INTRODUCTION:

The following report describes the magnetic survey made during November, December 1968 and January 1969, on a group of 21 unpatented mining claims of Quebec Uranium Mining Corporation which are located in Cavendish Township, about half-way between Peterborough and Bancroft, Ontario.

The survey was conducted to assist geological interpretation and possibly show any trends of magnetite mineralization that might have a relationship to uranium minerals.

PROPERTY, LOCATION AND ACCESS:

The property consits of 21 unpatented mining claims located in the southeastern part of the surveyed Township of Cavendish, Eastern Ontario Mining Division. The area of the group is approximately 1,050 acres and situated in concessions III, IV, V and VI. The property adjoins south of the Cavendish Uranium Mines and the eastern boundary is 1/2 to 3/4 of a mile west of Mississagua Lake. The claims registered with the Department of Mines are as follows:

CLAIM NO.	LOTS	CONCESSIONS
EO - 34375 34376 34377 34271	N 1/2 Lots 11, 12, 13, 14,	III

.... 2

CLAIM NO.	LOTS	CONCESSIONS
EO - 34379 34380 34381 34270	S 1/2 Lots 11, 12, 13, 14	IV
EO - 34378 34371 34372 34269 34268	N 1/2 Lots 11, 12, 13, 14, 15	IV
EO - 34370 34369 34368 34367 34366	S 1/2 Lots 11, 12, 13, 14, 15	V
EO - 34365	N 1/2 Lot 15	V
EO - 34364 34363	S 1/2 Lots 15, 16	VI

Access to the ground is gained by way of Highway 507, 30 miles north of Peterborough, Ontario. This road passes very close (a few hundred feet) to the southeast corner of the property. Travel within the property is assisted by several old lumbering roads.

CONCLUSIONS:

The claim group is apparently divided into two parts by a magnetic break, that is a north part consisting of north trending granite and related rocks, and the southern part. The south portion seems to be mostly granitic with banded biotite and hornblende gneisses to the southeast and granitic gneisses in the mid to western portion.

Some isolated highs may be related to disseminated

...3

magnetite in the granitic rocks but there is no known relationship at this time between the magnetite and uraniferous minerals as is generalized for the Bancroft area.

The radioactive outcrops found to date have had very low uranium oxide content.

PREVIOUS WORK:

The property likely received only prospecting during the 1950's as there is no record of trenching or drilling. During the spring of 1968, this claim group was given an aerial radiometric survey and prospected with some trenching and stripping. There were some radioactive outcrops found but their uranium content was very low.

MAGNETOMETER SURVEY:

Picket lines running east and west were established at 400 foot intervals and located by chaining to three north-south base lines.

A Sharpes Fluxgate Magnetometer, Model MF-1, was used to take readings every 100 feet. The readings are expressed in gammas and the maximum sensitivity of the instrument is 20 gammas per scale division of the 1000 scale.

1376 stations were established over the 27 miles of picket lines, and the values ranged from 3000 to 7300

...4

gammas.

The survey was conducted as accurately as possible using the usual precautions and establishing control stations at convenient locations and using a Main Base Control Station several hundred feet east of zero of Line O. A stump of a tree, cut two feet from the ground was appropriately marked and used for the Main Base Control Station. Readings were corrected for diurnal variations.

The magnetics are slightly distorted by the 400 feet spacing of the lines and the 100 foot intervals between readings, so that an elongated trend to the north or northwest is shown by the high and low magnetic areas. Nevertheless this strike trend is substantiated by the limited outcrops that have been observed.

The area is underlain by granitic rocks (i.e. granite, pegmatite, syenite and some diorite) and may have some areas of disseminated magnetite as displayed by the isolated highs and lows. There appears to be a break, roughly paralleling Line O, which may be the magnetic expression of the banded gneisses located in the mid western part of the claims.

Similarily, the magnetics to the southeast portion of the claim group are relatively flat or low and likely express the underlaying banded biotite and hornblende

gneiss. This latter rock type could be related to the sediments of the area.

The northeastern claims appear to be granitic and trend north to northwest, with some isolated magnetic highs and lows.

RECOMMENDATIONS:

The areas of magnetic high values and some of the related lows as well as the east to west magnetic break, should be prospected thoroughly for outcrop and the possibility of trenching to bedrock.

As the area is predominately covered by overburden, I would recommend a soil sampling survey to help locate areas with higher than average uranium mineralization.

Respectfully submitted by

QUEBEC URANIUM MINING CORPORATION

R. L. Alexander

R. L. Alexander, B.Sc.
Geologist

Montreal 101, Quebec.
February 4, 1969.

REPORT ON

AIRBORNE GAMMA RAY SPECTROMETER SURVEY

FOR

QUEBEC URANIUM MINING CORPORATION

CAVENDISH TOWNSHIP - BANCROFT AREA - ONTARIO

AREA SURVEYED

North half of Lots 11, 12, 13, 14 of Concession III

North half of Lot 15, Concession IV

Whole Lots 11, 12, 13 and 14 of Concession IV

South half of Lots 11, 12, 13, 14 and 15 of Concession V

North half of Lot 15, Concession V

South half of Lots 15 and 16 of Concession VI

All the above area of Cavendish Township is staked and the list of claims as recorded with the Ontario Department of Mines is as follows: - EO 34363, 34364, 34365, 34366, 34367, 34368, 34369, 34370, 34371, 34372, 34375, 34376, 34377, 34378, 34379, 34380, 34381, EO 34268, 34269, 34270, 34271.

A total of (21) Twenty-one claims was surveyed.

DATE OF SURVEY - May 11, 1968.

PERSONNEL

Pilot - John Sadowski, Toronto, Ontario

Navigator and Operator - Jaffery Denham, Cooksville, Ontario

Consultant - W. A. Smith, Toronto, Ontario

Geologist - R. L. Alexander, Montreal, Quebec

FLIGHT PATTERN

Length of flight lines - 24 miles

Direction of flight - East and west approximately

Number of flight lines - 16

Spacing of flight lines - 660 feet or 1/8 mile approximately

Navigation by VSR - Photographs and claim map

Altitude - 250 to 300 feet terrain clearance

EQUIPMENT

Aircraft - Cessna 180, Registration No. CF-J.I.W.

Four channel Gamma Ray Spectrometer, Model DGRS 1000, manufactured by Exploranium Corporation of Canada Limited, Toronto. (see appendix). Crystal size is 8 x 4 inches, of sodium iodide, with four single channel analysis ratemeters and a four channel chart recorder.

CALIBRATION

See Appendix. Each of the four ratemeters are set to measure one of the portions of the energy spectrum related to the following radiation emissions - total radiation, and 100% discrimination of potassium 40, bismuth 214 (uranium) and thallium 208 (thorium).

Time constant - 2 seconds

Chart width - 6 inches

Chart speed - 6 inches per minute

Full scale recording of 500 counts per second for total count, the other three are of 100 counts per second for full scale.

DISCUSSION

The Gamma Ray Spectrometer detects and measures the spontaneous disintegration energy of radioactive substances which is in the form of alpha and beta particles and gamma rays. Each substance emits a particular spectrum of energy and the four channel gamma ray spectrometer detects and measures the energy created by each of the three substances (potassium, uranium and thorium) as well as the total range of the spectrum.

These energies penetrate the atmosphere in a cone shape for several hundred feet but can be screened out or shielded by a few feet of water, snow or soil. Thusly the aerial spectrometer measures and analysis the radioactive characteristics of the rock outcrop over which it is flown.

The larger the detection crystal, the more sensitive it is to radioactive energy. Therefore this model DGRS-1000 by Exploranium Corporation of Canada is the most sensitive and latest equipment designed for mobile carriers, with its 8 x 4 inch sodium iodide crystal and separate ratemeters to measure the four spectra involved.

SURVEY RESULTS

The higher readings of each flight line are recorded on the accompanying map. The normal background count for the total count varied between 25 to 40 counts per second and the background count for uranium was 10-12 counts per second. This background count is due to the average of the terrain, air activity and weakly radioactive granite and pegmatitic dykes.

The values are marked in counts per second on the flight lines, the values on the left side or south are firstly total count and secondly potassium while the values on the right or north side are firstly

uranium and secondly thorium. None of the values were really significant but the higher readings of each line were recorded on the map.

Two readings gave about twice background for total count and uranium and are designated as B and E on lines 10 and 13 respectively.

CONCLUSIONS AND RECOMMENDATIONS

None of the values are indicative of uranium in economical quantities and generally require no further investigation. Nevertheless the two readings designated as B and E should be explored on the ground in case some screening effect is occurring and greater uranium content is present in the vicinity than that indicated by this survey.

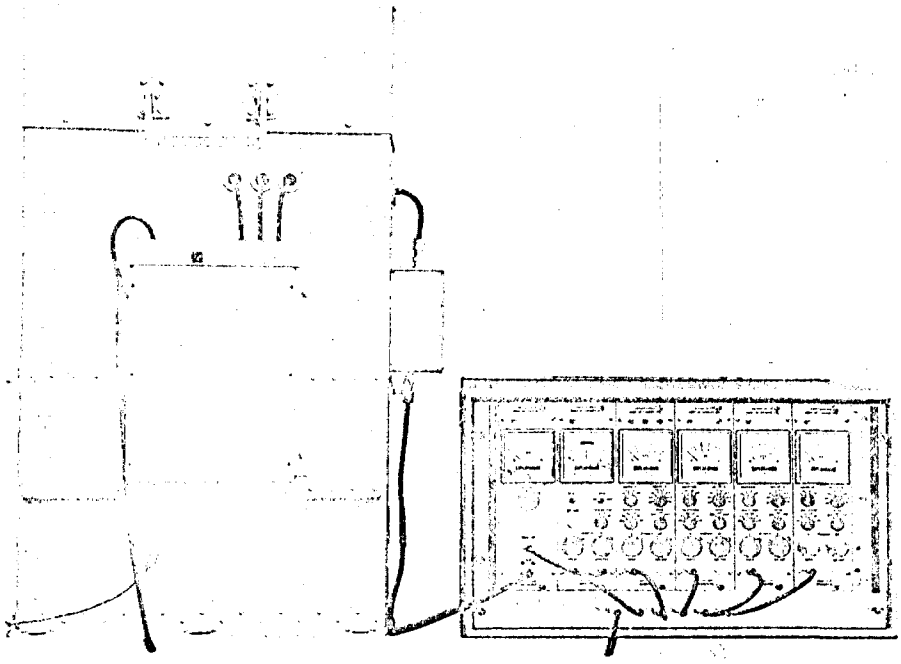
Respectfully submitted,

R. L. Alexander

MONTREAL, QUEBEC.
June 30, 1968.

R. L. Alexander, B. Sc.
Geologist

FOUR CHANNEL DIFFERENTIAL GAMMA RAY SPECTROMETER



DESCRIPTION

The Model DGRS-1000, four channel differential gamma ray spectrometer has been developed to provide the mining industry with this system to obtain precise radioactive quantative analysis from aircrafts, ships and ground vehicles.

The system may be used for bore hole logging with a special detector, laboratories or base camps.

The four channels are: 1. potassium -40 2. bismuth -214 3. thallium -208 4. total count or integral.

Spectral interaction has been eliminated by using specially developed techniques, which results in 100% discrimination between the three radioactive elements.

A large volume detector, 8" x 4" NaI (Tl) coupled to three matched photomultiplier tubes is used to obtain high sensitivity. The pulse height at the output of the detector is maintained constant as function of temperature by using spectrum stabilization techniques. As a reference element, the radioactive isotope Cesium -137 is used. The system conforms to the USAEC recommended standard instrument module and bin design as covered by TID-20893.

FEATURES

Integrated circuits have been used throughout the system, which resulted in a unique and small package and also provides maximum reliability. All analogue and pulse processing circuitry has been temperature compensated by using the latest integrated circuits. Each channel may be used for spectrum analysis by using spectrum scanning techniques. Plug-in modular construction allows system building, from one to four channels.

Temperature compensated analogue computer circuits are used, to provide spectral interaction elimination, resulting in 100% discrimination.

The system has been designed, incorporating nuclear instrumentation techniques, with an extended operating temperature range.

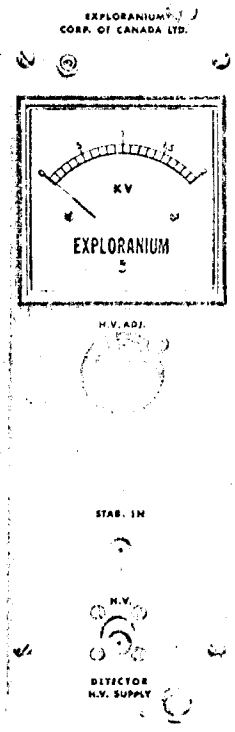
EXPLORANIUM

CORPORATION OF CANADA LIMITED — NUCLEAR INSTRUMENT DIVISION

1415 LAWRENCE AVENUE WEST • SUITE 7 • TORONTO 15, ONTARIO, CANADA

TELEPHONE: 248-6463 (AREA CODE 416)

JANUARY, 1968



High Voltage Power Supply

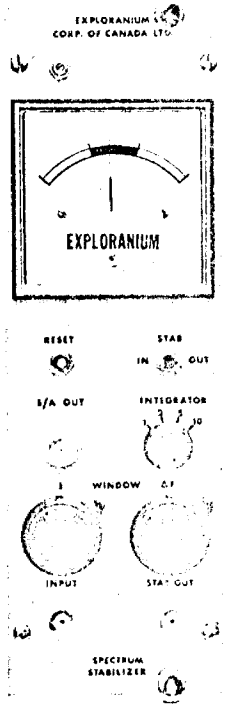
The high voltage power supply may be remotely regulated to control the gain of the photomultiplier tubes. A seperate input has been provided for this purpose. The regulation range is ± 100 volts.

SPECIFICATIONS

Range: 0 to 1,500 volts, controlled by 10 turn potentiometer.
Stability: .2% °/C
Operating Voltage: 1,000 v
Ripple: 3 mv

Spectrum Stabilizer:

To guarantee the high resolution of the detector and maintain a constant pulse height as function of temperature and aging spectrum stabilization techniques must be used. Cesium -137, a monoenergetic radioactive isotope has a single gamma emission at .662 Mev and a half life of 32 years. The ultra stable photopeak of Cesium -137 is used as a reference. The method is based upon a comparison technique. The photopeak is divided into two parts with the peak as center point. The integral of the left part is compared with the integral of the right part and when both are equal a zero output signal is the result. Any change in system gain will produce a shift in the measured photopeak. This shift is measured and converted to an error signal. The error signal is then fed back 180° out of phase as a correction signal to the high voltage power supply.



SPECIFICATIONS

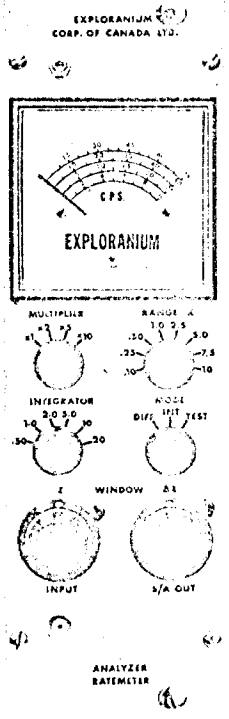
Input range: 0 to 10 volts – positive going pulse – pulse width 1 μs.
Input impedance: 1000 ohms
"E" Discriminator range: 0 to 10 volts – controlled by a 10 turn potentiometer
"ΔE" Discriminator range: 0 to 10 volts – controlled by a 10 turn potentiometer
"E" and "ΔE" baseline stability: .5 mv /°C
Window stability: better than .5 mv/°C
Integral linearity: .2% of full scale.
Differential linearity: 1.5% of full scale.
Integration Time Constants: 1 – 2 – 5 – 10 sec.
Spectrum shift as function of countrate: 2% at 50,000 cps.
Single channel output: +3v – pulse width 150 ns
Stabilization output (error signal): ± 2 volts
Gain regulation: about .1% of the loop gain.
Regulation: Holds photopeak of Cs -137 to within .1% of the center in a 25% photopeak shift in the system.

Single Channel Analyser Ratemeter

The Model DGRS-1000 comprises four of these units. This unique module contains a differential single channel pulse height analyser and a precision linear ratemeter. The operation of the single channel analyser is based upon a window method. If an incoming pulse (event) representing a certain amount of energy in Mev, exceeds a preset baseline ("E") level it will activiate a discriminator. The discriminator produces a pulse which is routed to a memory. If the incoming event is not exceeding another level ("ΔE") which is higher than the ("E") level, the pulse will be released out of memory and a single channel output occurs. If the incoming event exceeds the ("ΔE") level, it will activate the "ΔE" discriminator generating an inhibit signal, which in turn causes a coincidence and no single channel output is generated. This method allows the selection of a certain window width in Kev or percentage of full scale, independant of the "E" baseline level. The "E" baseline control may be used to sweep the spectrum in order to find peaks of interest. The single channel analyser has two selectable operation modes:

(1) differential (2) integral

The events appearing at the output of the single channel analyser are counted by a precision linear ratemeter. Its unique design allows accurate recording and displaying of countrates produced by the single channel analyser. All pulse and analogue processing circuitry has been temperature compensated. A temperature compensated analogue computer has been incorporated which may be used for spectral interaction elimination.



Single Channel Analyser Specifications:

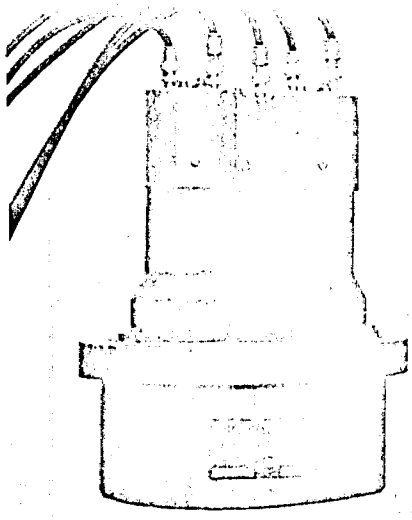
Input range: 0 to 10 volts, positive going pulse, pulse width 1 μs.
Input impedance: 1000 ohms
"E" discriminator range: 0 to 10 volts, controlled by a 10 turn potentiometer.
"ΔE" discriminator range: 0 to 10 volts controlled by a 10 turn potentiometer.
Integral linearity: .2% of full scale.
Differential linearity: better than 1.5% of full scale.
"E" and "ΔE" baseline stability: .5 mv/°C
Multiple pair resolution: 1.5 μs.
Operation mode: differential – integral – selectable by switch located on front panel.
Single channel output: + 3 v – pulse width, 150 ns
Spectrum shift as function of countrate: 2% at 50,000 cps.

Linear Ratemeter Specifications:

Ranges: 0 to 100 cps 0 to 250 cps
0 to 500 cps 0 to 1000 cps
0 to 2500 cps 0 to 5000 cps
Range multiplier: 1 – 2 – 5 – 10
Meter linearity: 1% full scale
Integration time constants: .5 – 1 – 2 – 5 – 10 – 20 seconds, zero to full scale.
Recorder output: 0 to 10 mv
Linearity: .2% full scale.
Meter zero adjustment: located on front panel.

TECTOR

The Harshaw Chemical Company selects specially for Exploranium Corporation sodium iodide thallium activated crystals with unique resolutions of 8.3% at .662 Mev at 1,000 volt. The diameter is 8" and the thickness is 4". Larger or smaller crystals to special order. The crystal is coupled to three selected photomultiplier tubes. The gain and focus of each photomultiplier tube can be varied individually. The crystal is mounted in a low background stainless steel case with a thin entrance window. The three photomultiplier tubes are magnetically shielded and are mounted with stainless steel tube bases. The crystal assembly is mounted in a protective enclosure, which is lined with 6" of polyurathene foam to protect the crystal from thermal shocks. An ambient temperature change of 75°C per hour will cause a change of temperature inside the enclosure of not more than 10°C per hour. The crystal is suspended in 6" of semi-hard foam.



Pre-Amplifier – Main pulse amplifier

The pre-amplifier is a low noise, low gain m.o.s. amplifier. The outputs of the photomultiplier tubes are summed at the input of the pre-amplifier. To prevent loading of the photomultiplier tubes, a very high input impedance is required. The pulse shape appearing at the output is R-C shaped, with a decay constant of about 30 μs. The main pulse amplifier consists of an amplifying section of which the gain can be selected, a pulse current limiter, a delay line bridge and a low impedance output buffer. The output pulse is gaussian shaped with a pulse width of about 1 μs. The maximum output is 10 volts. Both amplifiers are mounted on the detector enclosure.

PRE-AMPLIFIER SPECIFICATIONS

Input impedance: 1 M Ohms – negative going pulses.
Input capacity: 5 pf
Gain: 4 X.
Input pulse time constant: 30 μs.

SYSTEM SPECIFICATIONS

Power Requirement: 110 volts A.C. – 75 watts.
Instrument Weight: 55 lbs.
Detector Weight: 8" x 4" crystal – 75 lbs.

MAIN AMPLIFIER SPECIFICATIONS

Gain: 1 – 2 – 4 – 8 – 10.
Overload recovery: for 250 x overload about 20 μs.
Pulse shape: Gaussian – pulse width 1 μs.
Output: 0 to 10 volt maximum – positive going.
Maximum output load: 50 Ohms.
Stability: .1%/°C.
Differential linearity: ± 1%
Output impedence: .5 Ohms.

WARRANTY

The instrument is warranted free from material defects and poor workmanship for a period of one year from the date of shipment and defective material will be replaced free of charge during this period unless the equipment has been modified, adjusted and/or changed as a result of misuse, in which case this warranty is void.

Should repairs outside the warranty be required, then repairs will be made at our standard service rates.

RESERVED RIGHTS

Exploranium Corporation of Canada Ltd., reserves the right to adjust engineering specifications in the best interests of maintaining high quality instrumentation.

PRINTED IN CANADA

Glamorgan Twp. (M-95)

Galway Twp. (M-94)

Anstruther Twp. (M-45)

Harvey Twp. (M-101)

Burleigh Twp. (M-62)

THE TOWNSHIP OF CAVENDISH

COUNTY OF PETERBOROUGH

EASTERN ONTARIO MINING DIVISION

SCALE: 1 INCH = 40 CHAINS

LEGEND

PATENTED LAND	(P)
CROWN LAND SALE	C.S.
LEASE	(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.

NOTES

This Map Is Not To Be Used - FOR SURVEY PURPOSES -

400' Surface Rights Reservation around all lakes and rivers.

For status of summer resort locations & islands please contact Dept. of Lands & Forests.

Original shoreline shown thus:

F.R.I. shoreline shown thus:

Patents Map shoreline shown thus:

Area shown thus reserved for proposed Provincial Park - Withdrawn from staking, Sec 34(d) of the Mining Act. File 160708

Mining claims staked in this Twp. subject to Sec. 110 of the Mining Act.

PLAN NO. - M-72

DEPARTMENT OF MINES
- ONTARIO -

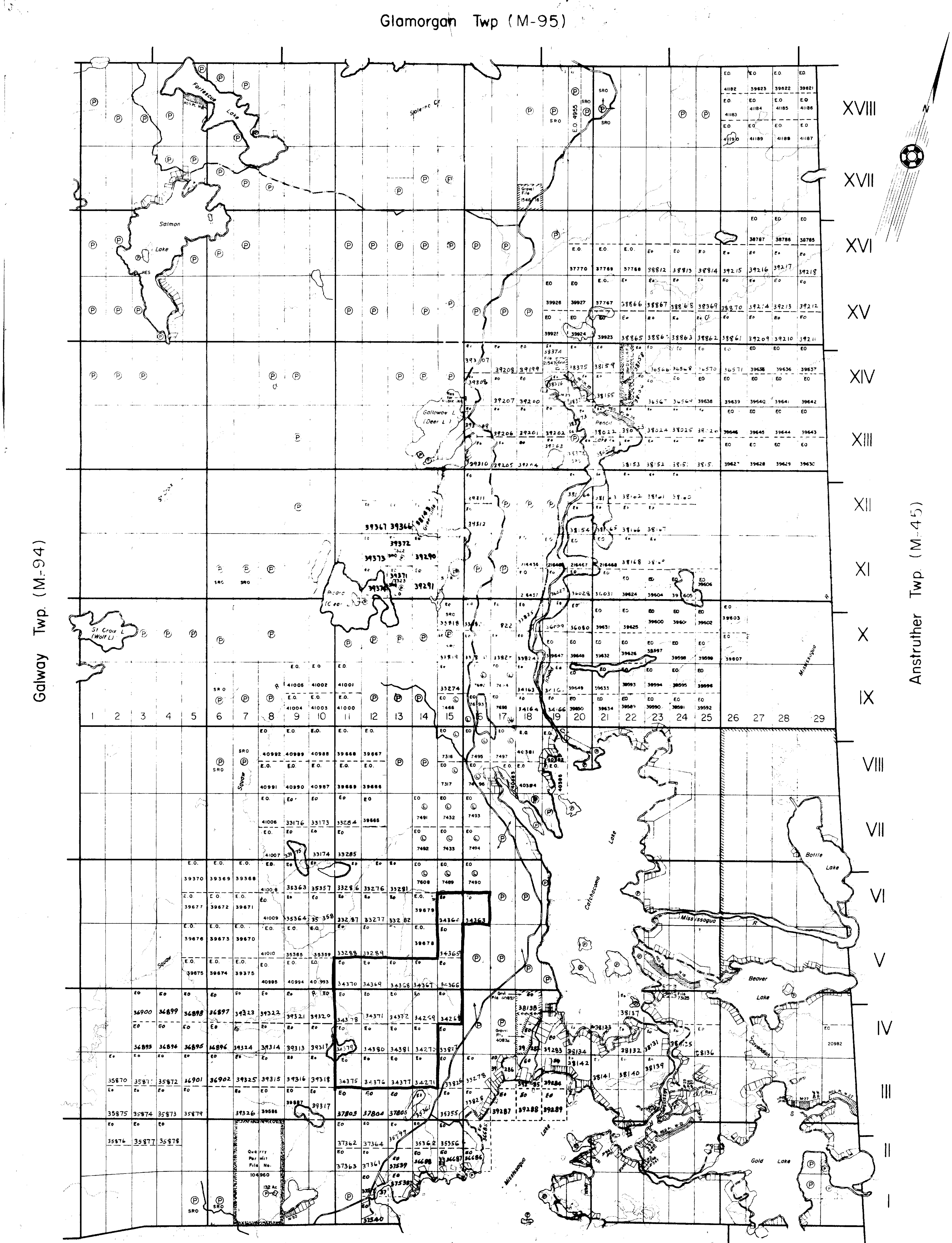
CLAIM MAP
THE TOWNSHIP
OF

CAVENDISH

COUNTY OF
PETERBOROUGH

EASTERN ONTARIO
MINING DIVISION

SCALE: 1 INCH=40 CHAINS



LEGEND

PATENTED LAND	Ⓟ
CROWN LAND SALE	C.S.
LEASE	Ⓛ
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.

NOTES

This Map Is Not To Be Used
- FOR SURVEY PURPOSES

400' Surface Rights Reservation around all lakes and rivers

For status of summer resort locations & islands please contact Dept. of Lands & Forests

Original shoreline shown thus

FR shoreline shown thus

Patents Map shoreline shown this

Area shown thus reserved for proposed Provincial Park - Withdrawn from staking Sec 34(d) of the Mining Act File 160700

Mining claims staked in this Twp subject to Sec 70 of the Mining Act

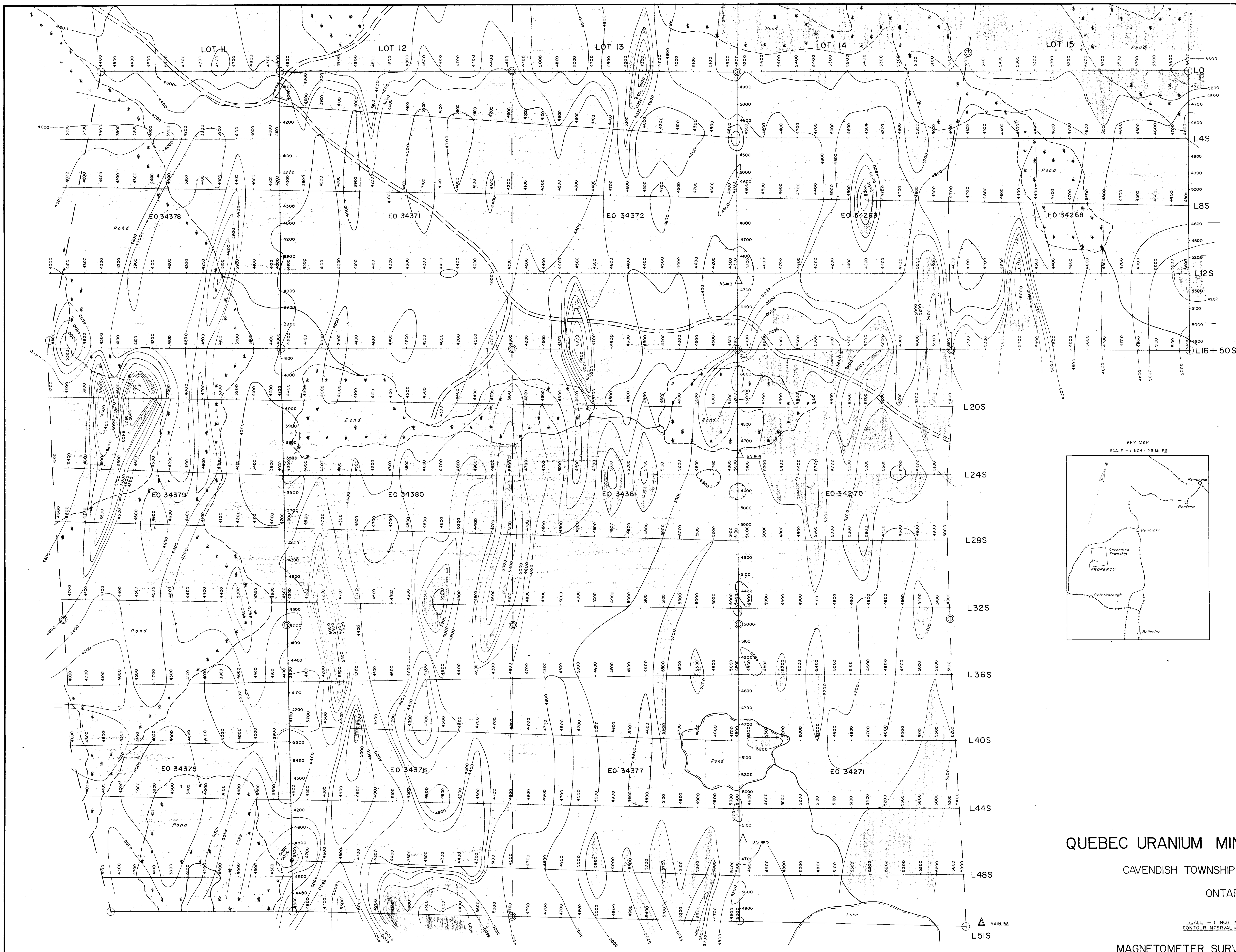
PLAN NO - M-72

DEPARTMENT OF MINES
- ONTARIO -

31D09NW8549 63.2326 CAVENDISH

210


QUEBEC URANIUM MINING CORP.
CAVENDISH TOWNSHIP - BANCROFT AREA
ONTARIO
SCALE - 1 INCH = 200 FEET
CONTOUR INTERVAL = 400 GAMMAS
MAGNETOMETER SURVEY (NORTH PART)
January 1969
Drawn by - H Blackburn
MAGNETIC CONTOURS
IN GAMMAS
4000 — 5200
5200 — 6000
6000 — 6800
6800 and above
Bush Road
Claim Post
Claim Post not Observed
Claim Boundary
Main Base Station
Base Station
SUPERVISOR - R.L. Alexander
OPERATORS - V. Sheehan
J. Ryan
KEY MAP
SCALE - 1 INCH = 25 MILES
Pembroke
Renfrew
Bancroft
Peterborough
Belleville
PROPERTY
LOT 11
LOT 12
LOT 13
LOT 14
LOT 15
LOT 16
CON VI
CON V
L50N
L46N
L42N
L38N
L33+60N
L30N
L26N
L22N
L18N
L16N
L12N
L8N
L4N
L0N
BL # 2
BL # 3
EO-34363
EO-34364
EO-34365
EO-34366
EO-34367
EO-34368
EO-34369
EO-34370
Lake
Pond
33 2326



MAGNETIC CONTOURS IN GAMMAS

4000 – 5200
5200 – 6000
6000 – 6800
6800 and above

Bush Road
Claim Post
Claim Post not Observed
Claim Boundary

SUPERVISOR – R. L. Alexander
OPERATORS – V. Sheehan
J. Ryan

Main Base Station
Base Station

QUEBEC URANIUM MINING CORPORATION

CAVENDISH TOWNSHIP BANCROFT AREA

ONTARIO

SCALE – 1 INCH = 200 FEET
CONTOUR INTERVAL = 400 GAMMAS

63.2326

MAGNETOMETER SURVEY (SOUTH PART)

January 1969

Drawn by – H. Blackburn

230

LOT 11 | 12 | 13 | 14 | 15 | LOT 16

North Astronomical

LAKE

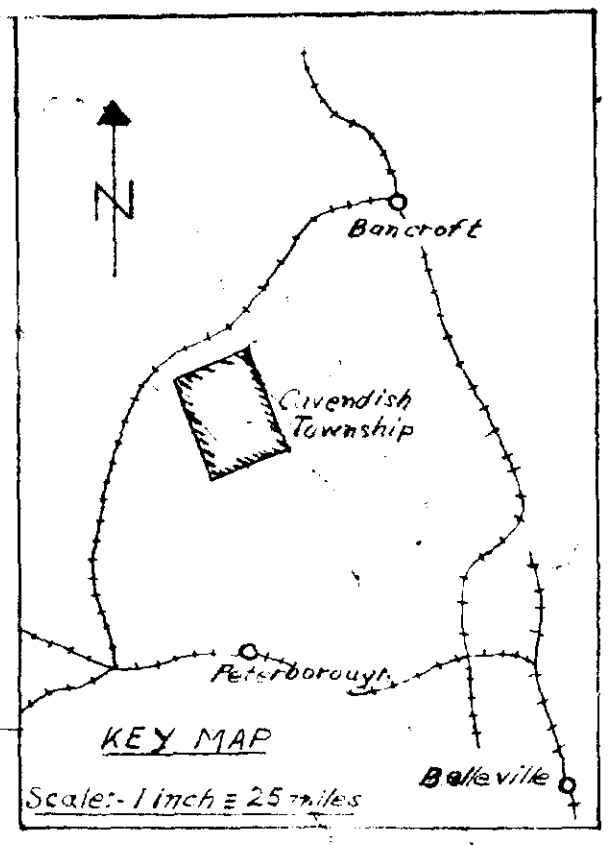
CONC. VI

V

IV

III

L.



CATCHACOMA LAKE

MISSISSAGUA LAKE

Road Hwy. 507

LEGEND

T/C K U Th.

1 Flight Line

70,20 +21,13 Radiation Count (Total Count, Potassium Uranium, Thorium)

63.2326

GAMMA RAY SPECTROMETER SURVEY

FOR

QUEBEC URANIUM MINING CORPORATION

Cavendish Township - Ontario.

SCALE:- 1 inch = 1320 feet

R.L. ALEXANDER, B.Sc.
Geologist
R. L. Alexander

JUNE 30, 1968.