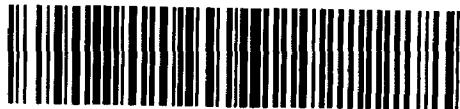


RONKA EM 16



41P12SW0121 2.482 CHESTER

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ELECTROMAGNETIC SURVEY
GOGAMA MINERALS LIMITED
CHESTER TOWNSHIP PROPERTY
ONTARIO

BY

William Russell Miller

SUMMARY

A Ronka EM 16 Electromagnetic survey has been completed on Gogama Minerals Ltd., Chester Township, Ontario property consisting of 3 patented claims numbered 8417, 8418 and 8420 known on the O.D.M. claims map as numbers S8995, S8996, and S8997, and ~~eleven~~ *12 claims* unpatented claims numbered S217461 and S269250 to S269260 inclusive.

Several NW-SE trending near vertical conductors with their effective centres about 100 feet deep and possibly deeper are located in both the northern and southern part of the Clam Lake portion of the property, and most appear to coincide with known mineral showings recorded by Laird (O.D.M. annual report 1932), and continue on land near Clam Lake suggesting importance. Conductors also seem to connect the southern group of conductors on Clam Lake eastward to the junction of Clam Creek and the Mollie River.

The resultant pattern is similar to Weeduck Lake about 1½ miles NE of Clam Lake where a mineral zone of good width was drilled in 1966-7.

Results of this survey should be correlated to I.P. check survey lines and diamond drilling performed to date, to assess the amount of further drilling necessary to test this area.

Introduction

Property:

The property consists of three (3) patented mining claims numbered 8417, 8418 and 8420 and (12) twelve unpatented mining claims numbered S217461 and S269250 to S269260 inclusive located in Chester Township, Ontario, Sudbury Mining Division.

Location:

The claim group is situated in the north-west quarter of Chester township, on and mostly surrounding Little Clam Lake and Clam Lake, with the eastern border near the Mollie River and the western border on the Chester and Yeo township common border.

Access:

The property lies about 70 miles south-west of Timmins and about 100 miles north of Sudbury, 3 miles west of the new highway No. 144. The flagstop of Nakwa on the main Toronto-Vancouver CNR line, is 12 miles to the east. The property is easily accessible by a bush road from No. 144 highway.

Resources:

Water The area has an abundant water supply in Clam Lake, as part of the property crosses the northern half of the lake.

Electricity The local powerline to supply the town of Gogama is 3 miles to the east and the main U.H.V. is 35 miles to the east.

Manpower The main mining centres of Timmins and Sudbury supply the local labour pool. Mining supplies have the same facilities.

Lumber Wood supplies are abundant on the property and several major lumber companies operate within a 50 mile radius.

History The area covered by the survey has two old exploration shafts and mineral showings that were worked in the 1930's by the previous owners, Young Shannon Mines Limited, located on patented mining claims 8995 and 16304. At the present time, there are neither surface nor underground plant or equipment on the property. The area is mentioned in the report of H.C. Laird, VOL, XII, Part 3 Department of Mines Annual Report 1932.

General Geology:

The long known greenstone belt which runs from Osway Township about 20 miles to the west to Connaught Township about 20 miles to the east, is now recognized to be ancient island arc, related to the Kenoran orogeny which extended from about 2300 to 2700 million years ago. The widening out at Chester Township appears to be a centre of volcanic activity. The younger granite described by

Laird would now be described as a late or post tectonic granite. Laird noted a quartz porphyritic phase. Island arcs mark mantle downflow areas and have been described in the recent literature (Isaacs, Oliver and Sykes 1968). The late tectonic granites under appropriate conditions are host to the major low grade copper-molybdenum deposits. Early NNW faults have controlled dyke emplacement and are known to be mineralized at Weeduck Lake a mile or so to the north east and at Mill Pond and Arethusa Lake again, two to three miles to the east.

Equipment and Technique:

Any electromagnetic equipment is based on measuring how much conductors in the ground effect and electromagnetic signal. A transmitter and receiver are therefore required. The penetration, or depth to which conductors can be detected, is a function of the distance between the transmitter and receiver. The Ronka EM16 Utilizes the U.S. Navy's very low frequency (VLF) transmitters. in the present case NAA, Cutler Maine and NBA Balboa, Canal Zone, and so does away with the need for a transmitter on the property, it can also penetrate to a greater depth and gives readings in all four quadrants of the compass, rather than the two as is usual. Thus an anomaly can be detected by completing the survey in this manner in a 360 degree circumference. Two maps were prepared on the present Ronka EM survey, one for the EW survey using NBA Balboa, Canal Zone, the other NS survey map using NAA Cutler, Maine transmitter. As can be seen from these maps, the NS survey picks up EW conductors and the EW survey picks up NS conductors, and with only one of these maps on the survey area, only half the information would be available.

The distance between the maximum positive and negative readings is about the same as the distance from the ground surface to a point somewhat above the centre of the effective area of the conductive area. In general, in phase readings are related to the bedrock conductors in bedrock, whereas from quadrature one may interpret some idea of conductive overburden.

Survey Results

A characteristic of the EM16 is that it readily detects conductors. Identification of these conductors is a prime concern of anyone understanding geology. The Ronka EM16 survey on this property is plotted on two sheets one giving NS readings and the other EW readings.

Most mineral showings in the surveyed area have an EW or NW-SE trend in, and on both sides of Clam Lake. A comparison between the data from the two sheets shows a coincidence of conductors, appearing to be generally vertical and having symmetrical profiles, with their effective centres of conductivity about 100 feet deep. Since many conductors coincide with known mineral showings near or on the lake, and continue onto the land portion of the property, it is reasonable to assume that the large number of conductors centered in the lake area are not the effect of the lake itself but rather a highly fractured zone. Profiles in the lake near shaft areas suggest a deeper effective centre similar to the pattern established on Weeduck Lake about $1\frac{1}{2}$ miles to the NR where a mineral zone of good width has been drilled in 1966-7.

Conclusions & Recommendations

Since several conductors in the north and south part of Clam Lake, the south part of which seems to join in an ENE direction to the junction of Clam Creek and the Mollie River appear to follow a pattern of importance, results of this survey should be correlated to I.P check survey results and diamond drilling completed to date, to assess the amount of further drilling necessary to test this area.

Respectfully submitted

William Russell Miller

WILLIAM RUSSELL MILLER

APR 12 6/71

ADDENDUM

Ronka EM16 (with reference particularly to the property of GOGAMA MINERALS LTD. in Chester Township, Ontario).

1. Principle of Operation

The VLF-radio stations operating for communications with submarines have a vertical antenna. The antenna current is thus vertical, creating a concentric horizontal magnetic field around them. When these magnetic fields meet conductive bodies in the ground, there will be secondary fields radiating from these bodies. This equipment measures the vertical components of these secondary fields.

The EM16 is simply a sensitive receiver covering the frequency band of the new VLF-transmitting stations, with means of measuring the vertical field components.

The receiver has two inputs with two receiving coils built into the instrument. One coil has normally vertical axis and the other is horizontal.

The signal from one of the coils (vertical axis) is first minimized by tilting the coil. The tilt-angle is calibrated in percentages. The remaining signal in this coil is finally balanced out by a measured percentage of a signal from the other coil, after being shifted by 90°. The axis of this coil is at right angles to the axis of the first coil. This coil is kept normally parallel to the primary field.

Thus, if the secondary signals are small compared to the primary horizontal field, the mechanical tilt-angle is an accurate measure of the vertical real-component, and the compensation 1/2 - signal from the horizontal coil is a measure of the quadrature vertical signal.

2. The selection of a transmitting station is done by a plug in unit inside the receiver. The equipment takes two units simultaneously. A switch is provided for quick station-changing.

The magnetic field lines are always at right angles to the direction of the transmitting station. Thus where a station is to the east of the survey area, its N-S field will make the best intersection with E-W conductors.

In practice, in Northern Ontario reading on the following two stations cover both E-W and N-S quadrants of the compass: Station NAA, Cutler, Maine, Frequency 17.80K is to the east and Station NBA, Balboa, Canal Zone, Panama. Frequency 24.00K is to the south.

When the cover on top of the instrument is removed, the appropriate plugs can be inserted.

Survey lines should be made approximately along lines at right angles to the direction of the station being used, i.e. run the survey north or south when using NAA, and east or west when using NDA. On the Gogama property four readings were taken at all stations in phase and quadrature facing south on NAA, west on NBA.

3. Taking a reading.

To take a reading, first orient the reference coil on the lower end of the handle along the magnetic lines. Rock the instrument back and forth for minimum sound intensity in the headphone. Use the volume control to set the sound level for comfortable listening. Then use your left hand to adjust the quadrature component dial on the front left corner of the instrument to further minimize the sound. After finding the minimum signal strength on both adjustments, read the inclinometer by looking into the small lens. Also mark down the quadrature reading on the front edge of the instrument.

While travelling to the next location you can, if you wish, keep the instrument in operating position. If abrupt changes in the position occur while travelling, you might take extra stations to accurately pinpoint the details of the anomaly.

The dials inside the inclinometer are calibrated plus and minus percentages, and in degrees. Either ones can be used. If the instrument is facing 180° from the original direction of travel, the polarities of the reading will be reversed. When plotting the readings, care should be taken to correct the polarities. The important thing is to know the actual physical tilt-angle of the instrument. The lower end of the handle will, as a rule, point towards the conductor. The instrument is so calibrated that when approaching the conductor, the angles are positive in the in-phase component.

4. Plotting the Results

For easy interpretation of the results, it is good practice to plot the actual curves on the paper, using suitable scales for the percentage readings as well as horizontal distances over the ground.

5. The determination of depth can be done with fair accuracy with this instrument by noticing the horizontal distance between the maximum positive and negative reading. This should be the same as the actual depth from the ground surface to the center of the effective area of the conductive body. This point is not the center of the actual body, but somewhat closer to the upper edge.

A vertical sheet type of conductor, if it comes close to the surface, gives a sharp cross-over of large amplitude and slow roll-off on both sides.

When looking at the plotted curves, one notices that two adjacent conductors may modify the shape of the anomalies for each one. In cases like this, one has to look for the steepest gradients of the vertical (plotted) field, rather than the actual zero-crossings.

Sometimes the quadrature-component shows a reversed polarity compared to the in-phase readings. This can be due to the conductive overburden on top of the area of deeper (better) conductor. The vertical secondary field penetrating through the overburden has negative quadrature component.

CERTIFICATE

● William Russell Miller, in the Province of Ontario,

hereby certify;

1. That I am a prospector with my office at 9 Foxcote Crescent, Etobicoke, Ontario.
2. That I have practiced as a prospector for more than the past ten years.
3. That I am a member of the Prospectors and Developers Association of Ontario, and a member of the Toronto Branch of the Canadian Institute of Mining and Metallurgy.
4. That I have not, nor do not expect to receive, any direct or indirect interest whatsoever in the mining properties or securities of Gogama Minerals Ltd.
5. That this report is based on actual participation in conducting the field work for this survey and a wide personal knowledge of adjacent properties in the same area.

DATED at Toronto, Ontario

April 6th, 1971

William Russell Miller
William Russell Miller

Prospector

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**SUBMISSION OF GEOLOGICAL, GEOPHYSICAL AND GEOCHEMICAL SURVEYS
AS ASSESSMENT WORK**

In order to simplify the filing of geological, geochemical and ground geophysical surveys for assessment work, the Minister has approved the following procedure under Section 84 (8a) of the Ontario Mining Act. This special provision does not apply to airborne geophysical surveys.

If, in the opinion of the Minister, a ground geophysical survey meets the requirements prescribed for such a survey, including:

- (a) substantial and systematic coverage of each claim
- (b) line spacing not exceeding 400 foot intervals
- (c) stations not exceeding 100 foot intervals or
- (d) the average number of readings per claim not less than 40 readings

it will qualify for a credit of 40 assessment work days for each claim so covered. It will not be necessary for the applicant to furnish any data or breakdown concerning the persons employed in the survey except for the names and addresses of those in charge of the various phases (linecutting contractor, etc.). It will be assumed that the required number of man days were spent in producing the survey to qualify for the specified credit.

Each additional ground geophysical survey using the same grid system and otherwise meeting these requirements will qualify for an assessment work credit of 20 days.

A geological survey using the same grid system, and meeting the requirements for submission of geological surveys for maximum credits will qualify for an assessment work credit of 20 days. If line cutting has not previously been reported with any other survey and is reported in conjunction with the geological survey a credit of 40 days per claim will be allowed for the survey.

Similarly, a geochemical survey using the same grid system with the average number of collected samples per claim being not less than 40 samples, and meeting the requirements for the submission of geochemical surveys for maximum credits, will qualify for an assessment work credit of 20 days. If line cutting has not previously been reported with any other survey and is reported in conjunction with the geochemical survey a credit of 40 days per claim will be allowed for the survey.

Credits for partial coverage or for surveys not meeting requirements for full credit will be granted on a pro-rata basis.

If the credits are reduced for any reason, a fifteen day Notice of Intent will be issued. During this period, the applicant may apply to the Mining Commissioner for relief if his claims are jeopardized for lack of work or, if he wishes, may file with the Department, normal assessment work breakdowns listing the names of the employees and the dates of work. The survey would then be re-assessed to determine if higher credits may be allowed under the provisions of subsections 8 and 9 of section 84 of the Mining Act.

If new breakdowns are not submitted, the Performance and Coverage credits are confirmed to the Mining Recorder at the end of the fifteen days.

Neville Twp. (M.-888)

THE TOWNSHIP OF
OF

CHESTER

DISTRICT OF
SUDBURY
Claim Map.
SUDBURY
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 MUSKIE
- MINES
- CANCELLED

NOTES

- 400' Surface Rights Reservation around all Lakes and Rivers.
- Flooding Rights To 1200' Contour Reserved To M.E.P.C. File: 10021.

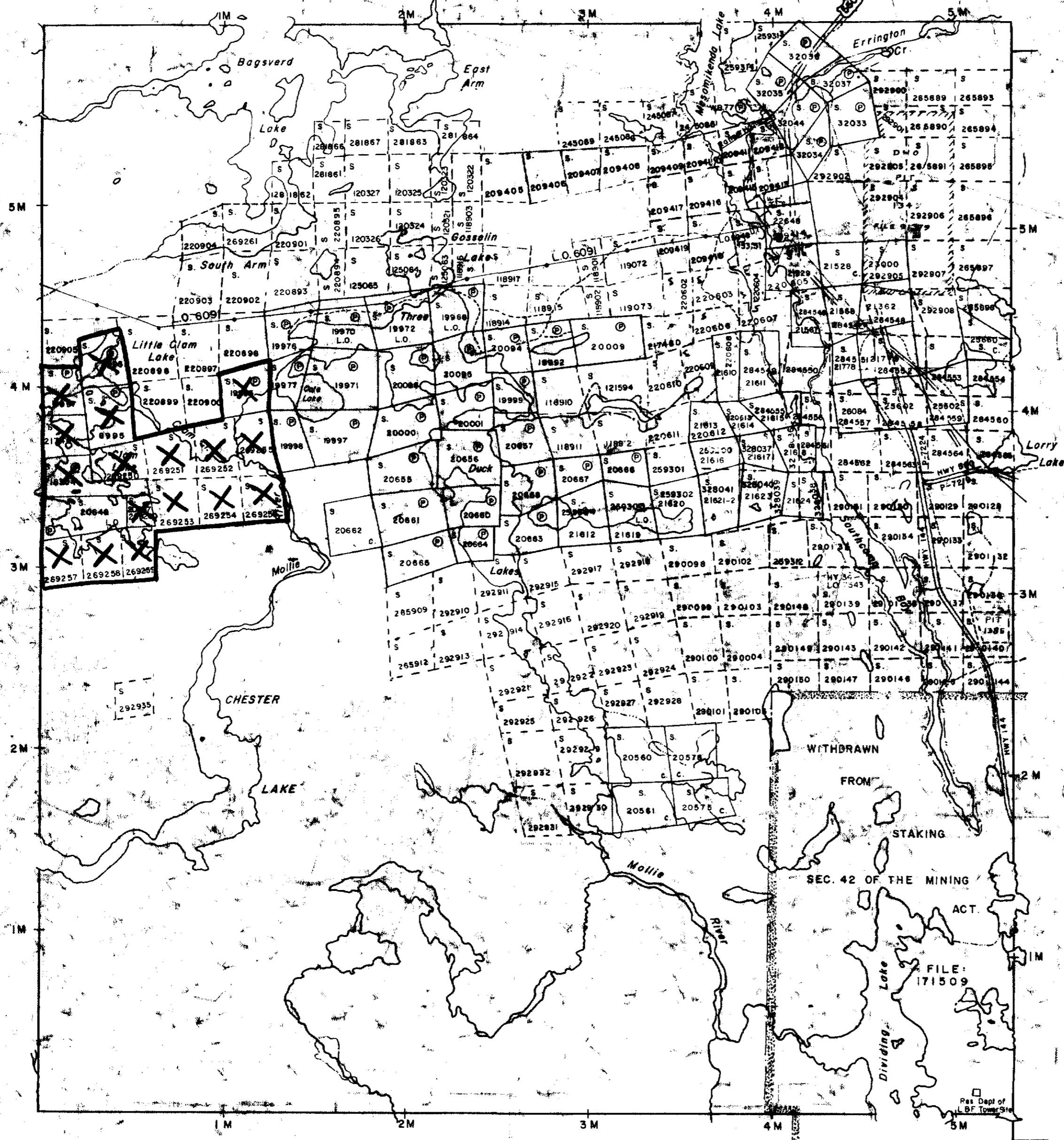
DATE OF ISSUE
JUL - 2 1971
ONT. DEPT. OF MINES
AND NORTHERN AFFAIRS

PLAN NO.-M. 717

ONTARIO
DEPARTMENT OF MINES
AND NORTHERN AFFAIRS

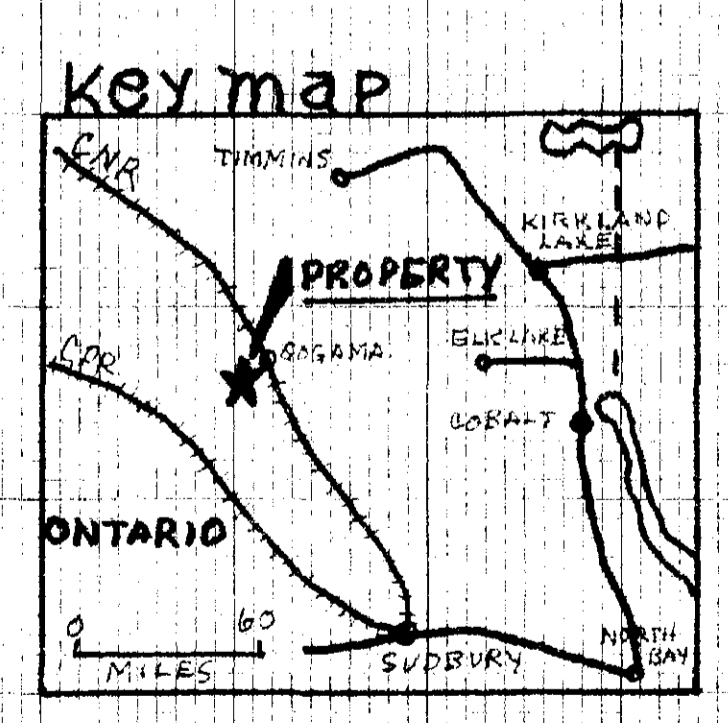
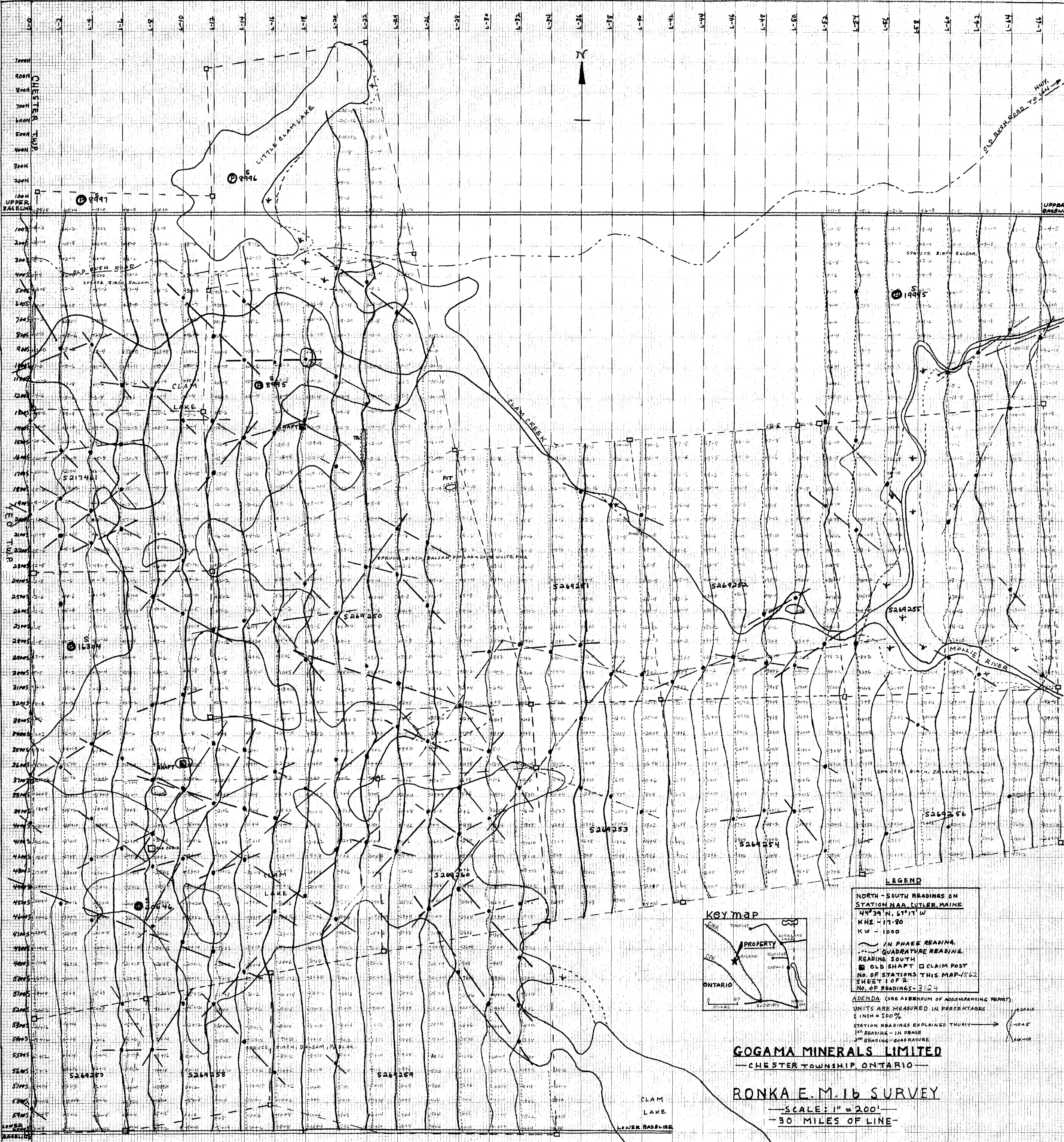
Yoo Twp. (M.-1188)

Bennewiss Twp. (M.-658)



Invergarry Twp. (M.-948)





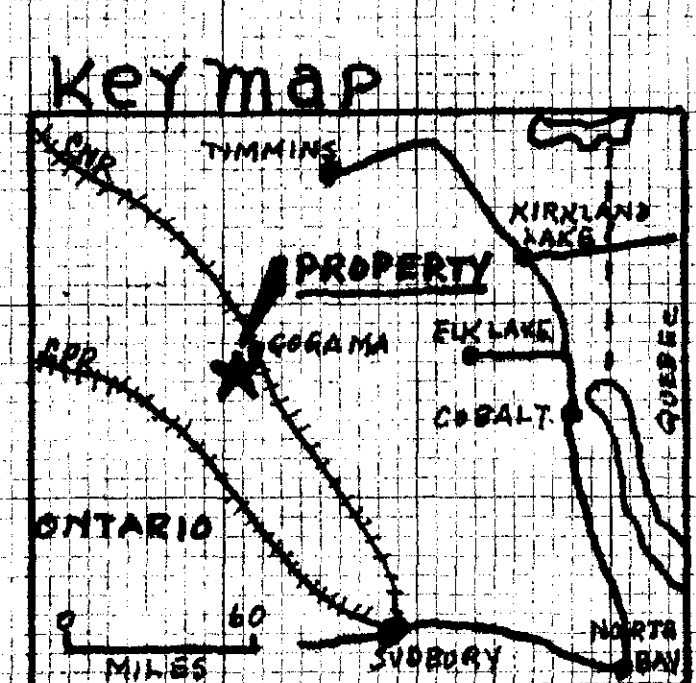
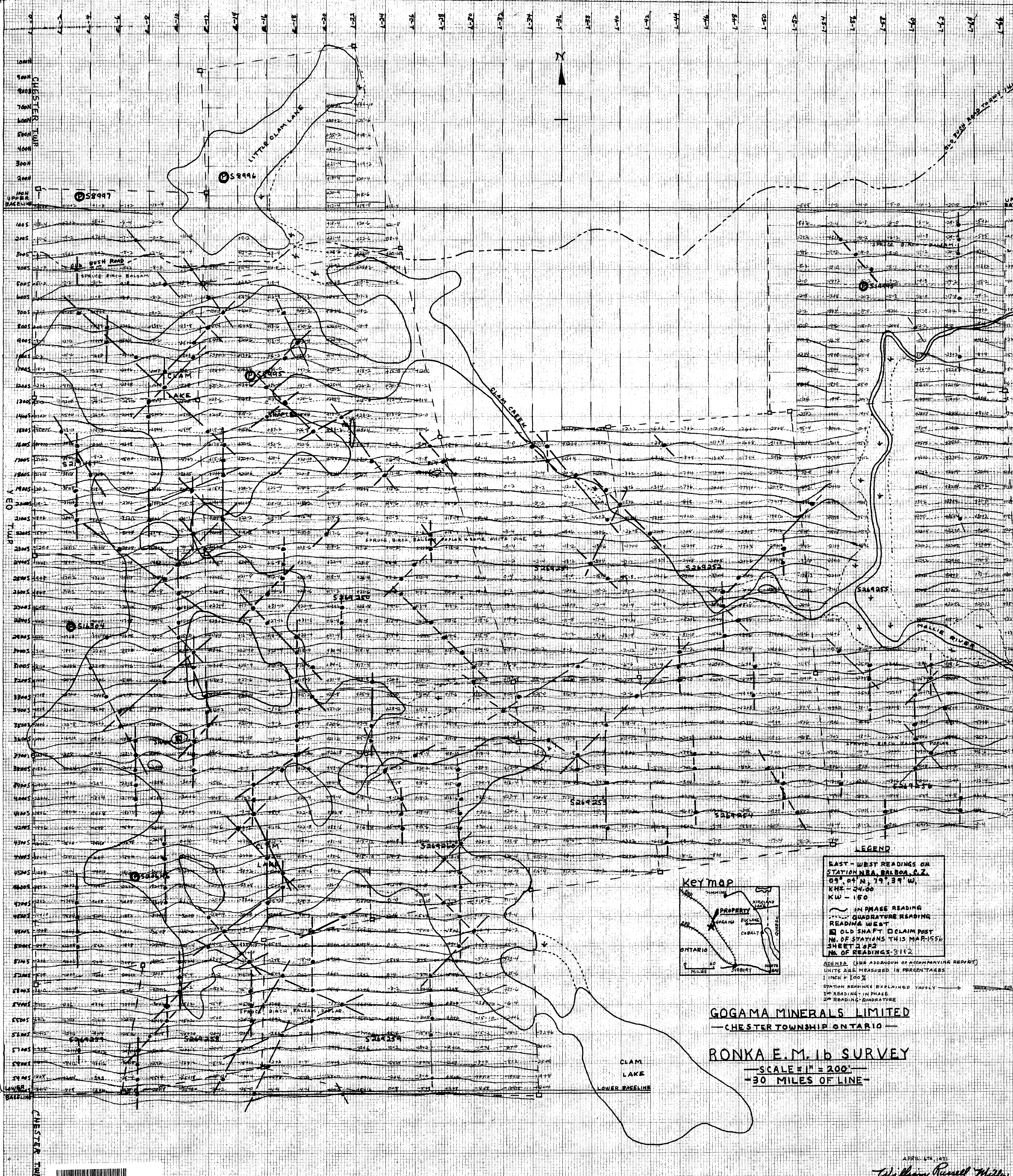
LEGEND
 NORTH-SOUTH READINGS ON STATION NAA, CUTLER, MAINE
 44°39'N, 67°17'W
 KHZ - 17.80
 KW - 1000
 — IN PHASE READING
 - - - QUADRATURE READING
 ○ OLD SHAFT □ CLAIM POST
 NO. OF STATIONS THIS MAP 562
 SHEET OF 2
 NO. OF READINGS - 3124

ADENDA (SEE ADDENDUM OF ACCOMPANYING REPORT)
 UNITS ARE MEASURED IN PERCENTAGES
 1 INCH = 1000'
 STATION READINGS EXPLAINED THUSBY →
 1-10+5
 1-10-10

GOGAMA MINERALS LIMITED
 — CHESTER TOWNSHIP, ONTARIO —

RONKA E.M. 16 SURVEY

SCALE: 1" = 200'
 — 30 MILES OF LINE —



LEGEND

EAST - WEST READINGS ON STATION N.B.A. BALBOA, C.Z. 09° 01' N, 79° 39' W. K.W. - 24.00 K.W. - 150

— IN PHASE READING
 - - - QUADRATURE READING
 ■ OLD SHAFT □ CLAIM POST
 # OF STATIONS THIS MAP - 1556
 SHEET 2 OF 3
 NO. OF READINGS - 3112

AGENDA (SEE ADDENDUM OR ACCOMPANYING REPORT)
 UNITS ARE MEASURED IN PERCENTAGES
 1 INCH = 100 FEET
 STATION READINGS EXPLAINED TABULARY
 1 IN PHASE READING
 2 QUADRATURE READING

GOGAMA MINERALS LIMITED
 - CHESTER TOWNSHIP ONTARIO -
RONKA E.M. 16 SURVEY
 SCALE = 1" = 200'
 - 30 MILES OF LINE -

APRIL 16, 1978
 William Russell Miller

