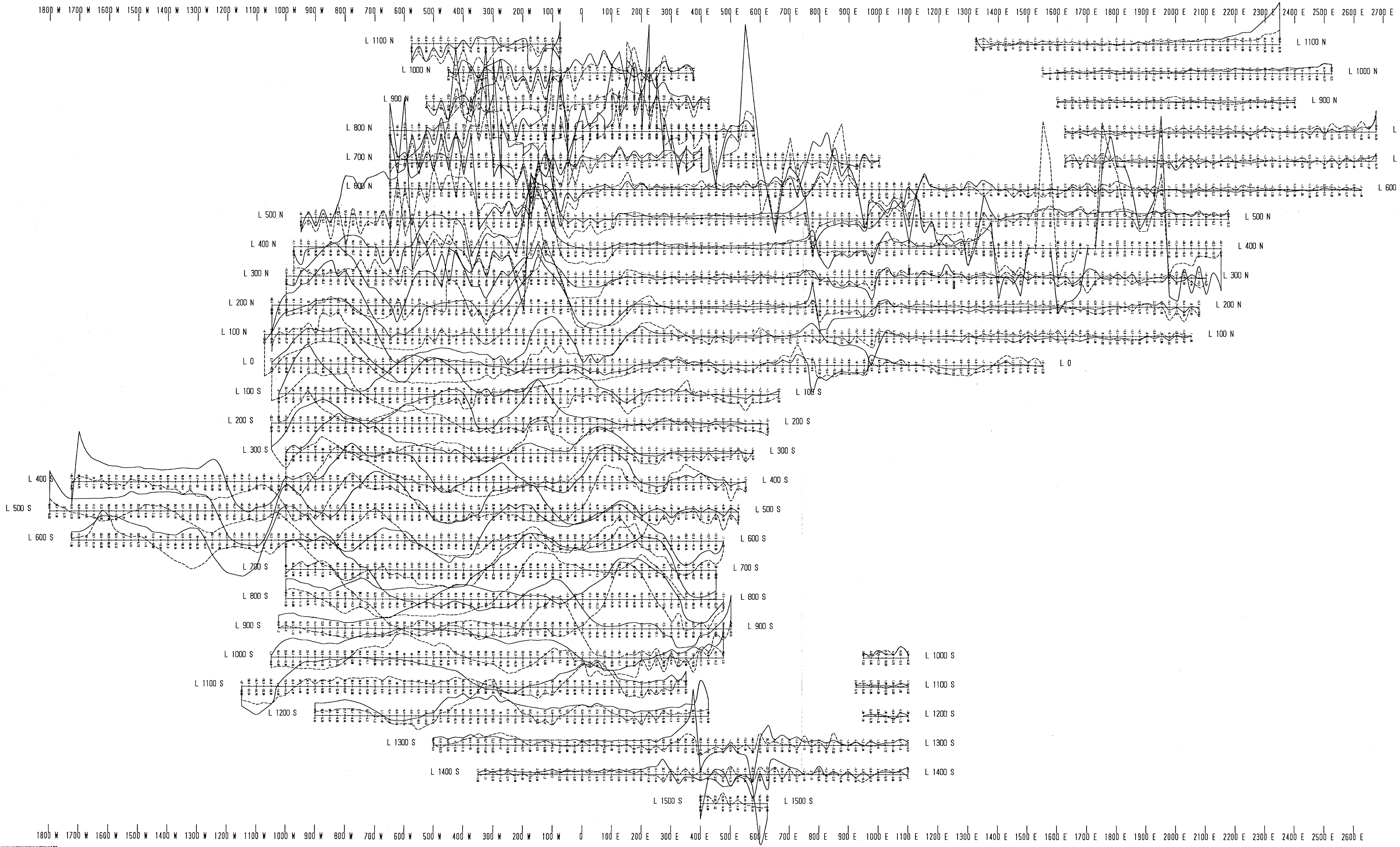
63.6079

Cogema Canada Ltd.

Kayorum Project
Kay-91 Grid
Timmins, Ontario
Horizontal Loop EM Survey
440 hz Postings and Profiles

Date: February 1991

Survey Contractor: TechTerrex Services Inc.
Mississauga, Ontario



Scale 1:5000

50 0 50 100 150 200 250 (metres)

Survey Date: February 1991

Instruments: Maxmin I-9 and MMC Data Recorder

In-Phase Profiles (Solid Line): 20 percent/cm

Quadrature Profiles (Dotted Line): 20 percent/cm

Coil Separation: 200 metres

63.6079

Cogema Canada Ltd.

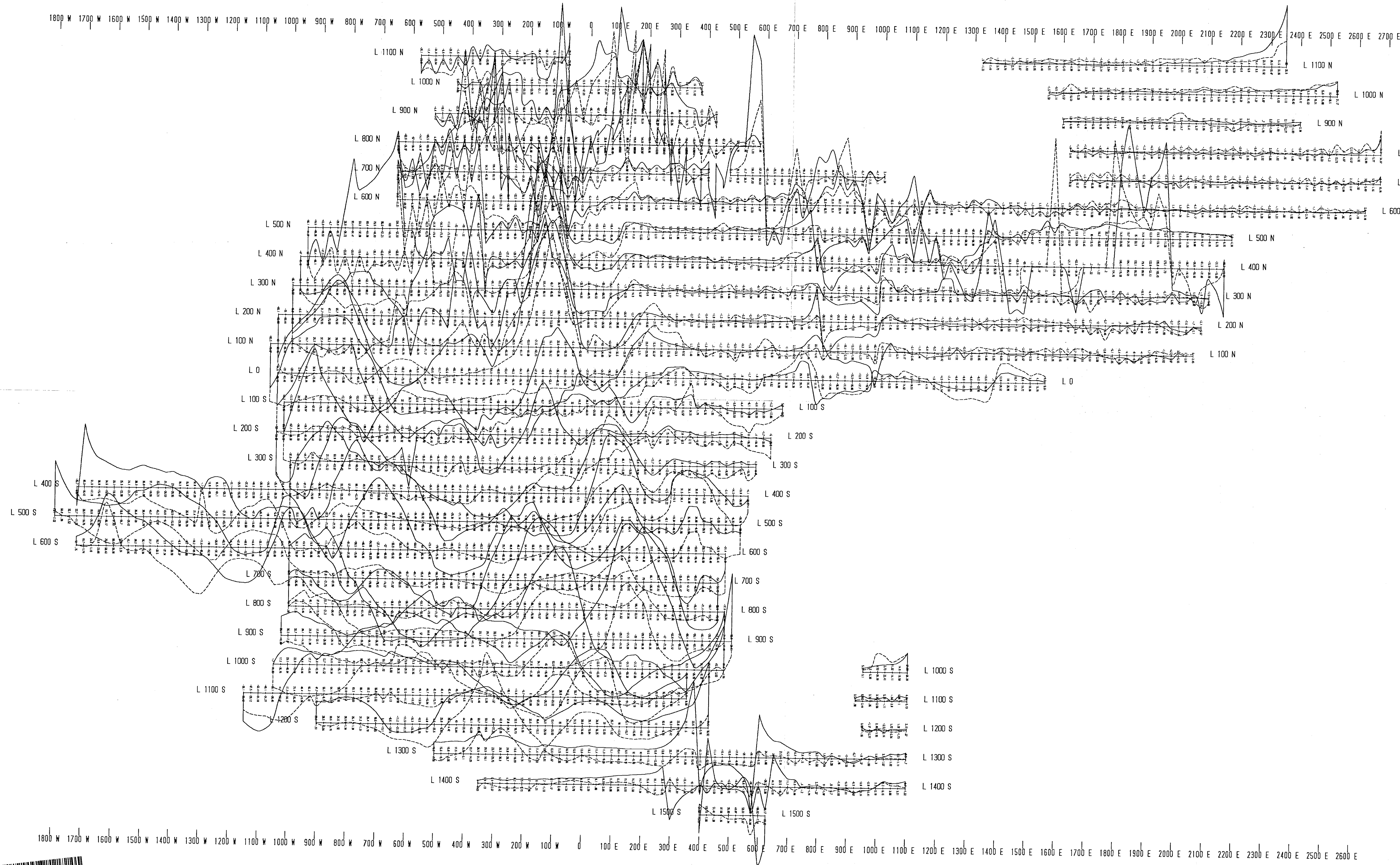
Kayorum Project
Kay-91 Grid
Timmins, Ontario
Horizontal Loop EM Survey
1760 hz Postings and Profiles

February 1991

Survey Contractor: TechTerrex Services Inc.
Mississauga, Ontario

42A06NW0017 63.6079 TISDALE

380



Survey Date: February 1991

Instruments: Maxmin I-9 and MMC Data Recorder

In-Phase Profiles (Solid Line): 20 percent/cm

Quadrature Profiles (Dotted Line): 20 percent/cm

Coil Separation: 200 metres

63.6079

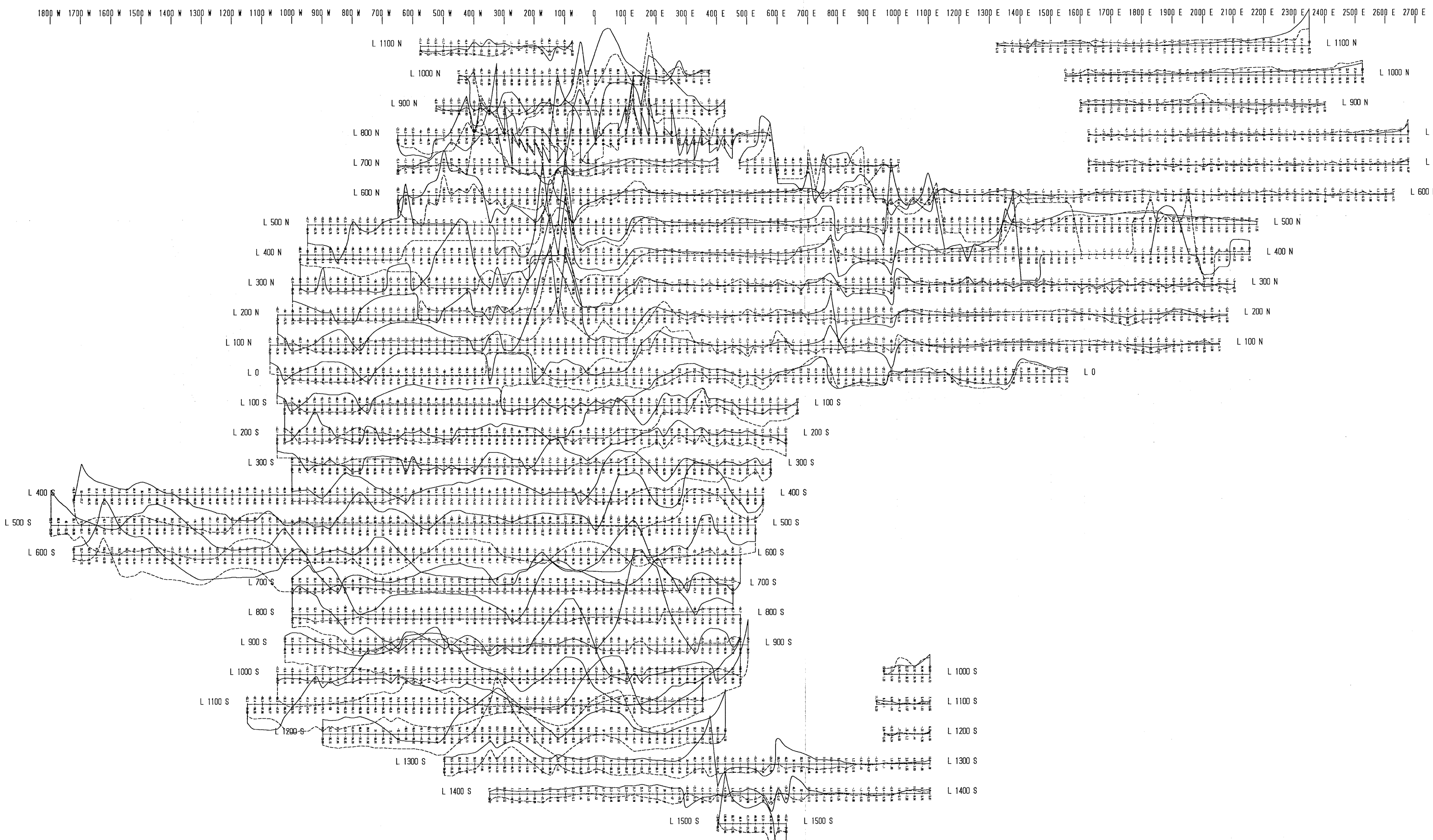
Cogema Canada Ltd.

Kayorum Project
Kay-91 Grid
Timmins, Ontario
Horizontal Loop EM Survey
3520 hz Postings and Profiles

SK 6/03/91 February 1991

Survey Contractor: TechTerrex Services Inc.
Mississauga, Ontario

390



Scale 1:5000

50 0 50 100 150 200 250

(metres)

Survey Date: February 1991

Instruments: Maxmin I-9 and MMC Data Recorder

In-Phase Profiles (Solid Line): 40 percent/cm

Quadrature Profiles (Dotted Line): 40 percent/cm

Coil Separation: 200 metres

63.6679

Cogema Canada Ltd.

Kayorum Project
Kay-91 Grid
Timmins, Ontario
Horizontal Loop EM Survey
7040 hz Postings and Profiles

February 1991

Survey Contractor: TechTerrex Services Inc.
Mississauga, Ontario

400