42A01SW0005 2.15758 BURT



WMC International Limited

Americas Division - Exploration

2.15758

KIRKLAND LAKE WEST PROJECT
(4043)

Report on Geophysical Exploration
1993-1994

Rex Brommecker
Project Geologist

Roman Tykajlo
Senior Geophysicist

December 15, 1994

42A01SW0005 2.15758 BURT

TABLE OF CONTENTS

	Page
Location	1
Access	1
Claim Status	1
Regional Geology	1
Local Geology	2
Target and Exploration Rationale	2
Previous Work	2
Work by Billiton	3
RC Drilling	3
Diamond Drilling	3
Work by Chevron	3
Geophysical Work by WMC International Limited	4
VES Survey	5
Magnetic Survey	5
Gravity Survey	6
Dipole-Dipole IP/Resistivity Survey	6
Conclusions	7
Recommendations	7
References	8

LIST OF FIGURES

Figure #	Description	scale	location
Figure 1	Property Location Map - Kirkland Lake Area		text
Figure 2	Kirkland Lake West Project - Claim and Grid Plan	1:20,000	pocket
Figure 3	Geological Map of the Kirkland Lake Area		text
Figure 4	Kirkland Lake West Project - Reconnaissance Grid Plan	1:10,000	pocket
Figure 5	Geophysical Data Interpretation	1:20,000	pocket
Figure 6a	Resistivity Sounding Line 95+00E at 40+00N		text
Figure 6b	Resistivity Sounding Line 105+00E at 40+00N		text
Figure 6c	Resistivity Sounding Line 115+00E at 40+00N		text
Figure 6d	Resistivity Sounding Line 125+00E at 40+00N		text
Figure 6e	Resistivity Sounding Line 139+25E at 70+00N		text
Figure 7	Total Magnetic Intensity Survey Data Profiles and Postings	1:10,000	pocket
Figure 8	Bouguer Gravity Survey (2.67 gm/cc) Data Profiles and Postings	1:10,000	pocket
Figure 9	Elevation Survey Data Profiles and Postings	1:10,000	pocket
Figure 10a	Line 11500E IP - Resistivity Survey	1:10,000	pocket
Figure 10b	Line 12500E IP - Resistivity Survey	1:10,000	pocket
Figure 10c	Line 12900E IP - Resistivity Survey	1:10,000	pocket
Figure 10d	Line 13925E IP - Resistivity Survey	1:10,000	pocket
Figure 10e	Line 14300E IP - Resistivity Survey	1:10,000	pocket

LIST OF TABLES

Table 1	**Kirkland Lake West Claim List**	**text**
Table 2	**Geophysical Surveys Completed**	**text**

LIST OF APPENDICES

APPENDIX A	**PROJECT MANAGEMENT & LIST OF CONTRACTORS**	**text**
APPENDIX B	**LOGISTICAL & TECHNICAL REPORTS**	**text**
APPENDIX C	**SURVEY INSTRUMENT SPECIFICATIONS**	**text**
APPENDIX D	**TABLES OF EXPENDITURES**	**text**
APPENDIX E	**CERTIFICATE OF QUALIFICATION**	**text**

Location

The Kirkland Lake West Project is located 20 kilometres WSW of Kirkland Lake in Burt, Eby, Bompas, and Grenfell Townships (Figure 1). The centre of the project is located at approximately longitude 80 18' and latitude 48 04' on NTS map sheet 42A/1.

Access:

The property can be accessed from a network of old logging roads which can be reached from the Eby West (Pothole) road on the east or the Swastika Tree Nursery Road on the west.

Claim Status:

The property consists of 43 claims (237 units) covering 3792 hectares (Table 1, Figure 2, and Figure 4). All claims are 100% owned by WMC International Limited (formerly Westminer Canada Limited) with the exception of 2 claims (10 units) which are under option from Stewart Carmichael.

Regional Geology:

The property is in the southwestern Abitibi Greenstone belt of the Superior Province. It lies 20 kilometres WSW and along strike of the famous gold deposits located at Kirkland Lake. Combined the Kirkland Lake deposits have produced more than 24 million ounces of gold (Meyer, 1992).

The geology of the Kirkland Lake area (Figure 3) has been most recently described by Jensen and Langford, 1985 who concentrated on the stratigraphy of the area and Hodgson et. al., 1990 who concentrated on the structure of the area. The stratigraphic nomenclature of Jensen and Langford, 1985 is used in this report.

The area is generally underlain by Archean ultramafic to mafic volcanic rocks of the Kinojevis and Larder Lake Groups. The Timiskaming Group, which consists of both late sedimentary and alkalic volcanic rocks unconformably overlies the Abitibi volcanics and is spatially related to the Larder Lake-Cadillac "Break". The Abitibi volcanics and Timiskaming Group rocks are intruded by various Archean aged felsic to intermediate granitic to syenitic rocks. The Archean rocks are locally unconformably overlain by embayments of flat lying Proterozoic sediments of the Gowganda Formation. The Gowganda Formation consists of conglomerates, wackes, and siltstones of glaciogenic origin.

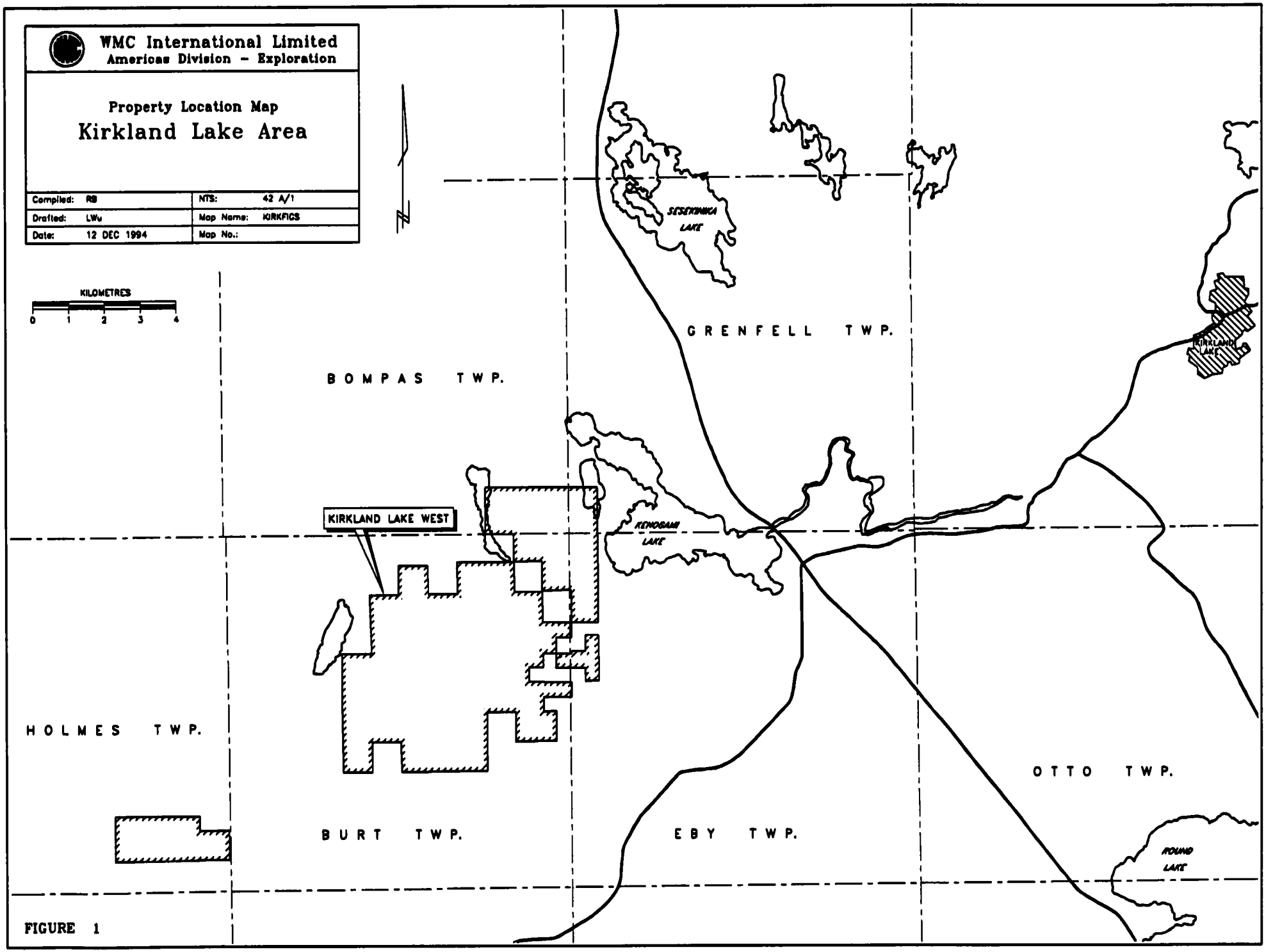

WMC International Limited
Americas Division - Exploration
Property Location Map
Kirkland Lake Area
Compiled: RB
NTS: 42 A/1
Drafted: LWu
Map Name: KIRKFIGS
Date: 12 DEC 1994
Map No.:
KILOMETRES
0 1 2 3 4
N
GRENFELL TWP.
BOMPAS TWP.
HOLMES TWP.
BURT TWP.
EBY TWP.
OTTO TWP.
KIRKLAND LAKE WEST
SESEKINIKA LAKE
KIRKLAND LAKE
ROUND LAKE

FIGURE 1

KIRKLAND LAKE WEST PROPERTY
CLAIM LIST

CLAIM NUMBER	UNITS	HECTARES	TOWNSHIP
1187011	4	64	BURT
1187013	6	96	BURT
1200479	8	128	BURT
1200480	8	128	BURT
1200481	8	128	BURT
1200483	8	128	BURT
1200484	4	64	BURT
1200486	8	128	BURT
1200487	4	64	BURT
1200488	8	128	BURT
1200609	8	128	BURT
1200610	8	128	EBY
1200611	8	128	BURT
1200612	2	32	BURT
1200613	2	32	BURT
1200614	2	32	BURT
1200615	8	128	BURT
1200616	2	32	BURT
1200617	1	16	BURT
1200618	4	64	BURT
1200619	8	128	BURT
1200620	8	128	BURT
1200621	8	128	BURT
1200622	4	64	BURT
1200623	1	16	BURT
1200624	2	32	BURT
1200625	8	128	BURT
1200626	8	128	BURT
1200627	8	128	BURT
1200628	6	96	BURT
1200629	2	32	BURT
1200630	4	64	BURT
1200631	1	16	EBY
1200632	3	48	EBY
1200634	1	16	BURT
1200635	6	96	HOLMES
1200636	6	96	HOLMES
1200637	6	96	HOLMES
1200638	4	64	HOLMES
1200961	12	192	BOMPAS
1200962	12	192	BOMPAS, GRENFELL
1200999	4	64	BURT
1202820	4	64	EBY
43 claims	237	3792	

Table 1

The Archean rocks have generally been metamorphosed to greenshist facies and suffered several periods of ductile, cleavage forming deformation. Archean stratigraphy dips moderately to steeply and is complexly folded and faulted. The Larder Lake-Cadillac Break is an important regional-scale deformation zone which is spatially related to large gold deposits from Matachewan (Ont.) to Val D'Or (Que.). The Kirkland Lake gold deposits are hosted by quartz-veins in a parallel structure (the Kirkland Lake Main Break) less than 2km from the Larder Lake-Cadillac Break.

Local Geology:

The project area is covered mainly by the Proterozoic Gowganda Formation. It has been mapped by Moore, 1966 and more recently by Jensen, 1988. The Gowganda Formation generally consists of glaciogenic conglomerate, wacke, and siltstone. It strikes north with shallow dips to the east and west. It unconformably overlies Archean basement.

Of main interest is the geology of the underlying Archean rocks. If the Gowganda Formation is not extremely thick (<100m) the Archean rocks could effectively be tested by geophysics and drilling from surface. The Larder Lake-Cadillac Break projects onto the property and can be traced by mapping deformation in the Proterozoic rocks (Powell and Hodgson, 1992). Other deformation zones were also mapped in similar fashion.

Target and Exploration Rationale:

The Archean rocks beneath the Proterozoic cover have an extremely good chance of hosting a large gold deposit given the proximity to the Larder Lake-Cadillac Break. The Proterozoic cover has hindered effective exploration of this very high potential area. A combination of geophysical and geological methods can assist in defining potential gold-hosting structures beneath the cover.

Previous Work

A compilation of previous work has shown that the area received examination by Billiton in 1983-1987 as well some work by Chevron in 1986-1988. All other work has been in the surrounding area which is not covered by Proterozoic sediments.

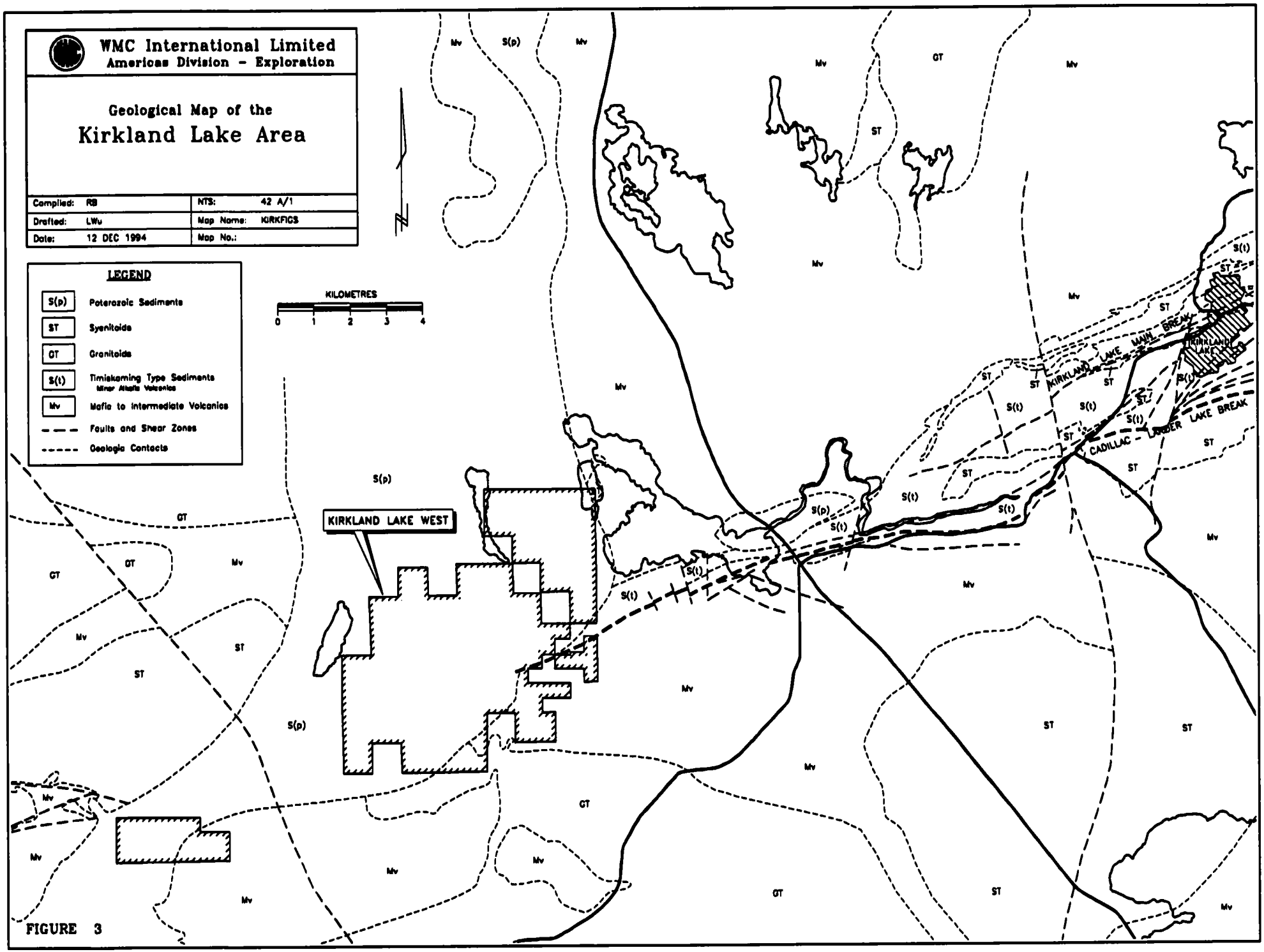

WMC International Limited
Americas Division - Exploration
Geological Map of the
Kirkland Lake Area
Compiled: RB
NTS: 42 A/1
Drafted: LWu
Map Name: KIRKFIGS
Date: 12 DEC 1994
Map No.:
LEGEND
S(p) Proterozoic Sediments
ST Syenitoids
GT Granitoids
S(t) Timiskaming Type Sediments
Minor Alkalic Volcanics
Mv Mafic to Intermediate Volcanics
Faults and Shear Zones
Geologic Contacts
KILOMETRES
0 1 2 3 4
KIRKLAND LAKE WEST
KIRKLAND LAKE MAIN BREAK
KIRKLAND LAKE LOWER LAKE BREAK
CADILLAC

FIGURE 3

Work by Billiton

Billiton performed an airborne magnetic and VLF survey, then drilled 8 reverse circulation holes (total 365m) and two diamond drill holes (total 230m).

RC-drilling

The RC holes were drilled to find windows of the Archean rocks under till. The program was unsuccessful at finding windows. Critically, however, the RC drilling showed that a deep overburden valley along the Englehart River has greater than 130m of till covering the Proterozoic cover, making this area almost impossible to explore. This overburden valley is located just to the west of the Property.

Diamond Drilling

Billiton drilled 2 diamond drill holes near the eastern edge of the Proterozoic cover as follows:

B84-1 (170, -60, EOH=114m)
0-14m - O/B
14-35m - Huronian Sediments
35-59m - Timiskaming Conglomerate
59-96m - Porphyritic Trachytic Tuff with minor carbonate veining and weak sericite alteration.
96-114m- Timiskaming siltstone and conglomerate with weak sericite and fuchsite alteration.
NO ASSAYS REPORTED

B84-2 (170, -60, EOH=116m)
0-4m -O/B
4-116m -Huronian sediments interbedded greywacke and conglomerate
NO ASSAYS REPORTED

Work by Chevron

Chevron did work on the NE-part of the Billiton ground. They made a rough map and sampled minor quartz-veins in the Huronian. A soil geochemistry survey was also completed. Both the lithogeochemistry and soil geochemistry produced no significant anomalies. Chevron drilled two diamond drill holes near the eastern edge of the cover sequence as follows:

K86-1 (155, -45, 198m)
0-8m -O/B
8-136m -Huronian conglomerate, siltstone, greywacke
136-142m -Diabase dyke
142-172m -Archean? lithic wacke and tuff
172m-198m-Basic volcanic with varioles and pillows
NO ASSAYS REPORTED

K86-2 (155, -45, 200m)
0-22m -O/B
22-64.5m -Huronian sediments
64.5-200m-Diabase
NO ASSAYS REPORTED

Geophysical Exploration Work by WMC International Limited

In November and December of 1993, a 26km reconnaissance grid was established with lines approximately every 1km and stations picketed at 25m along the lines (Figures 4 and 5). Gridding was completed by Natives Exploration Services of Chibougamau, Quebec. Subsequently, in July 1994, an additional 4.1 km of gridding was established by Mineral Exploration Services of Kirkland Lake, Ontario. Grid lines are compiled on Figures 2 and 4.

Geophysical follow-up, using magnetics, gravity, vertical electrical sounding (VES), and dipole-dipole IP/resistivity surveys was completed over the Kirkland Lake West reconnaissance grid with the purpose of:

- determining the thickness of Huronian Gowganda Fm cover rocks,
- testing for subtle, anomalous magnetic signatures over the zone of the inferred western extension of the Cadillac-Larder and Kirkland Lake-Main Breaks.
- mapping a gravity gradient possibly associated with the Cadillac-Larder Break through the grid area, and
- testing for polarizable sources at depth, beneath Huronian cover rocks.

Geophysical surveying was completed by contract data acquisition crews in two phases:

KIRKLAND LAKE WEST PROJECT

GEOPHYSICAL SURVEYS COMPLETED

PHASE 1
January/February 1994

METHOD	line km	L95E	L105E	L115E	L125E	L129E	L139+25E	L143E	BL 36N
magnetics (total field)	26.1	X	X	X	X		X		X
gravity (Bouguer 2.67 gm/cc)	26.1	X	X	X	X		X		X
vertical electrical sounding (VES)	5 soundings	X	X	X	X		X		
dipole-dipole IP/resistivity (a=100m, n=1 to 6)	9.5			X	X				

PHASE 2
'August 1994

magnetics (total field)	7					X	X	X	
dipole-dipole IP/resistivity (a=100m, n=1 to 6)	7					X	X	X	

Table 2

- Phase I completed by Mertens MacNeil Geophysical Ground Surveys Ltd. in January and February 1994, and

- Phase 2 completed by Tandem Geophysics Inc. in August 1994.

A breakdown of lines surveyed with each method during each phase is presented in Table 2.

Brief logistics and technical reports by the contractors are included in Appendix B. Survey Instrument Specifications are presented in Appendix C.

Significant geophysical features are summarized on an interpretation and compilation plan in Figure 5.

VES Survey

Five vertical electrical soundings were completed using the expanding Schlumberger array, with a north-south oriented a/2 electrode spread ranging between 2 and 1024m. Sounding points are plotted on Figure 5.

Each sounding was inverted to a best-fit depth-resistivity model, using PC based, 1-D inversion program RESIXIP written by Interpex Limited of Golden, Colorado, USA.

Best fit inversion results are presented for individual soundings in Figures 6a through e, and in geoelectric section **A-A'** on the inset in Figure 5.

The soundings successfully defined a lower, high resistivity layer which increases in depth-to-top, from <10m at 70N on L135+25E, to >500m at 40N along L95N. Assuming a significant resistivity contrast between steeply dipping Achean lithologies and overlying, horizontally stratified Huronian Gowganda Fn, the sounding results imply a step-like thickening of Huronian cover towards the west.

Magnetic Survey

Magnetic Survey profiles were completed at 25m station intervals along all lines, and were helpful in defining the position of a NW trending diabase dyke striking through the grid.

Total intensity magnetic profiles and data postings are plotted in Figure 7.

The position of the NW striking diabase dyke is summarized in Figure 5 along trend BB'. A kink in the dyke, inferred between L105E and L115E, marks its possible offset by

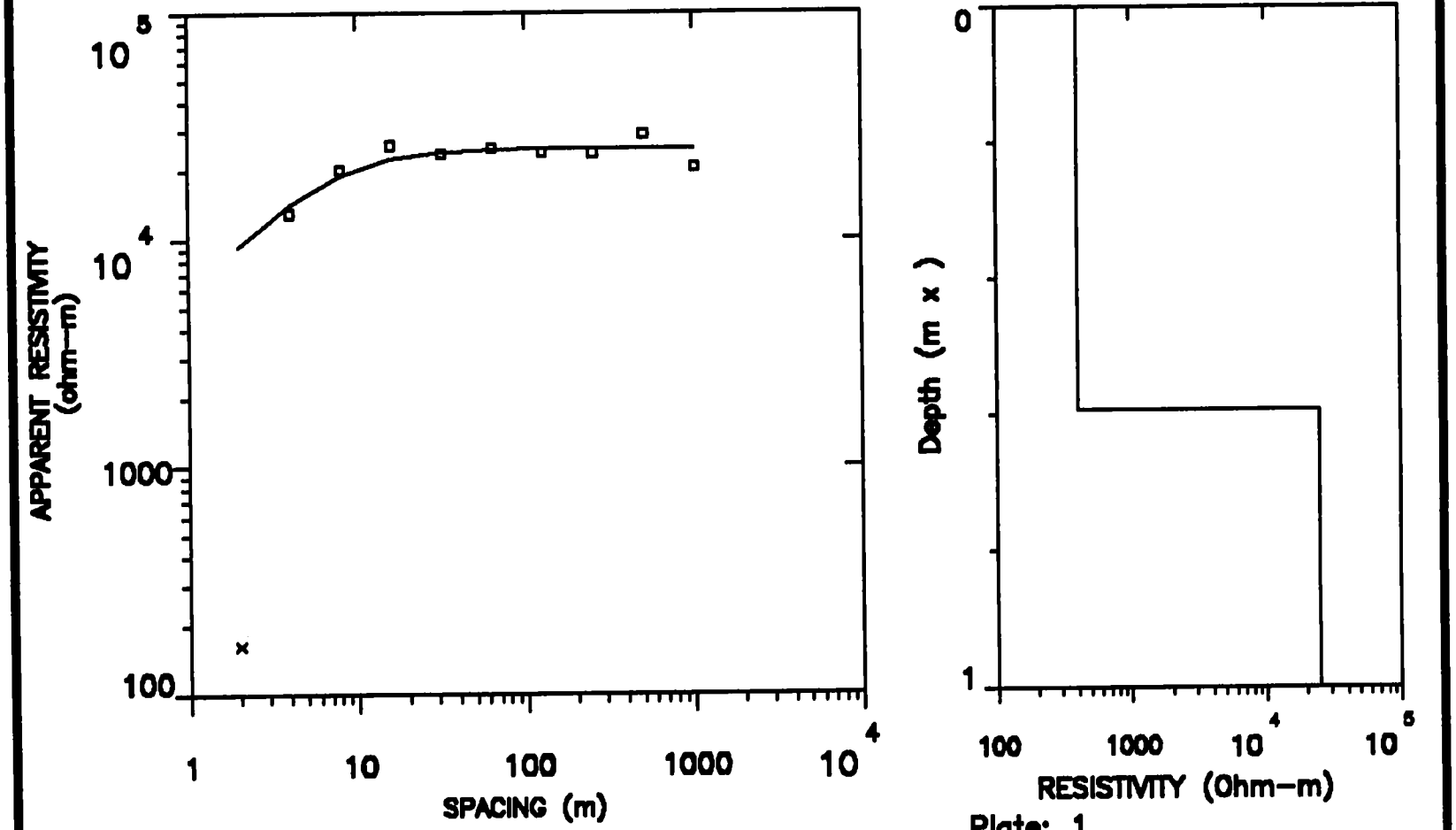


Plate: 1

for: Kirkland Lake West Project	Resistivity Sounding
by: Westminer	Burt Twp, Ontario Line 95+00E 40+00N
Data Set: KIRK95 / Date: Jan 24/94	
Equipment: IPT-1/IPV-4 / Sounding: 1	Azimuth: 0.00 Deg NORTH

FIGURE 6a

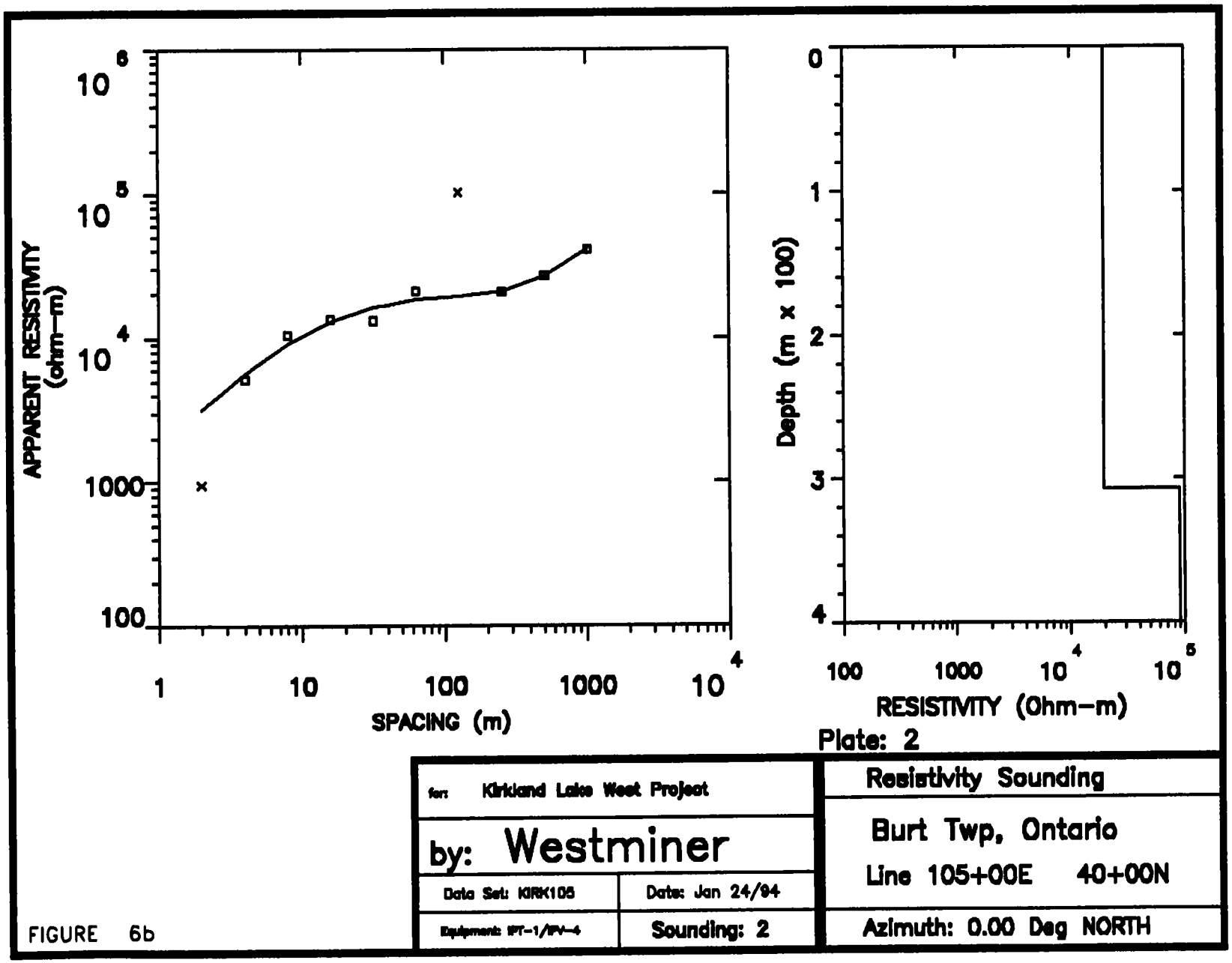


Plate: 2

for: Kirkland Lake West Project	Resistivity Sounding
by: Westminer	Burt Twp, Ontario Line 105+00E 40+00N
Data Set: KIRK105 / Date: Jan 24/94	
Equipment: IPT-1/IPV-4 / Sounding: 2	Azimuth: 0.00 Deg NORTH

FIGURE 6b

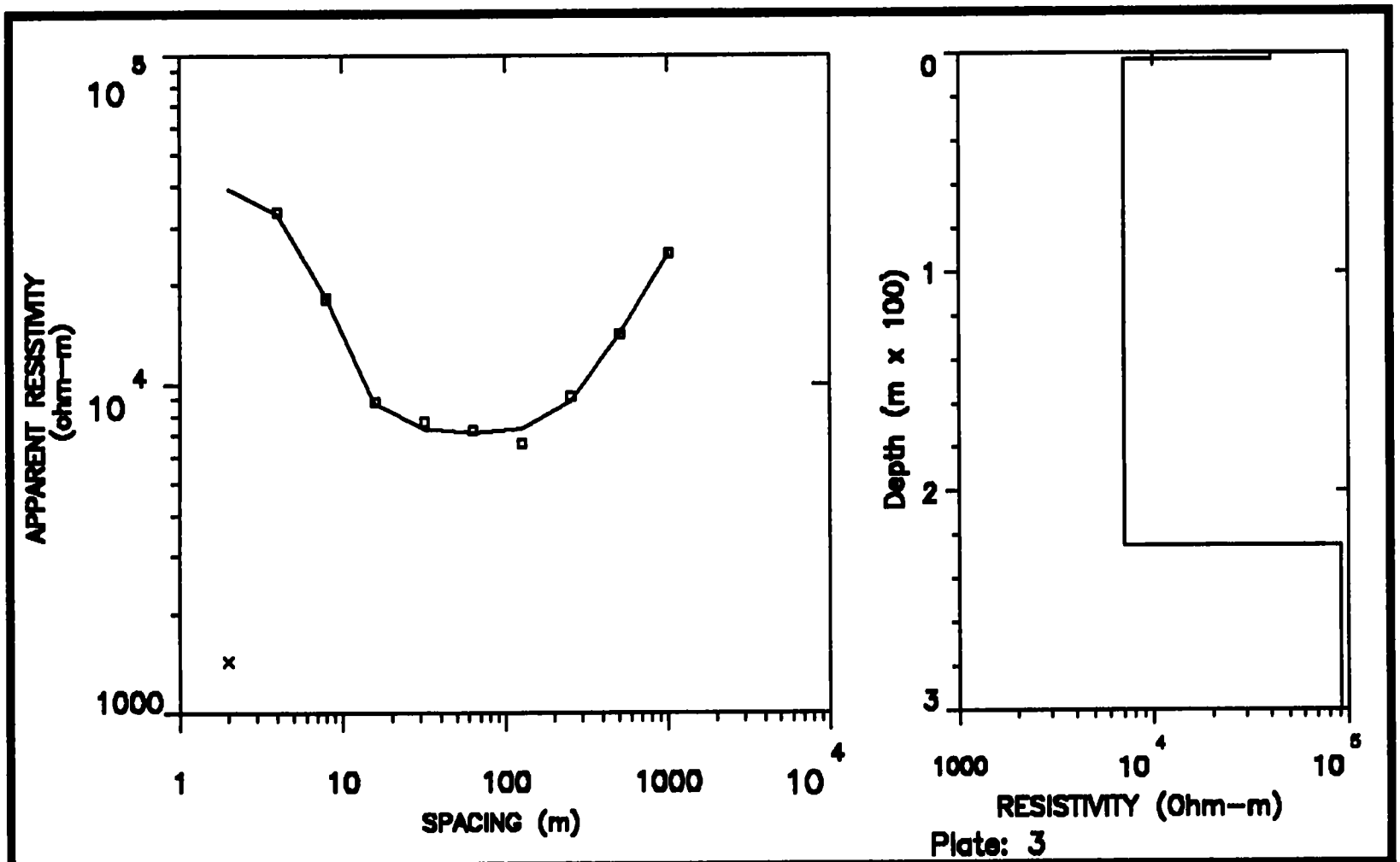


Plate: 3

for: Kirkland Lake West Project	Resistivity Sounding
by: Westminer	Burt Twp, Ontario Line 115+00E 40+00N
Data Set: KIRK115 / Date: Jan 24/94	
Equipment: IPT-1/RV-4 / Sounding: 3	Azimuth: 0.00 Deg NORTH

FIGURE 6c

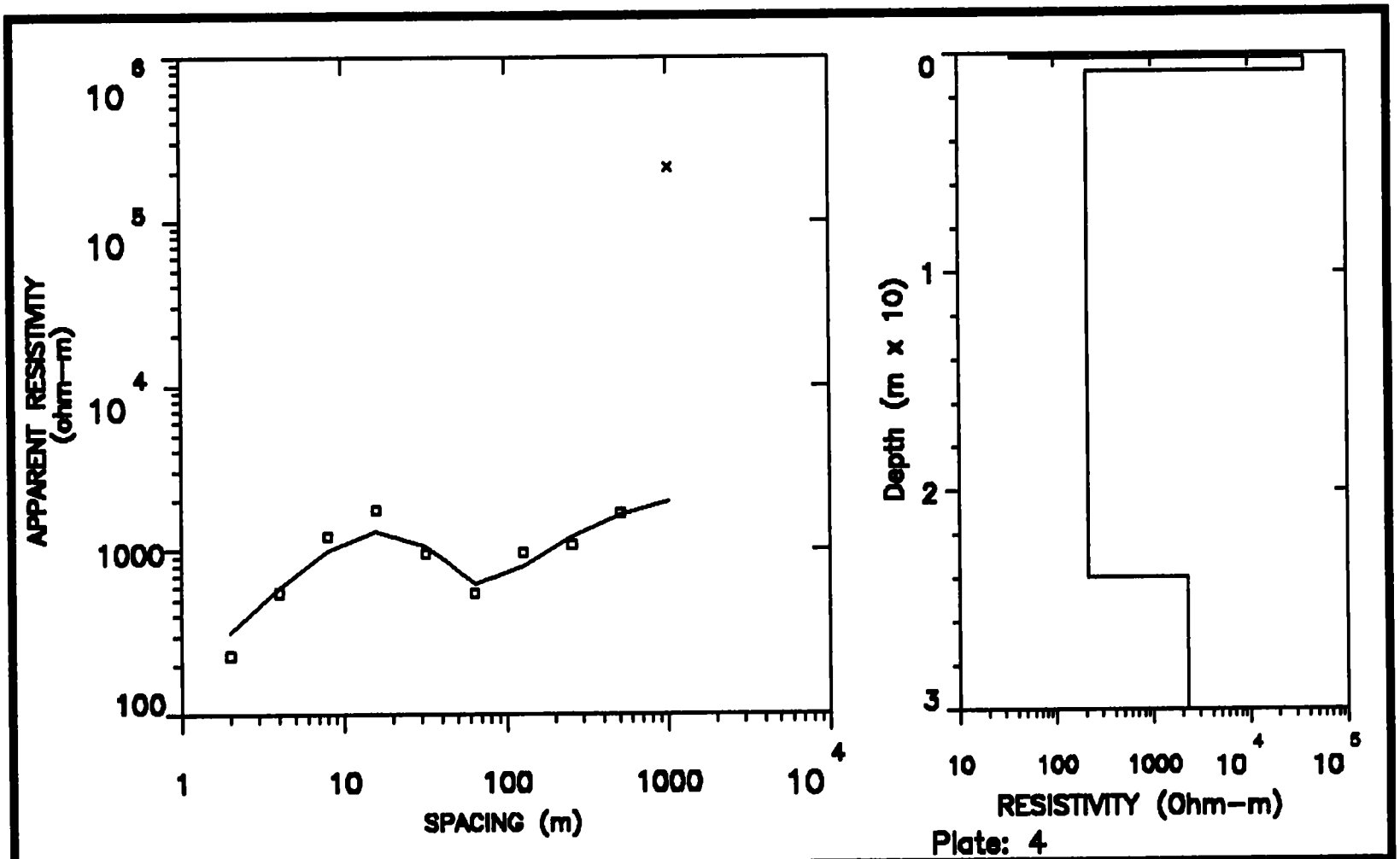


Plate: 4

for: Kirkland Lake West Project

by: Westminer

Data Set: KIRK125 | Date: Jan 24/94

Equipment: IPT-1/RV-4 | Sounding: 4

Resistivity Sounding

Burt Twp, Ontario

Line 125+00E 40+00N

Azimuth: 0.00 Deg NORTH

FIGURE 6d

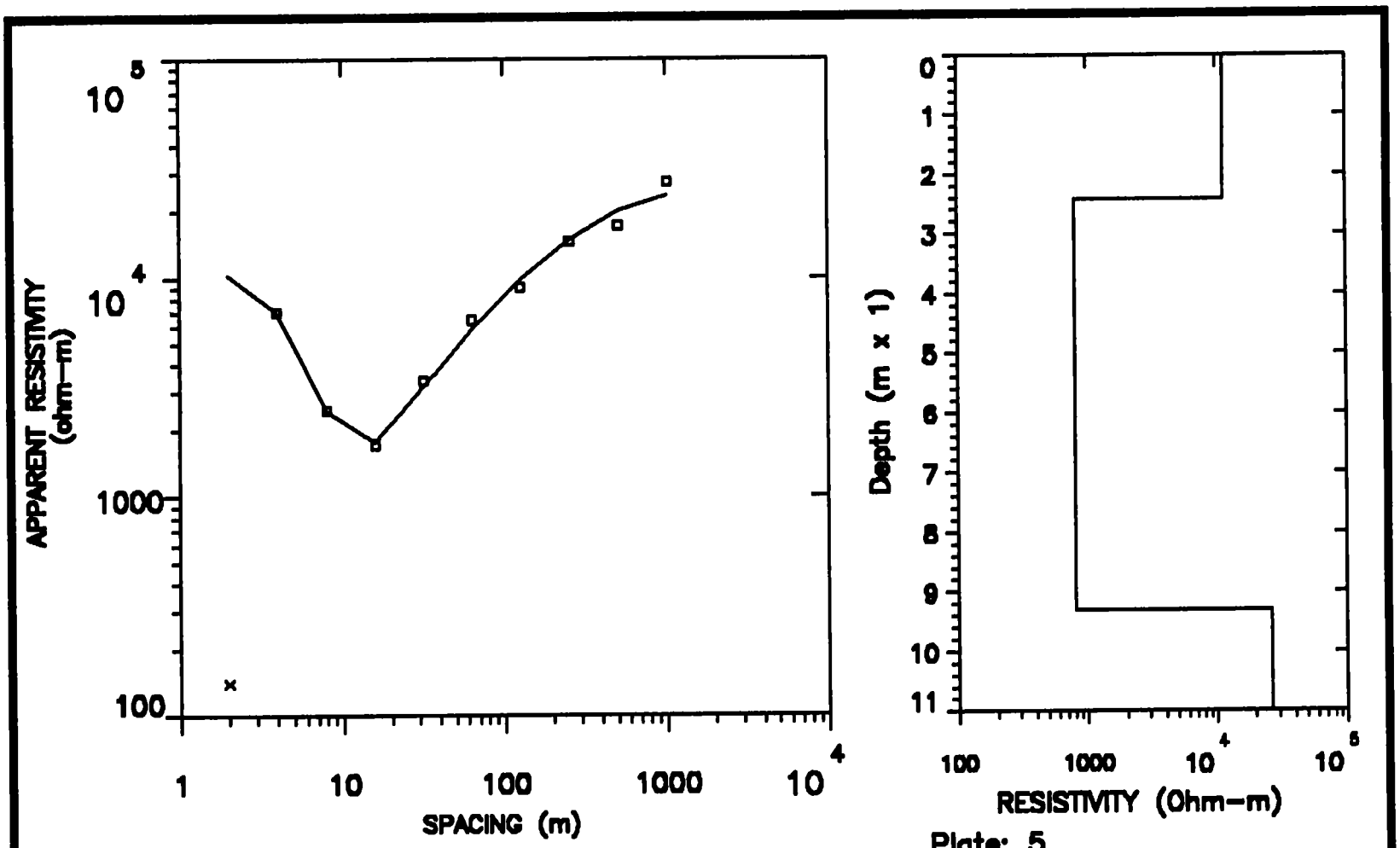


Plate: 5

for: Kirkland Lake West Project	Resistivity Sounding
by: Westminer	Burt Twp, Ontario Line 139+25E 70+00N
Data Set: KIRK139 / Date: Jan 24/94	
Equipment: IPT-1/RV-4 / Sounding: 5	Azimuth: 0.00 Deg NORTH

FIGURE 6e

the Kirkland-Main Break.

Other than the dyke, no subtly anomalous signatures were noted along the inferred extension of the targeted breaks.

Gravity Survey

Gravity stations were read at 50m intervals along surveyed lines. Survey lines were optically leveled, and tied to elevations along BL36N. Gravity data was reduced to Bouguer anomaly using a slab density of 2.67 gm/cc. Terrain corrections were not applied to the Bouguer data.

Bouguer gravity profiles and posted Bouguer values are plotted in Figure 8, and, elevation profiles and posted values in Figure 9.

The north flank of the gravity gradient defines the inferred position of the Cadillac-Larder Break, and is interpreted to result from the density contrast between fault contacted, Archean ultra-mafic rocks (estimated density 2.96 gm/cc) to the south, and Timmiskaming sedimentary rocks (estimated density 2.8 gm/cc) to the north.

Steepest gradient locations, and the inferred location of the Cadillac-Larder Break are summarized as trend CC' in Figure 5.

Dipole-Dipole IP/Resistivity Survey

Five lines of dipole-dipole IP/resistivity were completed using dipole spacings of 100m and n levels 1 through 6.

Difficulties were encountered establishing satisfactory electrode contacts during Phase 1 (winter) surveying, along sections of L115E and L125E. Poor electrode contact was mainly due to very thin (<10cm), frozen overburden cover over bedrock. Phase 2 (summer) surveying along L129E, L139+25E and L143E presented no serious problems with electrode contact.

Pseudosections for all lines surveyed are presented in Figures 10a through e.

Significant IP/resistivity anomalies are summarized on Figure 5 and include:

- **D:** a discrete high resistivity, coincident high phase anomaly at 50N along L129E. The anomaly appears to top out at n=5, at an estimated depth of 120m.

- **EE':** a wide zone of high resistivity and coincident elevated phase IP background correlatable between L115E and L125E. The anomaly is likely due to a wide, weakly sulphidic ultramafic unit in the Archean, and/or, the basal tillite unit in the Huronian Gowganda Fn.

- **FF':** a zone of low resistivity due to thickening of overburden spatially coincident with the inferred trace of the Cadillac-Larder Break.

Conclusions:

The geophysical methods applied in combination, were useful in defining the depth of Huronian cover rocks, and, the probable extension of the Kirkland Lake-Main, and Cadillac-Larder Breaks onto the project area.

Recommendations:

Further work is warranted as follows:

- Drill test the discrete high resistivity and coincident phase high anomaly on L129E to verify the polarizable source.

- Drill test the steepest gravity gradient along L115E and possibly L105N to confirm the hypothesized extension of the Cadillac-Larder Break, and test for gold anomalism.

References

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Jensen, L.S., 198?, Open File Map 139, 1 Map.

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Powell, W.G. and Hodgson, C.J. 1992. Deformation of the Gowganda Formation, Matachewan area, Ontario, by post-Early Proterozoic reactivation of the Archean Larder Lake - Cadillac break, with implications for gold exploration. Can. J. Earth Sci. 29, 1580-1589

KIRKLAND LAKE WEST PROJECT
(4043)

APPENDIX A

PROJECT MANAGEMENT
AND
LIST OF CONTRACTORS

APPENDIX A

Project Management and List of Contractors

Project Managers:

Geological: WMC International Limited - Rex Brommecker

Geophysical: WMC International Limited - Roman Tykajlo
22 Gurdwara Road
Nepean, Ontario
K2E 8A2

Linecutting / Gridding Contractors:

Natives Exploration Services - Sam R. Bosum
PO Box 334
Chibougamau, Quebec
G8P 2K7

Mineral Exploration Services - Thomas J. Obradovich
75 Balsam Ave.
Kirkland Lake, Ont.
P2N 1W7

Geophysical Contractors:

Mertens and McNeil Geophysical Ground Surveys Ltd. -Ron Mertens
Box 1682
Guelph, Ontario
N1H 6Z9

Tandem Geophysics Inc. -Ron Mertens
Box 1682
Guelph, Ontario
N1H 6Z9

KIRKLAND LAKE WEST PROJECT
(4043)

APPENDIX B

LOGISTICAL & TECHNICAL REPORTS:

MERTENS MACNEIL GROUND GEOPHYSICAL SURVEYS LTD.

TANDEM GEOPHYSICS INC.

Mertens MacNeil
Geophysical Ground Surveys Ltd.

LOGISTICAL & TECHNICAL REPORT

WESTMINER CANADA LTD

Exploration Division

PROJECT:

Induced Polarization Survey
Schlumberger Soundings
Magnetometer Survey
Gravity Survey

Kirkland Lake West

Kirkland Lake, Ontario

February / 1994

Box 1682, Guelph Ontario N1H 6Z9 • Box 1083, Sydney Nova Scotia B1P 6J7

Mertens MacNeil
Geophysical Ground Surveys Ltd.

LOGISTICAL & TECHNICAL REPORT

Mertens & MacNeil Geophysical Ground Surveys Ltd. was contracted to carry out a Magnetometer, Induced Polarization and Gravity surveys on this project.

Magnetometer Survey:

1) Total Survey: 26.150 km.
2) Reading Interval: 25 meters
3) Base Station Interval: 20 sec
4) Data to disk in Geosoft Format
5) Equipment: EDA Omni for Base Station and Field readings

Induced Polarization Survey

1) Total Survey: 9.5 km.
2) Equipment: Receiver- Phoenix IPV-4
   Transmitter- Phoenix IPT-1
   Power Source- 3.0 kw
3) Spread: "a" = 100 meters
4) Separations: "n" = 1 to 6
5) Frequency: 1.0 hz
6) Phase Shift in milliradians
7) Data and Plots in Geosoft Format
   Colour plots were provided

Gravity

1) Meter: La Coste Rhomberg Ser.# G642

2) Reading Interval: 50 Meters

3) Base Station: 3600N - 2750E

4) Density: 2.67

Schlumberger:

1) Equipment: as per I.P. survey

2) AB/2 - 2,4,8,16,32,64,128,256,512,1024

3) 5 Arrays

Survey Stations: All stations are in relation to the 3600N baseline.

Mobilization:

The crew travelled to Kirkland Lake, Ontario by truck. The grid was accessed by truck and snowmobile from a motel in Kirkland Lake, Ontario.

Accommodation:

Motel in the Kirkland Lake, Ontario.

Crew:

Ron Mertens
RR # 5
Belwood, Ont

Jack MacNeil
Box 1682
Guelph, Ont

Dave Gouthro
Frenchvale, N.S.

Kirk Morrison
Sydney, N.S.

Kevin MacKenzie
Sydney, N.S.

Shaun MacDonald
Toronto, N.S.

Alan MacDonald
Sydney
N.S.

If further information is required please call or write:

Ron Mertens
Mertens & MacNeil
Box 1682
Guelph, Ontario
N1H 6Z9
Phone: 519-856-4431
Fax: 519-837-2268

Report by;

Ron Mertens

LOGISTICAL & TECHNICAL REPORT

WMC INTERNATIONAL LIMITED

Exploration Division

PROJECT:

Induced Polarization Survey
Magnetometer Survey

Kirkland Lake West

Kirkland Lake, Ontario

August / 1994

LOGISTICAL & TECHNICAL REPORT

TANDEM GEOPHYSICS INC. was contracted to carry out a Magnetometer and Induced Polarization Survey at the Kirkland Lake West Project.

Magnetometer Survey:

1) Total Survey: 7.0 km.
2) Reading Interval: 25 meters
3) Base Station Interval: 20 sec
4) Data to disk in Geosoft Format
5) Equipment: EDA Omni for Base Station and Field readings

Induced Polarization Survey

1) Total Survey: 7.0 km.
2) Equipment: Receiver- Phoenix IPV-4
   Transmitter- Phoenix IPT-1
   Power Source- 3.0 kw
3) Spread: "a" = 100 meters
4) Separations: "n" = 1 to 6
5) Frequency: 1.0 hz
6) Phase Shift in milliradians
7) Data and Plots in Geosoft Format
   Colour plots were provided

Mobilization:

The crew travelled to Kirkland Lake, Ontario by truck. The grid was accessed by truck from a motel in Kirkland Lake, Ontario.

Accommodation:

Motel in the Kirkland Lake, Ontario.

Crew:

Ron Mertens RR # 5 Belwood, Ont	Jack MacNeil Box 1682 Guelph, Ont
Dave Gouthro Frenchvale, N.S.	Kirk Morrison Sydney, N.S.
Kevin MacKenzie Sydney, N.S.	Kevin Morrison Sydney, N.S.

If further information is required please call or write:

Ron Mertens
TANDEM GEOPHYSICS INC.
Box 1682
Guelph, Ontario
N1H 6Z9
Phone: 519-856-4431
Fax: 519-837-2268

Report by:



Ron Mertens

KIRKLAND LAKE WEST PROJECT
(4043)

APPENDIX C

Survey Instrument Specifications:
total field magnetic survey
VES and dipole-dipole IP/resistivity survey

SCINTREX

EDA Omni Geophysical System

Brief Description

When you require more flexible geophysical techniques in order to find the increasingly more elusive anomalous targets, Scintrex offers you the EDA Omni System. This system enables you to design your own unique instrument whether it is for complete Magnetic surveys, VLF Electromagnetic surveys or a combination of these techniques.



At the heart of the Omni System is the Omni System Control Console which is common to all Omni System applications. This customized approach gives you the ability to select the following options for your instrument:

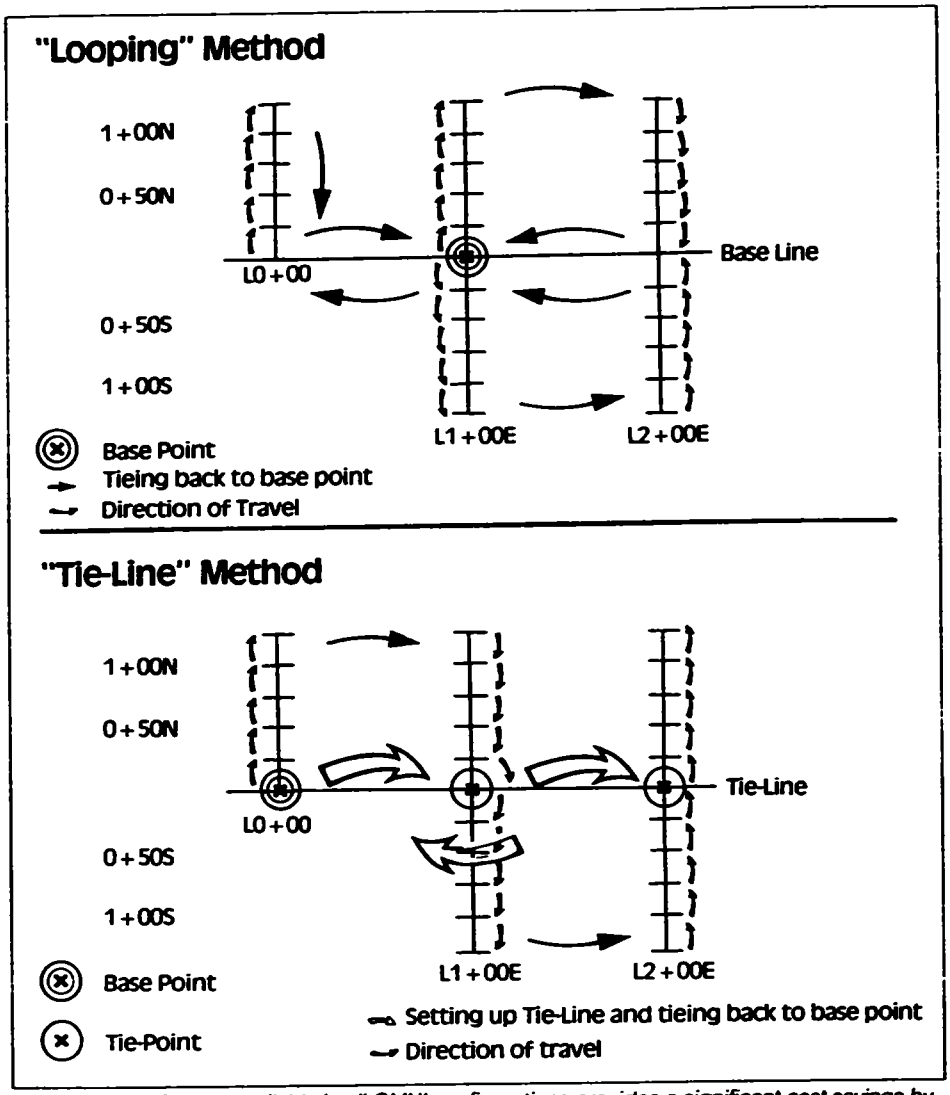
- Portable Field and Base Station Magnetometer
- True Simultaneous Gradiometer
- Portable Field and Base Station VLF Electromagnetic Receiver
- Two Probe, VLF Resistivity
- Non-Orientation, VLF Resistivity

Applications

Since the Omni System capabilities are so versatile, the data collected and recorded by the instrument can be applied to a variety of earth sciences including:

- mineral exploration
- geological mapping
- groundwater exploration
- groundwater contamination
- civil engineering
- geotechnical studies
- archaeology

Features



The "Tie-Line" feature available in all OMNI configurations provides a significant cost savings by allowing diurnal corrections to be made internally by one instrument without the need of a dedicated base station instrument

Rapid Data Recall

With a few keystrokes, you can instantly recall data from memory to the digital display by record number or in sequence. Scanning through the memory of a particular parameter is also possible.

Wide Range of Data Output Capabilities

The ability to efficiently transfer and present data in an interpretable format is important to the success of any survey or project.

The Omni System accomodates a wide selection of data output options, from simple listings of data and profile plots on a printer, to integrated software programs for computer plotting and modelling. The Omni System can transfer uncorrected, corrected or filtered magnetic and VLF data to most computers and printers with a RS-232C serial port.

Two Types of Formats available - data can be output from the Omni System in two format types. For ready to use data, the columnarized data dump format is the most suitable for direct hard copy printer outputs. For data which is to be further used with computer plotting or analysis software packages, you can select the fixed ASCII CPU dump format.

Profile Plot Outputs - Since VLF as well as magnetic data is often easier to interpret as a profile plot, data that the Omni System collects, can be presented in this analog format at a vertical scale best suited for data presentation. You can selectively output in analog and/or digital format the following:

- the magnetic total field strength
- the magnetic vertical gradient
- the VLF in-phase
- the VLF out-of-phase (quadrature)
- the VLF total field strength

Data Presentation - The grid co-ordinates under which the Omni System collects the data can be output in the standard Cartesian format (using positive and negative signs) or with the more familiar N,S,E,W compass descriptors.

Editing Capabilities - Prior to data transfer, you can program your Omni System to transfer a designated block of data, denoted by start and end points. Data can be separated into files that are best suited for survey or plotting conditions.

Pause Feature - You may stop the transfer of data at any time and resume where it left off, when it is more convenient. The Omni System will continue to pause until you press any one of keys on the keypad.

Choice of Data Outputs - The Omni System outputs data in a choice of formats, depending on the operating mode:

- corrected magnetic total field data
- uncorrected magnetic total field data
- magnetic base station data
- magnetic gradient field data
- corrected VLF field strength data
- uncorrected VLF field strength data
- VLF base station data
- corrected "Tie-Line" data
- uncorrected "Tie-Line" data

The Omni System can also transfer VLF data from all 3 VLF frequencies simultaneously or sequentially.

Features

Omni System Features

Each Omni System incorporates the following features:

Flexibility of the Omni System

You can select your own options to customize your unit to suit your specific geophysical needs.

Microprocessor Controlled

Gives you a choice of three fully protected data storage modes:

- spot record, for readings without grid co-ordinates (random samples)
- multi-record, for multiple readings at one station
- auto-record, for automatic update of station position

Complete Data Protection

The internal lithium battery assures you of complete data protection for up to 5 years.

Measures and Records in Memory

Measurement and recording in memory of the following magnetic field data for each reading:

- total field magnitude
- true gradient of the total field
- applied base station value
- statistical error
- signal strength
- decay rate

Measurement and recording in memory of the following VLF data for each field reading:

- vertical in-phase
- vertical quadrature (out-of-phase)
- total field strength
- total dip angle
- primary field direction
- apparent resistivity
- phase angle
- signal-to-noise ratio
- operator quality



The OMNI system configured as a MAG/VLF simplifies geophysical surveys by combining Magnetic and VLF EM techniques.

Records Survey Data

Records the following survey data for each magnetic and/or VLF reading:

- time of measurement and date
- grid co-ordinates
- direction of travel along grid lines
- natural and cultural features

Measures up to 3 VLF Transmitting Stations

The Omni System can measure up to 3 VLF transmitting stations and provides more complete coverage of an anomaly regardless of the orientation of the transmitter with respect to the survey grid or the anomaly itself.

Electronic Notebook

The internal Electronic Notebook enables you to record natural and cultural features that are unique to each grid location. This feature eliminates the need for a field notebook and provides additional information that can assist in interpreting recorded data.

Automatic Correction Using The Omni System's Unique "Tie-Line" Technique

The "Tie-Line" algorithm used exclusively by the Omni System allows for the self correction of atmospheric magnetic variations and variations in the primary field from the VLF transmitter(s). The instrument is able to store 'looping' or 'tie line' data in a separate memory at the beginning of each survey and then subsequently stores total field readings in a second memory along with the field readings of the tie point(s). At the end of each survey day the Omni System will then merge these two memories to automatically correct the total field data for diurnal variations.

The Omni System in the "Tie-Line" mode can:

- Store looping or tie line data, 3 ways:

  1. Using one looping base point
  2. Using one "Tie-Line" comprising a number of tie points, or
  3. 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.

Omni System Benefits

Only One Instrument Needed for Magnetometer, Gradiometer, VLF and VLF Resistivity Surveying

The Omni incorporates the capabilities of a "Tie-Line" magnetometer and simultaneous Gradiometer system with the ability to measure VLF magnetic and electric fields.

Only one complete Omni System 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 vertical in-phase
   - the vertical quadrature
   - the total field strength
   - the total dip
4. The VLF electric field, including:
   - the phase angle
   - apparent resistivity

A complete Omni System can, at each location, calculate and record in less than 8 seconds, four VLF magnetic field parameters from three different transmitters, a magnetic total field reading and a simultaneous magnetic gradient reading. In addition, it can also measure and record two VLF electric field parameters from three different transmitters.

Upgrade your Unit at any Time

Since the Omni System is based on a modular design, you can upgrade your system at any time. This built-in flexibility allows you to purchase an Omni System with only the surveying equipment that you need for now but does not limit you to one application. When your surveying needs grow, so can your Omni System.

Saves you Time

The Omni System with the unique 3-coil VLF Sensor does not require orientation of the VLF Sensor head toward the transmitter station. This simplifies VLF field procedures and saves considerable survey time. The operator does not need to orient the sensor head toward the first, selected transmitting station and then re-orient towards the second or third transmitting station.

The non-orientation technique is the first of its kind, and this provides the Omni System with many additional benefits. These benefits include:

- When you use the Omni System as both a magnetometer and VLF base station, you only need one instrument instead of three, to record data automatically from 3 VLF transmitting stations.

- When you use the Omni System with the Non-orientation VLF-Resistivity option, you can record automatically from 3 different stations the phase angle and apparent resistivity without having to re-orient any of the three electrodes. You can also use the Omni System with the conventional, two electrode method.

The Omni System quickly responds with a one-key operation. For example, if you must complete a magnetometer/gradiometer and three frequency VLF survey using the Omni System, you automatically measure the magnetometer, simultaneous gradiometer and three VLF frequency data by pressing only one key. Using another combined system, up to 5 different steps may be required. Such as, the operator would have to take one magnetic reading; then another sequential magnetic reading to calculate the gradient; orient the VLF sensor to the first VLF transmitter and then take a reading; orient the VLF sensor to the second transmitter, take a new reading and then repeat the same procedure for the third frequency. The Omni System one-key operation takes less than 8 seconds; a significantly shorter time period than the 5 step operation of other combined systems.

Since the Omni System saves all of the field data in memory and has many output capabilities, the elimination of the field notebook and also the transciption errors that can occur saves you a considerable amount of time.

Diurnal corrections, using the time saving "tie-line" method, can be done automatically by the Omni System eliminating hours of manual and tedious calculations. You can then directly transfer the corrected data to a computer for further data processing.

Higher Productivity System

Combined Magnetometer/VLF systems are inherently faster than conventional methods whereby two different operators collected magnetometer and VLF data from separate instruments.

Because of its unique user-friendly design, the Omni System provides higher field productivity for the user. The increased productivity originates from its two-microprocessor approach which significantly reduces calculation time and also from the non-orientation VLF technique.

Sensitive to Weak VLF Signals

The Omni System's ability to obtain repeatable readings from weak signals offers a number of benefits:

- It extends the use of VLF on to countries where its use was previously marginal.
- It enables you to increase the number of frequencies with which you can operate.
- It reduces your need for portable VLF transmitters
- It improves the quality of your readings in rugged terrains, such as the deep valleys of the North American Rockies.

The Omni System's digital signal processing removes the modulation in the received signals. This technique helps stabilize too weak signals much greater than the conventional phase-locked loop method.

Ability to receive weaker signals (20nA/m) and a background noise reduction algorithm are among the reasons why the Omni System can obtain repeatable readings from signals which had previously been too weak to record.

Features

```
OMNI-PLUS  Tie-line MAG/VLF R22K  Ser #428150
TOTAL FIELD DATA (uncorrected)
& GRADIENT

Reference  field: 56000.0
Datum subtracted:      0.0Date 13 DEC 88
Operator:  5000
Records:  10
Bat:  17.5 Volt     Lithium:  3.48 Volt
Last time update: 12/13  9:50:00
Start  of  print: 12/13 14:34:01

Line  0+00 E  Date 13 DEC 88          #2
POSITION   FIELD  ERR   DRIFT    TIME    DS CULT  GRADIENT
  0+80 N 56779.9 .04      0.0 11:38:55 88            1.1
  0+90 N 56769.6 .04      0.0 11:39:33 88            1.2
  1+00 N 56747.1 .05      0.0 11:40:10 88            2.1
  1+10 N 56627.4 .05      0.0 11:41:47 88            1.7
  1+20 N 56418.6 .08      0.0 11:42:30 88PIPE      -13.8
  1+30 N 56616.1 .07      0.0 11:43:36 88          -41.0
  1+40 N 56733.7 .05      0.0 11:44:28 88            6.2
  1+50 N 56765.6 .04      0.0 11:45:08 88            1.9
  1+60 N 56764.9 .05      0.0 11:45:47 88            1.1
  1+70 N 56767.2 .04      0.0 11:46:26 88            0.7
```

```
OMNI-PLUS  Tie-line MAG/VLF R22K  Ser #428150
VLF TOTAL FIELD DATA (uncorrected)

Date 13 DEC 88
Operator:  5000
Records:  10
Bat:  17.5 Volt     Lithium:  3.48 Volt

Last time update: 12/13  9:50:00
Start  of  print: 12/13 14:35:51

Line  0+00 E  Date 13 DEC 88  24.0     #2
POSITION     I/P  QUAD T.FLD  TILT    TIME   CULT S  DIR  4-FRA 5-FRA
 0+80 N    20.2  -5.4 71.14  61.0 11:38:55     55   7.0
 0+90 N    28.2  -7.6 73.45  67.6 11:39:33     44  11.7
 1+00 N    41.6 -10.2 78.82  79.3 11:40:10     43   0.6
 1+10 N    68.2 -13.7 98.68  85.3 11:41:47     43 -16.4 -36.0
 1+20 N    86.9  -6.8 202.4  84.3 11:42:30PIPE 52 -14.4 -22.7 -29.4
 1+30 N -101.3  12.2 202.0  84.3 11:43:36     59  -9.5  -4.0 -13.4
 1+40 N  -81.1  21.7 95.17  81.7 11:44:28     59 -14.2   3.6  -0.2
 1+50 N  -53.6  15.8 77.03  76.9 11:45:08     59 -22.2  10.0   6.8
 1+60 N  -40.7  13.4 68.07  74.7 11:45:47     49 -24.3  14.4  12.2
 1+70 N  -34.6  11.7 63.02  71.4 11:46:26     49 -16.9  12.5  13.4
```

Typical sample of data output from the OMNI system

Sealed, User Friendly Keypad

Protects your Omni System from water and dust and allows for easy operation and reliability.

Digital Display

Distinctly shows data which can sometimes be unclear with analog or audio-nulled systems.

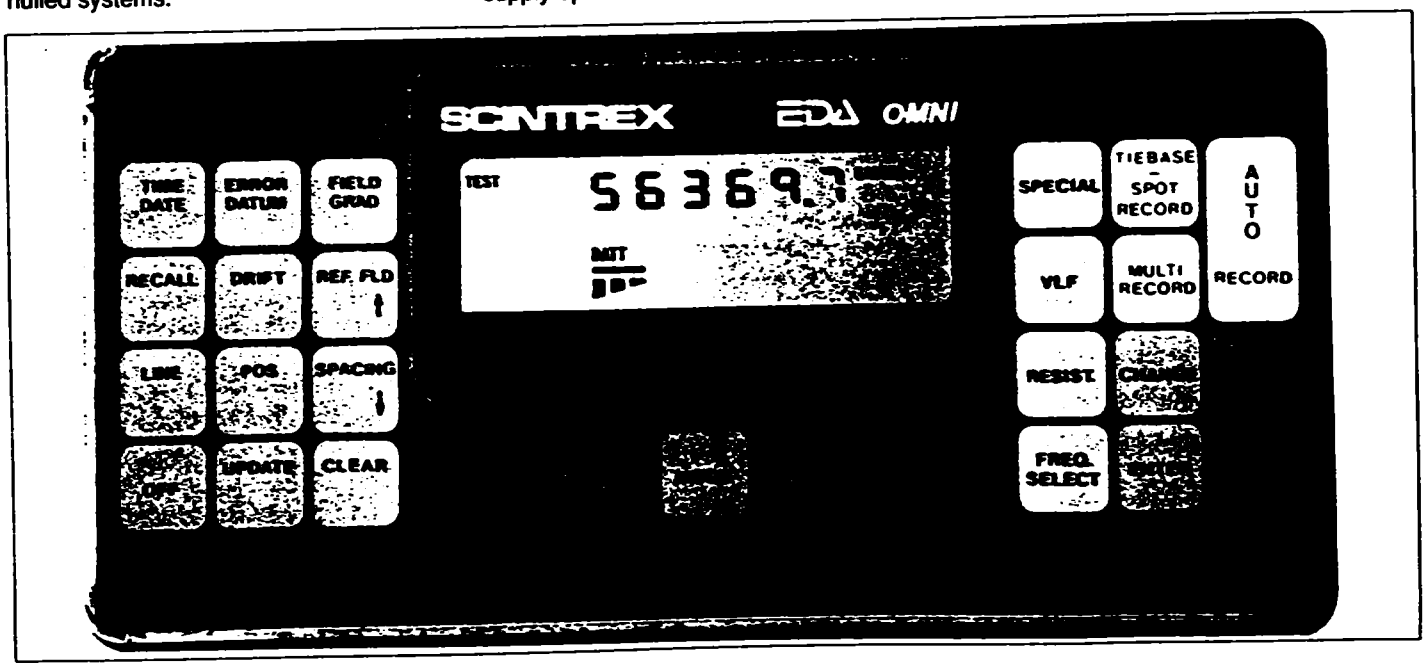
Display Descriptors

Monitor the signal strength and decay rate of the magnetic total field and/or the quality of all three VLF transmitter signals being measured.

Power Supply Options

You can choose from the following power supply options:

- Non-magnetic rechargeable sealed lead acid battery
- Non-magnetic rechargeable sealed lead acid battery belt
- Alkaline battery belt
- 12V DC power source for base station operation



Omni System Benefits

More System Benefits

- Display descriptors monitor the status of the primary battery source used.
- Output of grid co-ordinates with the designated compass bearing, using N, S, E, W descriptors.
- Audio feedback to confirm every keystroke
- Decimal spacing of 12.5 (metres or feet) for intermediate station intervals
- The ability to clear an unwanted last reading
- Two keystrokes to record data in memory - the first verifies the grid co-ordinate; the second puts it into memory.

The Omni Magnetometer unit measures and stores in memory the Earth's magnetic field at the touch of a key. This precise instrument is able to do the following:

- identify and store the location and the time of each measurement
- compute the statistical error of the reading
- store the decay and strength of the signal that you are measuring

Provides Data-Protected Readings

The Omni Magnetometer is packaged in a compact, lightweight and rugged housing and is able to measure and store 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

Increases Productivity

The Omni Magnetometer significantly increases survey productivity as:

- it can read and store a measurement in only 3 seconds.
- data is highly repeatable so a second measurement is usually not required.
- it calculates statistical error for each measurement which indicates whether an additional reading is required.

All of these benefits permit you to cover more ground and gather more data than would be otherwise possible.



OMNI MAG configuration used for measurement of total field magnetics

Omni System Benefits

Excellent Data Quality and Repeatability

The Omni System provides users with unparalleled data quality and repeatability. The 3-orthogonal coil sensor that the Omni System uses improves the data reliability over the conventional two-coil method as it provides a more complete calculation of both the in-phase and out-of-phase parameters. This difference becomes even more important in measuring large anomalies.

The 3-coil sensor method provides consistently high data quality unrelated to the operator's ability to orient the sensor for optimum coupling with the transmitting station. The higher data quality that the Omni System obtains with weak signals is enhanced even further when signals are stronger. Additional features, such as greater channel selectivity, atmospheric noise reduction and better immunity to spikes, improve even more the Omni System's capability to obtain repeatable data.

No Need to Take Multiple Readings

The Omni System's magnetic component uses four leading-edge design features to eliminate the need to take multiple readings, these are:

- 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 reading.

The "Tie-Line" Advantage

Not only does the Omni System eliminate hours of manual correction of data, it also gives you the flexibility of choosing the most appropriate tie-line method best suited for the survey, depending on the size and character of the grid. You can choose from:

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

The self-correcting "Tie-Line" feature can remove base station requirements from some surveys. The "Tie-Line" data can be recalled even if it was stored on different days.

You can program the Omni System to automatically remove a designated datum from field data and by removing this coarse, background value, plotting and interpreting the magnetic field data is made easier. The Omni System can also automatically calculate the desired diurnal drift measured between consecutive tie-point readings.



Environmentally sealed design of the OMNI permits use in all weather conditions

Operate Your Omni System in any Environment

The Omni System is completely water proof and dust proof. The fully sealed housing console ensures that you can perform your surveying needs during adverse weather conditions.

A Variety of Software Programs Available

Although the Omni System can transfer data directly to a serial printer, most computers require some initial handshaking prior to actual data transfer. Scintrex provides such handshaking programs for many computers including IBM PS-2/ IBM PC (AT and XT), Compaq, Macintosh and compatible systems.

In addition to handshaking software, we can provide you with plotting, profiling, contouring and modelling programs available from certain software houses. Packages for use with the Omni System include:

- Mapping systems that allow you to post and plot many of the geophysical parameters available, in a plan-profile or contoured format.

- Cartographic quality large-scale and real-location plan maps, complete with custom map surrounds, legends, scale bars, etc., that can be produced in a matter of minutes on most dot-matrix printers or small and larger-scale plotters. Standard graphics screen previewing is available prior to plotting.

- Software that allows you to present the data in 2 or 3-D perspective plots, through a full menu and/or command driven system interface in which you can select different colours, sizes, scales, angles etc. For example, you can create shaded relief maps and colour image plotting on common high resolution printers, including grey-scale support on laser printers.

- Interactive filtering and modelling programs that are used to determine the possible geometry and physical characteristics of the sources of magnetic anomalies, such as the MAGMOD program.

- Autocad and image-processing capabilities.

Through new software interface programs, you can use the Omni System as a field unit together with other integrated magnetometer/VLF systems (such as the Scintrex IGS-2) or with other microprocessor based base station magnetometers.

The Omni System as a Base Station Magnetometer

The Omni Base Station Magnetometer effectively measures and stores in its memory the daily fluctuations of the Earth's magnetic field. The Omni can automatically correct total field data of other Omni units in just a few minutes.

Records Magnetic Field Activity

The magnetic field activity is recorded 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

Automatically Corrects Data

The Omni in the base station mode can automatically correct magnetic field data for both diurnal variations and reference field values. It can also correct total field data stored in:

- another Omni System used as a field magnetometer
- another Omni System used as a field gradiometer

This is ideal when you want to remove diurnal errors sufficiently to make use of the full 0.1 gamma resolution of the Omni System.

Automatic Drift Calculations

The Omni automatically calculates the difference between each reading and its programmed reference field. If at the end of the survey day you find that the reference field is incorrect, you can re-select a new one and the Omni System can instantly re-calculate the drift. The drift calculation can be presented in either digital and/or profile plot format. It can also be simultaneously output to a compatible printer so you can visually verify the activity of the field.

Calculates Differential Field Variations

The Omni calculates the difference between the current reading and the previous one to a resolution of 0.1 gamma. This features assists you in ascertaining the degree of activity that is occurring such as a magnetic storm or active conditions.

Stores Approximately 55 Hours Of Continuous Unattended Monitoring

The Base Station mode enables you to store up to 20,000 sets of readings which is the equivalent to approximately 55 hours of unattended monitoring at a 10 second sampling interval. You can program the cycling time at any interval between 5 seconds and 60 minutes in 1 second increments.

Outputs and Stores Data At the Same Time

The Omni can simultaneously output data in digital or ASCII format to your choice of data collection units at the same time it stores the data in memory.

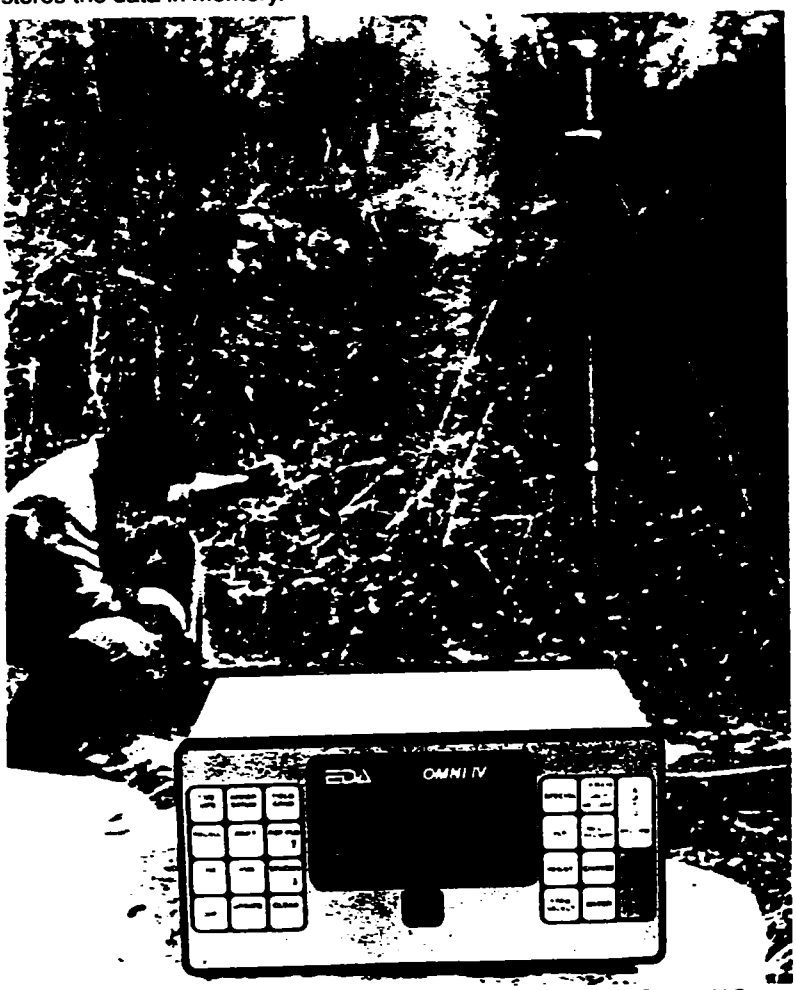
Synchronize Real Time Clocks

The Omni System real time clocks can be synchronized to the nearest second.

Magnetic Base Station Accessories Kit

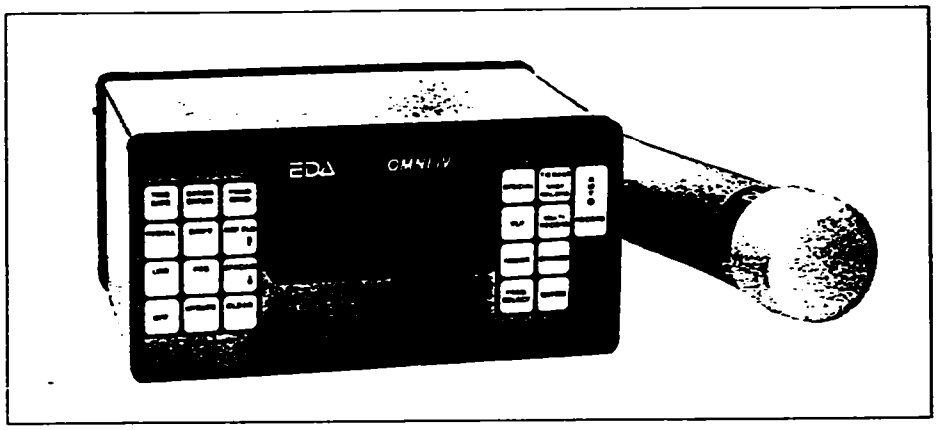
Sensor Extension Cable - This 30 metre cable enables you to place the Omni in a sheltered environment such as a tent, and position the magnetic sensor up to 30 meters away. This capability aids in eliminating possible cultural interference.

Rope Joiner - The rope joiner enables the sensor staff to be supported by ropes when it is being used as a base station sensor.



Magnetic diurnal corrections are automatically made by using an OMNI MAG as a base station magnetometer

The Omni System as a Portable Field Magnetometer



OMNI MAG electronics console with total field magnetic sensor

Simplifies Fieldwork

The Omni makes surveys easier to conduct because:

- the electronic notepad eliminates the need to write down field data. The Omni simultaneously stores time, field measurements, grid co-ordinates when you press any one of the three record keys.
- you are able to clear the unwanted last reading.
- the Omni automatically calculates the difference between the current reading and previous one.
- you can remove the coarse magnetic field value or data from the field data to simplify plotting of the field results.
- the Omni automatically calculates diurnal corrections.

The flexibility of the Omni System offers the following choices:

- if you use the Omni as a field magnetometer or as a gradiometer, the total field data can be corrected using the unique "Tie-Line" or "Looping" method.
- if you use one Omni as a base station, it will correct the total field magnetic data in:
  - an Omni set-up as a field magnetometer
  - an Omni set-up as a gradiometer

Unparalled Repeatability of Data

The Omni provides you with unparallelled data repeatability. This is a result of four leading edge design features that eliminates the need for taking multiple readings:

- Signal Processing Technique
- Constant Energy Polarization that maintains equal energy to the sensor
- Processing sensitivity to $\pm$ 0.02 gamma
- Automatic Fine Tuning which uses the previous reading as the base for the next

Saves You Time

The error analysis feature is a great time saver as the calculation of the statistical error of each reading lets you make an on-the-spot decision whether or not you should store the reading.

The Omni System also saves you time-consuming steps as it can:

- automatically assign a record number which you can also use to identify readings measured off of the grid.
- take more than one reading at one point without updating the current station number.
- according to the programmed station interval, automatically update your station position without having to program each station coordinate. The Omni magnetometer also provides a decimal digit for intermediate station intervals of 12.5 metres.
- rapidly recall readings either by record number or in sequence.

Tolerates Higher Gradients

The ability to tolerate local higher gradients of up to 6000 gammas per metre (field proven), is possible due to a sophisticated signal processing method and to a miniature sensor design using a highly optimized sensor geometry.

A Variety of Power Supply Options

You can choose from the following power supply options:

- non-magnetic rechargeable sealed lead-acid battery or belt
- heavy duty rechargeable battery
- alkaline battery belt
- 12V DC power source

Specifications

OMNI System Specifications

Operating Environment -40C to +55C; 0-100% relative humidity; weatherproof

Power Supply Non-magnetic rechargeable sealed lead-acid battery or belt; alkaline battery belt; or 12V DC power source option for base station operation.

Battery Life 1,700 to 5,000 readings, for sealed lead acid power supply, depending upon ambient temperature and rate of readings.

Weights and Dimensions

Instrument Console
3.8 kg, 122 x 246 x 210 mm

VLF Sensor Head
0.9 kg, 140 dia. x 130 mm

VLF Electronics Module
1.7 kg, 280 x 190 x 75 mm

Standard Rechargeable Battery
1.8 kg, 138 x 95 x 75 mm

Standard Rechargeable Battery Belt
1.8 kg, 540 x 100 x 40 mm

Heavy Duty Rechargeable Battery
2.0 kg, 138 x 115 x 75 mm

Alkaline Battery Belt
1.2 kg, 540 x 100 x 40 mm

Magnetometer Sensor
1.2 kg, 56mm dia. x 200mm

Gradient Sensor
(0.5m separation - standard)
2.1 kg, 56mm dia. x 790mm

Gradient Sensor
(1.0m separation - optional)
2.2 kg, 56mm dia. x 1300mm

Display
Custom designed, rugged liquid crystal display with an operating temperature range from -40C to +55C. The display contains six numeric digits, decimal point, battery status monitor, signal decay rate and signal amplitude monitor and function descriptors.

Magnetometer Component 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 using a specially developed tuning algorithm.

Automatic Fine Tuning ±15% relative to ambient field strength of last stored value

Display Resolution 0.1 gamma

Statistical Error Resolution
0.01 gamma

Absolute Accuracy ± 1 gamma at 50,000 gammas at 23C • ±2 gamma over total temperature range

Memory Capacity

Standard Memory Capacity 1300 data blocks (48K) or 5200 data blocks (128K)

Total Field or Gradient 100 data blocks

Base Station 4000 data blocks (48K) or 16,000 data blocks (128K)

RS-232C Serial I/O Interface Variable baud rate from 300 to 9600 baud, 8 data bits, 2 stop bits, no parity

Gradient Tolerance 6,000 gammas per metre (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 metre sensor separation (standard) normalized to gammas/metre. Optional 1.0 metre sensor separation available.

Sensor Cable Remains flexible in temperature range specified including strain relief connector

Cycling Time (Base Station)
Programmable from 5 seconds up to 60 minutes in 1 second increments.

VLF Component Specifications

Frequency Tuning Range 15 to 30 kHz in 100 Hz increments with bandwidth of 150 Hz; tuning range accommodates new Puerto Rico station at 28.5 kHz.

Transmitting Stations Up to 3 stations can be automatically measured at any given grid location within frequency tuning range.

Recorded VLF Magnetic Parameters
Vertical in-phase, vertical quadrature (out-of-phase), total field strength (or optional horizontal amplitude), dip angle

Channel Separation 80 dB at 600 Hz frequency separation

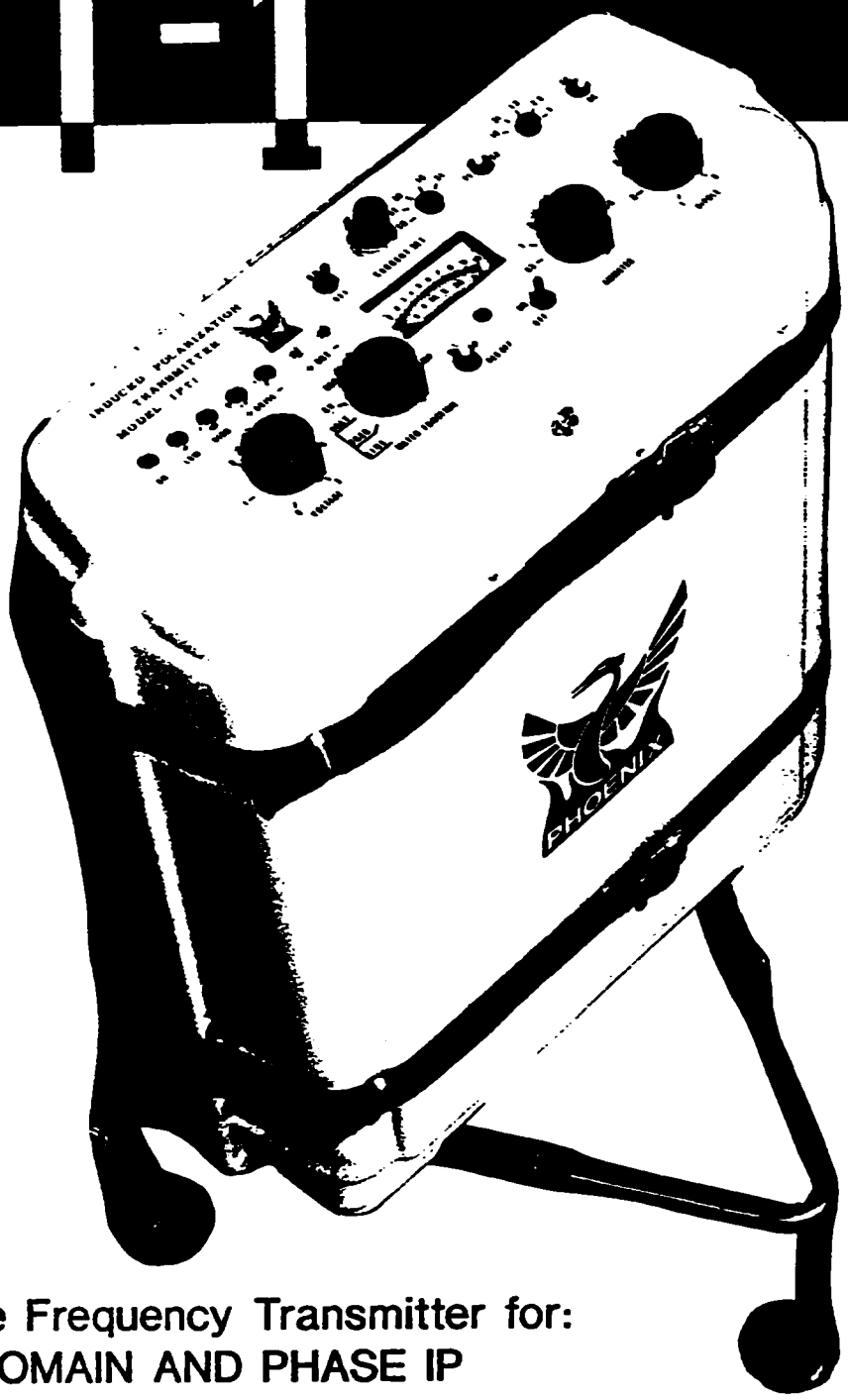
Standard Memory Capacity 1300 combined VLF magnetic and VLF electric measurements as well as gradiometer and magnetometer readings

SCINTREX

222 Snidercroft Road
Concord,Ontario,Canada
L4K 1B5

Telephone: (416) 669-2280
Telex: 06-964570
Telefax: (416) 669-6403
(416) 669-5132

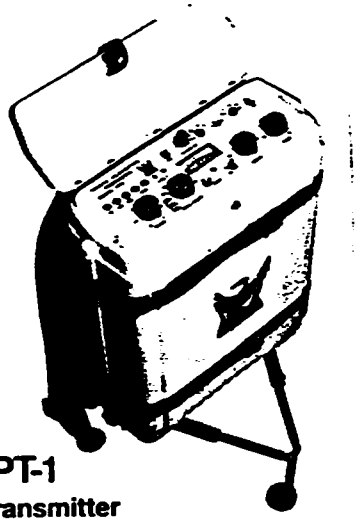
IPT-1



Variable Frequency Transmitter for:
TIME DOMAIN AND PHASE IP
TDEM - FDEM - CSAMT

- Stable: Excellent Current Regulation
- Lightweight / Portable
- Wide Selection of Power Sources
- Low Cost

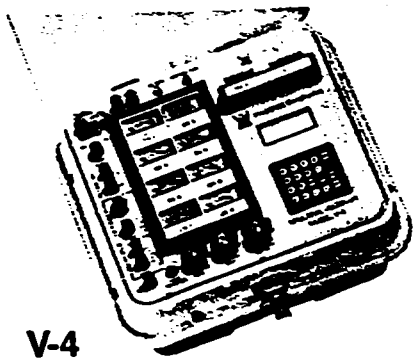
PHOENIX
GEOPHYSICS



IPT-1

Transmitter

Uses 50/60 Hz or 400 Hz Motor generators
DC-8192 Hz, DC-4 Hz versions
Drives grounded dipoles or inductive loads
For spectral IP, CSAMT, TDEM



V-4

Universal Receiver

8 channels, auto gain / DC offset
Solid state memory, computer interface
Spectral IP, time domain IP, CSAMT

A NEW DIMENSION IN INSTRUMENTATION

PHOENIX

Cost effectiveness through multiple functions, five controlled source geophysical techniques plus [illegible] acquisition processing [illegible] a rugged battery operated portable [illegible]

The Turbo V4 is an upgraded version of the V4 receiver, with a new, high-performance CPU board.

The Turbo V4 processor is 50 times faster than the original V4 processor, and features 12 times as much ROM/RAM memory for stored programs and data.

Programs for the Turbo V4 are written in high-level languages; the data processing is therefore much more efficient and intelligent than on the old CPU, which used assembler language only.

Also, the new CPU is programmable*. Users can develop their own programs in FORTRAN or C language using the IBM PC (or compatible), then download them into the V4. This capability means the V4 will remain up-to-date for years, and can be matched precisely to the user's applications.

*** Optional.**

SPECIFICATIONS

Analog Section

Number of channels	2, 4, 6 or 8 (in pairs)
Dynamic range	± 10 volts
Frequency range	1024 sec to 4 kHz (SIP); 4 sec to 4 kHz (CSAMT) in binary or 2/3 binary steps.
Input impedance	More than 100 megohms at low frequencies.
Powerline filtering	Triple notch 40 db powerline filter for 1/3/5 harmonics of 50/60 Hz. Switchable in/out.
Other filtering	Bad sample rejection; offset adjustment; programmable anti-alias filters; slope correction (TDIP) all under processor and/or manual control.
Gain	Automatic or manual control, range of 1 to 640.
DC offset	Processor controlled DC offset control, range: ± 2.5 volts.
Calibration	Manual external calibration; processor-controlled, internal calibration with built-in calibration/test signals: 1/128 Hz to 4 kHz ±5 v, 200 ohm impedance; 50% or 100% duty cycle.
Sensitivity	Sufficient for stand alone controlled source applications.

Digital Section

Processor/CPU board	32/16 bit NS32C016 with NS32081 maths coprocessor. Clock rate 6-10 MHz. Programmable interrupt controller with 16 request lines. MULTIBUS interface. DIN connectors. On-board real time clock.
Monitor firmware	Monitor firmware interfaces to National 32000 series software development tools. Also provides run time environment, terminal handler, debugger execute module, floating point support module and interrupt handler.
Applications firmware	Initially offered with geophysical applications firmware, for IP in time, frequency, or phase domain; spectral IP; resistivity; and CSAMT. Other offerings (such as FDEM) may become available from time to time. The user may develop proprietary applications in FORTRAN 77, PASCAL or C on VAX, IBM PC or compatibles and download into the V4.
CPU board memory	Up to 576 Kbyte RAM + 320 Kbyte ROM.
Serial I/O	Optional RS-232 port with selectable baud rate. Can drive RS-232 printer.
Parallel I/O	8 bit port with max 1/2 MHz transfer rate. For vest-pocket printer or external computer.
Timing	Internal crystal clock; processor-controlled resetting for synchronized operation with transmitters. Optional external precision clock.
A-D conversion	16-bit resolution, 12.5 kHz conversion rate.

Mechanical

Weight	approx. 13 kg
Dimensions	32 × 36 × 27 cm high
Case	resilient, tough PVC alloy
Connectors	3 multipin connectors for analog inputs, 2 of which have power for external sensors.

Environmental

Operating temperature	−10°C to +50°C (−20°C with LCD heater)
Storage temperature	−50°C to +60°C
Humidity	Splashproof, may be operated in light rain
Shock and vibration	Suitable for transport in bush vehicles.

Battery

12 v / 6 Ah rechargeable battery. Nominal 10 h continuous operation at +20°C. Provision for external 12V battery supply.

Inputs

Signal channel	Three multipin connectors for 8 analog inputs. (6 + 1 + 1)
Battery	Multipin connector for external battery or for charging of the internal battery @ 12 V, approx 1.2 A.
Remote clock signal	Optional input.
Current Monitor	Twin plugs for RF modulated signal from transmitter (for real-time deconvolution)

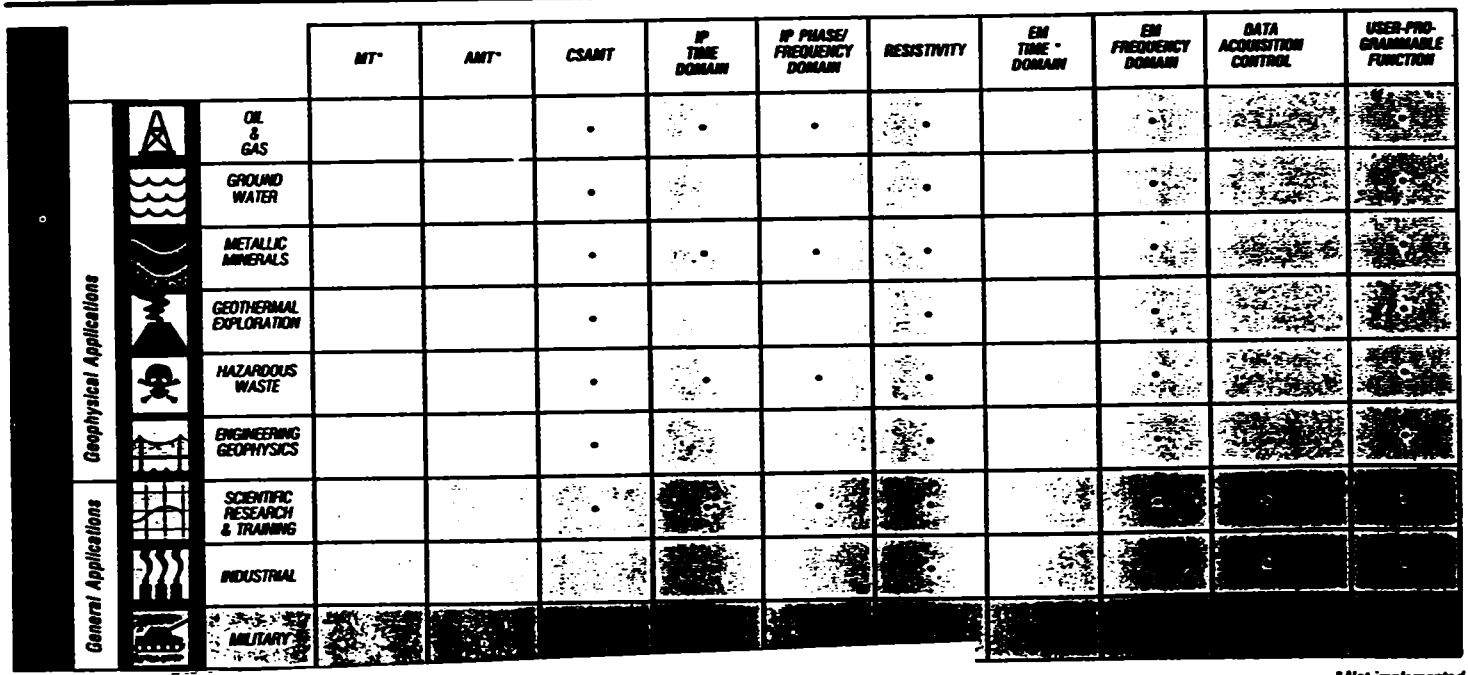
Outputs

Analog meters	Eight analog meters
Display	16 char × 4 lines LCD
Analog outputs	8 outputs for analog recorders, etc. ±5V range. (Optional)
External isolated transmitter drive	Via special purpose isolated RF link.
Calibration signal	Twin connectors

Switches and Controls

Keyboard	20-key alphanumeric/command keypad (waterproof).
On/off	2 position rotary.
Meter Mode	2 position toggle, AC or DC
Battery test	2 position toggle.
Input Select	2 position rotary

Note : Specifications subject to change. Customized configurations are available.



** Not implemented*

PHOENIX Geophysics Limited

3781 VICTORIA PARK AVENUE, UNIT #3
SCARBOROUGH, ONTARIO, CANADA M1W 3K5
TELEPHONE: (416) 491-7340 FAX: (416) 491-7378
TELEX: 06-986856 CABLE: PHEXCO TORONTO

KIRKLAND LAKE WEST PROJECT
(4043)

APPENDIX D

TABLES OF EXPENDITURES

APPENDIX D

TABLE OF EXPENDITURES

Contractor's Costs:	
• gridding/linecutting Phase 1	5,784.00
• gridding/linecutting Phase 2	2,000.00
• geophysical data acquisition Phase 1	38,615.00
• geophysical data acquisition Phase 2	8,400.00
Geophysical Supervision:	
• geophysicist - 160 hrs @ 27.50/hr =	4,400.00
Drafting	
• draftsman - 45 hrs @ 20.50/hr =	922.50
TOTAL COSTS*	60,121.50

*all costs are net of GST

KIRKLAND LAKE WEST PROPERTY
WORK PERFORMED PER CLAIM

CLAIM NUMBER	UNITS	HECTARES	# LINE KMS	WORK DONE
1187011	4	64		
1187013	6	96		
1200479	8	128	0.80	$1,522
1200480	8	128	0.80	$1,522
1200481	8	128	2.40	$4,566
1200483	8	128		
1200484	4	64		
1200486	8	128	1.60	$3,044
1200487	4	64	0.80	$1,522
1200488	8	128		
1200609	8	128		
1200610	8	128	3.20	$6,088
1200611	8	128	0.75	$1,427
1200612	2	32	0.85	$1,617
1200613	2	32		
1200614	2	32		
1200615	8	128	3.10	$5,898
1200616	2	32		
1200617	1	16	0.35	$666
1200618	4	64	0.80	$1,522
1200619	8	128	2.40	$4,566
1200620	8	128	2.40	$4,566
1200621	8	128	0.80	$1,522
1200622	4	64	2.00	$3,805
1200623	1	16	0.40	$761
1200624	2	32		
1200625	8	128	1.60	$3,044
1200626	8	128	1.60	$3,044
1200627	8	128	1.60	$3,044
1200628	6	96	0.80	$1,522
1200629	2	32	0.20	$381
1200630	4	64	0.80	$1,522
1200631	1	16		
1200632	3	48		
1200634	1	16		
1200635	6	96		
1200636	6	96		
1200637	6	96		
1200638	4	64		
1200961	12	192		
1200962	12	192	0.05	$95
1200999	4	64		
1202820	4	64	1.50	$2,854
43 claims	237	3792	31.6	$60,121

KIRKLAND LAKE WEST PROJECT
(4043)

APPENDIX E

CERTIFICATE OF QUALIFICATION

Certificate of Qualification

I, Rex Brommecker, of the City of Nepean, Province of Ontario, do hereby certify that:

1. I am a geologist residing at 35 Rideaucrest Drive, Nepean, Ontario.

2. I am a graduate of the University of Waterloo having received a Bachelor of Science in Applied Earth Science in 1988.

3. I am a graduate of Queens University having received a Master of Science in Geology in 1991.

4. I have been a practicing geologist since 1988.

5. I have been an employee of Westminer Canada Ltd./WMC International Ltd. since 1991.

6. I supervised and performed geological work covered by this report.

Rex Brommecker
Project Geologist

Certificate of Qualification

I, Roman Tykajlo, of the City of Nepean, Province of Ontario, do hereby certify that:

1) I am a geophysicist with WMC International Limited, residing at 74 Stonebriar Drive, Nepean, Ontario, K2G 5X9.

2) I am a graduate of Lakehead University with an Honours Bachelor of Science degree in Geology/Physics (1978).

3) I have been practising my profession since graduation.

4) I am a member of:
   Society of Exploration Geophysicists (SEG)
   Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA)

5) I supervised the work relevant to this study from January 1, 1994 to December 15, 1994.

Dated at the City of Nepean, this 15th day of December, 1994

Roman Tykajlo, H.BSc, P.Geol.

Ministry of Northern Development and Mines
Ontario

Report of Work Conducted After Recording Claim

Mining Act

Transaction Number: W9480.00568

Personal information collected on this form is obtained under the authority of the this collection should be directed to the Provincial Manager, Mining Lands, M Sudbury, Ontario, P3E 6A5, telephone (705) 670-7264.

42A01SW0005 2.15758 BURT

900

Instructions:
- Please type or print and submit in duplicate.
- Refer to the Mining Act and Regulations for requirements of filing assessment work or consult the Mining Recorder.
- A separate copy of this form must be completed for each Work Group.
- Technical reports and maps must accompany this form in duplicate.
- A sketch, showing the claims the work is assigned to, must accompany this form.

GAO

stewart CARMICHAEL 115973

Recorded Holder(s): WMC INTERNATIONAL LIMITED	Client No.: 293367
Address: 22 GURDWARA RD., NEPEAN, ONT., K2E 8A2	Telephone No.: (613) 727-3937
Mining Division: LARDER LAKE / Township/Area: BURT, EBY	M or G Plan No.:
Dates Work Performed — From: NOVEMBER 1993 To: AUGUST 1994	

Work Performed (Check One Work Group Only)

	Work Group	Type
V	Geotechnical Survey	LINECUTTING, GEOPHYSICS
	Physical Work, Including Drilling	
	Rehabilitation	
	Other Authorized Work	
	Assays	
	Assignment from Reserve	

Total Assessment Work Claimed on the Attached Statement of Costs $ 60,121.00

Note: The Minister may reject for assessment work credit all or part of the assessment work submitted if the recorded holder cannot verify expenditures claimed in the statement of costs within 30 days of a request for verification.

Persons and Survey Company Who Performed the Work (Give Name and Address of Author of Report)

Name	Address
LINECUTTING: NATIVES EXPLORATION SERVICES	P.O. BOX 334, CHIBOUGAMAU, P.Q. G8P 2K7
LINECUTTING: MINERAL EXPLORATION SERVICES	75 BALSAM AVE., KIRKLAND LAKE, P2N 1W7
TANDEM GEOPHYSICS INC.	BOX 1682, GUELPH, ONT., N1H 6Z9

(attach a schedule if necessary)

Certification of Beneficial Interest * See Note No. 1 on reverse side

I certify that at the time the work was performed, the claims covered in this work report were recorded in the current holder's name or held under a beneficial interest by the current recorded holder.	Date: DEC. 9/94	Recorded Holder or Agent (Signature): Pamela Cille

Certification of Work Report

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

Name and Address of Person Certifying: REX BROMMECKER c/o WMC INTERNATIONAL LIMITED 22 GURDWARA RD., NEPEAN, ONT., K2E 8A2		
Telepone No.: (613) 727-3937	Date: DEC. 9/94	Certified By (Signature): Rex Brommecker

For Office Use Only

Total Value Cr. Recorded: $48,734 reserve $11,387	Date Recorded: Dec 19/94	Mining Recorder: Cory Spooner	Received: RECEIVED LARDER LAKE MINING DIVISION DEC 19 1994
	Deemed Approval Date: March 20/95	Date Approved:	
	Date Notice for Amendments Sent:		

0241 (03/91)

Work Report Number for Applying Reserve	Claim Number (see Note 2)	Number of Claim Units	Value of Assessment Work Done on this Claim	Value Applied to this Claim	Value Assigned from this Claim	Reserve: Work to be Claimed at a Future Date
✓	1187011	4	—	1600		
✓	1187013	6	—	2400		
✓	1200479	8 ✓	1522	1522	—	—
✓	1200480	8 ✓	1522	1522	—	—
✓	1200481	8 ✓	4566	3200	1366	—
✓	1200486	8 ✓	3044	3044	—	—
✓	1200487	4 ✓	1522	1522	—	—
✓	1200610	8	6088	3200	2634 BC	254
✓	1200611	8	1427	1427	—	—
✓	1200612	2	1617	800	—	517
✓	1200615	8	5898	3200	—	2698
✓	1200617	1 ✓	666	400	—	266
✓	1200618	4 ✓	1522	1522	—	—
✓	1200619	8 ✓	4566	3200	—	1366
✓	1200620	8 ✓	4566	3200	—	1366
✓	1200621	8 ✓	1522	1522	—	—
✓	1200622	4 ✓	3805	1600	—	2205
	Total Number of Claims		Total Value Work Done	Total Value Work Applied	Total Assigned From	Total Reserve

1

Credits you are claiming in this report may be cut back. In order to minimize the adverse effects of such deletions, please indicate from which claims you wish to priorize the deletion of credits. Please mark (✓) one of the following:

1. ☑ Credits are to be cut back starting with the claim listed last, working backwards.
2. ☐ Credits are to be cut back equally over all claims contained in this report of work.
3. ☐ Credits are to be cut back as priorized on the attached appendix.

In the event that you have not specified your choice of priority, option one will be implemented.

Note 1: Examples of beneficial interest are unrecorded transfers, option agreements, memorandum of agreements, etc., with respect to the mining claims.

Note 2: If work has been performed on patented or leased land, please complete the following:

I certify that the recorded holder had a beneficial interest in the patented or leased land at the time the work was performed.	Signature	Date

0241 (03/91)

2

Work Report Number for Applying Reserve	Claim Number (see Note 2)	Number of Claim Units	Value of Assessment Work Done on this Claim	Value Applied to this Claim	Value Assigned from this Claim	Reserve: Work to be Claimed at a Future Date
	1200623	1	761	400	—	361
	1200625	8	3044	3044	—	—
	1200626	8	3044	3044	—	—
	1200627	8	3044	3044	—	—
	1200628	6	1522	1522	—	—
	1200629	2	381	381	—	—
	1200630	4	1522	1522	—	—
	1200962	12	96 *	96 *	—	—
	1202820	4	2854	1600	—	1254
	26		60121	49534	4000	10,587
	Total Number of Claims		Total Value Work Done	Total Value Work Applied	Total Assigned From	Total Reserve

Credits you are claiming in this report may be cut back. In order to minimize the adverse effects of such deletions, please indicate from which claims you wish to priorize the deletion of credits. Please mark (✓) one of the following:

1. ☑ Credits are to be cut back starting with the claim listed last, working backwards.
2. ☐ Credits are to be cut back equally over all claims contained in this report of work.
3. ☐ Credits are to be cut back as priorized on the attached appendix.

In the event that you have not specified your choice of priority, option one will be implemented.

Note 1: Examples of beneficial interest are unrecorded transfers, option agreements, memorandum of agreements, etc., with respect to the mining claims.

Note 2: If work has been performed on patented or leased land, please complete the following:

I certify that the recorded holder had a beneficial interest in the patented or leased land at the time the work was performed.	Signature	Date

0241 (03/91)

* $95+1 to account for rounding in spreadsheet! (see Appendix)

Ontario

Ministry of Northern Development and Mines

Ministère du Développement du Nord et des mines

Statement of Costs for Assessment Credit

État des coûts aux fins du crédit d'évaluation

Mining Act/Loi sur les mines

Transaction No./N° de transaction: W9480.00568

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used to maintain a record and ongoing status of the mining claim(s). Questions about this collection should be directed to the Provincial Manager, Minings Lands, Ministry of Northern Development and Mines, 4th Floor, 159 Cedar Street, Sudbury, Ontario P3E 6A5, telephone (705) 670-7264.

Les renseignements personnels contenus dans la présente formule sont recueillis en vertu de la Loi sur les mines et serviront à tenir à jour un registre des concessions minières. Adresser toute quesiton sur la collece de ces renseignements au chef provincial des terrains miniers, ministère du Développement du Nord et des Mines, 159, rue Cedar, 4e étage, Sudbury (Ontario) P3E 6A5, téléphone (705) 670-7264.

1. Direct Costs/Coûts directs

Type	Description	Amount Montant	Totals Total global
Wages Salaires	Labour Main-d'oeuvre	922	
	Field Supervision Supervision sur le terrain	4400	5322
Contractor's and Consultant's Fees Droits de l'entrepreneur et de l'expert-conseil	Type LINECUTTING	7,784	
	GEOPHYSICS	47,015	
			54,799
Supplies Used Fournitures utilisées	Type		
Equipment Rental Location de matériel	Type		
	Total Direct Costs Total des coûts directs		60121

2. Indirect Costs/Coûts indirects

** Note: When claiming Rehabilitation work Indirect costs are not allowable as assessment work.
Pour le remboursement des travaux de réhabilitation, les coûts indirects ne sont pas admissibles en tant que travaux d'évaluation.

Type	Description	Amount Montant	Totals Total global
Transportation Transport	Type		
Food and Lodging Nourriture et hébergement			
Mobilization and Demobilization Mobilisation et démobilisation			
	Sub Total of Indirect Costs Total partiel des coûts indirects		
	Amount Allowable (not greater than 20% of Direct Costs) Montant admissible (n'excédant pas 20 % des coûts directs)		
	Total Value of Assessment Credit (Total of Direct and Allowable indirect costs) / Valeur totale du crédit d'évaluation (Total des coûts directs et indirects admissibles)		

Note: The recorded holder will be required to verify expenditures claimed in this statement of costs within 30 days of a request for verification. If verification is not made, the Minister may reject for assessment work all or part of the assessment work submitted.

Note : Le titulaire enregistré sera tenu de vérifier les dépenses demandées dans le présent état des coûts dans les 30 jours suivant une demande à cet effet. Si la vérification n'est pas effectuée, le ministre peut rejeter tout ou une partie des travaux d'évaluation présentés.

Filing Discounts

1. Work filed within two years of completion is claimed at 100% of the above Total Value of Assessment Credit.
2. Work filed three, four or five years after completion is claimed at 50% of the above Total Value of Assessment Credit. See calculations below:

Total Value of Assessment Credit ____ x 0.50 = ____ Total Assessment Claimed

Remises pour dépôt

1. Les travaux déposés dans les deux ans suivant leur achèvement sont remboursés à 100 % de la valeur totale susmentionnée du crédit d'évaluation.
2. Les travaux déposés trois, quatre ou cinq ans après leur achèvement sont remboursés à 50 % de la valeur totale du crédit d'évaluation susmentionné. Voir les calculs ci-dessous.

Valeur totale du crédit d'évaluation ____ x 0,50 = ____ Évaluation totale demandée

Certification Verifying Statement of Costs

I hereby certify:
that the amounts shown are as accurate as possible and these costs were incurred while conducting assessment work on the lands shown on the accompanying Report of Work form.

that as GEOPHYSICIST (Recorded Holder, Agent, Position in Company) I am authorized

to make this certification

Attestation de l'état des coûts

J'atteste par la présente :
que les montants indiqués sont le plus exact possible et que ces dépenses ont été engagées pour effectuer les travaux d'évaluation sur les terrains indiqués dans la formule de rapport de travail ci-joint.

Et qu'à titre de _____ (titulaire enregistré, représentant, poste occupé dans la compagnie) je suis autorisé

à faire cette attestation.

Signature: [signature] Date: Dec 9/94

0212 (04/91)

Nota : Dans cette formule, lorsqu'il désigne des personnes, le masculin est utilisé au sens neutre.

Ontario

Ministry of Northern Development and Mines

Ministère du Développement du Nord et des Mines

Geoscience Approvals Office
933 Ramsey Lake Road
6th Floor
Sudbury, Ontario
P3E 6B5

Telephone: (705) 670-5853
Fax: (705) 670-5863

Our File: 2.15758
Transaction #: W9480.00568

February 17, 1995

Mining Recorder
Ministry of Northern Development and Mines
4 Government Road East
Kirkland Lake, Ontario
P2N 1A2

Dear Mr. Spooner:

Subject: APPROVAL OF ASSESSMENT WORK CREDITS ON MINING CLAIMS 1200479 et al. IN BURT & EBY TOWNSHIPS

Assessment work credits have been approved as outlined on the report of work form. The credits have been approved under Section 14 (Geophysical) of the Mining Act Regulations.

The approval date is February 16, 1995.

If you have any questions regarding this correspondence, please contact Steven Beneteau at (705) 670-5858.

ORIGINAL SIGNED BY:

Ron C. Gashinski
Senior Manager, Mining Lands Section
Mining and Land Management Branch
Mines and Minerals Division

SBB/jl
Enclosure:

cc: Resident Geologist
Kirkland Lake, Ontario

Assessment Files Library
Sudbury, Ontario

BURT TOWNSHIP

LARDER LAKE MINING DIVISION

DISTRICT OF TIMISKAMING

SCALE 40 CHAINS TO ONE INCH

BOMPAS TWP.

LEGEND

PATENTED LAND
CROWN LAND SALE
LEASES

M.334

Areas withdrawn from staking under Section 43 of the Mining Act (R.S.O. 1970)

Order No	File	Date	Disposition
W 7/74	104317	21/2/74	S.R.O.
W 71/76	100581	18/12/76	S.R.O.
NR W 53/79	139857	14/5/79	S.R.O.
NRW 92/80	139365	9/7/80	S.R.O.
W 24/82	188522	29/11/82	S.R.O./M.R.

1200999 1200609 1200487 1200611 1200612 1200613 1187013 1187011 1200488 1200486 1200618 1200630 1200614 1200615 1200616 5906 1200480 1200481 1200619 1200620 1200621 1200622 1200629 16723 11767 15268 13768 1200624 38688 38685 1200484 1200483 1200627 1200626 1200625 1200628 1200623 1313

Portage

Burt Lake

Englehart

Gravel File 186049

D.H.O. PIT

AREA WITHDRAWN FROM STAKING SECTION (2) MINING ACT

S.R.O. RESERVES

CABIN SITE

HOLLAND ST. TWP.

EBY TWP.

GROSS TWP.

12 11 10 9 8 7 6 5 4 3 2 1

VI
2.15758
MAG, I.P., GRAV.
V
IV
III
II
I

NOTICE OF FORESTRY ACTIVITY

THIS TOWNSHIP / AREA FALLS WITHIN THE ——— FLONSKI FOREST MANAGEMENT UNIT

AND MAY BE SUBJECT TO FORESTRY OPERATIONS. THE NEAR UNIT FORESTER FOR THIS AREA CAN BE CONTACTED AT: P.O. BOX 129
SWASTIKA, ONT.
P0K 1T0
705-642-3222

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.

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

COPY OF THIS MYLAR ARCHIVED AUG 25/93

BURT TWP
M.334

42A01SW0005 2 15758 BURT

TRIM LINE

Grenfell Twp. M.351

Burt Twp. M.334

Otto Twp. M.379

Eby Twp. M.345

Blain Twp. M.418

THE TOWNSHIP OF

EBY

DISTRICT OF TIMISKAMING

LARDER LAKE MINING DIVISION

SCALE 1 INCH = 40 CHAINS

LEGEND

PATENTED LAND
CROWN LAND SALE
LEASES
LOCATED LAND
LICENSE OF OCCUPATION
MINING RIGHTS ONLY
SURFACE RIGHTS ONLY
ROADS
IMPROVED ROADS
KING'S HIGHWAYS
RAILWAYS
POWER LINES
MARSH OR MUSKEG
CANCELLED

M.R.O. & S.R.O.

NOTES

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

AREAS WITHDRAWN FROM STAKING

Surface Rights Withdrawn under Sec. 36, The Mining Act R.S.O. 1980, ORDER NO. W-01/84/ONT (Trans Canada Pipeline Right of Way one Surface Zone northeasterly 40.23 metres or 132 ft. [illegible] either side of centre line of right of way)

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.

DATE OF ISSUE
DEC 29 1984
LARDER LAKE MINING RECORDER'S OFFICE

PLAN NO.- M-345

MINISTRY OF NORTHERN DEVELOPMENT AND MINES

COPY OF THIS MYLAR ARCHIVED APR.27/92

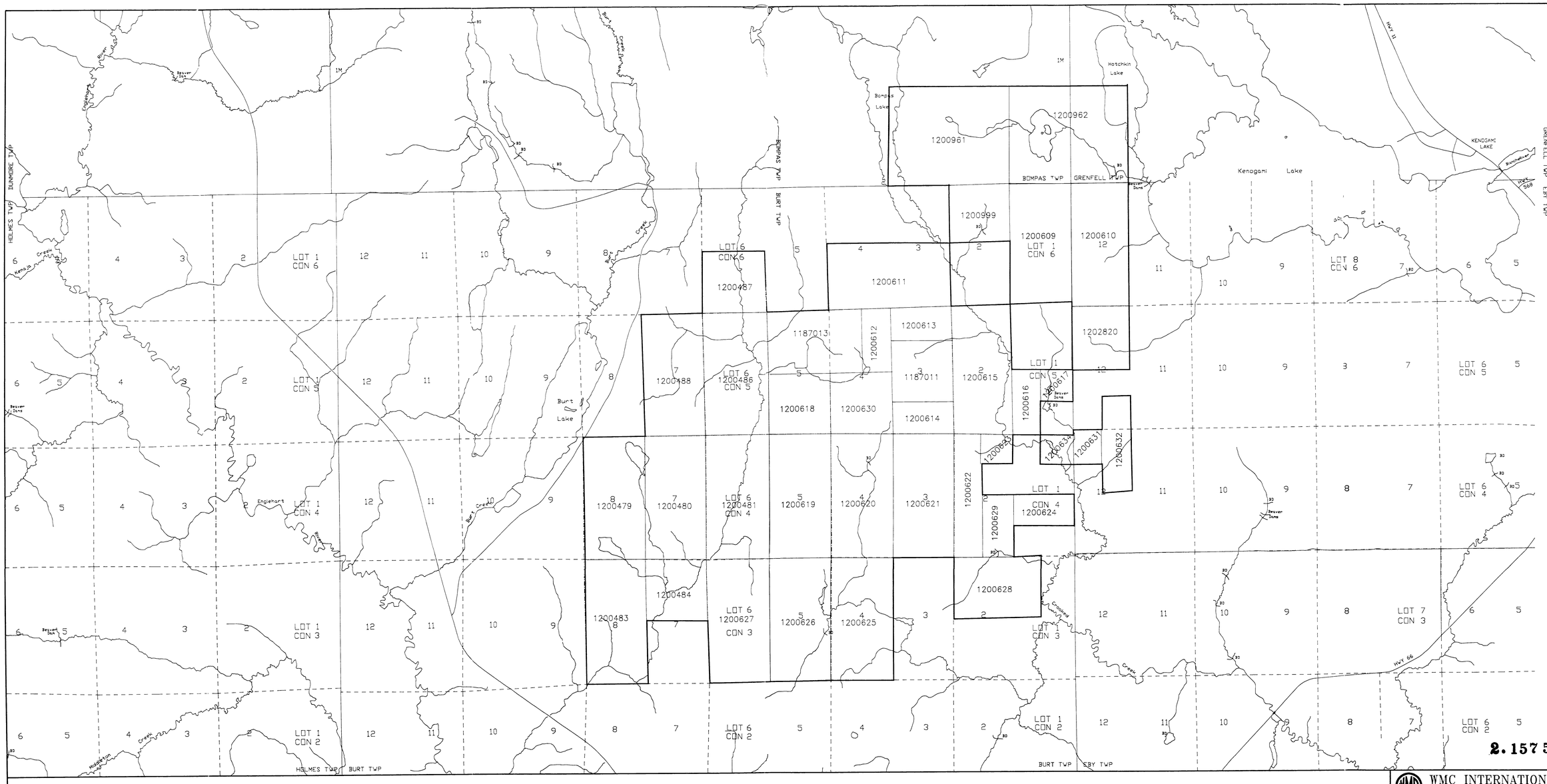
K. Kotsinov

Read Jan. 25/89

42A01SW0005 2 15758 BURT

210

TRIM LINE



2.15758

WMC INTERNATIONAL LIMITED
AMERICAS DIVISION – EXPLORATION

KIRKLAND LAKE WEST

CLAIM MAP

DRAWN by: Rez & Pam	DATE: AUG. 1994	PLAN NO.
WORK by: Rez & Pam	SCALE: 1:20 000	4043-08-02
	N.T.S.: 42A/1	

FIGURE 2

42A15NW0000 2.15758 BURT

BOMPAS TWP.

BURT TWP.

1200961

1200962

Bompas

Lake

1200999

1200609

1200610

1200611

1200487

1200612

1200613

1187013

1202820

1200488

1200486

1187011

1200615

Burt

Lake

1200618

1200630

1200614

1200616

1200617

1200623

1200634

1200631

1200632

BL 36+00

1200479

1200480

1200481

1200619

1200620

1200621

1200622

1200629

1200624

1200484

1200628

1200483

1200627

1200626

1200625

BURT TWP.

EBY TWP.

2.15758

Scale: 1:10000

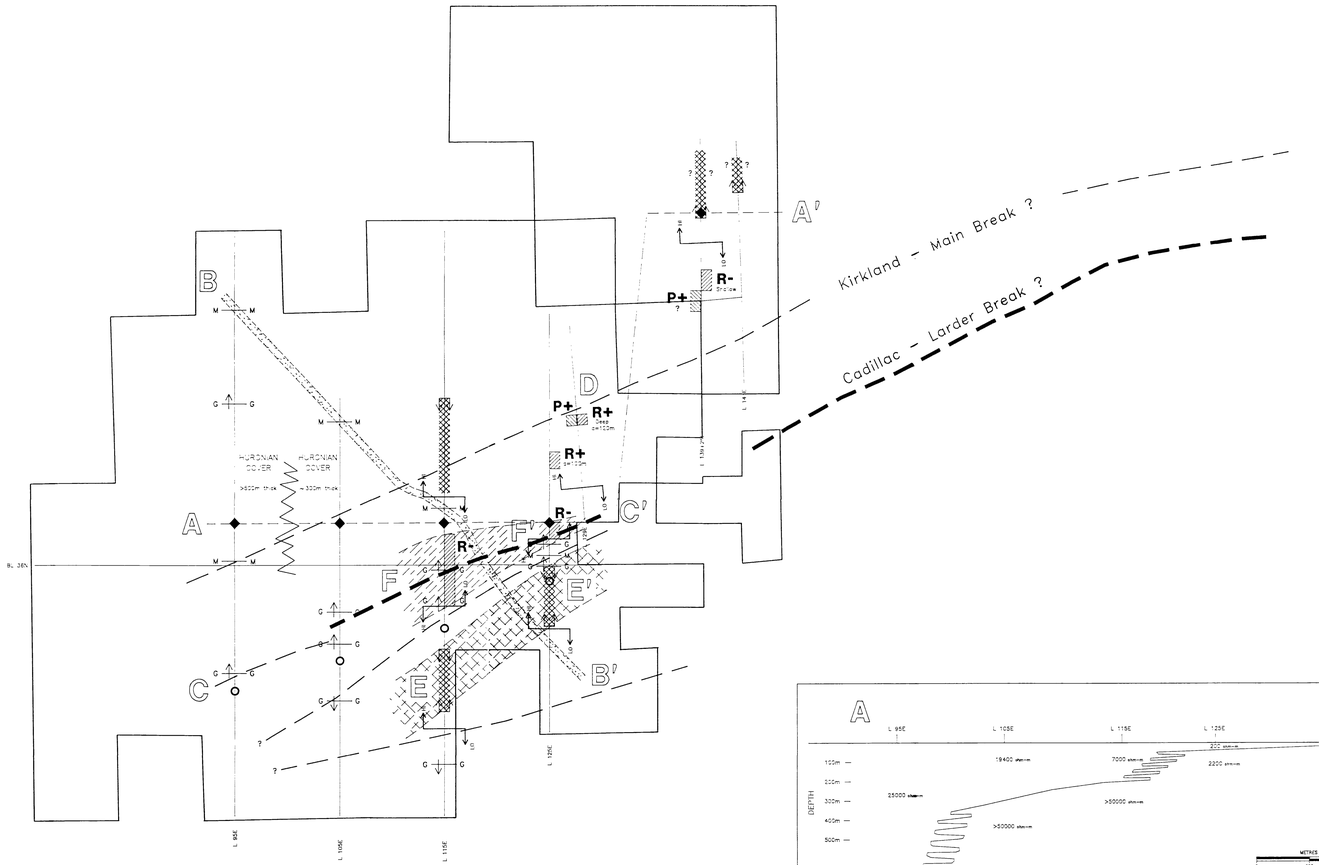
0 200 400 600 (metres)

WMC International Limited
Americas Division – Exploration

KIRKLAND LAKE WEST PROJECT
Claim Map

COMPILED: RB, PC	SCALE: 1:10000	PN:	4043
DRAFTED: RT, PC	REVISION:	PLAN:	4043GRID
DATE: 8 DEC 94	DATE:	MAP No.:	

FIGURE 4



GEOELECTRIC SECTION A - A'

WMC International Limited
Americas Division - Exploration

Kirkland Lake West Project

Interpretation of Geophysical Data

		DATE
Compiled:	RT	JAN 1994
Drafted:	LWu	28 SEP 94
Revised		30 NOV 94
NTS 42 A/1	File:	K:\KPHYS
PN: 4043	Plan:	

SCALE 1 : 20000

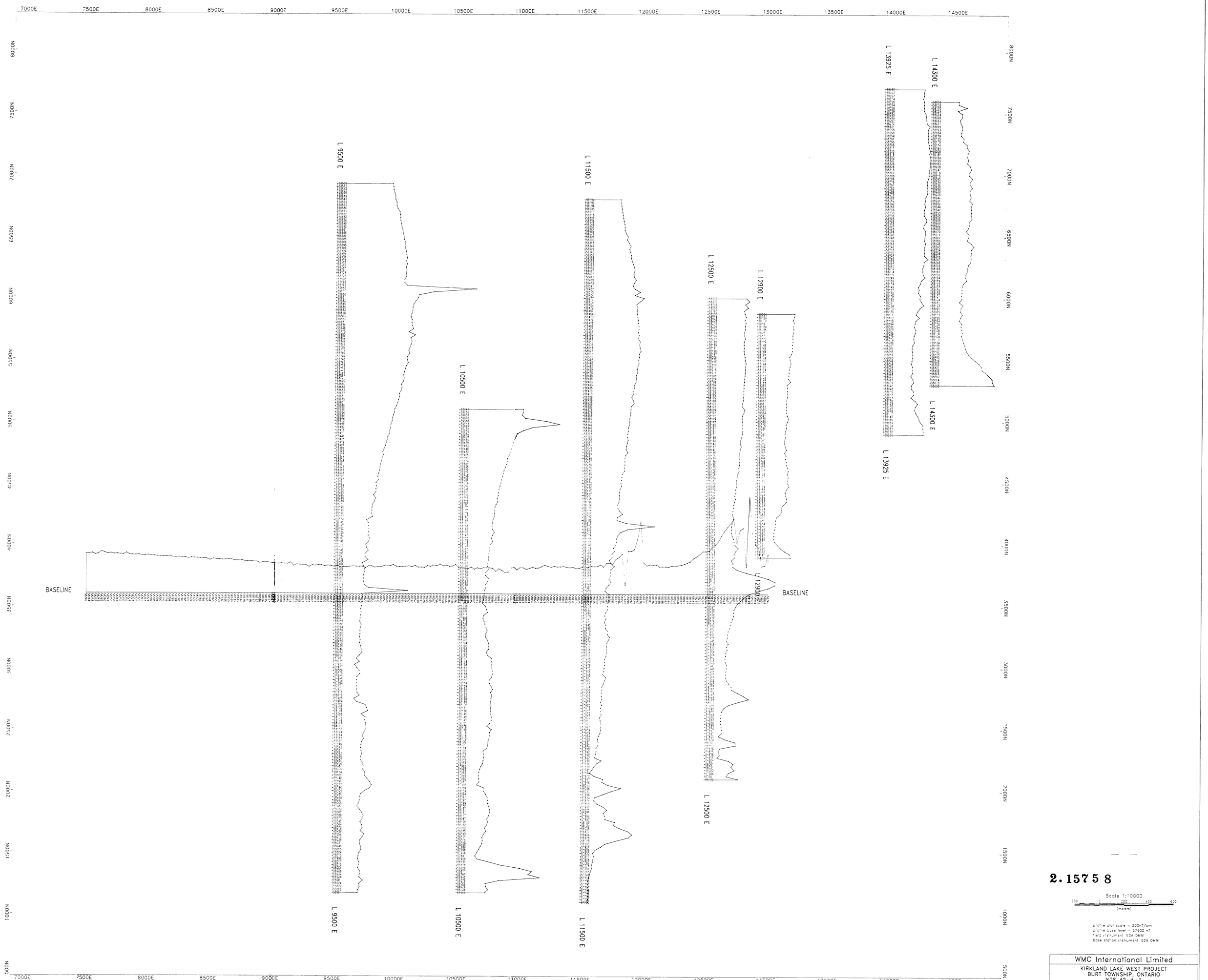
METRES 0 200 400 600 800 1000

2.15758

LEGEND

- Centre of Vertical Electrical Sounding (VES)
- R+ Resistivity High
- R- Resistivity Low
- Resistivity Contact
- P+ Discrete Phase IP High
- Elevated Phase IP and High Resistivity Background
- M — M Magnetic Anomaly Axis Along Profile
- G — G Gravity Profile Inflection Point (Interpretation from gradient analysis)
- Drill Hole
- A — A' Interpreted VES Section Line
- Interpreted Magnetic Dyke

FIGURE 5



2.15758

Scale 1:10000

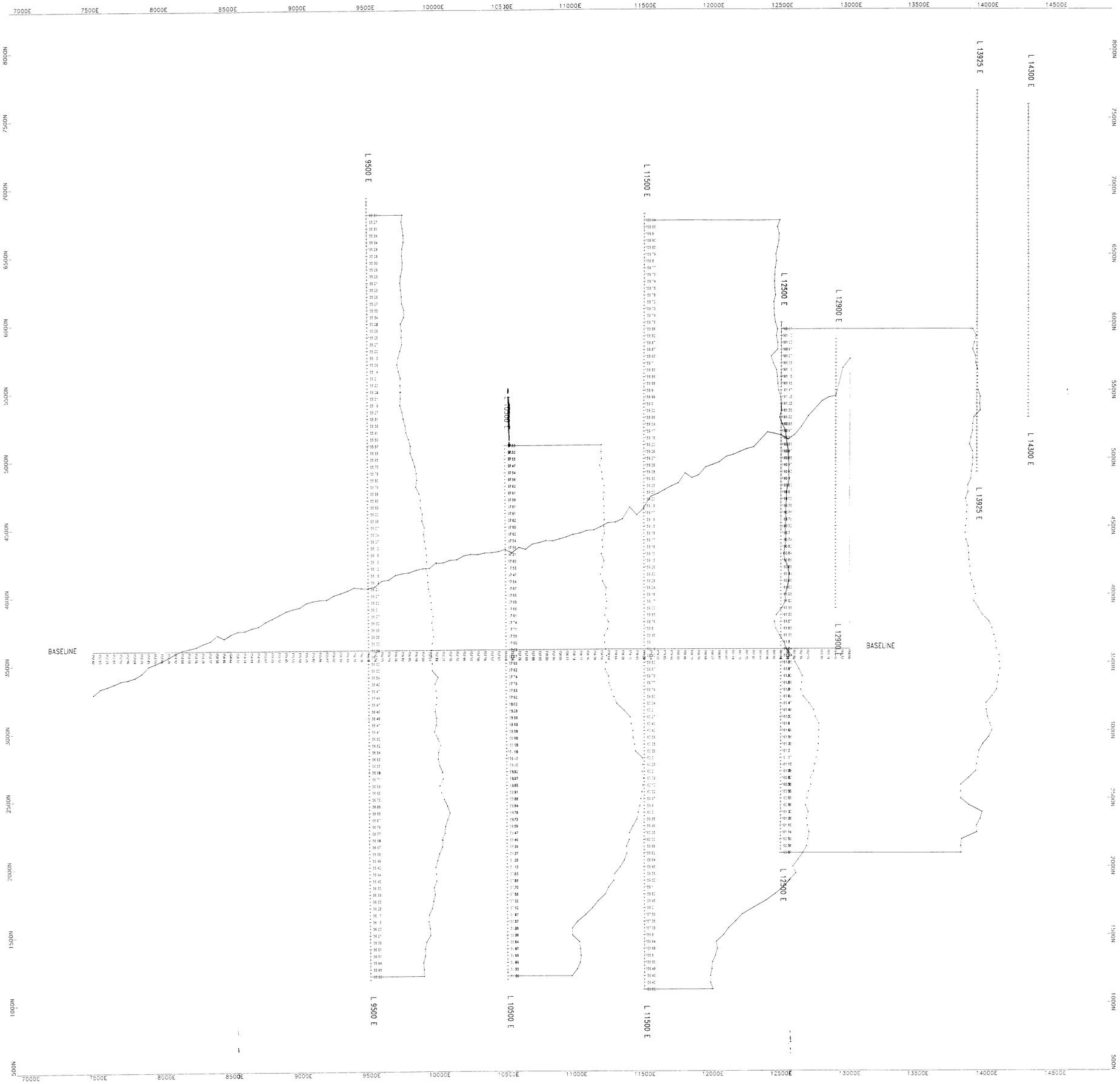
200 0 200 400 600
(meters)

profile plot scale = 200nT/cm
profile base level = 57600 nT
field instrument: EDA OMNI
base station instrument: EDA OMNI

WMC International Limited
KIRKLAND LAKE WEST PROJECT BURT TOWNSHIP, ONTARIO NTS 42-A-1
TOTAL MAGNETIC INTENSITY SURVEY
Data Profiles and Postings
WMC – Ottawa – rt – November 1994

FIGURE 7

42A01SW0008 2 15758 BURT



2.1575 8

Scale 1:10000

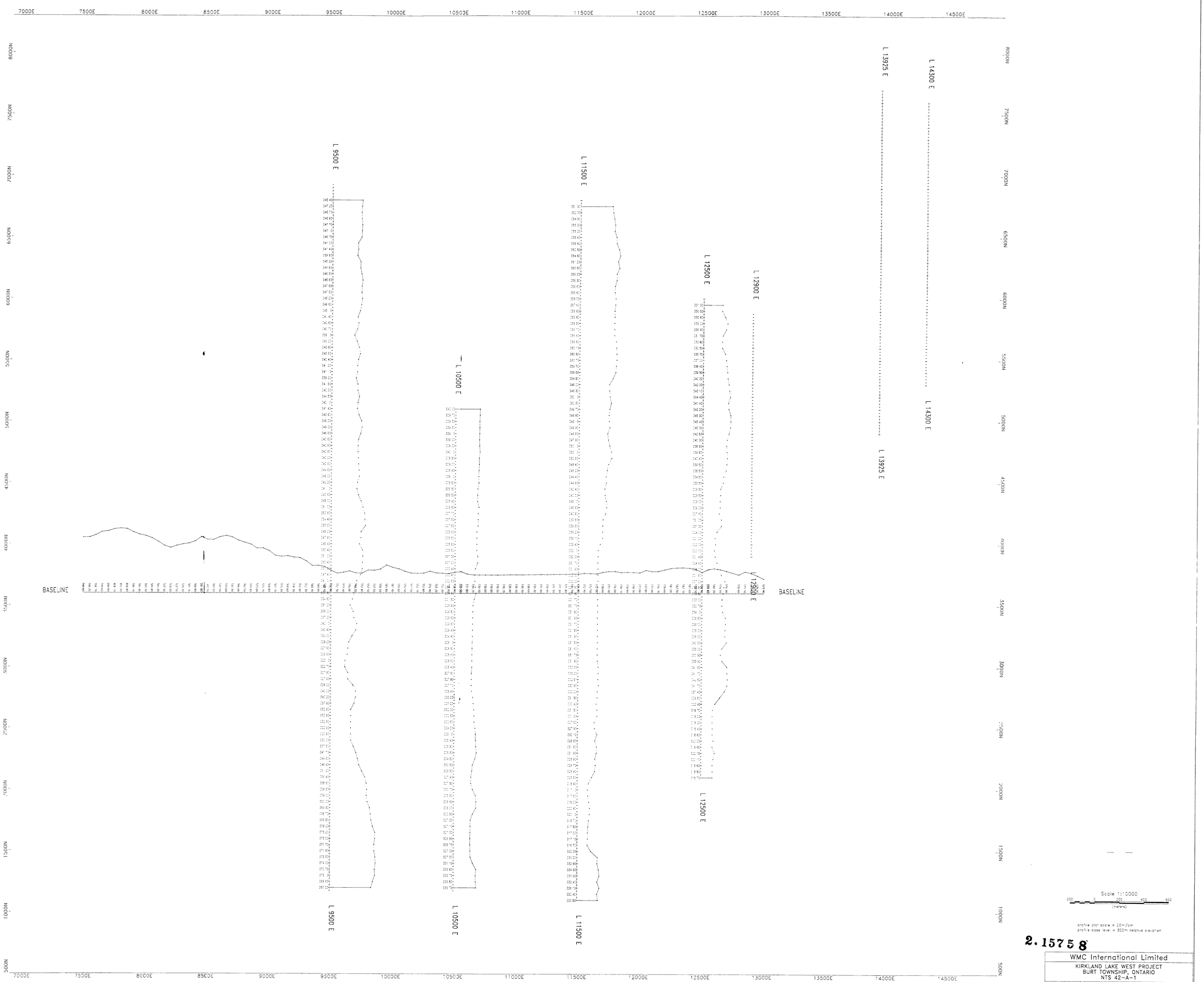
200 0 200 400 600
(meters)

profile plot scale 0.5mgal/cm
profile base level = 54 mgal relative
instrument LaCoste & Romberg serial #G642

WMC International Limited
KIRKLAND LAKE WEST PROJECT BURT TOWNSHIP, ONTARIO NTS 42-A-1
BOUGUER GRAVITY SURVEY (2.67 gm/cc) Data Profiles and Postings
WMC – Ottawa – rt – November 1994

FIGURE 8

42A01SW0005 2.1575B BURT



Scale 1:10000

200 0 200 400 600
(meters)

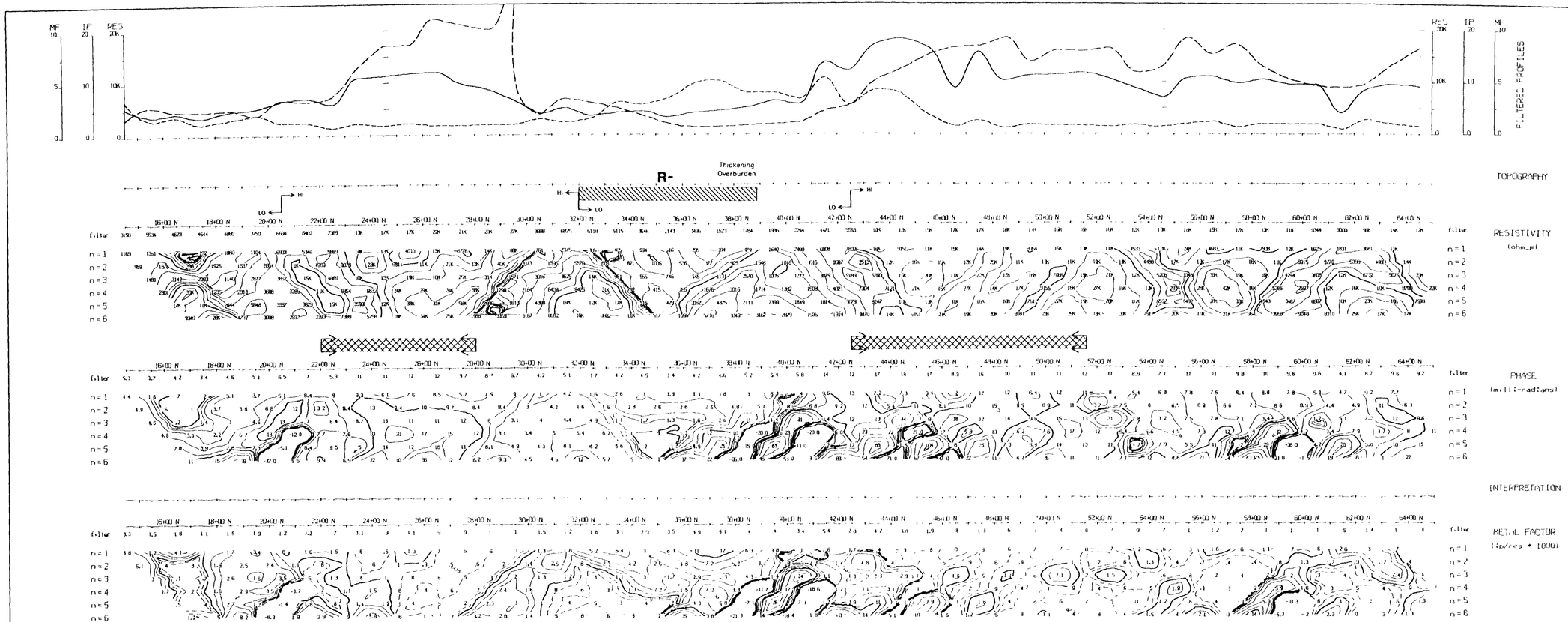
profile plot scale = 20cm/cm
profile base level = 300m relative elevation

2.15758

WMC International Limited
KIRKLAND LAKE WEST PROJECT BURT TOWNSHIP, ONTARIO NTS 42-A-1
ELEVATION SURVEY
Data Profiles and Postings
WMC – Ottawa – rt – November 1994

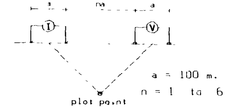
FIGURE 9

42A01SW0005 2.15758 BURT



Line 11500 E

Dipole-Dipole Array



Filtered Profiles

	filter
Resistivity	*
Polarization	* *
Metal Factor	* * *
	* * * *

Logarithmic Contours 1, 1.5, 2, 3, 5, 7.5, 10,...

Instruments: IRIS, TURBO IP-4
Frequency: 1.0 Hz.
Operator: J.M.N.

LEGEND

- R+ Resistivity High
- R- Resistivity Low
- P+ Phase IP High
- Elevated Phase IP & High Resistivity Background
- Resistivity Contact (HI / LO)

WESTMINER CANADA LTD.

INDUCED POLARIZATION SURVEY

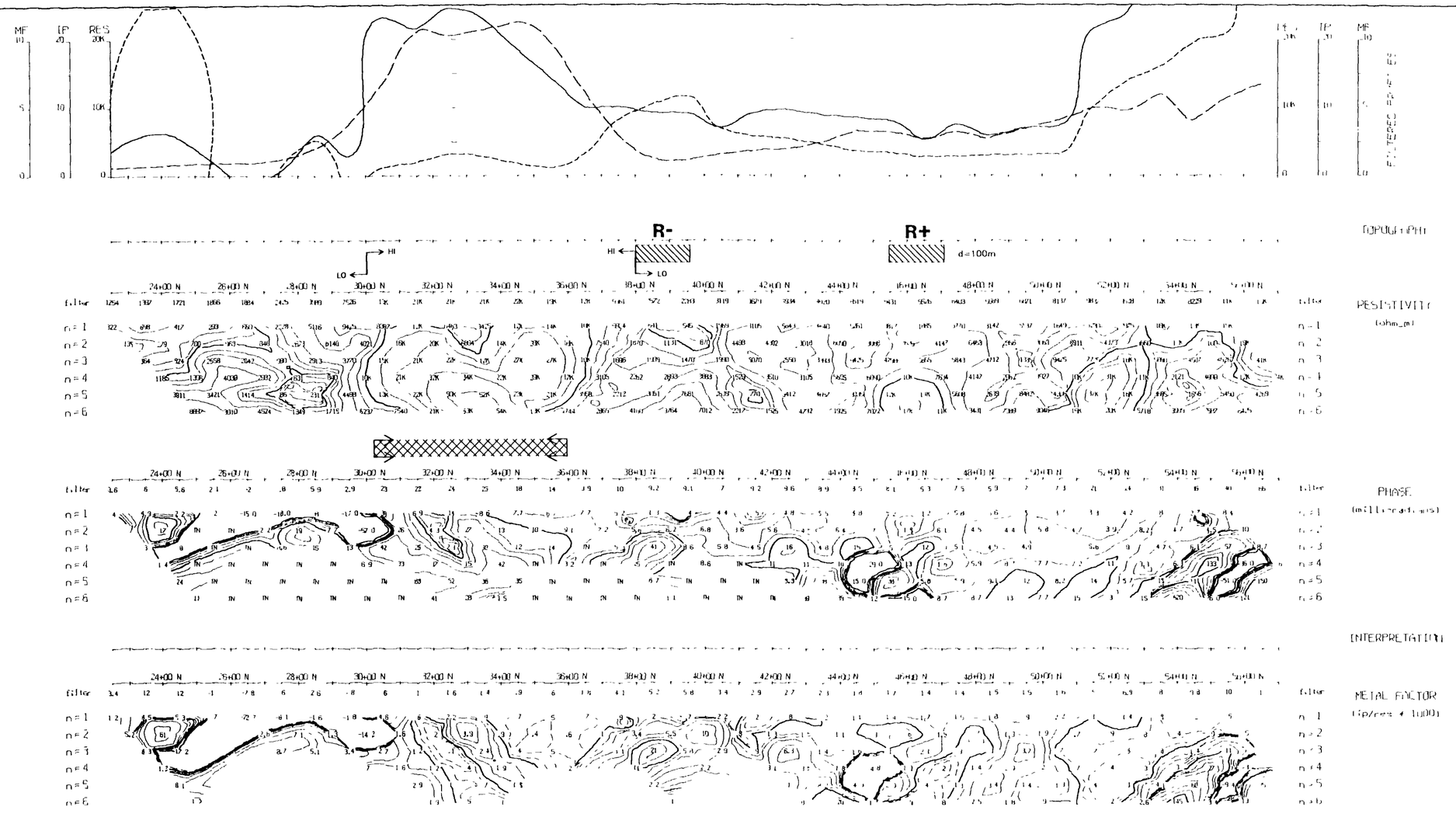
Kirkland Lake West Project,
Kirkland Lake, Ontario

Date: Jan \ 1994 N.T.S.

Scale: 1 : 10000 FIGURE 10a

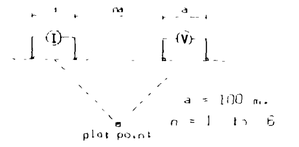
MERTENS & MacNEIL LTD.

42A01SW0005 2 15758 BURT



Line 12500 E

Dipole-Dipole Array



Filtered Profiles

	filter
Resistivity	*
Polarization	* *
Metal Factor	* * *
	* * * *

Logarithmic Contours 1, 1.5, 2, 3, 5, 7.5, 10....

Instrument: GDD TxRx IPV-4
Frequency: 1.0 Hz.
Operator: J.M.N.

LEGEND

R+	Resistivity High
R-	Resistivity Low
P+	Phase IP High
	Elevated Phase IP & High Resistivity Background
LO ← → HI	Resistivity Contact

WESTMINER CANADA LTD.

INDUCED POLARIZATION SURVEY

Kirkland Lake West Project,
Kirkland Lake, Ontario

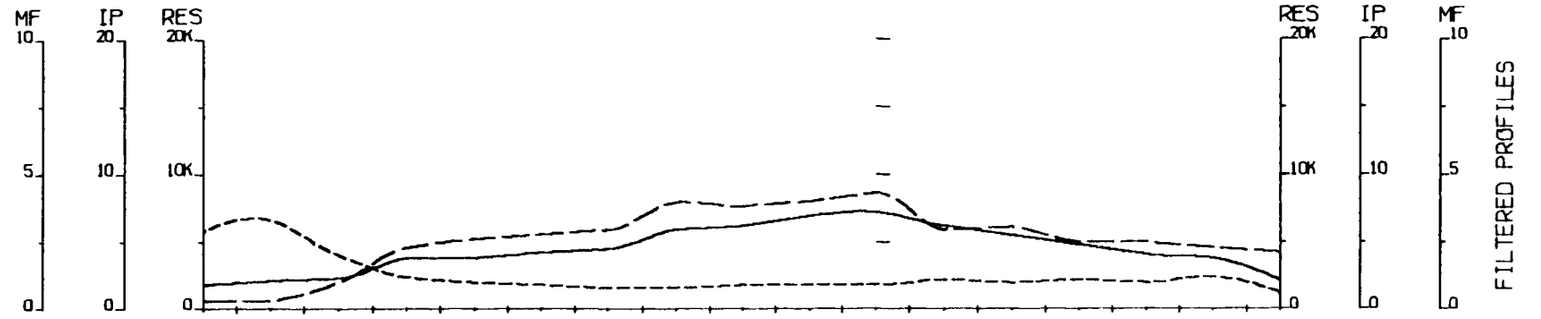
Date: Jun \ 1994 N.T.S.

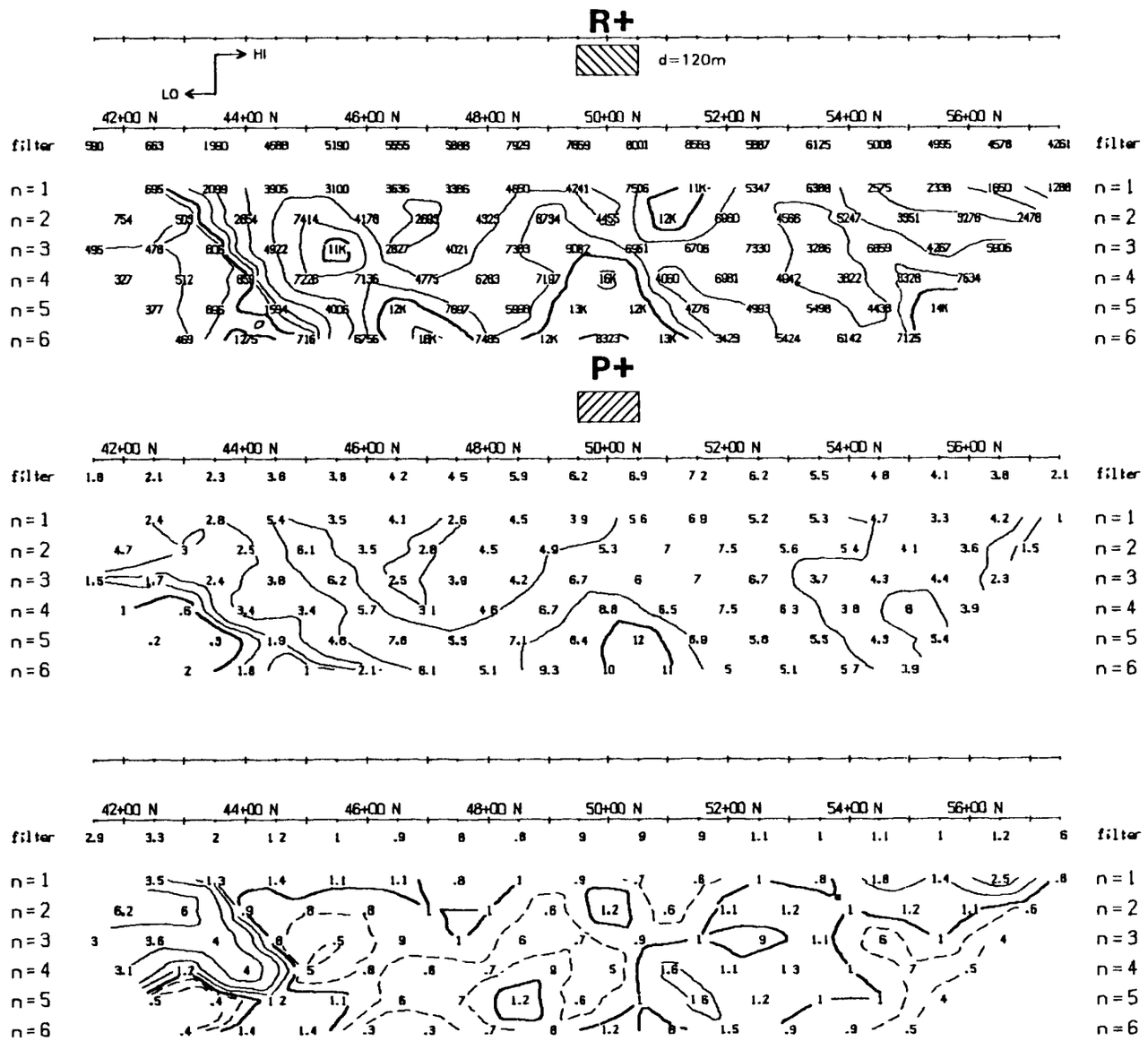
Scale: 1 : 10000

FIGURE 10b

MERTENS & MacNEIL LTD.

42A01SW0005 2 15758 BURT





TOPOGRAPHY

RESISTIVITY
(ohm_m)

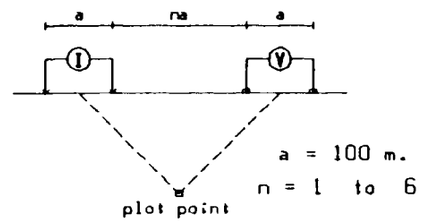
PHASE
(milli-radians)

INTERPRETATION

METAL FACTOR
(ip/res * 1000)

Line 12900 E

Dipole-Dipole Array



Filtered Profiles

		filter
Resistivity	———	*
Polarization	———	* *
Metal Factor	- - - - - - - -	* * *

2.15758 * * * *

Logarithmic Contours 1, 1.5, 2, 3, 5, 7.5, 10,...

Instruments: IPT1, TURBO IPV-4
Frequency: 1.0 Hz.
Operator: J.M.N.

LEGEND

- R+ Resistivity High
- R- Resistivity Low
- P+ Phase IP High
- Elevated Phase IP & High Resistivity Background
- HI / LO Resistivity Contact

WMC INTERNATIONAL LIMITED.

INDUCED POLARIZATION SURVEY

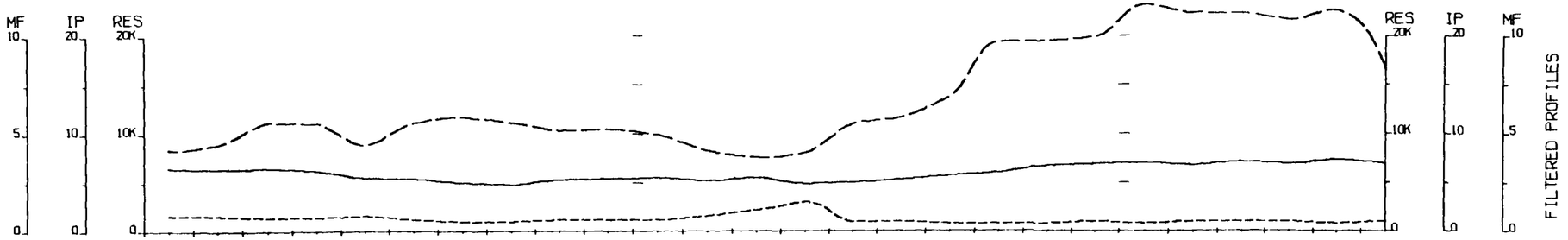
Kirkland Lake West Project,
Kirkland Lake, Ontario

Date: August\1994 N.T.S.

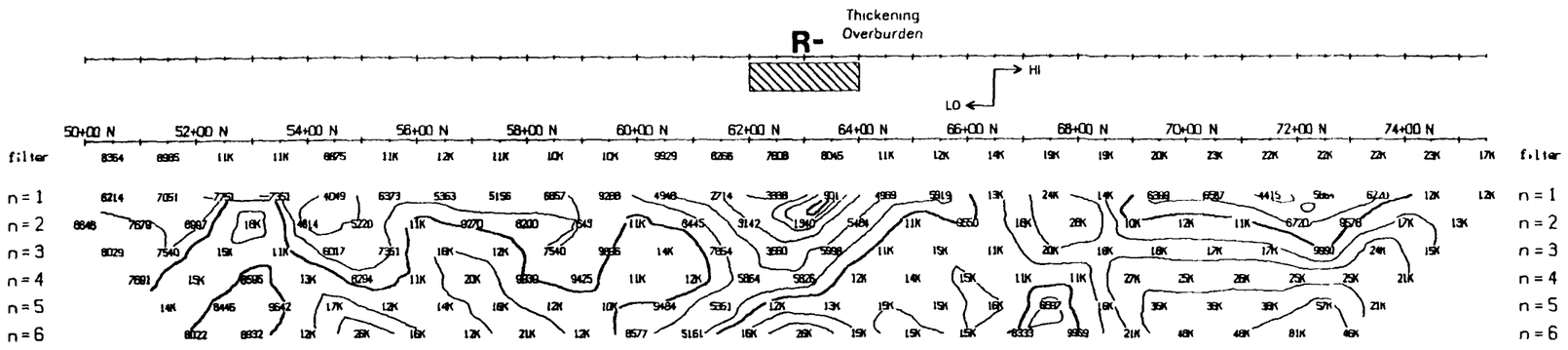
Scale: 1 : 10000 FIGURE 10c

MERTENS & MacNEIL LTD.

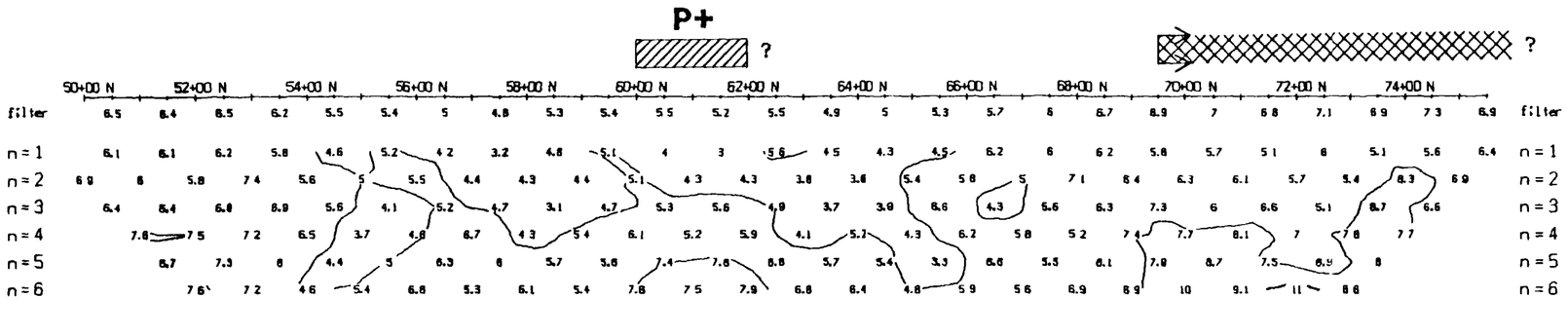
42A01SW0005 2 15758 BURT



TOPOGRAPHY

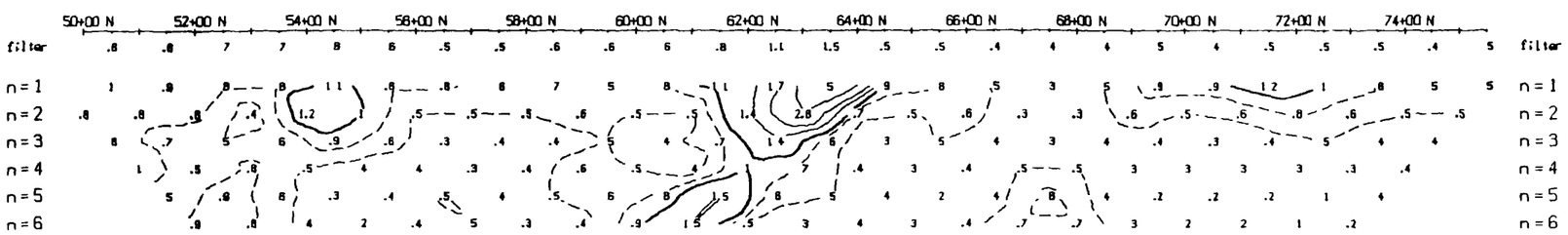


RESISTIVITY
(ohm_m)



PHASE
(milli-radians)

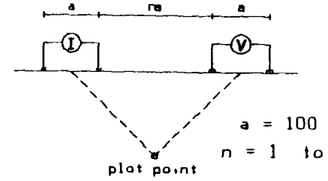
INTERPRETATION



METAL FACTOR
(ip/res * 1000)

Line 13925 E

Dipole-Dipole Array



Filtered Profiles

		filter
Resistivity	———	*
Polarization	———	* *
Metal Factor	- - - - - -	* * *
		* * * *

2.1575 8

Logarithmic Contours 1, 1.5, 2, 3, 5, 7.5, 10,...

Instruments: IPT1,TURBO IPV-4
Frequency: 1.0 Hz.
Operator: J.M.N.

LEGEND

- R+ Resistivity High
- R- Resistivity Low
- P+ Phase IP High
- Elevated Phase IP & High Resistivity Background
- HI / LO Resistivity Contact

WMC INTERNATIONAL LIMITED.

INDUCED POLARIZATION SURVEY

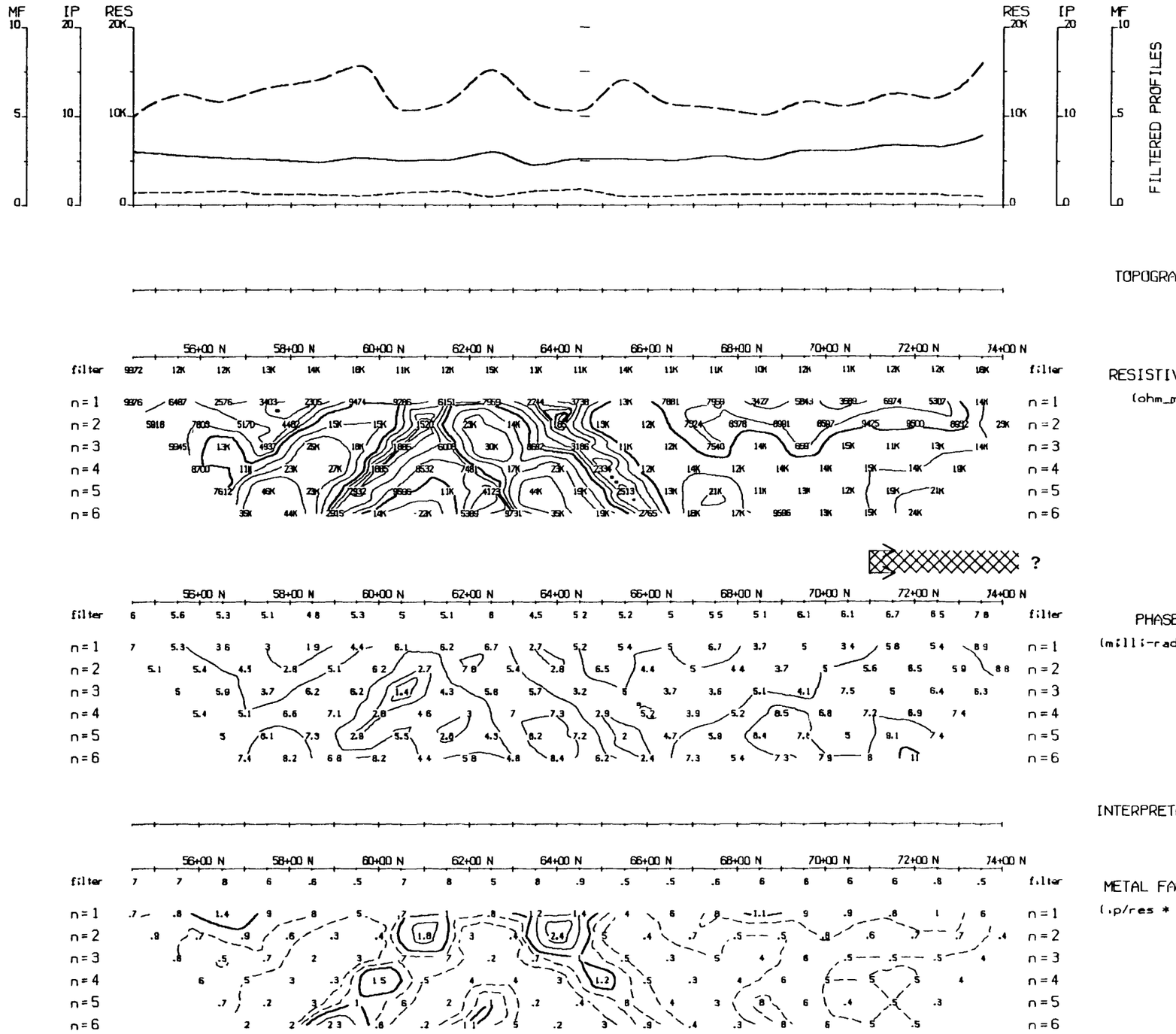
Kirkland Lake West Project,
Kirkland Lake, Ontario

Date: August\1994 N.T.S.

Scale: 1 : 10000 FIGURE 10d

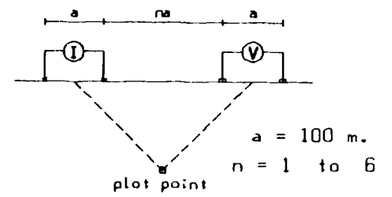
MERTENS & MacNEIL LTD.

42A01SW0005 2 15758 BURT



Line 14300 E

Dipole-Dipole Array



Filtered Profiles

Resistivity ——— filter *
Polarization ——— * *
Metal Factor - - - - - * * *

2.1575 8 * * * *

Logarithmic Contours 1, 1.5, 2, 3, 5, 7.5, 10,...

Instruments: IPTI, TURBO IPV-4
Frequency: 1.0 Hz.
Operator: J.M.N.

LEGEND

- R+ Resistivity High
- R- Resistivity Low
- P+ Phase IP High
- Elevated Phase IP & High Resistivity Background
- Resistivity Contact (HI / LO)

WMC INTERNATIONAL LIMITED.

INDUCED POLARIZATION SURVEY

Kirkland Lake West Project,
Kirkland Lake, Ontario

Date: August\1994 N.T.S.

Scale: 1 : 10000 FIGURE 10e

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42A01SW0005 2 15758 BURT