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REPORT ON COMBINED HELICOPTER BORNE MAGNETIC, ELECTROMAGNETIC AND VLF SURVEY OPIKEIGEN LAKE PROPERTY KENORA MINING DISTRICT, ONTARIO

RECEIVED

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MINING LANDS SECTION

for

PURE GOLD RESOURCES, INC.

by

AERODAT LIMITED

November 6, 1986

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TABLE C

LIST of MAPS

(Scale 1:10,000)

MAPS	
I	AIRBORNE ELECTROMAGNETIC SURVEY INTERPRETATION MAP; showing flight lines, fiducials conductor axes and anomaly peaks along with inphase amplitudes and conductivity thickness ranges for the 4600 Hz coaxial coil system.
II	TOTAL FIELD MAGNETIC CONTOURS; showing magnetic values contoured at 10 nanoTesla intervals, flight lines, fiducials and anomaly peaks
III	VERTICAL MAGNETIC GRADIENT CONTOURS; showing magnetic gradient values contoured in nanoTeslas per metre
IV	APPARENT RESISTIVITY CONTOURS; showing contoured resistivity values, flight lines, fiducials and anomaly peaks
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INTRODUCTION

This report describes an airborne geophysical survey carried out on behalf of Pure Gold Resources Inc. by Aerodat Limited. Equipment operated included a three frequency electromagnetic system, a high sensitivity cesium vapour magnetometer, a two frequency VLF-EM system, a video tracking camera, an altimeter and an electronic positioning system. Electromagnetic, magnetic and altimeter data were recorded both in digital and analog form. Positioning data were stored in digital form and recorded on film as well as being marked on the flight path mosaic by the operator while in flight.

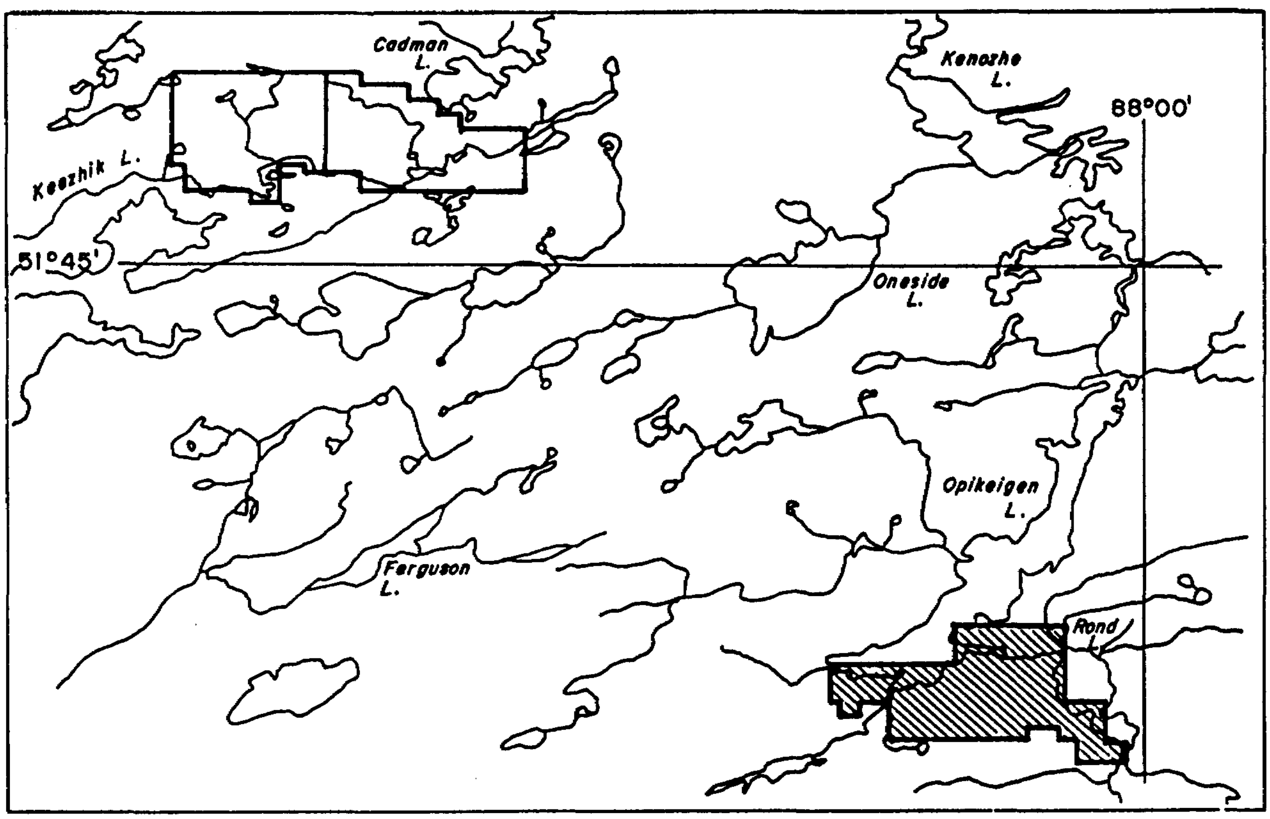
The survey area, comprising a block of ground in the Kenora Mining District of north western Ontario and situated about 10 kilometres north west of the settlement of Fort Hope, in north western Ontario, was flown during the period of August 1st to August 3rd, 1986. Two flights were required to complete the survey with flight lines oriented at an Azimuth of 000 degrees and flown at a nominal spacing of 100 metres. Coverage and data quality were considered to be well within the specifications described in the contract.

The purpose of the survey was to record airborne geophysical data over a group of 145 claims that are of interest to Pure Gold Resources Inc. (see OMNR claim map G.361, Opikeigen Lake and G.388, Rich Lake.)

A total of 265 kilometres of the recorded data were compiled in map form and are presented as part of this report according to specifications outlined by Pure Gold Resources Inc.

SURVEY AREA LOCATION

The survey area is depicted on the index map shown below. It is centred at Latitude 51 degrees 38 minutes north, Longitude 88 degrees 05 minutes west, approximately 10 kilometres due north west of the settlement of Fort Hope and about 150 kilometres east north east of the town of Pickle Lake in north western Ontario (NTS Reference Map No. 52 P/9). The area is accessed by float plane or helicopter from Fort Hope or Pickle Lake.



AIRCRAFT AND EQUIPMENT

3.1 Aircraft

The helicopter used for the survey was an Aerospatiale A--Star 350D (C-GRGK) owned and operated by Maple Leaf Helicopters Limited. Installation of the geophysical and ancillary equipment was carried out by Aerodat. The survey aircraft was flown at a mean terrain clearance of 60 metres.

3.2 Equipment

3.2.1 Electromagnetic System

The electromagnetic system was an Aerodat 3-frequency system. Two vertical coaxial coil pairs were operated at 935 Hz and 4600 Hz and a horizontal coplanar coil pair at 4175 Hz. The transmitter-receiver separation was 7 metres. Inphase and quadrature signals were measured simultaneously for the 3 frequencies with a time constant of 0.1 seconds. The electromagnetic bird was towed 30 metres below the transmitter.

3.2.2 VLF-EM System

The VLF-EM System was a Herz Totem 2A. This instrument measures the total field and quadrature components of two selected frequencies simultaneously. The sensor was towed in a bird 12 metres below the helicopter. The transmitting stations used were NAA, Cutler Maine broadcasting at 24.0 kHz for the Line sensor and NSS, Annapolis Maryland, at 21.4 kHz for the Orthogonal sensor.

3.2.3 Magnetometer

The magnetometer employed a Scintrex Model VIW - 2321 H8 cesium optically pumped magnetometer sensor. The sensitivity of this instrument was 0.1 nanoTeslas at a 0.2 second sampling rate. The sensor was towed in a bird 12 metres below the helicopter.

3.2.4 Magnetic Base Station

An IFG proton precession magnetometer was operated at the base of operations to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to facilitate later correlation.

3.2.5 Radar Altimeter

A Hoffman HRA-100 radar altimeter was used to record terrain clearance. The output from the instrument is a linear function of altitude for maximum accuracy.

3.2.6 Tracking Camera

A Geocam tracking camera was used to record flight path on 35 mm film. The camera was operated in strip film mode and the fiducial numbers for cross-reference to the analog and digital data were imprinted on the margin of the film.

3.2.7 Analog Recorder

An RMS dot-matrix recorder was used to display the data during the survey. In addition to manual and time fiducials, the following data were recorded:

Channel	Input	Scale
1	Low Frequency Inphase	2 ppm/mm
2	Low Frequency Quadrature	2 ppm/mm
3	High Frequency Inphase	2 ppm/mm
4	High Frequency Quadrature	2 ppm/mm
5	Mid Frequency Inphase	4 ppm/mm
6	Mid Frequency Quadrature	4 ppm/mm
7	VLF-EM Total Field (Line)	2.5%/mm
8	VLF-EM Quadrature (Line)	2.5%/mm
9	VLF-EM Total Field (Ortho)	2.5%/mm

10	VLF-EM Quadrature (Ortho)	2.5%/mm
00	Altimeter (500 ft. at top of chart)	10 ft./mm
14	Magnetometer Fine	2.5 nT/mm
15	Magnetometer Coarse	12.5 nT/mm

3.2.8 Digital Recorder

A Perle DAC/NAV data system recorded the survey on magnetic tape. Information recorded was as follows:

Equipment	Recording Interval
EM system	0.1 seconds
VLF-EM	0.5 seconds
Magnetometer	0.2 seconds
Altimeter	0.5 seconds
NAV System	0.5 seconds

3.2.9 Radar Positioning System

A Motorola Mini-Ranger (MRS III) radar navigation system was used for both navigation and flight path recovery. Transponders sited at fixed locations were interrogated several times per second and the ranges from these points to the helicopter measured to a high degree of accuracy. A navigational computer triangulates the position of the helicopter and provides the pilot with navigation information. The range/range data was recorded on magnetic tape for subsequent flight path determination.

DATA PRESENTATION

4.0 Base Map and Flight Path

A photomosaic base at a scale of 1:10,000 was prepared by enlargement of aerial photographs of the survey area.

The flight path was derived from the Mini-Ranger radar positioning system. The distance from the helicopter to two established reference locations was measured several times per second and the position of the helicopter calculated by triangulation. It is estimated that the flight path is generally accurate to about 10 metres with respect to the topographic detail of the base map. The flight path is presented with camera frame and navigator's manual fiducials for cross reference to both the analog and digital data.

4.1 Airborne Electromagnetic Survey Interpretation Map

An interpretation map was prepared showing flight lines, fiducials, peak locations of anomalies and conductivity thickness range along with the Inphase amplitudes. These values were computed from the 4600 Hz coaxial response. The data are presented on a greyflex copy of the photo base map.

4.2 Electromagnetic Profile Maps

The electromagnetic data were recorded digitally at a sample rate of 10 per second with a time constant of 0.1 seconds. A two stage digital filtering process was carried out to reject major sferic events and to reduce system noise.

Local sferic activity can produce sharp, large amplitude events that cannot be removed by conventional filtering procedures. Smoothing or stacking will reduce their amplitude but leave a broader residual response that can be confused with geological phenomena. To avoid this possibility, a computer algorithm searches out and rejects the major sferic events.

The signal to noise ratio was further enhanced by the application of a low pass digital filter. It has zero phase shift which prevents any lag or peak displacement from occurring, and it suppresses only variations with a wavelength less than about 0.25 secods. This low effective time constant permits maximum profile shape resolution.

Following the filtering process, a base level correction was made. The correction applied is a linear function of time that ensures the corrected amplitude of the various inphase and quadrature components is zero when no conductive or permeable source is present. The filtered and levelled data were then presented in profile map form.

The Inphase and Quadrature responses of the coaxial 4600 Hz and coplanar 4175 Hz configurations were plotted, in two colours, along with flight path and fiducials, on a transparent mylar film to overlay the photo base map.

4.3 Total Field Magnetic Contours

The aeromagnetic data were corrected for diurnal variations by adjustment with the digitally recorded base station magnetic values. No correction for regional variation was applied. The corrected profile data were interpolated onto a regular grid at a 25 metre true scale interval using a cubic spline technique. The grid provided the basis for threading the presented contours at a 2 nanoTesla interval.

The aeromagnetic data have been presented with flight path and eletromagnetic anomaly information on a greyflex copy of the photo base map.

4.4 Vertical Magnetic Gradient Contours

The vertical magnetic gradient was calculated from the gridded total field magnetic data. Contoured at a nT/m interval, the gradient data were presented on a greyflex copy of the photo base map.

4.5 Apparent Resistvity Contours

The electromagnetic information was processed to yield a map of the apparent resistivity of the ground.

The approach taken in computing apparent resistivity was to assume a model of a 200 metre thick conductive layer (i.e., effectively a half space) over a resistive bedrock. The computer then generated, from nomograms for this model, the resistivity that would be consistent with the bird elevation and recorded amplitude for the coaxial frequency pair.
The apparent resistivity profile data were interpolated onto a regular grid at a 25 metres true scale interval using a cubic spline technique.

The contoured apparent resistivity data were presented on a greyflex copy of the photo base map with the flight path and electromagnetic anomaly information.

4.6 VLF - EM Total Field

The VLF-EM signals from NAA, Cutler Maine nad NSS, Annapolis Maryland, broadcasting at 24.0 and 21.4 kHz respectively, were compiled in map form and presented on a greyflex copy of the photo base map along with flight lines and anomaly information.

INTERPRETATION

GEOLOGY

The 1:253,440 Geologic Compilation Series Map No. 2234 (Fort Hope-Lansdowne House) shows the area to be underlain by an east-west trending series of metavolcanics and metasediments. Mafic to intermediate metavolcanics predominate in the south, whereas metasediments cover most of the northern half of the area. The central east- west core of the block is mapped as felsic metavolcanics, probably interbedded with metasediments. Two gold showings are indicated on the map; one in the extreme south west corner and another gold-silver showing toward the south eastern corner. An east-west trending anticlinal axis was mapped through the northern third of the area. Iron formation was also mapped off the south west corner of the block but none has been indicated inside the survey boundaries.

No geologic data were supplied to Aerodat by Pure Gold Resources Inc. and no other published data was available to the writer. Also, types of targets sought have not been discussed or identified by the company although it is generally assumed that the primary interest is in gold mineralization that is known to occur throughout the general area.

MAGNETICS

The magnetic data from the high sensitivity cesium magnetometer provided virtually a continuous magnetic reading when recording at two-tenth second intervals. The system is also noise free for all practical purposes.

The sensitivity of 0.1 nT allows for the mapping of very small inflections in the magnetic field, resulting in a contour map that is comparable in quality to ground data. Both the fine and coarse magnetic traces were recorded on the magnetic charts.

The magnetic map is dominated by an east-west trending magnetic high along approximately the northern third of the area. The recorded magnetic values along this anomaly exceed 16,000 nT (at Line 510) above a background of roughly 59,900 nT. A second, weaker, sub-parallel trend occurs to the north of this anomaly. This zone dips shallowly to the south while the band to the north appears to be almost vertical.

Structural breaks appear to be aligned north westerly to west north westerly, particularly in the south east quarter of the block.

The southern half of this survey, masked somewhat by the strong magnetic gradient to the north, suggests a highly complex structural pattern to several magnetic trends of moderate amplitude. A narrow, north westerly trend, interpreted as a diabase, occurs at the west end of the survey.

VERTICAL MAGNETIC GRADIENT

The vertical gradient magnetic contours show a much less chaotic pattern to the southern third of the area. What appears is a series of short magnetic zones along the general east-west trend that has been downwarped approximately at the centre of the area. The segmented nature of these trends is more than likely due to faulting, likely along north easterly directions.

ELECTROMAGNETICS

The electromagnetic data was first checked by a line-by-line examination of the analog records. Record quality was fair with minor sferic interference on the first flight and somewhat higher sferic levels on the second flight. This was readily removed from the traces by an appropriate de-spiking filter. Instrument noise was well within specifications. Geologic noise, in the form of surficial conductors, is present on the higher frequency responses and to a minor extent, on the low frequency quadrature response. This latter occurs over Opikeigen and Rond lakes as well as the extensive swamps and string bogs within the area.

Anomalies were picked off the analog traces of all three EM channels. These selections were then checked with a proprietary computerized selection program which can be adjusted for ambient and instrumental noise. The data were then edited and re-plotted on a copy of the of the profile map. This procedure ensured that every anomalous response spotted on the analog data was plotted on the final map and allowed for the rejection - or inclusion if warranted - of obvious surficial conductors.

Each conductor or group of conductors was evaluated on the bases of magnetic (and lithologic, where applicable) correlations apparent on the analog data and man-made or surficial features not obvious on the analog charts.

RESULTS

At least twenty-nine bedrock conductors, conductive trends and conductive zones were detected within the area of the survey. They are listed and discussed below - though not in any order of priority - and have been grouped to reflect possible stratigraphic correlations. Doubtful bedrock/surficial zones have been classed as possible conductors.

CONDUCTOR I - (Lines 450 to 790):

Conductor I is a long, narrow zone of moderate to high conductivity with best response in the area of Line 620. It lies on the north flank of the northerly iron formation band, along the northern boundary of the survey. South dip is interpreted.

CONDUCTOR II - (Lines 420 to 450):

This short zone of moderate conductance coincides with a minor magnetic anomaly between the two strong iron formation zones. It appears to dip to the south.

CONDUCTOR III - (Lines 480 to 640):

Conductor II is a zone of low conductance along the major iron formation band. It shows only minor quadrature response and is likely dual banded, particularly toward the western end.

CONDUCTOR IV - (Lines 220 to 250):

This short, south dipping zone of moderate conductance falls along the north flank of a small, plug-like magnetic anomaly within what has been interpreted as felsic metavolcanics.

CONDUCTOR V - (Lines 400 to 460):

Conductor V is a low amplitude zone of moderate conductance that lies near or on the felsic metavolcanic/sediment contact. Amplitudes are too low to predict dip.

CONDUCTOR VI - (Lines 760 to 790):

This is a possible bedrock conductor that may actually be more of a reflection of lake bottom conductivity from Rond Lake.

CONDUCTOR VII - (Lines 10 to 740):

Conductor VII is zone of moderate to low conductivity over the eastern two thirds of its extent and increasing to fairly high conductivities in the area of Lines 100 to 170. It is thought to mark an unconformity between the felsic volcanics to the north and the mafic metavolcanics and sediments to the south. Dips at the western end are interpreted to be near vertical or to the south.

CONDUCTORS VIII, IX - (Lines 440 to 700):

These two zones of low to moderate conductance appear to be within sediments. They are probably multi-banded, especially zone VIII at its eastern end. No dip direction can be interpreted.

CONDUCTOR XI - (Lines 870 to 930):

Conductor XI appears to be in a similar situation to that of Conductors VIII and IX, but is of fairly high to moderate conductance and probably multi-banded.

CONDUCTORS X, Xa. XII & XV - (Lines 10 to 900):

These near vertical to south dipping zones probably represent the highest conductances recorded in the survey, particularly along Conductor X in the area of Lines 740 to 810. They have been grouped together as they are thought to lie along a contact between sediments and mafic metavolcanics.

CONDUCTORS XVI to XXIX (inclusive) - (Lines 10 to 1000):

The remaining conductors are spread out over the entire southern third of the survey. They are of generally moderate to high conductance and almost invariably show south dip. It is believed that they represent zones along interbedded metasediments and mafic metavolcanics.

- Very strong structural patterns are evident, such as from Conductors XXII, XXIII and XXV. It is felt that structure, both folding and faulting, should be a primary consideration in setting priorities on these conductors.

The isolated nature of some of these zones may also indicate facies changes along the interbedded sediments and volcanics, yet another situation considered as favourable for gold mineralization. Unfortunately, the known gold occurrences shown on the government geologic map cannot be located with sufficient accuracy to relate them to specific features on the 1:10,000 scale airborne survey maps.

APPARENT RESISTIVITY

Apart from outlining the stronger bedrock conductors, the Apparent Resistivity map gives a good portrayal of surficial conductivity, particularly in the contrast between areas of swamp and muskeg cover and those of fairly thin overburden. No other structural or lithologic information is evident from this map.

VLF - EM TOTAL FIELD

The VLF map sheds very little light on the structure of the southern half of the area. There is some correlation with the magnetic trends but in an over all sense, the contribution of the VLF data to the interpretation is minimal.

CONCLUSIONS

The data support the geologic interpretation of generally three major, east-west units trending across the length of the survey. However the structure within the mafic metavolcanics appears to be extremely complex, with a dense occurrence of interbedded sediments and volcanics.

The magnetics give the over all impression that a major unconformity separates the northern two thirds of the area from the portion to the south. The strong magnetic trends to the north fit the geologic picture in that they appear to be along the limbs of an overturned anticline; the stronger southern anomaly dipping shallowly to the south while the northern trend appears to be almost vertical.

A structural interpretation from any one data set does not appear to be entirely consistent with that from any other data set. A good example of this is seen from a comparison of the Total Field Magnetics and Vertical Magnetic Gradient data. The former establishes three possible sets of structures, north westerly at the western end, north north easterly over the east central quarter and east north easterly over the eastern portion. Some of this apparent structure is corroborated on the photomosaics. A possible north west trending diabase cuts across the western end of the block although the south eastern expression of this diabase appears to be masked by the high magnetic activity and complexity of the area.

The Vertical Magnetic Gradient data set suggests additional north westerly to west north westerly structures across the southern third of the survey that are not as apparent on the Total Field map.

RECOMMENDATIONS

The Opikeigen property appears to be a highly prospective area for gold mineralization as it meets several of the currently accepted criteria for the occurrence of gold deposits. These would include iron formation in a metavolcanic setting, transverse structures, facies changes and, not the least, the immediate proximity of known gold mineralization.

Conductors I, II and III - all associated with the iron formation are recommended as follow-up targets along with zones IV and V within the felsic volcanics.

A better understanding of the geology and structure within the mafic volcanics would be desirable before embarking on a full scale check of the area. A detailed geologic compilation is therefore advised. Conductors X (both ends), XI, XII, XV (east end), XX (both ends), XXII, XXIII, XXV and XXVII could be considered for a winter follow-up program.

Limited ground geophysics would be required (Max Min II and magnetometer), primarily to sort out the conductors than to locate them.

George Podolsky
for
AERODAT LIMITED
November 6, 1986

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APPENDIX I

GENERAL INTERPRETIVE CONSIDERATIONS

Electromagnetic

The Aerodat three frequency system utilizes two different transmitter-receiver coil geometries. The traditional coaxial coil configuration is operated at two widely separated frequencies and the horizontal coplanar coil pair is operated at a frequency approximately aligned with one of the coaxial frequencies.

The electromagnetic response measured by the helicopter system is a function of the "electrical" and "geometrical" properties of the conductor. The "electrical" property of a conductor is determined largely by its electrical conductivity, magnetic susceptibility and its size and shape; the "geometrical" property of the response is largely a function of the conductor's shape and orientation with respect to the measuring transmitter and receiver.

Electrical Considerations

For a given conductive body the measure of its conductivity or conductance is closely related to the measured phase shift between the received and transmitted electromagnetic field. A small phase shift indicates a relatively high conductance, a large phase shift lower conductance. A small phase shift results in a large inphase to quadrature ratio and a large phase shift a low ratio. This relationship is shown quantitatively for a non-magnetic vertical half-plane model on the accompanying phasor diagram. Other physical models will show the same trend but different quantitative relationships.

The phasor diagram for the vertical half-plane model, as presented, is for the coaxial coil configuration with the amplitudes in parts per million (ppm) of the primary field as measured at the response peak over the conductor. To assist the interpretation of the survey results the computer is used to identify the apparent conductance and depth at selected anomalies. The results of this calculation are presented in table form in Appendix II and the conductance and inphase amplitude are presented in symbolized form on the map presentation.

The conductance and depth values as presented are correct only as far as the model approximates the real geological situation. The actual geological source may be of limited length, have significant dip, may be strongly magnetic, its conductivity and thickness may vary with depth and/or strike and adjacent bodies and overburden may have modified the response. In general the conductance estimate is less affected by these limitations than is the depth estimate, but both should be considered as relative rather than absolute guides to the anomaly's properties.

Conductance in mhos is the reciprocal of resistance in ohms and in the case of narrow slab-like bodies is the product of electrical conductivity and thickness.

Most overburden will have an indicated conductance of less than 2 mhos; however, more conductive clays may have an apparent conductance of say 2 to 4 mhos. Also in the low conductance range will be electrolytic conductors in faults and shears.

The higher ranges of conductance, greater than 4 mhos, indicate that a significant fraction of the electrical conduction is electronic rather than electrolytic in nature. Materials that conduct electronically are limited to certain metallic sulphides and to graphite. High conductance anomalies, roughly 10 mhos or greater, are generally limited to sulphide or graphite bearing rocks.

Sulphide minerals, with the exception of such ore minerals as sphalerite, cinnabar and stibnite, are good conductors; sulphides may occur in a disseminated manner that inhibits electrical conduction through the rock mass. In this case the apparent conductance can seriously underrate the quality of the conductor in geological terms. In a similar sense the relatively non-conducting sulphide minerals noted above may be present in significant consideration in association with minor conductive sulphides, and the electromagnetic response only relate to the minor associated mineralization. Indicated conductance is also of little direct significance for the identification of gold mineralization. Although gold is highly conductive, it would not be expected to exist in sufficient quantity to create a recognizable anomaly, but minor accessory sulphide mineralization could provide a useful indirect indication.

In summary, the estimated conductance of a conductor can provide a relatively positive identification of significant sulphide or graphite mineralization; however, a moderate to low conductance value does not rule out the possibility of significant economic mineralization.

Geometrical Considerations

Geometrical information about the geologic conductor can often be interpreted from the profile shape of the anomaly. The change in shape is primarily related to the change in inductive coupling among the transmitter, the target, and the receiver.

In the case of a thin, steeply dipping, sheet-like conductor, the coaxial coil pair will yield a near symmetric peak over the conductor. On the other hand, the coplanar coil pair will pass through a null couple relationship and yield a minimum over the conductor, flanked by positive side lobes. As the dip of the conductor decreased from vertical, the coaxial anomaly shape changes only slightly, but in the case of the coplanar coil pair the side lobe on the down dip side strengthens relative to that on the up dip side.

As the thickness of the conductor increases, induced current flow across the thickness of the conductor becomes relatively significant and complete null coupling with the coplanar coils is no longer possible. As a result, the apparent minimum of the coplanar response over the conductor diminishes with increasing thickness, and in the limiting case of a fully 3 dimensional body or a horizontal layer or half-space, the minimum disappears completely.

A horizontal conducting layer such as overburden will produce a response in the coaxial and coplanar coils that is a function of altitude (and conductivity if not uniform). The profile shape will be similar in both coil configurations with an amplitude ratio (coplanar:coaxial) of about 4:1*.

In the case of a spherical conductor, the induced currents are confined to the volume of the sphere, but not relatively restricted to any arbitrary plane as in the case of a sheet-like form. The response of the coplanar coil pair directly over the sphere may be up to 8* times greater than that of the coaxial pair.

In summary, a steeply dipping, sheet-like conductor will display a decrease in the coplanar response coincident with the peak of the coaxial response. The relative strength of this coplanar null is related inversely to the thickness of the conductor; a pronounced null indicates a relatively thin conductor. The dip of such a conductor can be inferred from the relative amplitudes of the side-lobes.

Massive conductors that could be approximated by a conducting sphere will display a simple single peak profile form on both coaxial and coplanar coils, with a ratio between the coplanar to coaxial response amplitudes as high as 8*.

Overburden anomalies often produce broad poorly defined anomaly profiles. In most cases, the response of the coplanar coils closely follows that of the coaxial coils with a relative amplitude ratio of 4*.

Occasionally, if the edge of an overburden zone is sharply defined with some significant depth extent, an edge effect will occur in the coaxial coils. In the case of a horizontal conductive ring or ribbon, the coaxial response will consist of two peaks, one over each edge; whereas the coplanar coil will yield a single peak.

* It should be noted at this point that Aerodat's definition of the measured ppm unit is related to the primary field sensed in the receiving coil without normalization to the maximum coupled (coaxial configuration). If such normalization were applied to the Aerodat units, the amplitude of the coplanar coil pair would be halved.

Magnetics

The Total Field Magnetic Map shows contours of the total magnetic field, uncorrected for regional variation. Whether an EM anomaly with a magnetic correlation is more likely to be caused by a sulphide deposit than one without depends on the type of mineralization. An apparent coincidence between an EM and a magnetic anomaly may be caused by a conductor which is also magnetic, or by a conductor which lies in close proximity to a magnetic body. The majority of conductors which are also magnetic are sulphides containing pyrrhotite and/or magnetite. Conductive and magnetic bodies in close association can be, and often are, graphite and magnetite. It is often very difficult to distinguish between these cases. If the conductor is also magnetic, it will usually produce an EM anomaly whose general pattern resembles that of the magnetics. Depending on the magnetic permeability of the conducting body, the amplitude of the inphase EM anomaly will be weakened, and if the conductivity is also weak, the inphase EM anomaly may even be reversed in sign.

VLF Electromagnetics

The VLF-EM method employs the radiation from powerful military radio transmitters as the primary signals. The magnetic field associated with the primary field is elliptically polarized in the vicinity of electrical conductors. The Herz Totem uses three coils in the X, Y, Z configuration to measure the total field and vertical quadrature component of the polarization ellipse.

The relatively high frequency of VLF (15-25) kHz provides high response factors for bodies of low conductance. Relatively "disconnected" sulphide ores have been found to produce measureable VLF signals. For the same reason, poor conductors such as sheared contacts, breccia zones, narrow faults, alteration zones and porous flow tops normally produce VLF anomalies. The method can therefore be used effectively for geological mapping. The only relative disadvantage of the method lies in its sensitivity to conductive overburden. In conductive ground the depth of exploration is severely limited.

The effect of strike direction is important in the sense of the relation of the conductor axis relative to the energizing electromagnetic field. A conductor aligned along a radius drawn from a transmitting station will be in a maximum coupled orientation and thereby produce a stronger response than a similar conductor at a different strike angle. Theoretically, it would be possible for a conductor, oriented tangentially to the transmitter to produce no signal. The most obvious effect of the strike angle consideration is that conductors favourably oriented with respect to the transmitter location and also near perpendicular to the flight direction are most clearly rendered and usually dominate the map presentation.

The total field response is an indicator of the existence and position of a conductivity anomaly. The response will be a maximum over the conductor, without any special filtering, and strongly favour the upper edge of the conductor even in the case of a relatively shallow dip.

The vertical quadrature component over steeply dipping sheet-like conductor will be a cross-over type response with the cross-over closely associated with the upper edge of the conductor.

The response is a cross-over type due to the fact that it is the vertical rather than total field quadrature component that is measured. The response shape is due largely to geometrical rather than conductivity considerations and the distance between the maximum and minimum on either side of the cross-over is related to target depth. For a given target geometry, the larger this distance the greater the depth.

The amplitude of the quadrature response, as opposed to shape is function of target conductance and depth as well as the conductivity of the overburden and host rock. As the primary field travels down to the conductor through conductive material it is both attenuated and phase shifted in a negative sense. The secondary field produced by this altered field at the target also has an associated phase shift. This phase shift is positive and is larger for relatively poor conductors. This secondary field is attenuated and phase shifted in a negative sense during return travel to the surface. The net effect of these 3 phase shifts determine the phase of the secondary field sensed at the receiver.

A relatively poor conductor in resistive ground will yield a net positive phase shift. A relatively good conductor in more conductive ground will yield a net negative phase shift. A combination is possible whereby the net phase shift is zero and the response is purely in-phase with no quadrature component.

A net positive phase shift combined with the geometrical crossover shape will lead to a positive quadrature response on the side of approach and a negative on the side of departure. A net negative phase shift would produce the reverse. A further sign reversal occurs with a 180 degree change in instrument orientation as occurs on reciprocal line headings. During digital processing of the quadrature data for map presentation this is corrected for by normalizing the sign to one of the flight line headings.

APPENDIX II

Anomaly List

J8630 ANOMALIES, OPIKEIGEN LAKE

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
1	10	A	0	4.6	11.9	0.1	0	44
1	10	B	0	3.3	5.6	0.2	22	36
1	20	A	0	2.9	6.1	0.1	29	25
1	20	B	0	10.9	11.4	0.9	14	36
1	20	C	0	9.0	23.4	0.2	0	33
1	30	A	0	10.3	26.4	0.2	0	33
1	30	B	0	6.5	14.5	0.2	6	33
1	30	C	0	10.2	11.0	0.9	14	35
1	30	D	0	6.6	6.7	0.8	23	36
1	40	A	1	14.0	14.4	1.1	18	28
1	40	B	0	6.5	13.5	0.3	10	30
1	40	C	0	15.4	25.1	0.6	5	30
1	50	A	0	2.7	27.9	0.0	0	36
1	50	B	0	7.4	14.8	0.3	11	29
1	50	C	0	2.2	6.0	0.1	18	32
1	50	D	0	7.4	7.9	0.8	16	39
1	60	A	0	6.5	8.6	0.5	17	35
1	60	B	0	1.1	7.3	0.0	0	37
1	70	A	0	6.1	9.8	0.4	18	30
1	80	A	3	20.0	7.5	4.8	22	31
1	80	B	0	4.2	8.1	0.2	17	32
1	80	C	0	1.2	7.6	0.0	6	29
1	80	D	0	8.0	12.7	0.4	7	37
1	90	A	1	13.5	14.7	1.0	4	41
1	90	B	0	4.2	3.9	0.7	37	35
1	90	C	1	8.1	7.5	1.0	18	39
1	90	D	3	12.1	3.5	5.8	10	54
1	100	A	3	30.8	12.4	5.0	16	29
1	100	B	3	26.0	10.6	4.7	15	32
1	100	C	4	39.4	11.8	8.0	11	32
1	100	D	1	26.6	24.1	1.6	4	34
1	110	A	1	19.5	18.9	1.3	0	42
1	110	B	3	23.5	8.1	5.7	17	33
1	110	C	2	12.9	6.4	2.8	13	46

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J8630 ANOMALIES, OPIKEIGEN LAKE

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
1	110	D	2	23.5	11.2	3.7	6	42
1	120	A	4	39.1	11.0	8.7	8	35
1	120	B	2	14.5	8.5	2.3	20	35
1	120	C	2	14.2	7.6	2.6	21	35
1	120	D	1	15.1	16.1	1.0	0	44
1	130	A	1	17.3	15.4	1.4	0	46
1	130	B	2	15.8	7.2	3.4	21	35
1	130	C	0	6.1	8.0	0.5	6	48
1	130	D	1	10.6	7.1	1.7	0	58
1	140	A	3	28.3	12.0	4.5	10	35
1	140	B	1	13.5	13.8	1.1	12	34
1	140	C	3	31.4	11.3	5.8	12	33
1	140	D	2	32.5	21.9	2.6	8	31
1	140	E	1	27.5	30.0	1.3	6	29
1	150	A	0	10.8	14.2	0.7	1	43
1	150	B	0	5.7	6.8	0.6	9	49
1	150	C	0	10.4	13.4	0.7	11	34
1	160	A	0	20.8	27.4	0.9	5	30
1	160	B	0	13.4	20.5	0.6	11	27
1	160	C	0	3.8	8.1	0.2	14	35
1	160	D	0	19.9	25.7	0.9	7	29
1	170	A	1	16.0	15.1	1.3	1	44
1	180	A	0	9.2	14.6	0.5	11	31
1	180	B	0	15.4	18.6	0.9	6	35
1	190	A	0	8.5	12.4	0.5	0	45
1	190	B	0	7.6	10.6	0.5	5	43
1	200	A	0	7.9	13.6	0.4	3	39
1	200	B	0	11.6	15.8	0.7	1	41
1	200	C	0	3.2	7.9	0.1	6	40
1	210	A	0	7.3	10.3	0.5	0	54
1	210	B	0	7.1	10.2	0.5	0	50
1	210	C	0	4.3	12.1	0.1	0	44
1	220	A	0	2.3	22.5	0.0	0	38
1	220	B	0	3.9	13.1	0.1	3	32

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J8630 ANOMALIES, OPIKEIGEN LAKE

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
1	220	C	0	14.7	18.9	0.8	5	35
1	220	D	0	17.4	21.4	0.9	3	36
1	230	A	0	2.4	15.2	0.0	0	44
1	230	B	0	14.5	18.8	0.8	0	41
1	230	C	0	10.9	16.6	0.5	2	38
1	230	D	0	3.8	10.7	0.1	3	37
1	240	A	0	6.7	14.3	0.2	7	32
1	240	B	0	5.8	16.7	0.1	0	38
1	240	C	0	13.5	17.7	0.7	0	41
1	240	D	0	15.4	25.0	0.6	0	37
1	250	A	0	7.9	24.3	0.1	0	35
1	250	B	0	12.2	20.3	0.5	0	39
1	250	C	0	5.9	21.6	0.1	0	37
1	250	D	1	21.1	16.8	1.8	11	33
1	260	A	2	19.6	13.5	2.1	13	33
1	260	B	0	5.9	16.7	0.1	0	43
1	260	C	0	8.0	17.0	0.3	0	43
1	270	A	0	7.5	15.4	0.3	0	46
1	270	B	0	5.1	15.1	0.1	0	47
1	270	C	0	5.2	10.2	0.2	12	33
1	270	D	1	13.3	12.4	1.2	16	32
1	280	A	0	3.6	8.3	0.1	11	35
1	280	B	0	5.2	14.3	0.1	0	36
1	280	C	0	6.2	12.7	0.3	4	37
1	290	A	0	4.9	9.9	0.2	5	40
1	290	B	0	6.1	13.5	0.2	1	39
1	290	C	0	4.9	8.2	0.3	18	33
1	300	A	0	2.5	10.5	0.0	1	35
1	300	B	0	6.2	11.5	0.3	5	39
1	300	C	0	5.6	11.6	0.2	8	35
1	310	A	0	4.7	11.3	0.2	0	41
1	310	B	0	7.7	13.2	0.4	0	43
1	320	A	0	14.7	17.4	0.9	2	39
1	320	B	0	6.3	17.5	0.1	0	37
1	330	A	0	6.9	15.0	0.2	4	34

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J8630 ANOMALIES, OPIKEIGEN LAKE

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
1	330	B	0	7.3	21.1	0.2	0	35
1	330	C	0	16.3	26.3	0.6	0	35
1	340	A	0	7.4	32.6	0.1	0	27
1	340	B	0	3.4	26.4	0.0	0	27
1	340	C	0	5.0	19.9	0.1	0	30
1	340	D	0	19.1	27.5	0.7	2	32
1	340	E	0	8.0	22.9	0.2	0	31
1	340	F	0	8.3	24.1	0.2	0	34
1	350	A	0	7.3	17.4	0.2	0	43
1	350	B	1	17.0	18.9	1.0	2	39
1	350	C	0	12.3	15.1	0.8	5	39
1	350	D	0	5.7	15.2	0.1	0	37
1	350	E	0	4.7	15.4	0.1	0	40
1	360	A	0	11.2	16.1	0.6	5	37
1	360	B	1	16.3	17.2	1.1	8	35
1	360	C	1	25.5	27.0	1.3	4	32
1	360	D	0	8.8	23.8	0.2	0	35
1	370	A	0	7.3	17.4	0.2	0	38
1	370	B	1	20.9	17.9	1.6	3	40
1	370	C	0	15.0	19.9	0.8	0	41
1	370	D	0	11.4	17.5	0.5	0	41
1	370	E	1	15.0	13.3	1.3	13	34
1	370	F	0	10.6	15.8	0.6	2	39
1	370	G	0	6.8	17.6	0.2	0	40
1	380	A	0	12.2	16.5	0.7	3	39
1	380	B	1	20.1	16.6	1.6	8	36
1	380	C	0	11.4	17.0	0.6	3	37
1	380	D	1	20.2	17.6	1.5	6	37
1	380	E	2	30.0	15.6	3.5	10	34
1	380	F	0	7.9	18.6	0.2	0	39
1	390	A	0	5.7	14.8	0.2	0	42
1	390	B	2	25.9	13.8	3.3	7	38
1	390	C	1	17.1	16.4	1.3	8	36
1	390	D	0	13.0	17.6	0.7	3	38
1	390	E	1	21.4	16.4	1.9	5	39
1	390	F	0	14.2	16.8	0.9	2	40
1	400	A	0	17.8	21.8	0.9	1	37
1	400	B	1	16.6	13.2	1.6	7	40

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J8630 ANOMALIES, OPIKEIGEN LAKE

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
1	400	C	1	14.6	15.7	1.0	7	37
1	400	D	1	19.8	19.5	1.3	8	33
1	400	E	1	23.7	19.1	1.8	8	34
1	400	F	0	5.6	20.5	0.1	0	32
1	410	A	0	6.5	17.7	0.2	0	35
1	410	B	0	11.9	17.3	0.6	1	39
1	410	C	1	17.0	17.4	1.2	6	36
1	410	D	1	17.5	16.6	1.3	5	39
1	410	E	1	19.3	15.8	1.6	6	39
1	410	F	0	14.2	16.5	0.9	1	42
1	420	A	0	9.2	17.6	0.4	0	39
1	420	B	2	18.9	12.9	2.1	8	40
1	420	C	2	24.0	14.1	2.8	8	37
1	420	D	1	17.3	20.3	1.0	7	33
1	420	E	0	17.4	26.4	0.7	3	31
1	420	F	0	6.9	20.0	0.1	0	33
1	420	G	0	2.4	18.2	0.0	0	39
1	420	H	0	2.4	9.8	0.0	4	33
1	430	A	0	5.6	12.1	0.2	0	45
1	430	B	0	7.7	18.1	0.2	0	38
1	430	C	1	17.0	15.3	1.4	8	37
1	430	D	2	23.1	14.5	2.5	9	36
1	430	E	1	17.8	13.1	1.8	8	39
1	430	F	0	12.0	14.9	0.8	1	42
1	430	G	0	8.8	14.5	0.4	0	45
1	440	A	0	8.6	13.2	0.5	0	48
1	440	B	0	11.9	15.6	0.7	1	42
1	440	C	1	17.8	12.8	1.9	9	39
1	440	D	1	16.0	16.5	1.1	6	37
1	440	E	1	19.7	16.7	1.6	6	37
1	440	F	0	6.8	15.3	0.2	0	44
1	440	G	0	6.8	15.8	0.2	0	39
1	440	H	0	3.2	14.2	0.0	0	39
1	440	J	0	7.7	19.7	0.2	1	32
1	450	A	0	13.9	35.4	0.3	0	36
1	450	B	0	4.0	15.8	0.0	0	36
1	450	C	0	5.6	19.1	0.1	0	35
1	450	D	0	14.0	20.6	0.6	0	37
1	450	E	1	22.3	21.0	1.4	5	35
1	450	F	1	17.4	17.9	1.2	8	34

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J8630 ANOMALIES, OPIKEIGEN LAKE

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
1	450	G	0	12.1	20.6	0.5	2	35
1	450	H	0	14.4	21.0	0.7	0	39
1	460	A	1	14.5	16.2	1.0	1	43
1	460	B	0	9.8	19.0	0.4	0	36
1	460	C	1	24.4	24.1	1.4	9	29
1	460	D	0	21.4	27.4	0.9	3	32
1	460	E	0	2.7	16.2	0.0	0	34
1	470	A	0	8.3	20.8	0.2	0	39
1	470	B	0	12.4	18.0	0.6	2	38
1	470	C	0	12.9	19.1	0.6	0	39
1	470	D	2	23.2	14.8	2.5	4	41
1	480	A	3	40.1	20.0	4.1	7	33
1	480	B	1	22.8	23.6	1.3	7	31
1	480	C	0	14.5	23.9	0.5	2	32
1	480	D	0	6.9	19.6	0.2	0	34
1	490	A	0	6.1	22.3	0.1	0	34
1	490	B	0	-4.5	10.9	0.0	0	41
1	490	C	0	4.8	15.4	0.1	0	38
1	490	D	0	9.3	22.6	0.2	0	36
1	490	E	0	13.3	20.8	0.6	1	36
1	490	F	2	29.2	17.1	3.0	5	37
1	490	G	3	32.0	15.4	4.0	5	38
1	500	A	2	22.9	15.3	2.3	6	39
1	500	B	2	22.1	14.7	2.3	7	39
1	500	C	1	20.9	15.9	1.9	5	39
1	500	D	0	13.0	20.4	0.6	1	36
1	500	E	0	8.1	20.2	0.2	0	37
1	500	F	0	4.5	14.1	0.1	0	40
1	500	G	0	-6.4	13.5	0.0	0	36
1	500	H	0	4.5	17.5	0.1	0	36
1	510	A	0	4.7	19.7	0.0	0	34
1	510	B	0	-12.3	17.6	0.0	0	32
1	510	C	0	5.0	19.8	0.1	0	35
1	510	D	0	8.6	20.2	0.2	0	36
1	510	E	0	12.9	19.9	0.6	0	38
1	510	F	1	17.0	14.2	1.5	0	46
1	510	G	1	11.2	10.4	1.1	1	50
1	520	A	0	9.0	22.9	0.2	0	35

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J8630 ANOMALIES, OPIKEIGEN LAKE

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
1	520	B	0	4.7	17.3	0.1	1	30
1	520	C	0	10.7	20.6	0.4	6	30
1	520	D	0	15.6	38.8	0.3	0	26
1	520	E	0	11.0	32.7	0.2	0	27
1	520	F	0	5.4	22.2	0.1	0	33
1	530	A	0	10.7	24.8	0.3	2	30
1	530	B	0	-13.3	14.7	0.0	0	33
1	530	C	0	6.0	21.8	0.1	0	33
1	530	D	0	6.3	23.2	0.1	0	33
1	530	E	0	6.8	13.5	0.3	0	42
1	530	F	0	8.5	16.4	0.3	0	44
1	530	G	0	7.2	13.8	0.3	4	37
1	530	H	0	8.6	14.6	0.4	0	46
1	540	A	0	13.5	22.3	0.5	0	39
1	540	B	0	9.3	13.2	0.6	14	30
1	540	C	0	12.0	23.3	0.4	3	31
1	540	D	0	8.9	24.1	0.2	6	24
1	540	E	0	6.4	24.1	0.1	0	28
1	540	F	0	7.2	25.5	0.1	1	26
1	540	G	0	6.2	22.4	0.1	0	32
1	540	H	0	-9.0	12.1	0.0	0	35
1	540	J	0	10.1	12.4	0.7	12	35
1	550	A	1	11.6	11.6	1.0	11	38
1	550	B	0	-7.7	12.0	0.0	0	37
1	550	C	0	5.1	14.4	0.1	0	39
1	550	D	0	12.1	18.9	0.5	14	25
1	550	E	0	7.5	12.1	0.4	11	33
1	550	F	0	8.6	13.3	0.5	0	49
1	560	A	0	6.2	14.1	0.2	0	44
1	560	B	0	3.5	10.7	0.1	2	37
1	560	C	0	13.8	16.9	0.8	15	27
1	560	D	0	17.9	21.6	0.9	8	30
1	560	E	0	7.3	17.4	0.2	6	30
1	560	F	0	6.8	18.4	0.2	1	33
1	560	G	0	-9.3	10.2	0.0	0	41
1	560	H	0	7.0	10.1	0.5	7	41
1	570	A	0	6.5	12.8	0.3	5	37
1	570	B	0	-9.3	9.0	0.0	0	37
1	570	C	0	6.0	15.5	0.2	1	35
1	570	D	0	8.1	17.0	0.3	1	36

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J8630 ANOMALIES, OPIKEIGEN LAKE

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
1	570	E	2	31.4	20.8	2.6	6	34
1	570	F	0	8.0	12.1	0.5	14	32
1	570	G	0	3.0	11.2	0.0	0	40
1	570	H	0	4.9	8.3	0.3	0	54
2	580	A	0	10.4	15.0	0.6	3	39
2	580	B	0	5.9	29.2	0.0	0	27
2	580	C	2	32.0	26.3	2.0	7	30
2	580	D	0	9.1	18.5	0.3	6	31
2	580	E	0	7.3	21.6	0.1	0	31
2	580	F	0	-14.5	7.5	0.0	0	30
2	580	G	1	25.7	29.9	1.1	8	26
2	590	A	1	24.4	29.2	1.1	5	29
2	590	B	0	5.5	15.5	0.1	0	37
2	590	C	0	8.7	15.9	0.4	3	36
2	590	D	1	19.5	21.2	1.1	6	33
2	590	E	0	6.8	9.7	0.5	1	49
2	600	A	0	8.8	16.0	0.4	0	41
2	600	B	2	32.8	24.8	2.2	6	32
2	600	C	0	10.3	18.9	0.4	3	34
2	600	D	0	6.3	20.9	0.1	0	33
2	600	E	0	-14.0	5.0	0.0	0	35
2	600	F	0	9.6	17.5	0.4	4	34
2	610	A	1	41.1	47.3	1.4	7	23
2	610	B	0	-7.5	3.4	0.0	0	33
2	610	C	0	6.5	24.6	0.1	0	29
2	610	D	0	6.8	20.1	0.1	0	31
2	610	E	0	9.3	21.4	0.3	1	32
2	610	F	1	26.8	25.2	1.5	7	30
2	610	G	0	6.2	14.5	0.2	0	42
2	620	A	0	13.5	33.5	0.3	0	29
2	620	B	0	7.9	31.6	0.1	0	28
2	620	C	0	16.7	25.9	0.6	3	31
2	620	D	0	7.2	20.4	0.2	7	25
2	620	E	0	7.2	25.4	0.1	0	29
2	620	F	0	-3.7	2.6	0.0	0	36
2	620	G	2	31.5	23.0	2.3	14	25
2	630	A	2	25.8	13.7	3.3	18	28
2	630	B	0	-2.8	2.9	0.0	0	27
2	630	C	0	4.3	11.5	0.1	0	41

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J8630 ANOMALIES, OPIKEIGEN LAKE

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
2	630	D	0	11.4	25.7	0.3	0	31
2	630	E	0	3.7	12.5	0.1	0	36
2	630	F	0	7.6	16.7	0.3	0	39
2	640	A	0	14.8	21.1	0.7	0	38
2	640	B	0	9.5	19.2	0.3	0	36
2	640	C	1	20.1	18.2	1.5	11	32
2	640	D	0	10.6	21.2	0.4	0	35
2	640	E	0	4.6	15.4	0.1	0	34
2	640	F	0	-3.7	3.5	0.0	0	24
2	640	G	2	20.2	12.5	2.4	10	38
2	650	A	1	14.9	11.6	1.6	18	32
2	650	B	0	3.9	15.2	0.0	0	34
2	650	C	0	11.7	21.1	0.4	1	34
2	650	D	0	6.1	12.2	0.3	7	36
2	650	E	0	7.4	15.1	0.3	0	45
2	660	A	0	14.8	31.6	0.4	2	28
2	660	B	0	3.9	11.0	0.1	6	33
2	660	C	0	20.9	34.1	0.7	2	29
2	660	D	0	7.4	23.2	0.1	0	30
2	660	E	0	4.4	20.5	0.0	0	30
2	660	F	0	7.2	9.5	0.6	24	27
2	670	A	0	10.7	17.5	0.5	7	32
2	670	B	0	4.0	14.4	0.1	0	35
2	670	C	0	5.6	17.7	0.1	1	32
2	670	D	1	25.0	26.3	1.3	9	28
2	670	E	0	7.6	19.1	0.2	7	27
2	680	A	0	16.8	22.9	0.8	10	27
2	680	B	1	22.0	27.4	1.0	10	25
2	680	C	0	11.2	23.9	0.3	11	22
2	680	D	0	4.7	19.0	0.0	6	23
2	680	E	0	4.8	19.5	0.0	3	26
2	680	F	0	4.2	18.9	0.0	0	29
2	680	G	0	6.6	17.7	0.2	7	27
2	690	A	0	4.8	12.0	0.2	3	36
2	690	B	0	5.2	20.8	0.1	1	28
2	690	C	0	9.2	21.8	0.2	1	31
2	690	D	0	19.8	26.8	0.8	10	25
2	690	E	0	16.8	26.9	0.6	7	26
2	700	A	2	23.9	15.7	2.4	8	36

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J8630 ANOMALIES, OPIKEIGEN LAKE

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
2	700	B	0	12.4	23.1	0.4	5	30
2	700	C	0	14.2	22.2	0.6	7	30
2	700	D	0	4.4	17.9	0.0	0	30
2	700	E	0	4.6	19.5	0.0	4	25
2	710	A	0	4.4	12.0	0.1	0	42
2	710	B	0	4.2	19.7	0.0	0	32
2	710	C	0	13.5	16.9	0.8	7	34
2	710	D	0	4.0	13.1	0.1	4	32
2	710	E	2	21.8	12.6	2.8	9	38
2	720	A	2	30.0	16.6	3.3	14	29
2	720	B	1	19.1	17.9	1.4	16	27
2	720	C	0	9.3	21.9	0.3	2	30
2	720	D	1	23.9	22.6	1.5	9	30
2	730	A	0	3.7	17.5	0.0	0	29
2	730	B	2	24.6	18.5	2.0	2	40
2	730	C	0	10.1	15.0	0.5	10	32
2	730	D	3	32.0	14.3	4.4	15	29
2	740	A	2	23.5	11.7	3.5	18	30
2	740	B	0	12.4	19.0	0.6	10	28
2	740	C	2	45.7	29.6	3.0	5	30
2	750	A	0	5.2	13.1	0.2	0	40
2	750	B	3	42.8	19.6	4.7	0	42
2	750	C	0	11.1	14.9	0.7	2	41
2	750	D	3	24.2	8.2	5.8	13	37
2	760	A	3	29.9	12.9	4.5	11	34
2	760	B	0	4.4	14.6	0.1	0	35
2	760	C	3	70.6	28.3	6.5	2	31
2	760	D	3	73.6	35.2	5.2	0	32
2	760	E	0	3.8	22.9	0.0	0	32
2	760	F	0	8.3	19.9	0.2	3	31
2	770	A	0	7.7	14.8	0.3	0	43
2	770	B	3	75.3	34.7	5.5	0	33
2	770	C	3	79.5	30.2	7.2	0	35
2	770	D	0	9.4	20.2	0.3	3	32
2	770	E	2	24.5	18.7	2.0	11	31
2	770	F	0	12.2	14.8	0.8	9	35
2	770	G	0	4.9	12.3	0.2	7	33
2	780	A	0	3.3	4.0	0.4	42	28

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J8630 ANOMALIES, OPIKEIGEN LAKE

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
2	780	B	0	6.8	10.9	0.4	11	35
2	780	C	0	5.9	10.9	0.3	10	34
2	780	D	2	27.3	21.6	2.0	10	30
2	780	E	0	13.4	18.6	0.7	10	30
2	780	F	3	54.4	25.0	5.0	0	39
2	780	G	3	59.7	27.6	5.1	0	38
2	780	H	0	9.9	22.4	0.3	1	31
2	790	A	0	9.4	14.9	0.5	1	41
2	790	B	3	114.9	55.6	5.9	0	32
2	790	C	2	81.3	54.1	3.5	0	34
2	790	D	0	12.2	17.7	0.6	2	37
2	790	E	1	16.9	15.3	1.4	9	36
2	790	F	0	4.6	11.6	0.1	3	37
2	800	A	0	4.4	15.1	0.1	5	29
2	800	B	0	11.1	19.1	0.5	7	30
2	800	C	0	18.5	22.6	0.9	7	31
2	800	D	0	9.0	20.4	0.3	3	31
2	800	E	1	38.6	37.6	1.7	0	35
2	800	F	2	63.2	42.9	3.2	0	35
2	810	A	1	72.7	80.2	1.8	0	24
2	810	B	0	39.3	66.9	0.8	0	25
2	810	C	0	6.7	19.3	0.1	2	30
2	810	D	0	6.8	15.5	0.2	0	38
2	820	A	0	8.1	19.2	0.2	5	30
2	820	B	0	11.0	25.7	0.3	0	35
2	820	C	1	37.5	54.7	1.0	0	29
2	830	A	0	23.9	55.0	0.4	0	28
2	830	B	0	4.9	22.6	0.0	0	33
2	830	C	1	18.0	20.1	1.0	14	26
2	840	A	1	23.1	17.5	1.9	14	29
2	840	B	0	7.4	26.6	0.1	0	31
2	840	C	0	12.9	59.1	0.1	0	26
2	850	B	0	12.3	33.8	0.2	0	29
2	850	C	1	23.2	18.8	1.8	14	28
2	860	A	0	4.7	18.2	0.1	0	31
2	860	B	0	12.3	24.9	0.4	4	28
2	860	C	1	20.1	22.7	1.1	9	29

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J8630 ANOMALIES, OPIKEIGEN LAKE

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
2	860	D	0	13.9	24.6	0.5	0	37
2	870	A	0	23.3	101.9	0.2	0	21
2	870	B	0	15.0	52.5	0.2	0	27
2	870	C	0	12.0	31.4	0.2	0	32
2	870	D	0	16.0	19.6	0.9	10	30
2	870	E	0	13.1	20.5	0.6	5	32
2	880	B	0	8.9	28.7	0.1	0	38
2	880	C	0	10.6	28.3	0.2	0	38
2	880	D	0	9.8	14.0	0.6	9	35
2	880	E	0	12.3	37.2	0.2	0	32
2	880	F	0	18.9	72.9	0.2	0	24
2	890	A	0	17.8	44.4	0.3	0	34
2	890	B	0	11.7	16.0	0.7	0	42
2	890	C	0	13.1	26.8	0.4	0	40
2	900	B	0	17.6	29.5	0.6	0	34
2	900	C	0	10.3	19.0	0.4	10	27
2	900	D	0	7.3	17.3	0.2	5	31
2	900	E	0	17.4	46.4	0.3	0	30
2	910	A	0	22.4	50.1	0.4	0	28
2	910	B	0	11.1	14.4	0.7	8	36
2	910	C	0	14.4	21.3	0.6	0	40
2	920	B	1	34.9	46.9	1.0	4	25
2	920	C	1	24.0	26.4	1.2	11	25
2	920	D	0	8.2	33.3	0.1	0	29
2	920	E	0	18.9	48.8	0.3	0	25
2	930	A	0	16.2	41.3	0.3	0	28
2	930	B	1	12.8	13.7	1.0	0	46
2	930	C	0	13.8	18.7	0.7	0	43
2	930	D	0	5.3	9.3	0.3	12	36
2	930	E	0	0.7	5.8	0.0	0	40
2	940	A	0	16.0	21.5	0.8	0	44
2	950	A	0	4.9	15.1	0.1	0	43
2	950	B	0	17.0	28.6	0.6	0	41
2	960	B	0	5.8	24.7	0.1	0	34
2	960	C	0	9.4	20.4	0.3	1	34

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

J8630 ANOMALIES, OPIKEIGEN LAKE

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	AMPLITUDE (PPM) QUAD.	CONDUCTOR CTP MHOS	CONDUCTOR DEPTH MTRS	BIRD HEIGHT MTRS
2	980	A	0	13.0	26.2	0.4	0	40
2	980	B	0	3.2	15.1	0.0	0	30
2	980	C	0	4.0	25.1	0.0	0	41
2	1000	B	0	9.7	24.9	0.2	0	34
2	1000	C	0	3.3	15.9	0.0	0	42

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

APPENDIX III

CERTIFICATE OF QUALIFICATIONS

I, GEORGE PODOLSKY, certify that: -

1. I am registered as a Professional Engineer in the Province of Ontario and work as a Professional Geophysicist.

2. I reside at 172 Dunwoody Drive in the town of Oakville, Ontario.

3. I hold a B. Sc. in Engineering Physics from Queen's University, having graduated in 1954.

4. I have been continuously engaged in both professional and managerial roles in the minerals industry in Canada and abroad for the past thirty two years.

5. I have been an active member of the Society of Exploration Geophysicists since 1960 and hold memberships in other professional societies involved in the minerals extraction and exploration industry.

6. The accompanying report was prepared from information published by government agencies and materials supplied by Pure Gold Resources Inc. and Aerodat Limited. I have not personally visited the property.

7. I have no interest, direct or indirect, in the property described nor do I hold securities in Pure Gold Resources Inc.

8. I hereby consent to the use of this report in a Statement of Material Facts of the Company and for the preparation of a prospectus for submission to the Ontario Securities Commission and/or other regulatory authorities.

Signed,

George Podolsky, P. Eng.
Geopod Associates Inc.

REGISTERED PROFESSIONAL ENGINEER
G. PODOLSKY
PROVINCE OF ONTARIO

Oakville, Ontario
November 7, 1986

Ministry of Natural Resources
Ontario

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

#14 · 2 · The

File 791401

52P09NE0009 2.9707 RICH LAKE

900

G-361 G-380

Type of Survey(s): Airborne Geophysical Survey

Opikeigen Lake & Rich Lake

Claim Holder(s): Pure Gold Resources Inc.

Prospector's Licence No.: T-4689

Address: 1275 Main St. West North Bay Ontario P1B 2W7

Survey Company: Aerodat

Date of Survey (from & to): 01 08 86 (Day Mo. Yr.) – 03 08 86 (Day Mo. Yr.)

Total Miles of line Cut: 265 km

Name and Address of Author (of Geo-Technical report): 3883 Nashua Drive Mississauga Ontario L4V 1R3

Credits Requested per Each Claim in Columns at right

Special Provisions	Geophysical	Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	- Electromagnetic	
	- Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Man Days	Geophysical	Days per Claim
Complete reverse side and enter total(s) here	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	

RECEIVED
JAN 30 1987
MINING LANDS SECTION

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Radiometric	

Expenditures (excludes power stripping)

Type of Work Performed:

Performed on Claim(s):

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.

Date	Recorded Holder or Agent (Signature)
Dec. 19/86	Michelle Dubeau

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.
TB	791401	80		791424	80
	791402	80		791425	80
	791403	80		791426	80
	791404	80		791427	80
	791405	80		791428	80
	791406	80		791429	80
	791407	80		791430	80
	791408	80		791431	80
	791409	80		791432	80
	791410	80		791433	80
	791411	80		791434	80
	791412	80		791435	80
	791413	80		791436	80
	791414	80		791437	80
	791415	80		791438	80
	791416	80		791439	80
	791417	80		791440	80
	791418	80		854901	80
	791419	80		854902	80
	791420	80		854903	80
	791421	80		854904	80
	791422	80		854905	80
	791423	80		854906	80

Total number of mining claims covered by this report of work: 145

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
11600	January 22/87	[signature]
	Date Approved as Recorded: 87.2.20	Branch Director: [signature]

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:
Noramco Explorations 1275 Main Street West
North Bay Ontario P1B 2W7

Date Certified: Dec.19/86

Certified by (Signature): Michelle Dubeau

2.9707

Opikeigen Lake Property Claims continued

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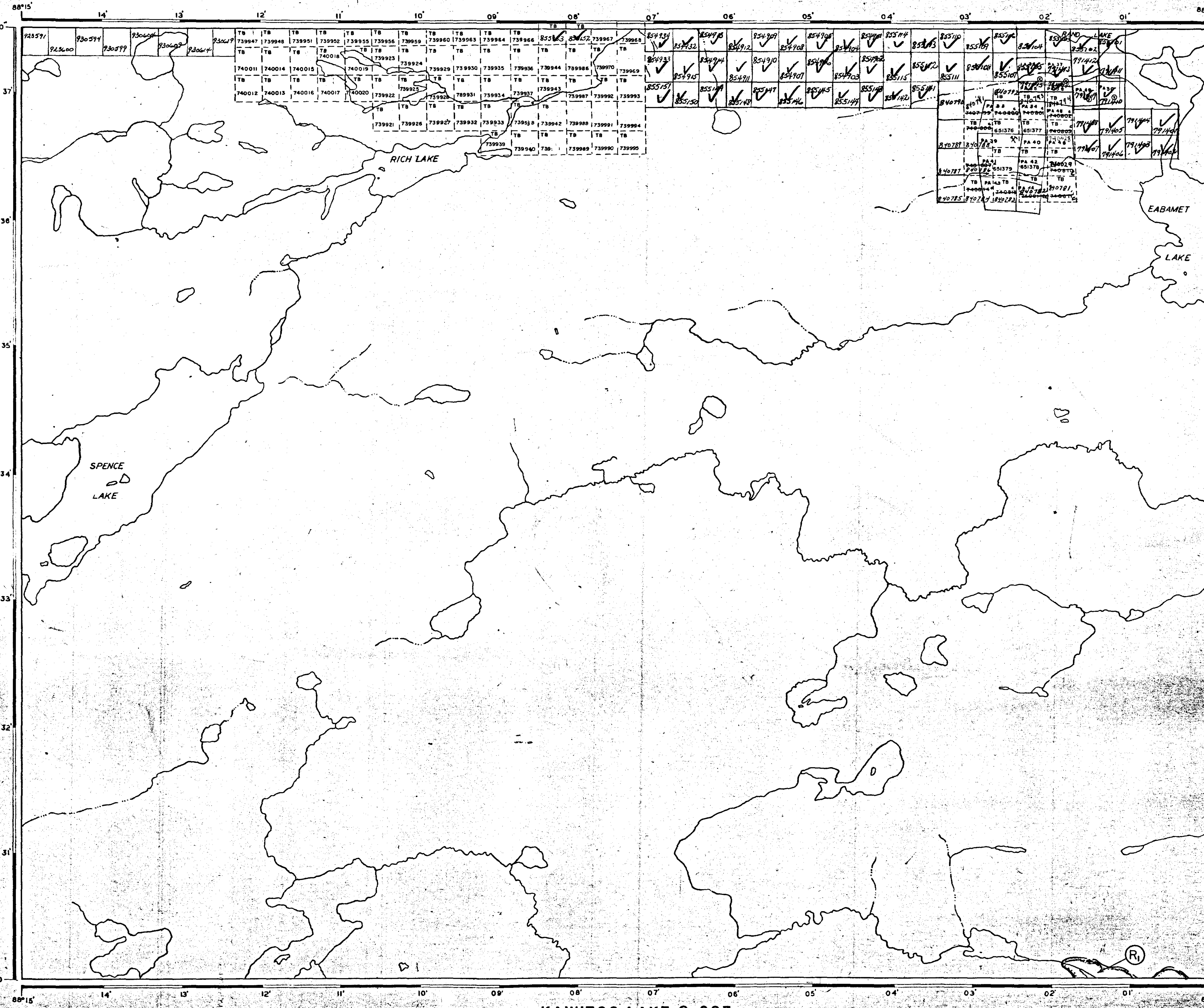
REFERENCES

AREAS WITHDRAWN FROM DISPOSITION

M.R.O. – MINING RIGHTS ONLY
S.R.O. – SURFACE RIGHTS ONLY
M.+S. – MINING AND SURFACE RIGHTS

Description	Order No.	Date	Disposition	File
PARK RESERVE	W 47/83	8/25/83	M&S	168516

DISPOSITION BY EXPLORATORY LICENCE OF OCCUPATION ONLY — APPLY TO MINING RECORDER.



REFERENCES

THUNDER BAY MINING DIVISION RECEIVED AUG 13 1986 AM 7|8|9|10|11|12|1|2|3|4|5|6 PM

LEGEND

HIGHWAY AND ROUTE No.
OTHER ROADS
TRAILS
SURVEYED LINES
TOWNSHIPS, BASE LINES, ETC
LOTS, MINING CLAIMS, PARCELS, ETC
UNSURVEYED LINES
LOT LINES
PARCEL BOUNDARY
MINING CLAIMS ETC
RAILWAY AND RIGHT OF WAY
UTILITY LINES
NON PERENNIAL STREAM
FLOODING OR FLOODING RIGHTS
SUBDIVISION OR COMPOSITE PLAN
RESERVATIONS
ORIGINAL SHORELINE
MARSH OR MUSKEG
MINES
TRAVERSE MONUMENT

DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT — SYMBOL
PATENT, SURFACE & MINING RIGHTS
SURFACE RIGHTS ONLY
MINING RIGHTS ONLY
LEASE, SURFACE & MINING RIGHTS
SURFACE RIGHTS ONLY
MINING RIGHTS ONLY
LICENCE OF OCCUPATION
ORDER-IN COUNCIL
RESERVATION
CANCELLED
SAND & GRAVEL

NOTE: MINING RIGHTS IN PARCELS PATENTED PRIOR TO MAY 6, 1913, VESTED IN ORIGINAL PATENTEE BY THE PUBLIC LANDS ACT, R.S.O. 1970, CHAP. 380, SEC. 63, SUBSEC. 1.

SCALE: 1 INCH = 40 CHAINS
FEET 0 1000 2000 4000 6000 8000
METRES 0 200 1000 (1 KM) 2000 (2 KM)

AREA
RICH LAKE

M.N.R. ADMINISTRATIVE DISTRICT
GERALDTON

MINING DIVISION
THUNDER BAY

LAND TITLES / REGISTRY DIVISION
KENORA/PATRICIA

Ontario — Ministry of Natural Resources — Land Management Branch
AUGUST 20, 1984

Date: JULY 1981
Number: G-388

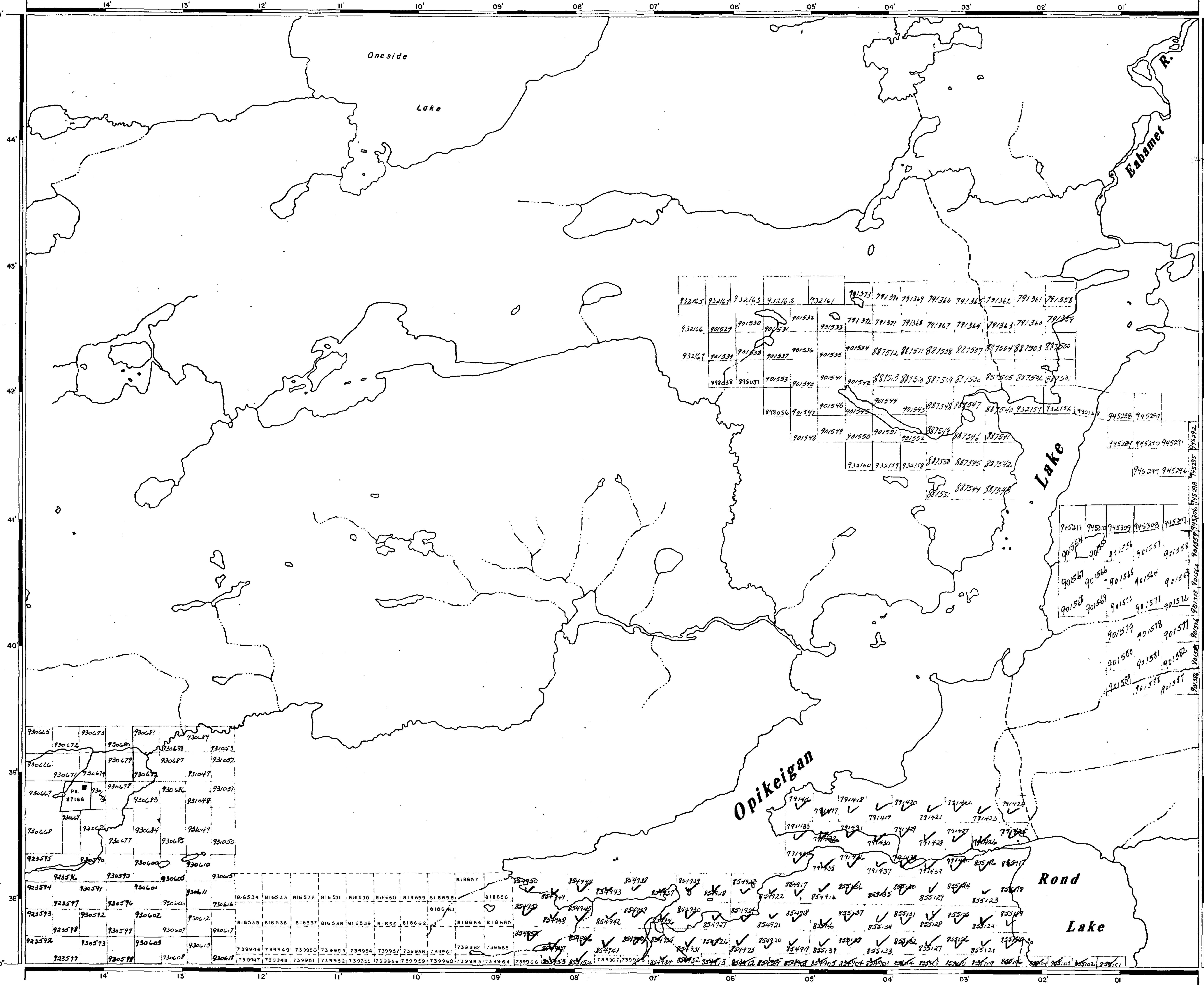
RICH LAKE G-388

52P09NE0009 2.9707 RICH LAKE 200

KENOZHE LAKE G-293

FERGUSON LAKE G-249

WEST OF GIFFORD LAKE G-453



RICH LAKE G-388

REFERENCES

THUNDER BAY MINING DIVISION
RECEIVED
SEP 15 1986
AM 7|8|9|10|11|12|1|2|3|4|5|6 PM

LEGEND

HIGHWAY AND ROUTE No.
OTHER ROADS
TRAILS
SURVEYED LINES:
TOWNSHIPS, BASE LINES, ETC.
LOTS, MINING CLAIMS, PARCELS, ETC.
UNSURVEYED LINES
LOT LINES
PARCEL BOUNDARY
MINING CLAIMS ETC.
RAILWAY AND RIGHT OF WAY
UTILITY LINES
NON PERENNIAL STREAM
FLOODING OR FLOODING RIGHTS
SUBDIVISION OR COMPOSITE PLAN
RESERVATIONS
ORIGINAL SHORELINE
MARSH OR MUSKEG
MINES
TRAVERSE MONUMENT

DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT	SYMBOL
PATENT, SURFACE & MINING RIGHTS	●
" , SURFACE RIGHTS ONLY	◐
" , MINING RIGHTS ONLY	◒
LEASE, SURFACE & MINING RIGHTS	■
" , SURFACE RIGHTS ONLY	◧
" , MINING RIGHTS ONLY	⬓
LICENCE OF OCCUPATION	▼
ORDER-IN-COUNCIL	OC
RESERVATION	Ⓡ
CANCELLED	⊗
SAND & GRAVEL	Ⓢ

NOTE: MINING RIGHTS IN PARCELS PATENTED PRIOR TO MAY 6, 1913, VESTED IN ORIGINAL PATENTEE BY THE PUBLIC LANDS ACT, R.S.O. 1970, CHAP. 380, SEC. 63, SUBSEC. 1.

SCALE: 1 INCH = 40 CHAINS

FEET 0 1000 2000 4000 6000 8000
METRES 0 200 1000 (1 KM) 2000 (2 KM)

AREA

OPIKEIGAN LAKE

M.N.R. ADMINISTRATIVE DISTRICT
GERALDTON

MINING DIVISION
THUNDER BAY

LAND TITLES / REGISTRY DIVISION
KENORA/PATRICIA

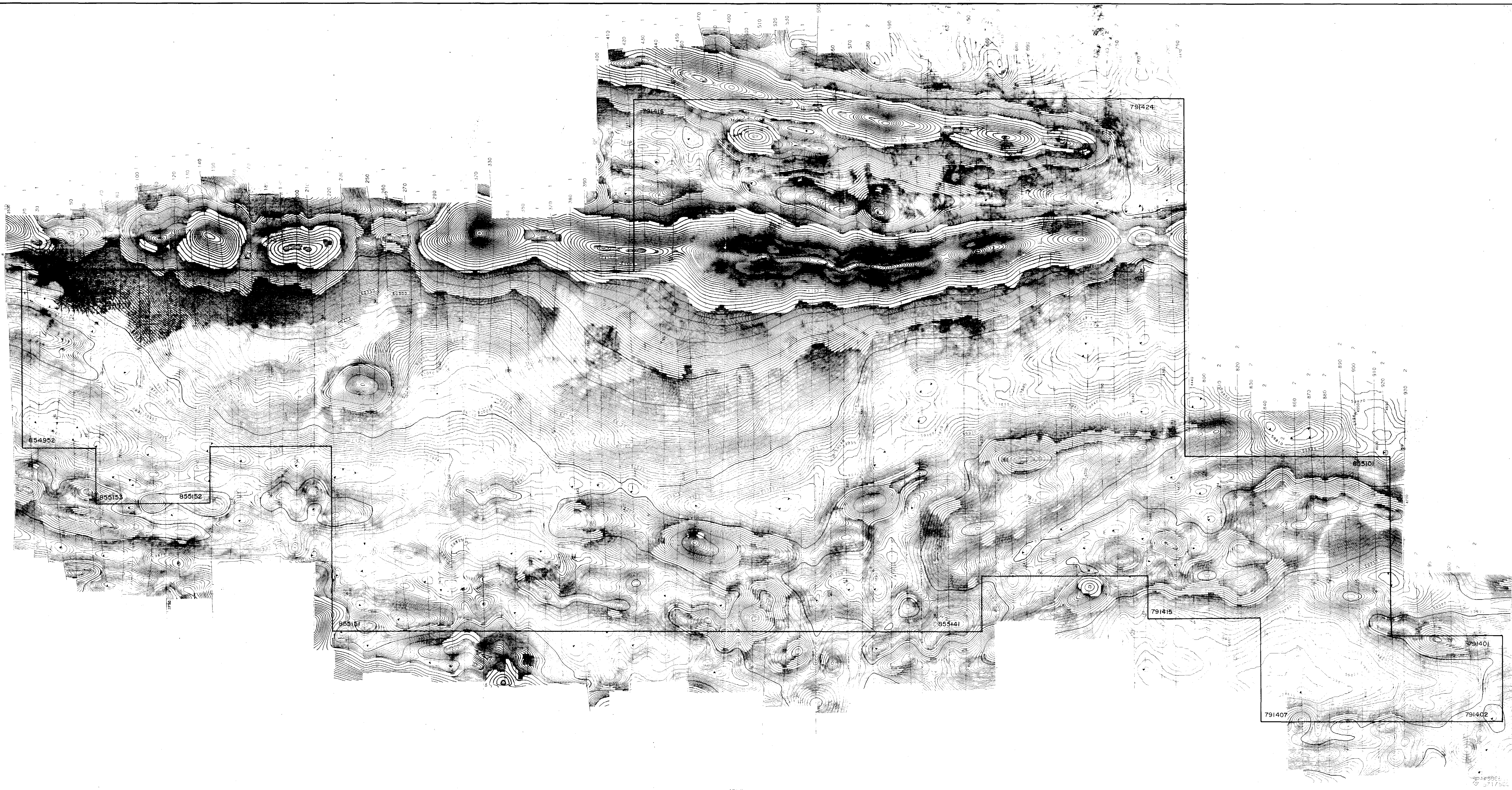
Ministry of Natural Resources
Land Management Branch
Ontario

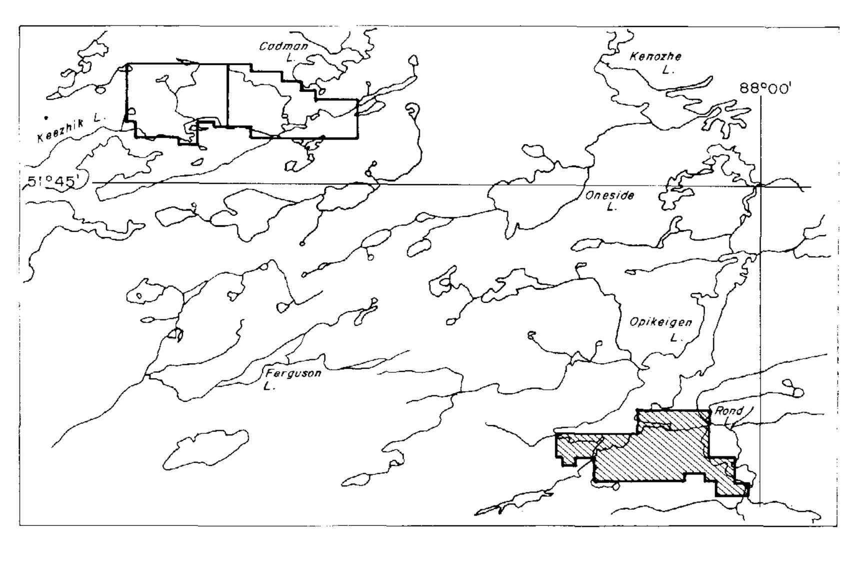
Date: JULY 1981

Number: G-361

52P09NE0009 2.9787 RICH LAKE

210





TOTAL FIELD MAGNETIC CONTOURS

MEAN MAGNETOMETER SENSOR ELEVATION 46 metres
CONTOUR INTERVAL 5 gammas

250 gammas
25 gammas
5 gammas

PURE GOLD RESOURCES INC.

TOTAL FIELD MAGNETIC CONTOURS

OPIKEIGEN LAKE PROPERTY
ONTARIO

SCALE 1/10,000

▼ **AEROTDAT LIMITED**

DATE:	August, 1986
N.T.S. No:	52 P
MAP No:	2

J8630

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VERTICAL MAGNETIC GRADIENT

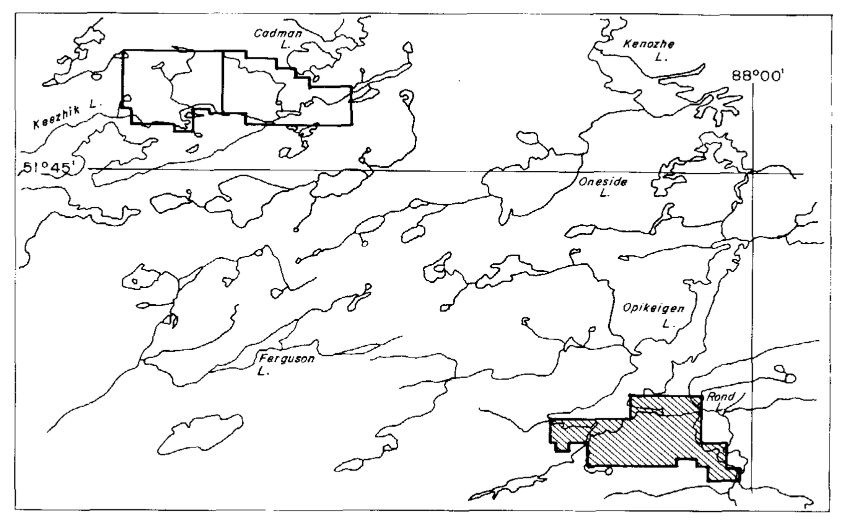
(CALCULATED FROM TOTAL MAGNETIC FIELD)

CONTOUR INTERVAL

50 gammas / metre

10 gammas / metre

2 gammas / metre



PURE GOLD RESOURCES INC.

COMPUTED VERTICAL MAGNETIC GRADIENT CONTOURS

OPIKEIGEN LAKE PROPERTY

ONTARIO

SCALE 1/10,000

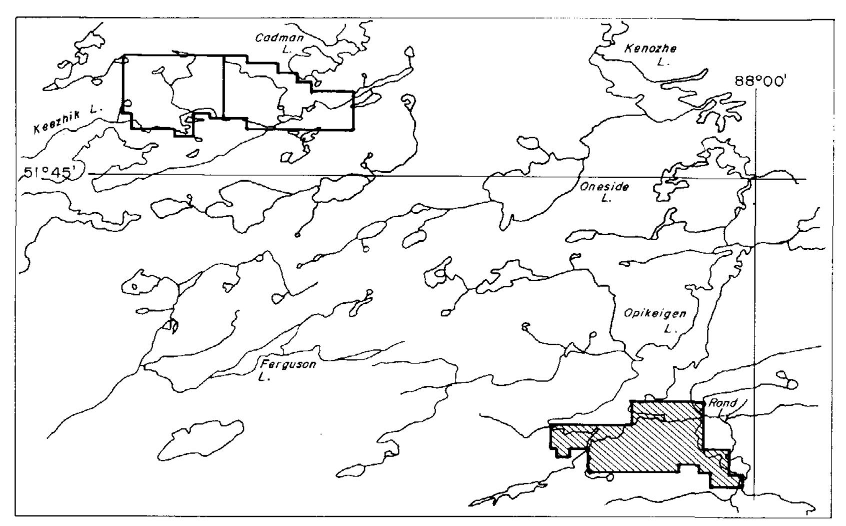
DATE:	August, 1986
N.T.S. No:	52 P
MAP No:	3

▼ AERODAT LIMITED

J8630

230

52P09NE0009 2.9787 RICH LAKE



APPARENT RESISTIVITY CONTOURS

Calculated assuming 200 m conductive layer
(using 4600 Hz coaxial data)

10^N OHM-M N 1 2 3 9
10^N OHM-M M 1 2 3 9

PURE GOLD RESOURCES INC.

APPARENT RESISTIVITY CONTOURS

OPIKEIGEN LAKE PROPERTY
ONTARIO

SCALE 1/10,000

▼ AERODAT LIMITED

DATE:	August, 1986
N.T.S. No:	52 P
MAP No:	4

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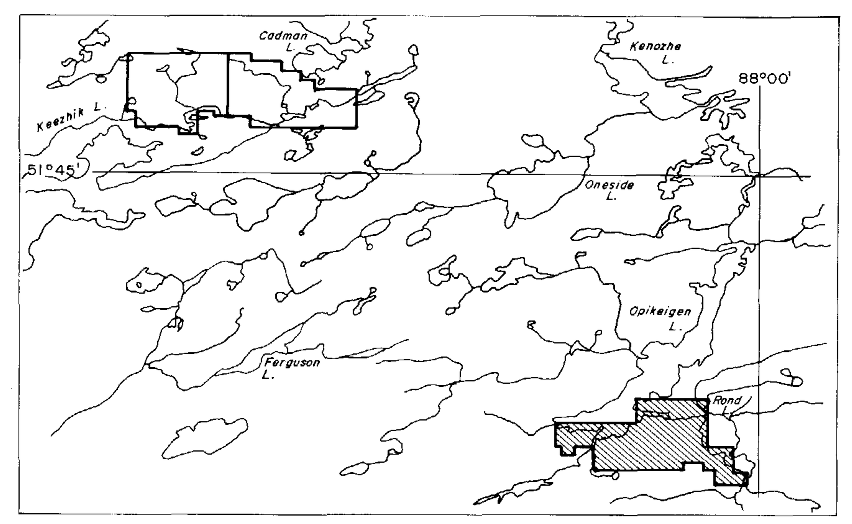
240



VLF-EM TOTAL FIELD CONTOURS

VLF STATION: NAA (24.0 kHz) Cutler, Maine
MEAN VLF-EM SENSOR ELEVATION: 48 metres
CONTOUR INTERVAL: 50% / 10% / 2%

PURE GOLD RESOURCES INC.

VLF-EM TOTAL FIELD CONTOURS

OPIKEIGEN LAKE PROPERTY

ONTARIO

SCALE 1/10,000

0 330 660 1320 — 1/2 mile
0 100 200 500 — 1 Kilometre

▼AERODAT LIMITED

DATE:	August, 1986
N.T.S. No:	52 P
MAP No:	5

J8630

250

INTERPRETATION LEGEND

PURE GOLD RESOURCES INC.

ELECTROMAGNETIC SURVEY
INTERPRETATION

LAKE PROPERTY

AERODAT LIMITED