Report on Magnetometer Survey,

Nat River Property, Penhorwood Township

Quinterra Resources Inc./Highland-Crow Resources Ltd.

by

William O. Karvinen, Ph.D.

March 1984

W.O.Karvinen & Associates Ltd.

Introduction

During the period Nov. 26 to Dec. 6, 1983, Terry Fricker and Bruce Raine in the employ of W.O. KARVINEN & Associates Ltd. carried out a proton magnetometer survey on 17 contiguous claims in Penhorwood Township owned jointly by Quinterra Resources Inc. and Highland-Crow Resources Ltd. The survey was done on a 400 ft. by 100 ft. grid cut earlier by Doug Lalonde of Matheson. Purpose of the survey was to assist in interpreting the geology of the bedrock which is almost totally covered by Quaternary sediments.

Property Description

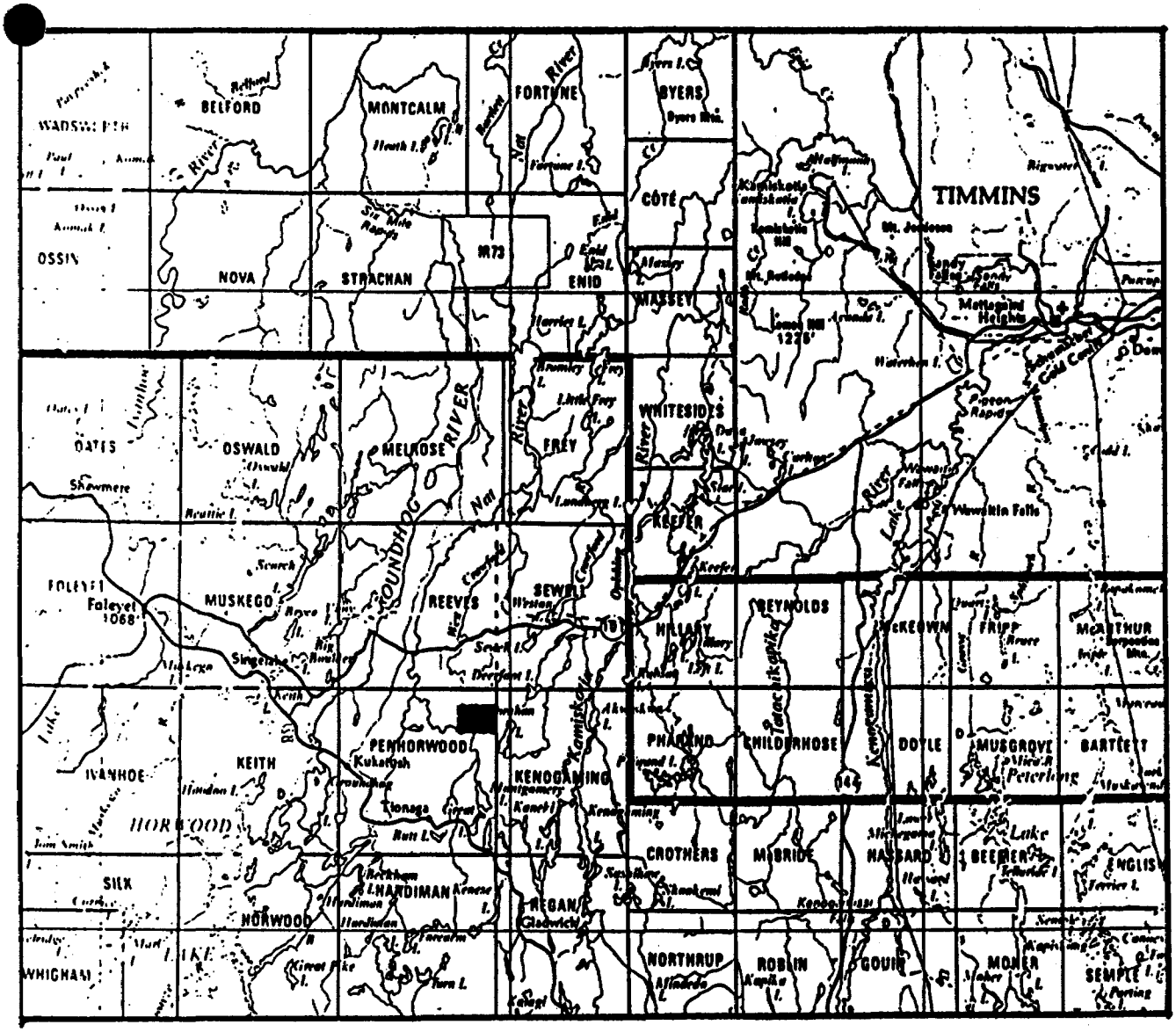
The property comprises 17 contiguous claims numbered P650373 to P650387 inclusive; P661737 and P661738. The claims are owned 50% by Quinterra Resources Inc., Suite 1120, 635 Eighth Avenue S.W., Calgary, Alberta and 50% by Highland-Crow Resources Ltd., 1199 W. Hastings St., Vancouver, B.C. The claims are registered in the name of Quinterra Resources Inc.

Location and Access

The claims are located in the northeast quadrant of Penhorwood Township, about 45 miles south-west of Timmins. The group is accessible via the Kenogaming Lumber Co. haulage road, which leads southward from Highway 101 and cuts across the middle of the group (see map). Numerous logging roads and the Nat River cross the property.

Previous Work

The southeast portion of the group was previously held under patent by the Kukatush Mining Corp., who investigated the potential of the iron formations in the area in the 1950's. No record of work on the present group of claims



Location of Nat River Property, Penhorwood Township

Scale: 1:600,000

is known. Because of the virtual absence of outcrop, little is known about the bedrock geology. On the Ontario government geology map (Map 2231) prepared by V.G. Milne (1972) for Geological Report 97, the group is shown to be underlain by mafic volcanics, some felsic porphyry and oxide iron formation. A few old pits around mineralized quartz boulders are the only evidence of past gold prospecting interest.

Present Survey

The magnitude of the total magnetic field was measured with a Unimag proton magnetometer at 100-ft. intervals along each of the grid cross lines. Traverses were tied into base stations at intervals of no less than one hour and daily variations were controlled by regular readings of some stations recorded the previous day. The data were corrected accordingly and a list of final results, accurate to ±10 gammas was obtained. The data is displayed on a contour map enclosed in this report.

Interpretation of Results

The 100 gamma contours delineate the main rock types on the property: iron formation, quartz-feldspar porphyry, carbonate alteration with quartz veins, ultramafic rocks and mafic volcanics.

The strongly magnetic, northeast-trending anomalies in the southeast portion represent units of oxide facies iron formation which outcrop in a few places in the area.

The irregular anomalies with several magnetic lows north-northwestward of the iron formation are caused partly by the strongly magnetic iron formation as well as irregular zones of quartz-carbonate alteration.

The large area (1500 ft. by 3400 ft.) of magnetically flat to low

anomalies in the west central part of the group reflects the location of a quartz-feldspar porphyry mass which is known on surface only by two widely-spaced outcrops. It appears to have a southward limb located along lines 44W and 48W.

Northeast-trending, moderately-strong anomalies in the northeast and southwest reflect areas underlain by mafic volcanics. These are correlated with a few widely-spaced outcrops.

The strong magnetic feature in the northwest is probably ultramafic rock grading eastward into carbonatized equivalents.

Linear northerly-trending magnetic features, especially low anomalies, may reflect faults which may be part of the Hardiman Bay Fault system.

Conclusions

The detailed total field magnetic survey clearly delineates the geometry and distribution of a variety of bedrock on the property. Combined with detailed bedrock mapping, an accurate bedrock map can be acquired. In addition, magnetic features related to the quartz-feldspar porphyry as well as alteration will be useful in defining exploration targets for gold.

W O Karvinen

March 24, 1984

Dr. William O. Karvinen

Appendix A

Description and Specifications of a Proton Magnetometer.

1 - INTRODUCTION

The McPhar model GP-70 Proton Magnetometer is a light weight, portable instrument, designed for field operation under widely varying environmental conditions. It measures the absolute magnitude of the total magnetic field within the range of 20,000 to 100,000 gammas with an accuracy of 1 gamma $\pm$ 15 parts per million of the field under measurement. The instrument is simple to operate and requires no special skills. A complete reading is obtained in 3.6 seconds by depressing a push-button. The magnetic field intensity is read directly in gammas from a 5-digit display.

2 - PRINCIPLE OF OPERATION

The operation of the GP-70 magnetometer is based on the principle of NUCLEAR FREE PRECESSION of polarized hydrogen protons in the presence of an external magnetic field.

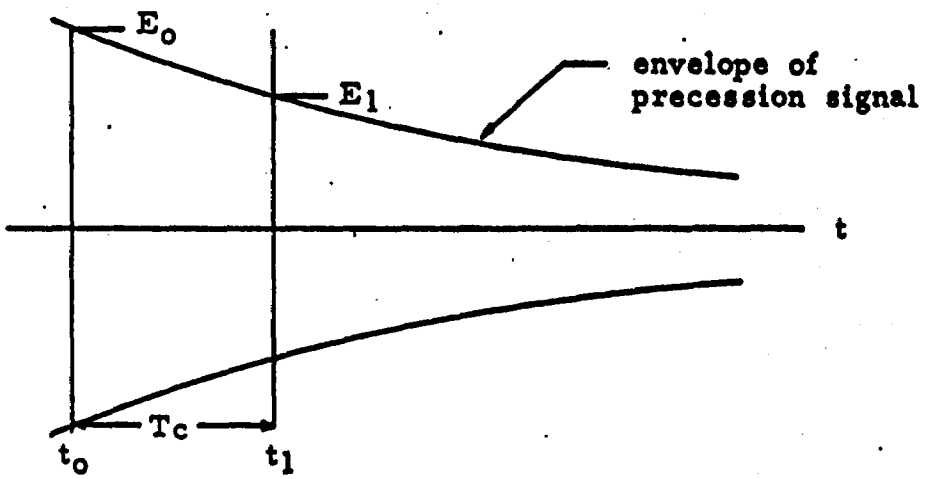
The frequency of precession is always directly proportional to the magnitude of the total field, and is free of orientation requirements and temperature drift.

But since the amplitude of the precession signal produced by a practical fluid such as Kerosene decays with an average time constant (T_k) of 1.2 seconds, a more suitable counting period is obtained by electronic multiplication of the Larmor frequency by a factor of 64, as follows :

$$f_L \times 64 \times T_c \triangleq H_g ,$$

$$T_c = \frac{H_g}{f_L \times 64} = \frac{23.4874 \times f_L}{f_L \times 64} = 0.36699 \text{ sec.}$$

During the count period T_c , the amplitude of the precession signal decays as follows :



If $T_c = t_1 - t_o = 0.36699$ sec., and

$T_k = 1.2$ sec., and $E_o = 100\%$, then

$$E_1 = E_o \epsilon^{-\frac{t_1 - t_o}{T_k}} = 73.65 \% \text{ approx.}$$

The relation between precession frequency w_L (Larmor frequency) and total magnetic field H_o is expressed as the gyromagnetic ratio y_p, a physical constant derived from the properties of the atomic nucleus, as follows :

$$y_p = \frac{w_L}{H_o} = 26751.3 \text{ (radians/second-oersted)}$$

If $w_L = 2\pi f_L$, then

$$H_o = \frac{2\pi f_L}{y_p} = \frac{2\pi f_L}{26751.3} = 23.4874 \times 10^{-5} \times f_L$$

But since 1 oersted = 10^5 gammas,

$$H_g = 23.4874 \times f_L \quad .$$

In order to obtain a direct readout in one gamma units by conventional frequency counting methods, the required counting period T_c can be calculated as follows :

($\triangleq$ means " equal by definition ")

$$f_L \times T_c \triangleq H_g, \text{ or}$$

$$T_c = \frac{H_g}{f_L} = \frac{23.4874 \times f_L}{f_L} = 23.4874 \text{ seconds}$$

During the count period T_c , the amplitude of the precession signal decays to approximately 73% of its maximum value.

The fluid in the sensor is first polarized by a strong magnetic field (100 Gauss). After the polarizing field has been removed , the protons of the fluid start precessing around the earth's magnetic field, and their combined magnetic moments induce a small alternating signal voltage in the sensor coil . This signal is amplified, filtered and frequency-multiplied by a factor of 64.

The multiplied signal frequency is then accurately measured by a crystal-controlled frequency counter, and the count, equivalent to the earth's magnetic field in gammas, is displayed on the five-digit readout .

3 - UNPACKING AND INSPECTION

Carefully unpack the equipment and inspect for shipping damage. If the instrument or accessories were damaged during transit, the carrier should be notified immediately , so he can arrange for repair or replacement.

Compare contents of shipping container with parts list below :

1	GP-70 Magnetometer Console,		
1	Carrying Case ,	1	Sensor Cable
1	Shoulder Strap ,	1	Aluminum Staff
1	Sensor ,	2	Instruction Manuals
24	Eveready # E 95 Alkaline Batteries ,	1	Screw Driver

8 - SPECIFICATIONS

Sensitivity:	1 gamma
Range:	20,000 to 100,000 gammas in ten switch positions (world-wide).
Operating Temperature:	- 40°C to +55°C (-40°F to +130°F)
Absolute Accuracy:	± 1 gamma and ± 15 parts per million of measured field, over range of -30°C to + 50°C.
Cycling Time:	Single Reading - 3.6 sec./reading. Continuous Readings - 2.5 seconds/reading.
Display:	5 digits in-line light emitting diode numbers.
Power Supply:	Standard - 12 internally mounted Alkaline size "D" Optional - 2 internally mounted rechargeable non-ferrous storage batteries. External power supply recharges battery through sensor connector.
Alkaline Battery Life:	10,000 readings approx. at 25°C ambient, decreasing to 1,000 readings approx. at -30°C ambient.
Storage Battery:	Globe Gel/Cell # GC 826-1 (2 required)
Storage Battery Discharge:	Approx. 3,000 readings from a fully charged new battery.

Sensor:	Omni-directional and noise cancelling, electrostatically balanced toroidal coil, contained in a hermetically sealed nylon case.
Sensor Fluid:	cubic centimeters of laboratory grade Kerosene. (Fisher Scientific # K 10 or equivalent)
Magnetic Field Gradient Tolerance:	260 gammas per ft. (850 gammas per meter) maximum in a low noise environment.
Dimensions:	Console - 3" x 6" x 9.5" high (7.5x15x24 cm) Sensor - 4.5" dia. x 4" high (11.4 x 10.1 cm) Staff - 5 ft. extended (1.52 meters) 2 ft. collapsed (0.61 meters)
Weights:	Console - 3.8 lbs. (1.73 kg) Sensor & Cable - 5 lbs. (2.3 kg) Staff - 1 lbs. (0.45 kg) 12 Alkaline "D" cells - 3.8 lbs (1.73 kg) 2 Gel/cells # GC 826-1 - 3.5 lbs (1.59 kg)

9 - ALKALINE BATTERY CROSS REFERENCE

Eveready	# E 95	Bright Star	# 7520
Burgess	# AL 2	Mallory	# Mn 1300
Marathon	# 122	RCA	# VS 1336
Sears	# 4653	NEDA	# 13 A

C E R T I F I C A T E

I, William Oliver Karvinen of 32 Lakeland Point Drive, Kingston, Ont., Geologist and President of W. O. KARVINEN & Associates Ltd., do hereby certify that:

The information contained in this report is accurate and correct;

I have a net proceeds interest in the property described herein;

I hold a Doctorate of Philosophy and an Honours B.Sc. in geology from Queen's University (1974 and 1968) and a Master of Science in geology from the University of British Columbia (1970);

I am a fellow of the Geological Association of Canada and a member of the Canadian Institure of Mining and Metallurgy;

I personally supervised and monitored the survey described herein;

I have been actively carrying out mineral exploration and consultative services in Canada for over five years.

W O Karvinen

Kingston, Ontario
March 24, 1984

Dr. William O. Karvinen

900

Mining Lands Section

File No 26588

Control Sheet

TYPE OF SURVEY

✓ GEOPHYSICAL

____ GEOLOGICAL

____ GEOCHEMICAL

____ EXPENDITURE

MINING LANDS COMMENTS:

OK.

LGD. LI

A. Hunt

Signature of Assessor

June 22/84

Date

may 4th

Ontario — Ministry of Natural Resources

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

#62184

The Mining Act 2.65-88

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

Type of Survey(s)	Township or Area
Geophysical	Penhorwood Twp.

Claim Holder(s)	Prospector's Licence No.
Quinterra Resources Inc.	T-1312

Address: Suite 1120, 635 Eighth Avenue S.W., Calgary, Alberta T2P 3M3

Survey Company	Date of Survey (from & to)	Total Miles of line Cut
W.O. KARVINEN & Associates Ltd.	04 | 11 | 83 (Day | Mo. | Yr.) to 06 | 12 | 83 (Day | Mo. | Yr.)	14.5

Name and Address of Author (of Geo-Technical report): 32 Lakeland Point Drive, Kingston, Ontario K7M 4E7

Credits Requested per Each Claim in Columns at right

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

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.	Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
P	650373				
	650374				
	650375				
	650376				
	650377				
	650378				
	650379				
	650380				
	650381				
	650382				
	650383				
	650384				
	650385				
	650386				
	650387				
	661737				
	661738				

RECEIVED
9 1984
MINES BRANCH SECTION

RECORDED
MAR 5 1984
Receipt No.

Total number of mining claims covered by this report of work: 17

Expenditures (excludes power stripping)

Type of Work Performed

Performed on Claim(s)

RECEIVED
PORCUPINE MINING DIVISION
MAR 05 1984
P.M.
A.M. 7 8 9 10 11 12 1 2 3 4 5 6
SR

Calculation of Expenditure Days Credits

Total Expenditures: $ ÷ 15 = Total Days Credits

Instructions: Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
680	March 5/84	
	Date Approved as Recorded: 84.7.10	Branch Director of Mining Revenue

Date	Recorded Holder or Agent (Signature)
Feb. 28, 1984	W.O. Karvinen

Certification Verifying Report of Work

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

Name and Postal Address of Person Certifying: William O. Karvinen, 32 Lakeland Point Dr., Kingston, Ont. K7M 4E7

Date Certified	Certified by (Signature)
Feb. 28, 1984	W.O. Karvinen

1984 04 09

Your File:
Our File: 2.6588

Mr. Bruce Hanley
Mining Recorder
Ministry of Natural Resources
60 Wilson Avenue
Timmins, Ontario
P4N 2S7

Dear Sir:

We have received reports and maps for a Geophysical (Magnetometer) Survey submitted under Special Provisions (credit for Performance and Coverage) on Mining Claims P 650373 et al in the Township of Penhorwood.

This material will be examined and assessed and a statement of assessment work credits will be issued.

We do not have a copy of the report of work which is normally filed with you prior to the submission of this technical data. Please forward a copy as soon as possible.

Yours sincerely,

S.E. Yundt
Director
Land Management Branch

Whitney Block, Room 6643
Queen's Park
Toronto, Ontario
M7A 1W3
Phone:(416)965-6918

A.Barr:mc

cc: Quinterra Resources Inc
Suite 1120
635 Eighth Avenue S.W.
Calgary, Alberta
T2P 3M3

cc: W.O. Karvinen
32 Lakeland Point Drive
Kingston, Ontario
K7M 4E7

						2·6588
650373	✓					
74	✓					
75	✓					
76	✓					
77	✓					
78	✓					
79	✓					
80	✓					
81	✓					
82	✓					
83	✓					
84	✓					
85	✓					
86	✓					
87	✓					
661737	✓					
38	✓					

Reeves Twp. (M.1074)

Keith Twp. (M.962)

Kenogaming Twp.(M.967)

Hardiman Twp. (M.916)

THE TOWNSHIP OF

PENHORWOOD

DISTRICT OF SUDBURY

PORCUPINE MINING DIVISION

SCALE: 1-INCH - 40 CHAINS

LEGEND

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

NOTES

100' Surface Rights Reservation along the shores of all lakes and rivers

Mining Rights on Horwood Lake Reserved to Contour 817' L.O. 7746.

RESERVES

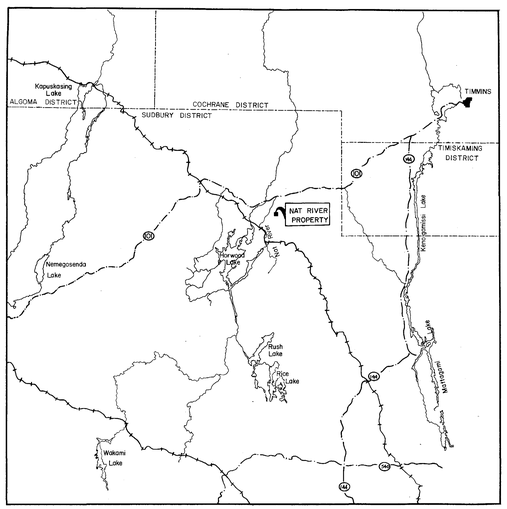
PLAN NO M.1055

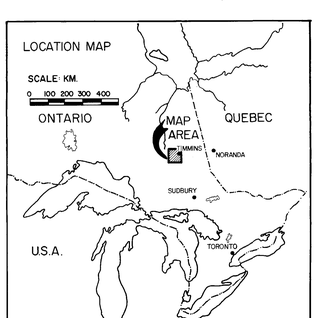
M1022

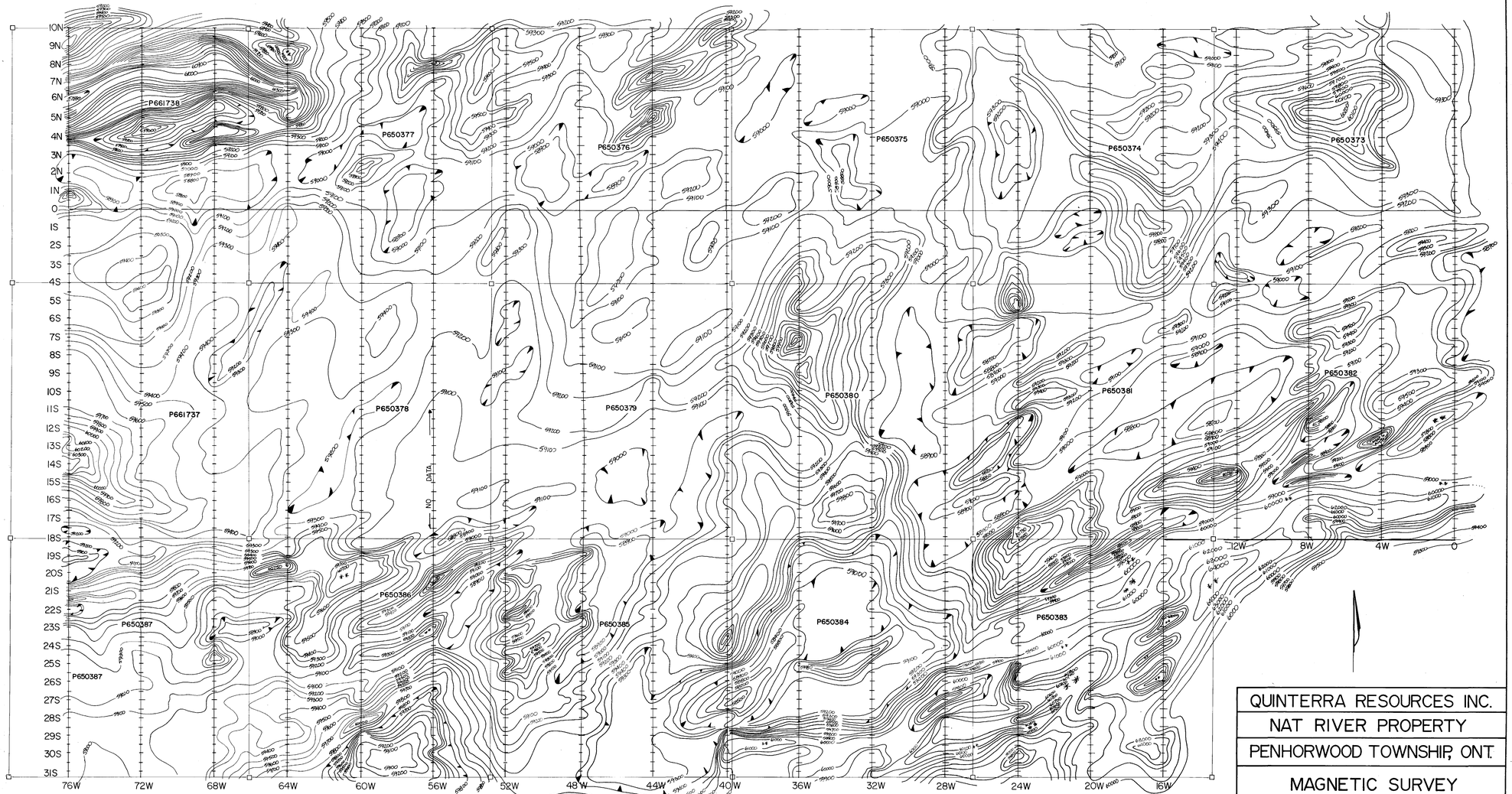
M1022

PENHORWOOD TWP

200







** CONTOUR INTERVAL CHANGED FROM 100< TO 1000<

W.P. Kawmer
Mar 30/84

QUINTERRA RESOURCES INC.

NAT RIVER PROPERTY

PENHORWOOD TOWNSHIP, ONT.

MAGNETIC SURVEY

DATE: MARCH 1984 DRAWN BY: R.J. DEZALL

0 200 400 600 800
SCALE: FEET

26588