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MINING LANDS SECTION

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GEOPHYSICAL REPORT

ON THE

SCADDING TOWNSHIP PROJECT

SUDBURY, ONTARIO

for

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NORTHGATE EXPLORATION LIMITED

Toronto, Ontario, Canada D. Jones, M.Sc. July, 1981



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SUMMARY

During the period March 11th to April 5th, 1981, M P H Consulting Limited of Toronto, Ontario carried out a programme of geophysical surveying on behalf of Northgate Exploration Limited of Toronto, Ontario on the latter's Scadding Township Project near Sudbury, Ontario.

The surveying programme consisted of VLF-EM and total field magnetometer surveys carried out on four separate grid locations.

The purpose of this work was to systematically map and survey the grid areas with a view of outlining areas of potential economic interest.

The area is mainly underlain by units of conglomerate and limestone of the Sudbury group and quartzite of the Mississagi formation. Post-Huronian gabbro intrudes the Sudbury group with smaller areas of intense shearing containing quartz located within and close to the contact. (Thompson, 1961).

The gold occurrences in the area have been documented as accompanying quartz carbonate veining within shear zones -

in the gabbro. Disseminated pyrite generally accompanied the gold.

The shear zones containing the gold mineralization could possibly respond to the high frequency (relative to other exploration geophysical methods) utilized by the VLF-EM. However this response would probably reflect a change in lateral resistivity since the nature and extent of the reported accompanying sulphides (as described in the literature) will probably not be present in sufficient quantity to produce a conductive response.

The nature and extent of the gold mineralization in Scadding Township does not lend itself to definitive mapping with the systems used for this survey and as such no highpriority targets can be outlined from the data at hand.

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1. INTRODUCTION

During the period from March 11th to April 5, 1981, a programme of geophysical surveying was carried out by M P H Consulting Limited on behalf of Northgate Exploration Limited on the latter's Scadding Township Project near Sudbury, Ontario.

The field programme was carried out under the supervision of D. Jones, M.Sc., of M P H Consulting Limited with overall supervision provided by Dr. G. Harper, PhD, and R. Zinn, B.Sc., both of Northgate Exploration Limited.

This report describes the exploration techniques employed and presents the results of ground exploration work to date and provides recommendations for further exploration of the property.

2. LOCATION AND ACCESS

The property consists of 199 contiguous unpatented mining claims located in Scadding Township in the District of Sudbury and in the Sudbury Mining Division of northern Ontario.

Within Scadding Township the property covers lots 5 through 12 in concessions 1 through 5 (see Figure 1).

The claims covered by this geophysical survey are numbered:

478823-478832	359343-359345	5346915,5346916
357987-357990	357993-357996	5359359,5359360
346897-346900	538818-538833	346895,546827
539389-539403	478916-478928	539384,478891
478976-478979	478880-478881	

while those included in the property but not surveyed are numbered:

346887-346892	507801-507811	357991-357993
346894-364896	478876-478879	357997-357998
478886-478880	346902-346903	651183-551222
538663-538669	551176-551177	551179-551182 (part)

Access to the property is by an all weather road departing north from the Trans-Canada Highway (Highway 17) approximately 25 kilometers east of Sudbury. A series of gravel roads leading from this all weather road provides access to various portions of the property.



3. SURVEY PARAMETERS

The survey grids on which the geophysical surveying was conducted were established at various times and are in both English and metric units. For this report the English grid has been converted to metric (100 feet = 30.48 meters).

3.1 Grid #1

Grid #1 was established with its main baseline having the point 0+00 on line 762+00E approximately 487.68 meters north of the concession post II and III which post also marks the boundary of lots 4 and 5 of Scadding Township. This baseline runs at an azimuth of 180° for 762 meters to point 0+00 of line 0+00 and then continues westward for a further 975.36 meters. A second baseline, located at 152.40S extends the grid from 975.36 to 1249.68W.

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Crosslines were established on this baseline at intervals of 30.48 meters (100 feet) and were extended a distance of 487.68 meters south. North of the baseline the line length varied from 396.24 meters in the east to 736.52 meters in the west. Stations on both the baselines and crosslines were at 30.48 meter (100 feet) intervals. Approximately 67 km of survey lines were cut, chained and picketed.

Grid #2

This grid was established with point 0+00 of Line 731.52N located near post #3 of Claim 357994. The baseline extends southward at an azimuth of 155° for a distance of 1036.32 meters.

Crosslines were established on this baseline at 15.26 meter (50 foot) intervals and were extended for a distance of 304.80 meters both east and west of the baseline. Stations were located on both the baselines and crosslines at 15.24 meter intervals.

Approximately 44 km of survey line was cut, chained and picketed.

Grid #3

Grid #3 was established with point 0+00 of the baseline located at the concession post common to concessions I and II, which post was also common to lots 4 and 5 of Scadding Township.

The baseline was driven due west for a distance of 4200 meters. North-south striking crosslines were established on this baseline at 100 meter intervals. These crosslines were driven north to the boundary of concessions II and III while the southern lines were cut to the property boundary. Stations were established on both the baselines and crosslines at 25 meter intervals. Approximately 105 km of line was cut, chained and picketed.

Grid #4

Grid #4 was established with the point 0+00 of the baseline located 50 meters west and 20 meters north of post marking the common boundary between lots 6 and 7 and concessions III and IV of Scadding Township.

The baseline was driven due north for a distance of 2300 meters. Crosslines were established at 100 meter intervals on this baseline and were cut and chained for a distance of 1800 meters west of the baseline. A number of the most southerly lines were extended for a further 600 meters eastward.

Stations were located on all the crosslines and baselines at 25 meter intervals.

3.2 VLF-EM Surveying

- 3.2.1 <u>Grid #1</u> Approximately 67 km of VLF-EM surveying was carried out on this grid. Cutler, Maine transmitting at a frequency of 17.8 kHz was the transmitting station used. The propagation direction of this station is 110° in the vicinity of Grid #1 which will ensure good electromagnetic coupling with the geologic strike of the area. For the VLF-EM surveying a 15.24 meter (50 feet) station interval was utilized with line spacing of 30.48 meters' (100 feet).
- 3.2.2 <u>Grid #2</u> Approximately 23 km of VLF-EM surveying was completed on this grid. Line and station spacing for this grid was 15.24 meters (50 feet). As for Grid #1, Cutler, Maine was the transmitting station used and would provide good coupling with the geologic strike of the area. It was requested that the eastern half of the grid not be surveyed since a previous survey had covered this area.
- 3.2.3 <u>Grid #3</u> Approximately 101 km of VLF-EM surveying was completed on this grid. Cutler, Maine at 17.8 kHz was the transmitting station used as the signal source. The propagation plane wave direction was 110° which would intersect the projected geologic strike at 20° thus providing adequate coupling with

any conformable conductive trend. Station intervals of 25 meters were utilized for the systematic coverage of the grid area.

3.2.4 <u>Grid #4</u> - No VLF-EM surveying was carried out on this grid since the east-west survey lines were located such as to cover a north-south geologic trend. No VLF-EM transmitting station will provide adequate coupling with conductor striking in this direction in the area and thus no VLF-EM surveying was conducted.

3.3 Magnetics

- 3.3.1 <u>Grid #1</u> Approximately 69 km of magnetic surveying was conducted on this grid with station observations at 15.24 meter. (50 foot) intervals. Line spacing was at 30.48 meters (100 foot) intervals.
- 3.3.2 <u>Grid #2</u> Approximately 42 km of total field proton precession magnetometer surveying was conducted on this grid. The magnetometer reading intervals were established at 15.24 meters.
- 3.3.3 <u>Grid #3</u> For this grid area the line spacing was established at 100 meter intervals. Nominal station separation was at 25 meter intervals. In

anomalous areas intermediate stations at 12.5 meter intervals were observed to provide additional detail. Approximately 105 km of surveying was conducted in this fashion.

3.3.4 <u>Grid #4</u> - Approximately 55 km of total field proton precession magnetometer surveying was conducted on this grid. A 25 meter reading interval was utilized for systematic coverage of the grid with a 12.5 meter station interval used in anomalous areas to provide additional detail.

3.4 Personnel

The following M P H Consulting Limited personnel were employed during this exploration programme:

D.Jones, M.Sc.	Geophysical	Consultant	Toronto,	Ontario
D.Hall	Party Chief		Toronto,	Ontario
M.Bickers	Geophysical	Operator	Toronto,	Ontario
T.Kraft	Geophysical	Operator	Toronto,	Ontario
D.Johnston	Geophysical	Operator	Windsor,	Ontario
M.Nadjiwan	Geophysical	Operator	Wiarton,	Ontario

4. GEOLOGY

Most of Scadding township is underlain by the Aphebian Age sedimentary rocks which make up the Sudbury, Bruce and Cobalt Groups. Younger Aphebian or Helikian gabbro or diabase is intrusive into the older sediments.

Sudbury Group Sediments outcrop in the southwestern part of the township. Quartzite and conglomerate with minor limestone intercalations are the predominant rock types. These sediments are well-bedded, and generally strike northwestsoutheast. Dips are variable from 40° to 70° to both the south and north. The sediments are usually brecciated near the gabbro intrusives.

Conglomerate of the Mississagi Formation unconformably overlies the rocks of the Sudbury Group. A rusty regolith has been noted at some localities in the region along the paleosurface. In Scadding Township, the Mississagi Formation is comprised of siltstone, argillite and quartzite and may contain traces of sulphides. The formation dips to the north or northeast at between 20° and 45° with local dips of up to 70°.

The sediments in the northeastern part of the township are part of the Gowganda Formation of the Cobalt Group.

Interbedded polymictic conglomerate, argillite, greywacke and quartzite lie unconformably on the rocks of the Mississagi Formation. Gowganda Formation rocks generally strike north to east and dip 20° to 80°.

Gabbro or diabase intrusives make up about 20% of the bedrock in the township. The intrusives vary in occurrence from large sill or dyke-like bodies to small, irregularly distributed swarms. Texture and composition of the gabbro may be variable due to differentiation of the intrusive sheets. Brecciation of host rocks may also have accompanied some of the intrusions.

Two major faults trending approximately northwest-southeast cross the central part of the township. Shearing, brecciation, quartz veining and sulphide mineralization with minor copper and gold values is associated with one of these faults.

Other occurrences of possible economic interest in Scadding Township are limited to quartz-carbonate veins closely associated with the gabbro intrusives. Native gold, galena, chalcopyrite and pyrite have been reported to occur with some of these veins. The basal portions of the Mississagi Formation are a possible target for paleoplacer-type uranium and gold occurrences; in Maclennan Township just to the



west, the Skead gold mine may represent a residual gold deposit formed on the Sudbury Group erosional surface with the gold being later remobilized into quartz-carbonate veins along the contact.

5. INSTRUMENTATION

5.1 VLF-EM Electromagnetic Method

The VLF-EM method employs as a source one of the numerous submarine communication transmitters in the 15 to 25 kHz band located throughout the world. At the surface of the earth these radio waves propagate predominantly in a single mode along the earth-air interface. This mode is known as the 'surface wave'. Over flat homogeneous ground in the absence of vertical conductive discontinuities the magnetic field component of this ratio is horizontal and perpendicular to its direction of propagation.

Where non-horizontal structures such as faults, contacts and conductors give rise to change in ground conductivity, secondary modes are generated which produce a vertical component of the magnetic field. This produces an elliptical polarization of the total field in a plane perpendicular to the direction of propagation.

Commercial VLF instruments enable detection of disturbing structures by measuring the tilt angle of the major

axis of the polarization ellipse. On flat homogeneous ground the tilt angle will be zero, but in the vicinity of conducting disturbances it will acquire a finite value. Direction of tilt indicates directions of the disturbing structure. Ability to deduce such parameters as depth, depth extent, dip, and width of anomalous structures is minimal.

Fortunately, this does not seriously affect location of points where VLF-EM profiles cross the upper limit of dipping structures which can be identified as areas of greatest change in tilt angle per unit of distance.

The transmitting station used during the survey was Cutler, Maine transmitting at 17.8 kHz.

The data is read as a dip angle and a vertical quadrature where the dip angle is a percentage of the incline from the horizontal, i.e. (100 x tan θ), where θ is the tilt angle of the major axis of the polarization ellipse in degrees, and the vertical quadrature is the out-of-phase amplitude of the polarization ellipse.

The data is presented as profiles with positive to the left, negative to the right. The instrument

specifications are given in Appendix I.

5.2 Magnetics

Two McPhar GP 70 proton precession magnetometers were used on the project. The proton magnetometer utilizes the precession of spinning protons of a hydrogen atom within a hydrocarbon fluid. These spinning magnetic dipoles are polarized by applying a magnetic field using a current within a coil of wire. Upon discontinuation of the current the protons precess about the earth's magnetic field and in turn will generate a small current in the wire. This current is proportional to the precession frequency which in turn is proportional to the earth's total magnetic field.

The instrument reading unit is the gamma and the reading is the absolute value of the earth's total field for that station. Repeatability is usually within two gammas for a particular station.

Magnetic data was corrected for diurnal variations using a Barringer M123 base station magnetic recorder. Deviations from a chosen base value were measured every ten seconds throughout the day. These deviations were then used to reduce field survey results to a constant datum plane.

The instruments' specifications are presented in Appendix I.

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6. PRESENTATION OF DATA

All the field data from this area is presented on a series of maps at a horizontal scale of 1:2000.

The VLF-EM data is presented as profiled data along the survey lines. The in-phase or dip angle data is plotted with positive to the right and negative to the left such that negative slopes are representative of a 'true' crossover.

Conductor axes are also presented on the VLF-EM profile maps.

The magnetic data is presented as a series of isomagnetic contours superimposed on a map of corrected magnetic values recorded at each station. Contour lines at 100 and 25 gamma intervals were found suitable to highlight the magnetic expression from the survey area.

The maps accompanying this report are as follows:

Мар	#1	Magnetics	Grid	1	East-side
Map	#2	Magnetics	Griđ	1	West-side
Мар	#3	VLF	Grid	1	East-side

Мар	#4	VLF	Grid	1	West-s	ide
Мар	# 5	Magnetics	Griđ	2		
Map	#6	VLF	Grid	2		
Мар	#7	Magnetics	Grid	3	Lines	0+00-16+00W st 0+00-16+00N
Мар	#8				Lines	16+00-32+00W st 0+00-16+00N
Мар	# 9				Lines	32+00-44+00W st 0+00-16+00N
Мар	#10				Lines	16+00-32+00W st 0+00-16+00S
Мар	#11				Lines	32+00-44+00W st 0+00-12+00S
Мар	#12	VLF-EM	Grid	3	Lines	0+00-16+00W st 0+00-16+00N
Мар	#13				Lines	16+00W-32+00W st0+00-16+00N
Мар	#14				Lines	32+00W-44+00W st0+00-16+00N
Мар	#15				Lines	16+00W-32+00W st0+00-16+00S
Мар	#16				Lines	32+00W-44+00W st0+00-12+00S
Мар	#17	Magnetics	Grid	3	Lines	9+00N-23+00N
Мар	#18	Magnetics	Grid	3	Lines	0+00W- 9+00N st4+50E-10+50W
Мар	#19	Magnetics	Grid	3	Lines	0+00W- 9+00N st9+00W-24+00W

7. INTERPRETATION

7.1 Grid #1

7.1.1 <u>Magnetics</u> - The magnetic survey carried out on this grid outlined a very weak magnetic response with the majority of the area showing a magnetic relief of 100-200 gammas. This low relief coupled with a low anomaly density revealed a nebulous magnetic trend from the survey area.

> The main structural features outlined from the magnetic surveying were a number of northwest striking magnetic linears which are probably attributable to diabase intrusives. These features are probably conformable but could be crosscutting stratigraphy and thus cannot be deemed to represent the geologic strike of the area.

> Interpretation of selected magnetic profiles indicates a northerly dip of 45° to the magnetic linear and a depth estimation of 10 to 30 meters.

The remaining magnetic features observed from the grid area showed no distinct trends although an interpretation of the magnetic contouring has outlined a number of possible fault structures. These are presented on Maps 1 and 2.

The grid is believed to be underlain by quartzite and quartz-pebble conglomerates of the Mississagi Formation which is in contact with conglomerate and intercalated limestone of the Sudbury group in the southwest portion of the grid area. No magnetic signature was observed which could be directly attributable to the contact zone.

7.1.2 <u>VLF-EM</u> - The VLF-EM survey conducted on Grid #1 revealed a generally flat response with a number of small amplitude anomalous zones showing a northwest-southeast conductive trend.

> The largest amplitude and longest strike length VLF-EM features are coincident with the magnetic linears believed to represent diabase.

Inspection of the VLF-EM response indicates a topographic source for several conductive axes, and these anomalies have been discounted in the interpretation of this grid. The remainder of the VLF-EM anomalies were short, discrete conductive horizons which are considered to be bedrock responses. These anomalies have been labelled on the VLF-EM profiles map and are discussed below.

Anomaly 'D'- This anomaly is located at approximately 182.88N between lines 30.48W and 60.96E and trends approximately 090%. The anomaly amplitude is exceedingly small (\sim 5% peak to peak) and as such no dip or depth estimates were extracted from the VLF-EM profiles.

The anomaly showed no coincident magnetic signature. The nature of the causative source is uncertain.

<u>Anomaly 'E</u>' - Anomaly 'E' is a semi-arcuate, small amplitude zone located at approximately 213.36N between lines 975.36W and 822.96W. The anomaly is semi-coincident with a number of topographic features which possibly in part contribute to the anomaly's signature. For this reason no dip or depth estimates were interpreted from the VLF-EM profiles.

The eastern end of the anomaly appears truncated by a north-south striking feature interpreted from the magnetics.

The conductive axis of this anomaly is located on the northern flank of a discrete magnetic high which could possibly be spatially related to the VLF-EM anomaly.

The nature of the causative source for Anomaly 'D' is uncertain .

Anomaly 'E' - is located at approximately 213.36N between lines 274.32 and 364.76E for a strike length of \sim 80 meters. The anomaly trend is northwest-southeast and parallels the main VLF-EM trend from this grid. The eastern extent of the anomaly is curtailed by a magnetically interpreted fault. Interpretation of the VLF-EM profiles indicated a depth to conductive axis of \sim 30 meters. No dip value was estimated from this zone since topographic effects on the south side of the anomaly distort the positive flank of the profile.

The anomaly is situated in a small magnetic low

of approximately 50 gammas. The magnetic correlation is probably coincidental with the two geophysical responses not directly attributable to the same causative source.

Anomaly 'G' - this anomaly is a long, linear, conductive feature which parallels and in places straddles the baseline between lines 426.72W and 91.44E. A possible easterly extension could be postulated to line 579.12E, however, it is possible that a topographic source contributes part if not all the VLF-EM response associated with this eastern extension.

The broadness of the VLF-EM response indicates that bedrock topography is a possible cause for this anomaly with the positive shoulder south of the baseline reflecting a ridge or uplift of the bedrock. No magnetic signature was observed coincident with this anomaly.

A number of very small 1 or 2° dip angle anomalies are observable from the VLF-EM survey. These have not been discussed within the text of this report however they are represented on the VLF-EM profile map.

7.2 Grid #2

7.2.1 <u>General Comments</u> - This grid lies at an azimuth of 155° and overlaps in part both grids #1 and #3.

The grid covered a gold zone which is associated with pyrite mineralization apparently conformable to the

pyrite mineralization apparently conformable to the geologic strike of the area.

7.2.2 <u>Magnetics</u> - The total field magnetic survey from the area revealed a low magnetic relief of approximately 200 gammas with a low anomaly density. The magnetic trend observed appears to strike north-northwest south-southeast. This trend is dominated by a series of three magnetic linear highs (of approximately 400-500 gammas). These highs have been attributable to diabase dykes and as such may not be conformable with the geologic stratigraphy from the area. The low magnetic relief outside of these zones preclude any accurate definiation of the magnetic trend from this area.

> Interpretation of selected profiles of the magnetic data indicates easterly dips of 45° to the major dyke-like features and depth values varying from 10-35 meters. A tabular body of infinite strike extent was used as a model for this work. A change in magnetic background is observable on either side of the westernmost dyke-like feature with the response on the eastern side being approximately 100 gammas higher. This probably relates to a thinning of overburden

due to uplifting of the bedrock on the eastern side of the dyke rather than a change in rock type, the diabase dyke in this case occupying the fault plane at which the movement occurred.

The portion of the grid from line 121.92N to line 335.28N shows a greatly increased magnetic relief. This response is directly attributable to cultural noise (i.e. drill casing). This portion of Grid #2 has been drilled and a mineralized gold zones discovered. Unfortunately the cultural noise resulting from the drilling has destroyed any recognizable magnetic signature from the mineralized zone such that it cannot be used as a case study by which to grade other anomalies from the grid area.

A number of crosscutting (fault?) structures have been interpreted from the truncation and deviations of the magnetic contour lines. These are presented on the magnetic map (Map 5).

7.2.3 <u>VLF-EM</u> - The VLF-EM survey conducted on this grid displayed a north-northwest strike direction conformable with the magnetic trend. Three anomalous features were outlined which dominated the VLF-EM response from this area. These zones corresponded

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closely with the interpreted diabase dyke from the magnetic survey.

Additionally a number of short strike length anomalous features were outlined which are presented on Map 6.

All the anomalous features outlined were low amplitude anomalies indicative of a relatively homogenous bedrock with little change in lateral resistivity values within the bedrock.

No VLF-EM anomaly mapped on the grid could be correlated with the known gold mineralization on the property.

Anomaly 'A' - is located at approximately 152.40W between lines 487.68 and 335.28N. This short strike length anomaly appears to intersect a longer formational anomaly, (diabase), on line 274.32N at approximately 152.40W. This anomaly shows no magnetic signature and appears to crosscut stratigraphy at a low angle. No causative source can be attributed to this target.

Anomaly 'B' - this anomaly is located at approximately 182.88E between lines 182.88N and 121.92N and is apparently conformable with the geologic strike of the area. The anomaly is open to the south and has been mapped by a previous survey conducted by Northgate Exploration Limited.

The anomaly shows no magnetic signature and no geological source can be ascribed to the observed geophysical response.

<u>Anomaly 'C'</u> - is a short arcuate anomaly located at approximately 243.84E between lines 243.84N to 304.80N with the anomaly being open to the north. The conductive strike axis is conformable with the postulated geologic strike of the area.

The anomaly is coincident with a small (100 gamma) discrete magnetic high. No definite causative source can be ascribed to this anomaly although the associated magnetic signature would suggest a possible sulphide and/or magnetite concentration in underlying gabbroic intrusive rocks.

7.3 Grid #3

7.3.1 <u>Magnetics</u> - The magnetic survey conducted on Grid #3 outlined a higher magnetic relief than that observed on either Grids 1 or 2. This increase in magnetic relief reflects the higher mafic content present in the gabbro intrusive believed to underlie the major portion of this grid. The magnetic trend observed from this grid area is a basic east-west trend with a number of northwestsoutheast linears crosscutting the magnetic stratigraphy in the northeast portion of the grid area. These units are the southerly continuation of the interpreted diabase dykes previously outlined on both Grids #1 and #2

The magnetic relief observed on Grid #3 is approximately 300 to 400 gammas superimposed on a relatively flat background of 58700 gammas.

Structural interpretation of the magnetic maps has outlined several fault structures trending in an approximate northwesterly direction. These are presented on Maps 7 through 11.

In addition an interpretation of the magnetic signature of the Sudbury group and the intrusive post Huronian gabbro has been carried out with the interpreted common boundaries represented as geologic contacts. This is presented on Maps 7 - 11.

A west-northwest-east-southeast striking contact has been postulated bisecting the northeast portion of the grid area. The postulated contact separates the conglomerate of the Sudbury group on the north from the Post Huronian gabbro in the south. (Thompson,

1961). (Maps 7 and 8).

The occurrence of gold mineralization in close proximity to this contact as reported by Kindle in 1933 and Thompson in 1961 makes the location and mapping of this contact of paramount importance. The gold is reported to be located within a series of irregular veins and pockets of quartz within a sheared gabbro. Disseminated pyrite accompanies the gold, some of which is reportedly visible.

The contact location as interpreted from the magnetics is empirical and the actual location should be ground located by geologic mapping.

The interpreted southern boundary of the intrusive gabbro is presented on Maps 7, 8 and 9. This projected southern boundary in essence parallels the northern boundary. This postulated southern contact is located at 0+00 on line 0+00 and runs northwesterly to 12+00N on line 42+00W.

The higher magnetic values and increasing magnetic relief located in the south-central portion of the grid area is also interpreted as reflecting a gabbroic intrusion. The postulated boundary has been outlined on the magnetic maps.

Similarly a smaller zone has been outlined located in the southwest corner of the grid area.

The magnetic anomalies located in the interpreted intrusive portion of the grid area are mainly narrow linear, discrete zones. These features probably represent zones containing higher concentrations of magnetite and/or sulphide mineralization. The presence of gold mineralization accompanying disseminated sulphide mineralization within the gabbro is documented by Thompson (1961) and as such the linear magnetic anomalies located within the interpreted gabbroic unit could be of economic importance.

7.3.2 <u>VLF-EM</u> - The VLF-EM electromagnetic survey carried on on Grid #3 outlined an east-west trend conformable to the magnetic trend. In comparison with Grids # 1 and 2 the dip angle amplitudes outlined on this grid were substantially larger as were the peak to peak anomaly amplitudes. This reflects either a larger concentration of conductive material or a larger lateral inhomogeneity within the bedrock. Both these observations are probably true in the case of Grid

#3.
The most prominent VLF-EM response was a long, linear anomaly extending from approximately 1+00N, Line 1+00W to 12+00N, Line 40+00W. This is coincident with and probably reflects the interpreted contact between conglomerate of the Sudbury group in the south and intrusive gabbro in the north.

The remainder of the above geologic contact as interpreted from the magnetic survey did not show any strong electromagnetic response.

Eight anomalies believed to be representative of bedrock were shown by the VLF-EM Survey. These are presented on the VLF-EM profile maps (Maps 12-16).

Almost all of the VLF-EM anomalies located on the map are located within areas interpreted from the magnetics to be underlain by gabbro intrusive.

A number of anomalies interpretable from the data have been ascribed to topographic features and are not discussed further within the context of this report.

The small amplitudes and the extremely wide NLF-EM crossovers (possibly due to the shallow dips of the



geologic units) are not conducive to qualitative interpretations. Depth estimates are given only for anomalies where parameter values can be interpreted with any degree of confidence.

<u>Anomaly 'H'</u> - This east-west striking feature was located at approximately 12+00N between Lines 13+00W and 23+00W with a possible westerly extension of the anomaly to Line 29+00W Lack of data on the intervening lines precludes accurate definition of this extension.

The character of the anomaly changes along its strike length. From west to east, the amplitude and breadth of the anomaly diminishes indicating either a deepening, or a decreasing conductive content of the anomaly, eastward.

This anomaly shows no magnetic signature and is located in a quiescent magnetic zone. The eastern end of Anomaly 'H' could possibly be terminated by a magnetic structure which appears as an offshoot of the interpreted diabase. Within the context of the magnetic interpretation this anomaly is believed to be located within the gabbro and is subparallel to the contact.

From the VLF-EM profile map, extrapolation of Anomaly 'H' would appear to show it intersecting the southern gabbro contact at Line 24+00 or 25+00W. Both of these lines unfortunately lie off the property, and no definite conclusion regarding this observation can be made.

Anomaly 'I' - This anomaly is located at approximately 7+50N between Lines 2+00 and 12+00W. The anomaly strikes slightly north of east and is subparallel to Anomaly 'H'.

The anomaly appears to intersect the interpreted gabbro/conglomerate contact at Lines 11+00 and 12+00W at which intersection the anomaly is truncated. No magnetic signature was directly attributable to Anomaly 'I' and the anomaly was located in a relative magnetic low of approximately 100-200 gammas.

The eastern end of the anomaly abuts against a magnetic high interpreted as a diabase dyke. Thus the zone is bounded by structural controls at either end. Probable causative source for this zone is a shear or a fracture-filled fault zone.

<u>Anomaly 'J'</u> - is a small amplitude (5° peak to peak) short strike length anomalous zone, located at approximately 4+50N between Lines 0+00 and 3+00W. The anomaly is open to the east.

The anomaly appears to be crosscutting the magnetic trend of the area and parallels the postulated gabbro-conglomerate contact. From the magnetic interpretation the zone is located within the gabbro intrusive.

There is no directly coincident magnetic signature and no causative source could be ascribed to this anomaly.

Anomaly 'K' - is located at approximately 3+00N and between Lines 9+00 and 4+00W. The anomaly subparallels Anomalies 'H' and 'I' and as with both 'H' and 'I' it appears that its western extent intersects with and is truncated by the gabbro/conglomerate contact. The anomaly is open to the east and shows no direct magnetic signature.

Anomaly 'L' - is a long, arcuate anomalous zone located at approximately 6+00S between Lines 10+00 and 32+00W. The western extension of the anomaly is truncated at or near an interpreted gabbro contact. The conductive axis of Anomaly 'L' could possibly represent the southern margin of the gabbro intrusive. The contact as interpreted from the magnetics is not sharply defined and could possibly be moved northward slightly from its present interpreted location to correspond with the VLF-EM conductive axis.

No direct magnetic signature can be attributed to this zone and a possible causative source is a geological contact.

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Anomaly 'M' - this conductive zone straddles the baseline between Lines 20+00 and 30+00W. The anomaly is located in a topographic low but topography is not believed to be the main causative source of the anomaly. The western extent of the anomaly is truncated at an interpreted north-south striking fault.

Anomaly 'M' is located in a relative magnetic low, however the magnetic low does not appear to be caused by the source of the conductor.

Anomaly 'N' - is located at approximately 2+00N between Lines 39+00 and 45+00W, and is open to the west. This zone is the largest amplitude anomaly on the property and depth estimates have been interpreted from the VLF-EM profile. Depth to the conductive axis of Anomaly 'N' is estimated at30 meters and a northerly dip of 60-80° is interpreted from the profile.

The anomaly is believed to be located within the conglomerate of the Sudbury group. Thompson's 1961 geological map indicates a contact in this vicinity which could relate to Anomaly 'N' however based on the geophysical interpretation of the magnetics no gabbro contact was outlined in this area.

The anomaly is believed to be underlain by conglomerate and/or possibly limestone and should be ground checked geologically.

Anomaly '0' - is a short, discrete, large amplitude conductive zone located at approximately 7+00S between Lines 39+00 and 42+00W.

The anomaly has an interpreted depth of 15 meters and appears to be dipping steeply to the north.

The anomaly was located within an area of large magnetic relief believed to reflect a post-Huronian

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gabbro. No direct magnetic coincidence was observed and no direct causative source was attributed to the geophysical response.

Other Anomalies - A number of other small anomalies were detected. These have been presented as possible conductive horizons on the VLF-EM maps. They have not been discussed in detail in this report but should not be overlooked in any subsequent investigations of this property. Re-evaluations of the targets in light of any further information may enhance these weak zones regarding their possible economic potential.

7.4 Grid #4

- 7.4.1 <u>General Comments</u> This grid has been mapped as being underlain mainly by quartzite of the Mississagi Formation with a conglomerate and argillite of the Gowganda Formation being located in the northeast corner of the grid area. These two formations are mineralogically similar and no large magnetic contrast would be expected.
- 7.4.2 <u>Magnetics</u> The magnetic survey conducted on the property outlined a north-south magnetic trend. The very low magnetic relief observed on the property indicates a fairly homogeneous bedrock with no large lateral

magnetic inhomogeneities.

Interpretation of the magnetic data did not reveal any signature attributable to contact zones and no distinction between any of the underlying units could be made.

A number of east-west fault zones have been interpreted and are presented on Maps 17, 18 and 19.

7.4.3 <u>VLF-EM Survey</u> - The geologic strike of the survey area is north-south as reflected in the magnetic survey. and as such no VLF-EM station is located such as to provide a transmitter signal which would be conducive to VLF-EM mapping of the property.

8. CONCLUSIONS

The VLF-EM and magnetic surveys carried out on the grids have shown a generally quiescent geophysical area. Known gold associations in the area are as quartz stockworks within gabbro and as possible paleo-placer deposits at the contact between Aphebian conglomerate and quartzite. Neither of these targets will give rise to unique magnetic response, and the reported nature and extent of any sulphide (pyrite) associated with the gold will probably not give rise to a VLF-EM response due to its disseminated nature. These types of gold occurrences are therefore not ideal geophysical targets although the surveys described herein have provided valuable structural lithologic information.

8.1 Grid #1

The magnetics outlined a very low relief magnetic pattern containing a number of northwest-southeast striking-magnetic linears. These zones have been attributed to diabase intrusions which are possibly paralleling stratigraphy. The VLF-EM survey also outlined the diabase zones. Four short, discrete bedrock conductors were outlined, none of which showed any magnetic signature and no definite causative source was ascribed to any of the zones. A number of other small amplitude zones were detected and are presented on the VLF-EM profile maps. These zones were not highly rated geophysically but it is felt that their priority value should be reassessed as more information of a geological nature becomes available for the grid area.

8.2 Grid #2

The magnetics and the VLF-EM response from this grid has outlined a fairly flat geophysical response with the main geophysical features attributable to a series of diabase dykes two of which are the same as and continuations of those mapped on Grid #1.

Of the three discrete VLF-EM anomalies outlined, only Anomaly 'C' showed any magnetic correlation which could possibly be attributable to an increase in sulphide (pyrrohotite) and/or magnetic content.

As previously mentioned gold mineralization on this grid is in the process of being drill evaluated. Cultural noise associated with the drilling precluded observation of any magnetic signature associated with the gold mineralization. There was no VLF-EM response attributable to the zone.

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As with Grid #1, no economic implications can be ascribed to any of the geophysical anomalies outlined. Re-evaluation of the anomalies in light of detailed geological mapping could possibly alleviate this and allow priorities to be placed on the individual anomalies.

8.3 Grid #3

A larger magnetic relief was observed on Grid #3 relative to Grids 1 and 2. This could be attributable to a higher magnetite content in the gabbro which underlies the major portion of Grid 3.

Structural interpretation outlined a fault trending northsouth in the western portion of the grid. Detailed interpretation aided in outlining the gabbro/conglomerate contact with three separate intrusive bodies outlined. A southerly continuation of the diabase dyke outlined on Grid #1 was located and mapped in the northeast portion of the grid area.

The VLF-EM mapping outlined eight anomalies. Four of these anomalies, 'H', 'I', 'J', and 'K' were located within the northern gabbroic zone. Anomalies 'H' and 'I' are probably structurally controlled being truncated by the gabbro/conglomerate contact in the south and the diabase contact in the north. These are possibly shear

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or fracture-filled fault zones. 'J' could represent the contact of a gabbro intrusive with conglomerate of the Sudbury group.

Anomalies 'M' and 'O' are located within gabbro units and no causative sources have been ascribed to them.

Anomaly 'N' is a large amplitude anomaly and believed to be located within the conglomerate.

No economic implications can be drawn from the data at hand although, bearing in mind the location of the known mineralization, Anomalies 'H' and 'I' are of obvious interest.

The other anomalies, though of lower priority at this time, are nonetheless good targets and further geological information is necessary before a definitive answer can be given regarding their potential.

8.4 Grid #4

The magnetic survey from Grid #4 outlined a north-south magnetic trend. The low magnetic relief and low anomaly density indicate a homogenous bedrock and no subdivisions were made from the magnetic survey. A number of east-west striking structures (faults) were interpreted from the

magnetics. No VLF-EM was carried out on this grid.

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9. RECOMMENDATIONS

The nature and extent of the gold mineralization in Scadding Township does not lend itself to definitive mapping with the systems used for this survey and as such no high-priority targets can be outlined from the data at hand.

Recommendations for further work include:

- A detailed geological mapping programme of the area using the geophysical grids as control.
- 2) The geological information from the drilling conducted on Grid #2 should be analysed in detail to provide information regarding the nature of occurrences and association of the gold mineralization in this area.
- 3) Re-evaluation of the geophysical data should be carried out following the detailed geologic analysis of the area at which time decisions regarding the further exploration of the area could be made.
- 4) The documented pyritic association with the gold mineralization should be examined with a view to utilizing Induced Polarization surveying to outline possible areas of economic interest.

Respectfully submitted,

D. Jones, M.Sc.

DJ:g

CERTIFICATE

I, David Jones of Toronto, Ontario hereby certify that:

- 1) I hold a Bachelor of Technology degree in Applied Physics from the University of Bradford, England, and a Master of Science degree in Applied Geophysics from McGill University in Montreal.
- I have practised my profession in exploration continuously since graduation.
- 3) I have based conclusions and recommendations contained in this report on knowledge of the area, my previous experience with the geophysical techniques used and on the results of the field work conducted on the property during March, 1981 which was carried out under my supervision.
- 4) I hold no interest, directly or indirectly in this property other than professional fees, nor do I expect to receive any interest in the property or in Northgate Exploration Limited or any of its subsidiary companies.

David Jones, M.Sc.

Toronto, Ontario

REFERENCES

Society of Exploration Geophysicists	1967	Mining Geophysics Vols. I and II - Society of Ex- ploration Geophysicists
Telford, W. M.	1976	Applied Geophysics. Cam- bridge University Press, 860 p.
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APPENDIX I

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#2

VLF Electromagnetic Unit

Pioneered and patented exclusively by Geonics Limited, the VLF method of electromagnetic surveying has been proven to be a major advance in exploration geophysical instrumentation.

Since the beginning of 1965 a large number of mining companies have found the EM16 system to meet the need for a simple, light and effective exploration tool for mining geophysics.

The VLF method uses the military and time standard VLF transmissions as primary field. Only a receiver is then used to measure the secondary fields radiating from the local conductive targets. This allows a very light, one-man instrument to do the job. Because of the almost uniform primary field, good response from deeper targets is obtained.

The EM16 system provides the in-phase and quadrature components of the secondary field with the polarities indicated.

Interpretation technique has been highly developed particularly to differentiate deeper targets from the many surface indications.

Principle of Operation

¹EM16

The VLF transmitters have vertical antennas. The magnetic signal component is then horizontal and concentric around the transmitter location.



Specifications

Source of primary field	VLF transmitting stations.	Reading time	10-40 seconds depending on signal strength.
Transmitting stations used	Any desired station frequency can be supplied with the instrument in the form of plug in tuning units. Two	Operating temperature range	40 to 50° C.
	tuning units can be plugged in at one time. A switch selects either station.	Operating controls	ON-OFF switch, battery testing push button, station selector, switch,
Operating frequency range	About 15-25 kHz.		\pm 40%, inclinometer dial \pm 150%.
Parameters measured	(1) The vertical in-phase component (tangent of the tilt angle of the polarization ellipsoid)	Power Supply	6 size AA (penlight) alkaline cells. Life about 200 hours.
	(2) The vertical out-of-phase (quadra- ture) component (the short axis of the	Dimensions	42 x 14 x 9 cm (16 x 5.5 x 3.5 in.)
	polarization ellipsoid compared to the long axis).	Weight	1.6 kg (3.5 lbs.)
Method of reading	In-phase from a mechanical inclino- meter and quadrature from a calibrated dial. Nulling by audio tone.	Instrument supplied with	Monotonic speaker, carrying case, manual of operation, 3 station selector plug-in tuning units (additional fre- quencies are optional), set of batteries.
Scale range	In-phase \pm 150%; quadrature \pm 40%.	Shipping weight	4.5 kg (10 lbs.)
Readability	± 1%.		



GEONICS LIMITED Designers & manufacturers of geophysical instruments

subsidiary of Deering Milliken Inc. 2 Thorncliffe Park Drive, Toronto/Ontario/Canada M4H 1H2 Tel: 425-1824 Cables: Geonics



EM 16 Profile over Lockport Mine Property, Newfoundland dditional case histories on request.



ither station.



Station Selector **Receiving Colls** wo tuning units can be plugged at one time. A switch selects



By selecting a suitable transmitter station as a source, the M 16 user can survey with the most suitable primary field zimuth.

The EM 16 has two receiving coils, one for the pick-up of the orizontal (primary) field and the other for detecting any anomalous vertical secondary field. The coils are thus orthogonal, and are mounted inside the instrument "handle".

he actual measurement is done by first tilting the coll assembly to minimize the signal in the vertical (signal) coil and then further sharpening the null by using the reference signal o buck out the remaining signal. This is done by a calibrated 'quadrature'' dial.



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Areas of VLF Signals

Coverage shown only for well-known stations. Other reliable, fully operational stations exist. For full information regarding VLF signals in your area consult Geonics Limited. Extensive field experience has proved that the circles of coverage shown are very conservative and are actually much larger in extent.



In-Phase Dial shows the tilt-angle of the instrument for minimum signal. This angle is the measure of the vertical in-phase signal expressed in percentage when compared to the horizontal field.



Quadrature Dial Is calibrated in percentage markings and nulls the vertical quadrature signal in the vertical coil circuit.

The tangent of the tilt angle is the measure of the vertical in-phase component and the quadrature reading is the signal at right angles to the total field. All readings are obtained in per centages and do not depend on the absolute amplitude of the primary signals present.

The "null" condition of the measurement is detected by the drop in the audio signal emitted from the patented resonance loudspeaker. A jack is provided for those preferring the use of an earphone instead.

The power for the instrument is from 6 penlight cells. A battery tester is provided.

GP-70 Proton Magnetometer

Measures absolute magnitude of total magnetic field



Model GP-70 is a reliable, light weight, proton magnetometer designed for field operation under widely varying environmental conditions. It measures the absolute magnitude of the total magnetic field within the range of 20,000 to 100,000 gammas to an absolute accuracy of \pm 1 gamma and \pm 15 parts per million of the field under measurement, over the temperature range of -30° to + 50° C. The instrument is simple to operate. A complete reading is obtained in 3.5 seconds by depressing a push button. The field intensity is read directly in gammas from a five digit display consisting of light emitting diodes. A 10 position switch sets the appropriate range.

The instrument is powered by internally mounted size "D" alkaline batteries

(standard) or by non-ferrous rechargeable batteries (optional). The rechargeable batteries have virtually zero magnetic effect and permit full use of the magnetometer sensitivity even with close spacing between the sensor and console.

A battery meter shows condition of batteries at all times and allows

1 gamma sensitivity.

10 scale ranges: 20,000 to 100,000 gammas

Digital readout with long life, light emitting diodes.

M.G. ELAR

Noise cancelling toroidal sensor.

Wide operating temperature range.

Back packed sensor allows for hands free operation



anticipation of when batteries should be replaced.

The GP-70 noise cancelling toroidal sensor minimizes effect of external interference from man made sources. In high electrical noise areas, further improvement in signal to noise ratio can be achieved by keeping the push button depressed during a reading. This procedure automatically doubles the sensor polarize time, creating a higher signal output from the sensor.

Model GP-70 comes complete and ready for use with console, carrying strap, sensor, extending aluminum staff, spare batteries, instruction



manual; all in a sturdy transit case.

An optional feature of the GP-70 is the back pack sensor harness. This option allows for a hands-free operation of the magnetometer, a major benefit in areas of rough terrain or thick vegetation.

Specifications

Sensitivity: 1 gamma

Range: 20,000 to 100,000 gammas in ten switch positions.

Operating Temperature: -40° to 55° C.

Absolute Accuracy: \pm 1 gamma and \pm 15 parts per million of measured field over range of -30° to + 50° C.

Sensor: Noise cancelling toroidal coil is electro-statically balanced to minimize interference between sensor and console.

Read Out: 3.5 seconds total - by push button. Double polarizing time by keeping button depressed.

Display: 5 digits on long life, light emitting diodes.

Electronic Circuits: Integrated circuits complying with military specifications used throughout.

Console: Sturdy aluminum housing with rubber light shield and shock guard.

Dimensions: Console - 3" x 6" x 9.5" (7.5 x 15 x 24 cm) Sensor - 4.5" x 5" (10.5 x 12.7 cm) Staff - 5 ft. (1.5 m) extended 2 ft (0.6 m) collapsed

Weights:

Console 3.8 lbs. (1.7 kg) Sensor and cable 5 lbs. (2.3 kg) Aluminum staff 1 lb. (0.45 kg) 12 Alkaline "D" cells 3 lbs (1.1 kg) **Power Supply: Standard -** 12 internally mounted alkaline "D" cells provide over 10,000 readings at 25° C. decreasing to approximately 1,000 readings at -30° C. **Optional:** Internally mounted rechargeable non-ferrous batteries and charger. Over 3,000 readings between charges.

Battery Indicator: A miniature meter monitors battery life and helps predict battery replacement time.

McPhar Instrument Corporation

Head Office:

55 Tempo Avenue, Willowdale, Ontario, Canada M2H 2R9 Tel: (416) 497-1700 Telex: 0623541 Cable: McPHAR TOR

Sales agents in:

Africa, Asia, Australia, Europe, North & South America

Contact McPhar Instrument Corp. head office for the agent in your area.



BASE STATION MAGNETOMETER Model BM-123



DESCRIPTION

The Barringer BM-123 magnetometer system uses the proton precession principle to measure the earth's total magnetic field intensity. There is no need for levelling or calibration of the sensor and it is unaffected by external influences such as temperature, etc.

FEATURES

- Magnetometer neatly combined with analog recorder in console measuring only 17" x 12" x 8" (43.2 cm x 30.5 cm x 20.3 cm)
- powered by mains AC or 24 Volts DC
- Full 1 gamma or 0.5 gamma sensitivity

APPLICATIONS

- Storm monitoring
- Diurnal variation monitoring

TYPICAL SYSTEM COMPONENTS

- Magnetometer console, including 5-inch chart recorder
- Toroidal sensor

- Fully adjustable cycling rate from 2 seconds to 99 minutes in 1 second stages
- BCD output readily adaptable to digital cassette or other magnetic type recording
- To save power chart recorder can be made to operate only when magnetometer cycles
- Observatory measurements including three component measurements with the use of Helmholtz coils
- Connecting cable
- Tripod
- Power supply (optional)

ADVANCED TECHNIQUES AND INSTRUMENTATION FOR THE EARTH SCIENCES

CONSOLE MODEL M-123-1

Sensitivity 1 gamma throughout the range Accuracy ± 1 gamma at 24 volts dc Range 20,000 to 100,000 gammas in 12 overlapping settings Cycle Rates: **Continuous Cycling** 0.6, 0.8, 1.2 and 1.9 seconds. Automatic Cycling 2 seconds to 99 minutes in 1 second steps Manual Cycling pushbutton single cycling at 1.9 seconds **External Cycling** actuated by a 2.5 to 12 volt pulse longer than 1 millisecond **Outputs:** Analog front panel select 0 to 99 gammas or 0 to 990 gammas Fiducial Marker internal selection of 1 second to 99 minutes in 1 second steps Visual 5 digit numeric display directly in gammas **External Outputs:** Analog 2 channels, 0 to 99 gammas and 0 to 990 gammas at 1 milliamp or 1 volt Full Scale Deflection Digital BCD 1, 2, 4, 8 code, TTL compatible 0 State - 0 to 0.5 volts 1 State - 2.5 to 5 volts **Fiducial Mark** Relay closure or open state selected internally from 1 second to 99 minutes Size 8" x 12" x 17" (20.3 cm x 30.5 cm x 43.2 cm) (fits under a commercial airline seat) Weight 20 lbs (9.1 kg) **Operating Temperature** -28°C to +65°C **Power Requirements** Magnetometer 12 to 30 volts dc 60 to 200 milliamps maximum Recorder 12 to 30 volts dc 0.5 to 0.9 amps maximum Options Component Spares Kit - a selection of critical solid state components and fuses required for general console maintenance Board Spares Kit - a complete selection of plug-in PC boards for maintenance of the console on longer term surveys

HIGH SENSITIVITY CONSOLE MODEL M-123-2

Sensitivity0.5 gammas at 1.9 secondsAccuracy± 0.5 gammas at 1.9 secondsAll other specifications the same as Model M-123-1

MAGNETOMETER ELECTRONICS ONLY MODEL M-123-3

Weight Outputs

External Outputs

Size

6" high x 7" wide x 6" deep (15.2 cm x 17.8 cm x 15.2 cm) can fit a standard 19" (48.3 cm) rack approximately 5 lbs (2.3 kg) 5 digit display in gammas same as model M-123-1 above

CONSOLE OPTIONS

Digital Cassette Recording — various systems available, details on request Hewlett-Packard Recorder Spares Hewlett-Packard Recording Supplies — chart paper and disposable pens

Barringer Research Limited 304 Carlingview Drive Metropolitan Toronto Rexdale, Ontario, Canada M9W 5G2 Phone: 416-675-3870 Telex: 06-968743 Representative:



14. A.S.

2.4211

TITONE0179 2.4211 SCADDING

1983 02 03

Mining Recorder Ministry of Natural Resources 199 Larch Street Sudbury, Ontario P3E 5P9

Dear Sir:

RE: Geophysical (Electromagnetic & Magnetometer) Survey on Mining Claims S 346895 et al in the Township of Scadding.

The Geophysical (Electromagnetic & Magnetometer) Survey assessment work credits as listed with my Notice of Intent dated December 6, 1982 have been approved as of the above date.

Please inform the recorded holder of these mining claims and so indicate on your records.

Yours very truly,

E.F. Anderson Director Land Management Branch

Whitney Block, Room 6450 Queen's Park Toronto, Ontario M7A 1W3 Phone: 416/965-1380

A. Barr:sc

cc: Northgate Exploration Limited Toronto, Ontario

cc: Resident Geologist Sudbury, Ontario 900



Dec 23. 1982

Your file:

1982 12 06

Our file: 2.4211

Mining Recorder Ministry of Natural Resources 199 Larch Street Sudbury, Ontario P3E 5P9

Dear Sir:

Enclosed are two copies of a Notice of Intent with statements listing a reduced rate of assessment work credits to be allowed for a technical survey. Please forward one copy to the recorded holder of the claims and retain the other. In approximately fifteen days from the above date, a final letter of approval of these credits will be sent to you. On receipt of the approval letter, you may then change the work entries on the claim record sheets.

Yours very truly,

E.F. Anderson Director Lands Administration Branch Whitney Block, Room 6450 Queen's Park Toronto, Ontario M7A 1W3 Phone: 416/965-1316

For further information, if required, please contact Mr. F.W. Matthews at 416/965-1380.

A. Barr:sc

cc: Northgate Exploration Limited Toronto, Canada

cc: Nr. G.H. Ferguson Mining & Lands Commissioner Toronto, Ontario



Ministry of Natural Resources Notice of Intent for Technical Reports

> 1982 **9**2 06 2.4211

An examination of your survey report indicates that the requirements of The Ontario Mining Act have not been fully met to warrant maximum assessment work credits. This notice is merely a warning that you will not be allowed the number of assessment work days credits that you expected and also that in approximately 15 days from the above date, the mining recorder will be authorized to change the entries on his record sheets to agree with the enclosed statement. Please note that until such time as the recorder actually changes the entry on the record sheet, the status of the claim remains unchanged.

If you are of the opinion that these changes by the mining recorder will jeopardize your claims, you may during the next fifteen days apply to the Mining and Lands Commissioner for an extension of time. Abstracts should be sent with your application.

If the reduced rate of credits does not jeopardize the status of the claims then you need not seek relief from the Mining and Lands Commissioner and this Notice of Intent may be disregarded.

If your survey was submitted and assessed under the "Special Provision-Performance and Coverage" method and you are of the opinion that a re-appraisal under the "Man-days" method would result in the approval of a greater number of days credit per claim, you may, within the said fifteen day period, submit assessment work breakdowns listing the employees names, addresses and the dates and hours they worked. The new work breakdowns should be submitted direct to the Lands Management Branch, Toronto. The report will be re-assessed and a new statement of credits based on actual days worked will be issued.



2	421	1

File

Recorded Holder

Township or Area

Ministry of

Natural

Besources

SCADDING GOLD MINES LIMITED

SCADDING TOWNSHIP

Type of survey and number of Assessment days credit per claim	Mining Claims Assessed
Geophysical	5 346905
Electromagnetic days	346897 to 99 inclusive S 373196
Magnetometer days	357987 to 90 inclusive 357993 to 96 inclusive
Radiometric days	346915 357990
Induced polarization days	357993 to 95 359343 to 45
Section 86 (18) days	359300 373196 346900
Geological days	478823 to 32 incl. 538818 to 22 incl.
Geochemical days	538824
Man days 🗌 🛛 Airborne 🗔	538828 to 33 incl. 546805 to 24 incl.
Special provision 🗌 Ground 🗖	546827-28 546831 551172 75
Credits have been reduced because of partial coverage of claims.	551178
Credits have been reduced because of corrections to work dates and figures of applicant.	
Special credits under section 86 (15a) for the following	i mining claims
0 days	20 days
S 551179	S 538823 538825
No credits have been allowed for the following mining	claims
X not sufficiently covered by the survey	Insufficient technical data filed
5 538926-27	
5 5500£0=£/	

The Mining Recorder may reduce the above credits if necessary in order that the total number of approved assessment days recorded on each claim does not exceed the maximum allowed as follows: Geophysical — 80; Geological — 40; Geochemical — 40; Section 86(18)-60:



File		
2	.42]	1

Recorded Holder

SCADDING GOLD MINES LIMITED

Township or Area SCADDING TOWNSHIP

Assessment days credit per claim	Mining Claims Assessed	
Geophysical Electromagnetic 20	S 478916 S 538824 478919 to 26 incl. 538828 to 33 incl	c]
Magnetometer days	478976 to 79 incl. 546805 to 24 in 539384 546827-28	c1.
Radiometric days	539389-90 546831 539397 to 400 incl. 551173 to 75 in 539403 373196	c].
Induced polarization days	346895 346897 to 99 incl.	
Section 86 (18) days	357987 to 90 incl. 357993 to 95 incl.	
Geological days	346915 357990	
Geochemical days	357993 to 95 incl. 359343 to 45 incl.	
Man days 🗌 Airborne 🗌	373196	
Special provision 🛣 Ground 🗷	478823 to 32 incl. 538818 to 22 incl.	
Credits have been reduced because of partial coverage of claims.	al	
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Natural (Goo	Ort of Work	Ser	SMIGGE	TWP.	structions: -	If number of m	ining claims traversed
Resources Geo	chemical and Expendi	itures)		192)	Note: -	exceeds space on Only days cred	this form, attach a list, its calculated in the
	·	```				"Expenditures" sin the "Expend.	ection may be entered Days Cr." columns.
Tupe of Survey/el	· · ·		The Mining A	Act		Do not use shaded	areas below.
GADUND DA	A NETICE A	1/0 1/	JF E	~~~		DIALS T	ing (1) 119
Claim Holder(s)	GNETTS A	rro y	4 . 6	<u>-1 /.</u>	Juni	Prospector's Lice	nce No.
SCADDI	NG GOLOM	INFS	LTD				T1024
Survey Company				Survey Dates (I	inecutting to (office) Total N イータ) つ・	liles of line Cut
Name and Address of Author (o	f Geo-Technical report)	2		Day Mo.	Yr. Day I	Mo. Yr. 2	11 Fm
DAVE JONES	#706 141 AD	ELAIDE	W. Tok	onto			
Special Provisions Credits Re	equested		Mining Clai	ms Traversed (1	_ist in nume	rical sequence)	
	Geophysical	Days per Claim	Prefix	Number	Expend. Days Cr.	Prefix N	umber Days Cr.
For first survey:	- Electromagnetic	20		SEE		•	
includes line cutting)	- Magnetometer	40	A Carl	ATOLONCO		A A BAR	
	Radiomatria	10		ATTACALD			
For each additional survey: using the same grid:	- Hadiometric			SHEETS	<u>]</u>]		
Enter 20 days (for each)	- Other	· .					
, . .	Geological		<u>後</u> 際的				
	Geochemical		No.				
Man Days	· · · · · · · · · · · · · · · · · · ·				11		
Instructions	Geophysical	Days per Claim	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			2.5 2	· · ·
Complete reverse side	- Electromagnetic						
and enter total(s) here			24 6 3 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9				
	- Magnetometer						
	- Radiometric			•		- 1947	
	- Other						
	Geologicat						
s. *.	Geochemical		Star S				
Airborne Credits		<u> </u>					
		Days per					
Note: Special provisions credits do not apply		Claim					
to Airborne Surveys.	Electromagnetic			SUDDU	Y		
	Magnetometer		8-8-	MIKING DIV	ET		
	Radiometric				t ₇		
Expenditures (excludes pow	er stripping)			NOV 16 1	181 24	RE	CEIVED
Type of Work Performed			A,N		: 1		
Performed on Claim(s)			7.		3(6)(5)	NOV	18198
	•		1	.] .			
				# 1		MINING I	ANDS SECTION
	- Out alles						
Total Expanditures	Creatts	Total s Credits					
\$	_] ÷ [15] = []		-10 ²	والأربق المتحمد معلا المعكم والمعروق المترجعين و	Total number of	
Instructions Total Days Credits may be as	portioned at the claim h	older's	r			claims covered b	y this -10.5
choice. Enter number of day	s credits per claim select	be	F Total Days C	or Office Use O	<u>nly</u>	Mining Recorder	
Report Completed			Recorded	7	16. 191	11 9 19 17	$\Lambda^{\circ}_{\mathcal{N}}(0, \mathbb{R})$
Date of Report / Re	corded Holder or Agent (Signature)	57.20	Date Approved	as Recorded	Regional/Branch	Director
OCT/21/81	·Kaza	rri		<u>k'`</u>		COF	SSIO.
Certification Verifying Repo	rt of Work			The second secon	Nov	-18-	
I hereby certify that I have a or witnessed same during and	personal and intimate kind for after its completion	nowledge of and the ann	the facts set for exed report is tr	th in the Report (ue,	of Work annex	ked hereto, having	performed the work
Name and Postal Address of Per	son Certifying						ABRER S
6. HARPER C.	HER CECICE	15- A	1 7 4 6 41	er Freih	CATION	At nothing	<u>, ", "1</u>
Sex 14: 1 Fins	1 CANADIAN	· L ·; c	· //	Date Certified		Certified by (Sig	hature) 0
77 (G. 7 2 (A)	1. C. 1. C.	<u>A 16 7</u>		IK NOF	TIDEN P.M	1	CHIII

Claims in Scadding Township

(

ID IV	478891 \$478916 \$478917 \$478918		40 man da 40 " 40 "	ys (" "	Ground Magnetics On	ly)
	S478919 S478920 S478921- S478922		40 " 40 " 40 " 40 "	11 11 19 . 11		:
	S478923 S478924 S478925 S478926		40 " 40 " 40 " 40 "	11 11 11 13		• •
	S478927 S478928 S478976 S478977		40 " 40 " 40 "	1) 1) 1) 1)		•* •
•	S478978 S478979 S539389 S538398 S 5 3 9 3 9 €		40 " 40 " 40 "	1) 13 13 14 -		•
	S539384 S539390 S539391 S539392		40 " 40 " 40 " 40 "	1) 61 81 1)		
	S539393 S539394 S539395 S539396	• .	40 " 40 " 40 " 40 "	1) D1 D1		Ui-
	S539397 S539399 S539400 S539401 S539402		40 " 40 " 40 " 40 " 40 "	01 11 , 11 11 11	ΥΥΥΥ ΥΥΥ΄.	
ID I	S539403 S346895 S346897 S346898 S346899		40 " 60 " 60 " 60 "	и и ((и и и	Ground Magnetics and	VLF-EM)
	S357987 S357988 S357989 S357990. S357993 S357994 S357995 S357995		60 " 60 " 60 " 60 " 60 " 60 "	81 33 81 33 81 81 82 82 84		• •
ID II	S346915 S357990 S357993 S357994 S357995 S359343 S359344 S359360		Included	in G	rids I and III	
	\$373196		•			

Claims in Scadding Township (Con't)

_{iRID} III

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II	S346900			60 60	man "	days "	(Ground	Magnetics	and	VLF-EM)	
	S478824			60		н					
	S478825			60	41	8					
	S478826			60	н						
	CA70020			00	· n	11		•			
	S4/0027				8	11	•			,	
	54/0020 C470020			60		11					
	5478829			60							
	5478830		•	60							
	5478831			60							
	54/8832			60							
	S359343			60	1	"					
	S359344			60	· II						
	S359345			60	u -	11					
	S538818	• · ·		60	"	11					
	S538819			60	11	11					
	S538820		•	60	0	0					
	S538821	•		60	8	11					
	S538822			60.	11	11					
	S538823	•		60		11		·			
	\$538824			60	11	81		•			
	\$538825			60	-11						
	\$538826			60	H	11			•		
	5538827			60		н					
	553007.7			60	8	н					
	2220020			60	11	11				•	
	2220029 CE20020			00	н	17					
	333663U			00	11	n					
	2238831			60		в					
	5538832			60		1					
	5538833			60	. ••						
	S546805			60							
	S546806			60							
•	S54680 7			60							
	S546808			60 [.]	, I I						
	S546809	· · ·		60				•	-	÷	
	S546810			60	, II	n		÷			
	S546811			60	H	. 8		· ·		• •	
	S546812		,	60 ⁻	, 11	11				11-1	
	S546813			60	н	"			. '.	Ū	
	S546814			60	, H	11					
	S546815			60	. 11	11				$\{ f_{i} \}_{i \in \mathcal{I}} = \{ f_{i} \}_{i \in \mathcal{I}} $	
	S546816			60	- B	'n		218.75		•	
	\$546817			60	11	£1		$r = 2 - \Lambda$			
•	\$546818			60	/ 11	11					
	- \$546819		. · · ·	60	, 1 1	н					
	5546820	·		60	× 11	н	·				
·	5546821			60	- 0	u		•			
	5546622		,	60	. н	11					
	5040022			- 60 - 60	, n	11					
	554082 5			00	- 11						
	5546824			00	П	11					
	5546827			60							
	5546828			<u>ь0</u>		11					
	55468 31			60							
			•		; 3						

Claims in Scadding Township (Con't)

60 man days (Ground Magnetics and VLF-EM) 5551173 11 Ĩн. 60 S551174 N 11 60 S551175 n 11 S551178 60 11 12 60 S551179/ 8 60 \$373196 \mathcal{O} TOTAL DAYS 5620 J TOTAL CLAIMS 105

TOTAL CLAIMS AT 40 MAN DAYS 34

(Magnetometer Survey only)

TOTAL CLAIMS AT 60 MAN DAYS 71

(Magnetometer and VLF-EM Surveys)

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Ontario	Ministryof Natural Resources	С Р А
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Geotechnical
Report
Approval

File	4211

Mining Lands Comments

				· · · · · · · · · · · · · · · · · · ·
			· / ·	
			· · · · · · · · · · · · · · · · · · ·	·····
			····	
To: Geo	ophysics	Mr. Barlerv.		
Commen	its			
		<u> </u>	Date	Signature
	proved	Wish to see again with corrections	002 (182	Ky- Uch
To: Geo	ology - Expe	enditures		
Commen	175			
				······································
	proved		Date	Signature
To: Gec	ochemistry	·····	······································	· · · · · · · · · · · · · · · · · · ·
	proved	Wish to see again with corrections	Date	Signature
To: Min	ning Lands S	Section, Room 6462, Whitney Block. (Tel:	5-1380)	



NOPTHGATE EXPLORATION LIMITED

SUITE & P.O. BOX 143, 1 FIRST CANADIAN PLACE, TORONTO, CANA

July 28th, 1982

Director

Re:

Queen's Park

Mr. E. F. Anderson

Dear Mr. Anderson,

Land Management Branch Whitney Block, Room 6450

Toronto, Ontario M7A 1W3

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h, 1982	RECEIVED Land Management Branch CIRCULATE COMMENTS PLEASE BY
Your File: 2.4211	
Andonson	JUL 2 9 1982
. Ander son	E. F. ANDERSON
agement Branch	J. R. MORTON
Block, Room 6450 Park	J. C. SMITH
Ontario M7A 1W3	
Anderson,	J. M. SM#1
Geophysical (Electromagnetic and Magnetometer) Survey re Mining Claims: S 346895 et al. Scadding Township	RETURN TO R.6450

Enclosed, please find the V.L.F. maps for the above mentioned survey which have now had the values added as per your request. Furthermore, I enclose the Grid III maps, now showing the north direction.

For further assistance, please don't hesitate to contact me.

Yours truly,

NORTHGATE EXPLORATION LIMITED

Mining Claims: S 34689

A. Pelley

W. W. Weber Manager of Exploration

/hp

Mining Recorder cc: Sudbury, Ontario

Encl.

1982 06 21

2.4211

Northgate Exploration Limited Suite 3140 - 1 First Canadian Place P.O. Box 143 Toronto, Ontario M5X 1C7 Attn: Mr. W.W. Weber

Dear Sir:

RE: Geophysical (Electromagnetic and Magnetometer) Survey submitted on Mining Claims: S 346895 et al in the Township of Scadding

Enclosed are the V.L.F. maps for the above-mentioned survey. These maps must show the values of the readings taken at each station point, i.e., raw data. Also the Grid III maps are missing the north direction.

For further information, please contact Mr. F.W. Matthews at 965-6918.

Yours very truly,

E.F. Anderson Director Land Management Branch

Whitney Block, Room 6450 Queen's Park Toronto, Ontario M7A 1W3 Phone: 416/965-1316

A. Barr/amc

Encl.

cc: Mining Recorder Sudbury, Ontario



IONTHGATE EXPLORATION LIMITED

SUITE 3140, P.O. BOX 143, 1 FIRST CANADIAN PLACE, TORONTO, CANADA M5X 1C7 • TELEPHONE (416) 362-6683 • TELEX 06-217766

Ministry of Natural Resources Whitney Block, Room 6450 Queen's Park Toronto, Ontario M7A-1W3 RECEIVED

OCT 2 1 1981

MINING LANDS SECTION

Attention: Mr. Fred Matthews

Dear Mr. Matthews:

Enclosed please find the Mining Act of Work for the Magnetic and Electromagnetic Survey conducted over 105 claims in Scadding Township. Application is being made for 40 man days credit on 34 claims and 60 man days credit on 71 claims.

I hope this report is to your satisfaction. Should any further information be required please do not hesitate to contact me.

Yours truly

Jr. Jr. meher

W.W. Weber Manager of Exploration North America

Enclosed: 2 copies of Geophysical Data Statement

1 copy of the Mining Act Report of Work including claims schedule and invoices

2 copies of the Geophysical Report on the Scadding Township Project Sudbury, Ontario . Report by MPH Consulting Ltd. for Northgate Exploration. (Volume 1 and Map Volume 2)
	Ø
τ	Ontario

Ministry of Natural Resources

File.

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

GEOPHYSICAL – GEOLOGICA TECHNICAL DATA TO BE ATTACHED AS AN APPENDIX	L – GEOCHEMICAL STATEMENT
FACTS SHOWN HERE NEED NOT BE TECHNICAL REPORT MUST CONTAIN INTER	REPEATED IN REPORT PRETATION, CONCLUSIONS ETC.
Type of Survey(s) <u>Magnetometer</u> , VLF-EM Township or Area <u>Scadding Township</u>	
Claim Holder(s) Northgate Exploration Limited	List numerically
Toronto, Ontario	
Survey Company MPH Consulting	See_list_attached
Author of Report Dave Jones	(prenky (number)
Address of Author706-141 Adelaide Street West,	<u>Toronto</u>
Covering Dates of Survey November 1980 - April 1981	
Total Miles of Line Cut 271 km.	
SPECIAL PROVISIONS CREDITS REQUESTED Geophysical	AYS claim
ENTER 40 days (includesElectromagnetic line cutting) for firstMagnetometer	20 40
survey. –Radiometric	
ENTER 20 days for each –Other	
additional survey using Geological	
Geochemical	
AIRBORNE CREDITS (Special provision credits do not apply to airborn	e surveys)
Magnetometer Electromagnetic Radiometric (enter days per claim)	· ·
DATE: October 20/81 SIGNATURE: DI.))	Titul
Res. GeolQualifications212750	7
Previous Surveys	
File No. Type Date Claim Holder	
<u> </u>	
	TOTAL CLAIMS

OFFICE USE ONLY

GEOPHYSICAL TECHNICAL DATA

9	ROUND SURVEYS If more than one survey, specify data for each type of survey
N S P C	number of Stations Mag 13,800, VLF 11,600 Number of Readings Mag 13,800, VLF 11,600 station interval $\#1$ 100', $\#2$ 50', $\#3$, 4 25 m Line spacing $\#1$ 100', $\#2$ 50', $\#3$, 4 100 m station interval $\#1$ 100', $\#2$ 50', $\#3$, 4 25 m Line spacing $\#1$ 100', $\#2$ 50', $\#3$, 4 100 m station interval 1 cm = 10% 100 gammas and 25 gammas 100 gammas
MAGNETIC	Instrument McPhar GP70 Proton Precession Accuracy – Scale constant <u>+ 1 gamma, + 15 ppm of field under measurement</u> Diurnal correction method <u>Barringer M123 Base Station</u> Base Station check-in interval (hours) <u>10 sec. intervals</u> Base Station location and value <u>Base camp</u>
ELECTROMAGNETIC	Instrument _EM 16 Coil configuration _Horizontal Loop Coil separation _As per grid Accuracy
<u>GRAVITY</u>	Instrument
RESISTIVITY	Elevation accuracy Instrument Instrument
	Electrode arrayElectrode spacing

Claims in Scadding Township

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GRID IV	S478891	40	man	davs	(Ground Magnetics Only)
	S478916	40	II	"	(around hugherres only)
	S478917	40	п	п	
	S478918	40	п	н	
	S478919	40	п	п	
	S478920	40	Ш	п	
	S478921	40	н	11	
	S478922	40	н	11	
	S478923	40	11	п	
	5478924	40	п	н	
	\$478925	40	н	н	
	\$478926	40			
	\$478927	40	н	п	
	\$478928	40			
	\$478976	40			
	\$478977	40			
	\$478978	40			
	\$478979	40		11	
	5530380	40			
	5538308	40			
	5530390	40			
	2222204	40			
	5539390	40			
	2222222	40			
	5530303	40			
	5539393	40			
	5535354	40		11	
	5539393	40			
	2237370 5537370	40		14	
	5539397	40	11		
	5539399	40	11	н	
	5539400	40	11	н	
	5539401	40	0	11	
	\$539402	40	п	п	
	\$539403	40	11	п	
GRID I	S346895	60	11	п	(Ground Magnetics and VLF-EM)
	S346897	60	П	ш	-
	S346898	60	н	11	
	S346899	60	11	н	
	S357987	60	u	н	
	S357988	60	n	11	
	S357989	60	11	н	
	S357990	60	н	н	
	S357993	60	11	11	
	S357994	60	н	11	
	S357995	60	н	H.	
	S357996	60	н	п	
GRID II	S346915	In	clude	ed in	Grids I and III
	S357990				
	S357993				
	S357994				
	S357995				
	\$359343				
	\$359344				
	\$359360				

S359360 S373196

Claims in Scadding Township (Con't)

GRID III

\$346900	60	man	days	(Ground
S478823	60	н	ĨI	·
S478824	60	н	н	
\$478825	60	н	н	
\$478826	60	н	н	
\$478827	60	н	u –	
\$478828	60	н	U II	
\$478820	60	11	н	
S470029 C470020	60	н	u	
5470050 CA70051	00	н	n	
0470001 CA70000	00	н	n in	
5478832	60			
5359343	60			
\$359344	60	: 11		
\$359345	60	11		
S538818	60	н	U U	
S538819	60	н	п	
S538820	60	п	11	
S538821	60	н	- 11	
\$538822	60	н	ŧ	
\$538823	60	n	41	
\$538824	60	u	11	
\$538825	60	п	11	
\$538826	60	11	п	
5530020	00	н	11	
SJ 30027	60	н	11	
2020020 CE 20020	00	н	н	
2220023 CE20020	60			
333663U 6530631	60			
S538831	60			
5538832 5539933	60			
5538833	60			
\$546805	60			
\$546806	60			
\$546807	60			
S546808	60	н		
S546809	60	11	11	
S546810	60	11	н	
S546811	60	н	н	
S546812	60	H	н	
S546813	60	п	Ш	
S546814	60	11	н	
S546815	60	н	11	
\$546816	60	н	н	
\$546817	60	П	11	
\$546818	60	п	11	
5546810	60	11	н	
5546015	60	н	н	
S540020 SEA6021	60	н	н	
5040021 SEA6000	60	п	н	
5540022 SE 46000	00	н	н	
3340823 SEA6934	60	11		
3340824 6546937	60	n		
5540827	60			
5546828	60	.,		
5546831	60		.,	

man days (Ground Magnetics and VLF-EM)

Claims in Scadding Township (Con't)

GRID III Con't

S551173 S551174 S551175 S551178 S551179 S373196	60 60 60 60 60	män " " " "	days " " "	(Ground	Magnetics	and	VLF-EM)
TOTAL CLAIMS 105 TOTAL	DAYS 562	0					
TOTAL CLAIMS AT 40 MAN DAYS 34	(Ma	gneto	meter	r Survey	only)		
TOTAL CLAIMS AT 60 MAN DAYS 71	(Ma	gneto	ometer	and VL	-EM Survey	ys)	

. .

SELF POTENTIAL	
Instrument	Range
Survey Method	
Corrections made	
RADIOMETRIC	
Instrument	
Values measured	
Energy windows (levels)	
Height of instrument	Background Count
Size of detector	5
Overburden	
(typc, depth – in	clude outcrop map)
OTHERS (SEISMIC, DRILL WELL LOGGING ETC.) Type of survey	
Instrument	
Accuracy	
Parameters measured	
Additional information (for understanding results)	<u>`</u>
AIRBORNE SURVEYS	
Type of survey(s)	
Instrument(s)	
(specify for each	type of survey)
(specify for each	type of survey)
Aircraft used	
Sensor altitude	
Navigation and flight path recovery method	
Aircraft altitude	Line Spacing
Miles flown over total area	Over claims only

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken_____

Total Number of Samples	ANALYTICAL METHODS							
Type of Sample(Nature of Material) Average Sample Weight	Values expressed in: p. p. m. p. p. b.							
Method of Collection	Cu, Pb, Zn, Ni, Co, Ag, Mo, As,-(circle)							
Soil Horizon Sampled	Others							
Horizon Development	_ Field Analysis (tests)							
Sample Depth	Extraction Method							
Terrain	Analytical Method							
	Reagents Used							
Drainage Development	Field Laboratory Analysis							
Estimated Range of Overburden Thickness	No. (tests)							
	Extraction Method							
	Analytical Method							
	Reagents Used							
SAMPLE PREPARATION	Commercial Laboratory (tests							
(Includes drying, screening, crushing, ashing)	Name of Laboratory							
Mesh size of fraction used for analysis	Extraction Method							
• • • • • • • • • • • • • • • • • • •	Analytical Method							
	Reagents Used							
	General							
General								
	_							



upto that 2.3.

> B. Copas.

MPH Consulting Limited

141 Adelaide Street W., Suite 706, Toronto, Canada M5H 3L5

March 31, 1981

Northgate Exploration Ltd. P.O. Box 143 First Canadian Place Toronto, Ontario M5X 1C7

C429 Scadding

TO: Professional Services

D.	Jones	3	hours	at	\$40	\$ 120.00
D.	Hall	14	days	at	\$150	2,100.00
М.	Bickers	14	days	at	\$125	1,750.00
D.	Johnston	5	days	at	\$125	625.00
т.1	R.Kraft	14	days	at	\$125	1,750.00
М.	Nadjiwan	4	days	at	\$125	500.00
			-			\$6,845,00

Equipment Rental: VLF-EM Unit 13 days at \$17

Disbursements: Page Two

\$ 221.00

\$2,710.59



Cable: GEOCONSUL

Telephone: (416) 363-6375 363-4002



Northgate Exploration Ltd. Page Two March 31, 1981

C429

TO: Disbursements

College Copy Shop BPX Delivery BPX Delivery R1767 Bell Canada McPhar Instruments R1785 McPhar Instruments R1786 Langridge R1784 Project Truck R1780 D. Hall Exp. Acct. R1067 D. Hall Exp. Acct. R1067 Geonics

Administration 10%

 $$12.25 \\
5.05 \\
5.05 \\
10.22 \\
636.93 \\
432.55 \\
52.91 \\
588.50 \\
99.98 \\
54.33 \\
566.40 \\
$2,464.17 \\
246.42 \\
$2,710.59 \\
}$

MPH Consulting Limited

Suite 706, 141 Adelaide St. W Torohto, Canada M5H 3L5 (416) 363-6375 (416) 363-4002 Telex 06-219626

April 30, 1981

Northgate Exploration Lto P.O. Box 143 First Canadian Place Toronto, Ontario M5X 1C7 C-429 Scadding	3.	ПССЕЛ МАУ 1 4 1981
TO: Professional Service	es	
D. Jones D. Hall D. Johnston M. Bickers Tom Kraft	4.75 hours @ \$ 40 14 days @ \$150 13 days @ \$125 13 days @ \$125 20 days @ \$125	<pre>\$ 190.00 2,100.00 1,625.00 1,625.00 2,500.00 \$8,040.00</pre>
Equipment Rental:		
VLF-EM Unit	13 days 0 \$ 17	\$ 221.00
Dispuisements //		\$9,606.79 X

...2

 $\begin{array}{r} 772 - 401 = 25\% \quad 2401.70 \\ \hline 00DE & AMOUNT \\ \hline 724 - 401 = 25\% \quad 2401.70 \\ \hline 723 - 401 = 121/2\% & 2200.55 \\ \hline 725 - 401 = 121/2\% & 1200.55 \\ \hline 726 - 401 = 121/2\% & 1200.55 \\ \hline 726 - 401 = 121/2\% & 1200.55 \\ \hline 727 - 401 = 121/2\% & 1200.55 \\ \hline 0190 & 000 \\ \hline 0190 & 000$



Northgate Exploration Ltd. Page Two April 30, 1981

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C-429 Scadding

TO: Disbursements:

\$ 27.25 D. Johnston Expense Account 650.03 R1852 Barringer Research 1.07 -J. Siriunas Expense Account 208.10 🗸 D. Hall Expense Account R1102 325.01 × R1882 Barringer Research 11.99 -D. Hall Expense Account / \$1,223.45 / Administration 10% 122.34

1

\$1,345.79

MPH Consulting Limited

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Suite 706, 141 Adelaide St. W. Toronto, Canada M5H 3L5 (416) 363-6375 (416) 363-4002 Telex 06-219626

May 30, 1981

Northgate Exploration Ltd. PO Box 143 First Canadian Place Toronto, Ontario M5X 1C7

C429 Scadding

TO:

Professional Services							
D. T.	Jones Kraft	12.5 ho 8 da	urs @ ays @	\$40/hour \$125/day	\$ 500.00 1000.00		
					\$1500.00	7	
Dis	sbursements						
Geo Cartographic Services Ltd.R189727.94Geo Cartographic Services Ltd.R1907304.82Project Truck Rentals Ltd.R1929974.30Credit for D. Johnston27.94Exp. Acct Invoiced in April(27.25)					-		
	\$1279.81						
Adn	ninistration - 10%				127.98	-	

\$1407.79

\$2,907.79

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TOTAL:







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MPH Consulting Limited

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		Date:	June 30, 1	981
		Invoice No.	0115	
		Page No. C-4	29 Scadding T	ownship
Nort P.O. Firs Toro	hgate Exploration Co. Ltd. Box 143 t Canadian Place nto, Ontario M5X 1C7			
то:	Professional Services		. <u></u>	
	D. Jones 21.5 hour D. Hall 1 day T.R.Kraft 9 days	s at \$40 at \$150 at \$125	\$860.00 150.00 1,125.00	\$2,135.00 >
	Geo Cartographic Services Geo Cartographic Services Geo Cartographic Services Bell Canada Geo Cartographic Services Geo Cartographic Services Geo Cartographic Services Administration - 10%	R2081 R2080 R2079 R3069 R3067 R3066	\$3,095.64 52.00 107.86 2.43 2.41 20.54 106.57 \$3,387.45 338.75	<u>\$3,726.20</u>
	CODE AMOUNT $123 - 401 - 240 + 1277 724 - 401 - 240 + 1277 724 - 401 - 240 + 17553 725 - 401 - 20 + 17553 725 - 401 - 20 + 17553 725 - 401 - 20 + 17527 727 - 401 - 20 + 15727 727 - 401 - 20 + 15727 727 - 401 - 20 + 15727 727 - 401 - 20 + 15727 727 - 401 - 10 + 15720 CHERED $	117294 175838 117294 117224 5661.20		\$5,861.20 X

1981 10 22

2.4211

Mining Recorder's Office Ministry of Natural Resources 199 Larch Street, Sudbury, Ontario P3E 5P9

Dear Sir;

We have received reports and maps for a Geophysical (Electromagnetic and Magnetometer) survey submitted under Special Provisions (credit for Performance and Coverage) on mining claims S 346895 et al in the Township of Scadding.

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

Yours very truly

E.F. Anderson Director Land Management Branch

Whitney Block, Room 6450 Queen's Park Toronto, ontario M7A 1W3 Phone 416/965-1380

Joan Skura

cc: Northgate Exploration Limited Toronto, Ontario

> MPH Consulting Toronto, Ontarto

FILE: 2. 4211 GEOTECHNICAL REPORT APPROVAL MINING LANDS COMMENTS: L.D. V.L.F. Survey may be not here readings isoms many of the Marthe directories and GEOPHYSICS Mr. Barlow. - ULF maps need readings - Grid The massing month dout ... DATE: Fibrilsi APPROVED SIGNATURE: Fj- R.C. 4 WISH TO S WISH TO SEE AGAIN WITH CORRECTIONS GEOLOGY - EXPENDITURES DATE: APPROVED SIGNATURE: WISH TO SEE AGAIN WITH CORRECTIONS GEOCHEMISTRY APPROVED DATE: SIGNATURE: WISH TO SEE AGAIN WITH CORRECTIONS RETURN TO F. W. MATTHEWS, ROOM 6452 WHITNEY BLOCK (5-1380)

Ministry of Natural Resources Ontario

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A separate form is required for each type of work to be

		THE MINING ACT	REPORT OF WO	RK	recorded.
To the Recorder o	f. Sudbury				
I, W. W. Webe	er, for Northga	te Exploration	Limited		T835
P.O. Box 1	name of Recorded 1 43, 1 First Ca	Holder Inadian Place,	Toronto, Onta:	Pi rio M5X 10	rospector's Licence C7
do hereby report t	he performance of		days of	Geopl	hys.ical
not before reporte	d to be applied on t	he following contig	uous claims		type of work
Claim No.	Days	Claim No.	Day s	Claim No.	Days

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All the work was j (In the case of geo	performed on Mining ological and/or geo	r Claim (s) physical survey (s)	where more than 1	8 claims are	involved attach a schedule
READ CAREFULI	Y: THE FOLLOW	NG INFORMATION IS	REQUIRED BY TH	E MINING RE	CORDER.
For Manual Work, addresses of the n For Diamond and a owner or operator For Compressed A Type of drill or ea their employment. For Power Strippin work was done. Pr With each of the a to the nearest clai For Geophysical, a dates of survey (I maps, expenditure I For Land Survey - The Required Info Contractor MPI Date of Survey VLF-EM survey Magnetometer s Copies of line	Stripping or Openin men who performed to other Core Drilling of drill. Dates when wir or Other Power E quipment. Names an mg - Type of equipm roof of actual cost r bove types of work im post. In the cas Geological, Geoche inecutting & office breakdown, receipts the name and addre ormation is as Follo H Consulting, I y, Line cutting July 1981 - EM 16 instru- survey - GP 70 e cutting charge	g up of Mines, Sinki the work and the dat - Footage, No. and n drilling was done. Driven or Mechanica d addresses of men ent. Name and addre must be submitted w sketches are requi e of diamond or othe mical Surveys and I). Type of instrum smust be filed in du ess of Ontario L and bws: (Attach a D. Jones g commenced Oct ument Proton Magneto ges and MPH bill	ing Shafts or Other res and hours of the langle of holes an Signed core log an <u>I Equipment</u> engaged in operat ess of owner or op- vithin 30 days of re- red to show the lo er core drilling the Expenditure Credit ent used. Total an uplicate with the W surveyor. list if this space cober 1980, Ge ometer with BM ling enclosed	Actual Mini eir employme d diameter o nd sketch in ing equipmen erator. Amour cording. cation and e e sketch mus s - the name nount of exp linister with is insufficie ophysica] 123 Base	ng Operations — Names and ent. f core. Name and address of duplicate. at and the dates and hours of at expended. Dates on which extent of the work in relation is be submitted in duplicate of author of report. Coverin benditure. Technical report in 60 days of recording. nt) report was submitte Station
DoteOctober	20 1981		Signatu)7- 37- re of Record	ed Holder or Agent
		The Min Certificate Verifyi	ing Act ng Report of Work		
l,	W.W. Weber Burbank Drive	, Willowdale, ((Post Office)	Ontario M2K-1F e Address)	27	
hereby certify:			•		
1. That I I to, having performe	have a personal and ed the work or with	l intimate knowledg essed same during c	e of the facts set f ind/or after its cor	orth in the re npletion.	eport of work annexed here-
2. That th	e annexed report is	true.	$\sum \lambda$	17.	1
DotedOctober	20,198119.		Ur or,	OF CA Signat	ure



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274·32 N	58 746 58 746	58738 58763	58708 58733	58733 58705	58687	5-8705	58697	58746	58741	58735	58714	58734 58730	58721	58736	58662	5928	58698	58736	58714 58724	58726	58714 58700 - 58697	58722	58736	58745	58727	58714	52610	58727	58713	58745	58794
243.84 N	58759	58744	58708	58752	58673	58726	- 58713	58720	58708	58722	58706	5 8737	58705	58773	58669	59703	58748	58728	58723	58698	587/7	59614	59693-	Seater 1	St 746	68725	5\$716	58721	58778	5 8 708	58760
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121-92 N	58789	58755 58745	58706 58718	58733 58736	58739 58741	58721	58739	5-9715	58672	58695	58722-	58734	58702	58689	58713	58717	58733	58842	52708	50732	59683	58734	58734	59763	5-8744 5*740	58800 58820 58777	58751	58703	58745	58727	58678
91·44 N	58735	58751	58744	58775	58735	53698	5873)	58710	58696	58(19	1.5.8 747	59661	58707	58752	51715	58727	58700	58725	586m 587	200	55705	58683	58707	171742	58704	58747	58708	58727	58677	59775	58673 (
60.96 N	5874 8 58728	5 ⁻ 8769 5 ⁻ 8780	58749 58747	58772 58772	58713	58716 58750	58711	58773	5\$670	58626	58 203	50675	58687 48 CMS	58694	58714	58699	58724	58730 -58718	5 8766	58694	58701	58741 58721	58724	58763 58734	58724	58736 58720	58725 58729	58734 58724	58694	5 8734	58690
30.48 N	58 739 58735	58717	58736	58793 58773	58730	58751	58701	58705	58705	58700	58703	59677	58658	58690	58741	587/8	58721	58715	58794	58711	58735	58755	58744 58736	58734 58762	58714 58714	58719	59717	58733 58743	58748	58692	58708
	58719	58777	58727	58774	58713	58700	58668	68730	58717	5-8713 51	8700	58712	58707	58707	58723	58743	58724	58742	5-56-96	58731	58739	58717	58744	58710	58711	58711	58706	58710	58725	58788	58737
BLO	<u>58750</u> 58740	58800	<u>58778</u> 58761	58739 58784	58702 68763	58735	58683	58569	5 \$ 755	58716	59689	597/8 59730	58707	58706	58707	58720 58700 	58694	58722	58691	58724	5 8 12 6	58198	5873	58700 58737	<u>58728</u> 58728	58735	58714 58705	58716	58728	58707	58717
30- 48 S	58749 (8773	58771	58730	58742	58714	58743	5 26 78	58709	68738	58734	58691)	58726	58692 33483 36546	58707	58704	58702	58630	58745	58711	58732	5 8707	58710	587.92	Series Dates	58723 58716	58722	58716	58722	58673	58619	58734
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152·40 S	58708 58703	58727	58708 58712 58659	58715	58693	587/8	58679	50719	68735 58666	5 5 720	58694	58717	58673 58687	58691 58694	58691	58672 ¥ 68662	5 866 7	58757	58 693	58696 58671	58696	58705 58709-	58715	58 758	58800	58740	58057	58701	587/6	58757	58696
182-88 S	58 708 58 702	58706	59768 59721 (58123	58683	58692	58691	58722	58709	58718	58687	58661	68165	58720	58608	58700	55697	58674	5-8700 5-8700	58676	58701	58678	5 8 705	58737	58729	58742	58737 <	58841 58800 58743 58743	58719	587/4	58720
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243·84 S	58900 5882 7	58706-	58695 39020 38545 59067	58693	58691	58687	58706	5 8702	68689	58677	58673	52 72)	58671	58675	58686 58642	58729	58670	58712	58671 58654	58625 58700	58702 58682	58685	58731 (58771 -	586970700	58729	58759 58731	58714	58696	58713 58704	58722	58698
274 · 32 S	58725	58713	58902 58719	58772 58752	58711	58656	58682	55690 8500 159235	58(56	58495	58680	58712	5869	58684	58658	58711	58677	58709	58681	58684	\$8697 58703	58686	58706 58713	59722	58750 58705	58738 58729	58702	58733	58711	58600	58707
704 00 0	58727	58773	58701	58743¥	58780	5-8748	393	59702	58725	58711	58646	51693	58650	58712	58883	58725	5870)	58701	58.658	58(93	58674	58685	5 8707	58711	5870 5	58126	58726	58737	5 9675	597/1	58280
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335-28 S	.68708 58752	58715	58665	58716	58705	58577		58768	58784 58691	58713	58660	58674	58643 58647 51903	58679	5 8667	5 8716	8705 5678	58699 58713	58673 586 8 6	-58695 58691	5 86 86 5 86 86	58674 58694	58706 58710	58718	5890	58712 58719	58716	58719	58697	58721 58707	58725
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426·72 S	58800 58795	58882	58864 59044 5903)	58542 58906- 68142	58696 58715 58666	58712	5 8656	58784	58691	58703	58679	58714	58711	58743 5870)	58721	58754	58693	58715	58670	5869 58676	58676	58701	5-8716 5-8714	58722	-58706 58706 58723	58722 58715	58714 58722	58713 58712	58714	58739	58689
	58750	58760	58859	59771	58661	58751	58737	587865	800	58681	58446	58705	58696	58718	5 8702 58700	587/)	58702	50041	59655	58700 55703	58709	58683	5-8720	58711	58698	58717	587/4	58709	58714	58727	58724
457-20 5	58744	5876B	58730	59/85	58760	58213	58654	58736	58691	58758	58680 58674	58694	58694	58743	58684	58687	58123	58716	5 HI-2 6 - 1735	58721	58693	58670 58899 58777	58197	58720	5 8717	58722 58725	38686	58700 18676	58687	59723	58715
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640-08 N		58700 58845	58668) 58658	58697 58682	- 5°8696 5°676	5 8697 5 8635	58699	58751 58730	58655	58670	58967 58626 58618	58693	5-8691	58654 58700 51896	58692 58712 59597	58654	58690 58679	-58677 58701	58643	58699 58685	587123	58717	58768 58763	58704	58750	58696	58718	58731	59711	58729 58744	58123 58723	
609-60 N		58713	58969	58883	58976	58673	58747 (587 <u>72</u>	58731	5,8700	58644	58660	5 8631		58630	58690 58634	58667 58650	<u>- 58686</u> 58737	58657 58661	<u>.59698</u> 596 8	5 1702	58655 58664	58740 58743 (58649	58741	58641	58718 58651	58742 58749	58754 58768	58720	58713 58724	
579·12 N		-58665 58646	- 5 ⁻ 8843 58800 - 58786	58824 58707	58724	5 8 8 5 8 59000 5 8 8 8 4	58727	58723	58687	58702	58944 00 <u>58800</u> 58614	58701	58(29)	5 1230	1070) (5 875 8	58689	58680 58746	58659 58700- 58720	5-8658	58684	58726	58670	58747	58735	58725 K	58695	58722 58757	59728	58697)	58759 58744 (58712 58700 58697	
548-64 N		58700 58800 58800	- 58761 58726	- 5 8 7 9 0 5 8 7 8 0	58735	58793	58767 58	1900 1900 1900 1900 1900 1900 1900	58835	59096	58638	58718	58770	9400 53765 53	5 88 9 7	51719 (58682	58700- 59(87	58684	58725	58699	-58718 58706	58747	58734	58736	6 8676 - 58700	- 58726 58710	58752 58768	58747 58711	58737	587155870	x
518-16 N		58787 (58970	58807 (58800 58751	58751) 58784 58780	58800 58789 58724	558807	58900. 58900.	589621	586981	58625	575 67.	58700	58721	58715 593712 593712 593712	586.79	59716-	58678	5 56 48	58716	58683	58769	58721	587//	-58719	58717	58773	587+3	58736	58686	
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457-20 N		58700	58773	- 58706	58800	58768	58769	54020	58818	58800	58700-58695	6 657	59416	01-9801	2 59610	68672 68672	58689	58720	5 8697	58702	58705	58690	58743 58775	58725	58742	- 5.8725	58716	58735	58700	58742	58678	
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396-24 N	ž	58754	58762	58760	58760	58759	58736	58924	58743	58815	58759	58983 58719 58742	5-8730	5 8632	59000	59632 58677 59221 59221	58664	58695 -58685	58696-58	58693 3700 58724	58710	58720 58729	58786 58770	58713	58750 58763	58710 58720	58721 58724	58765 58680	58742 58831	58756	58698 58695	\$ 8700]
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335-28 N		58752	58760	58722 58729	58786	58761	58781 58742	58720 -58757	58741 58794	58817	58730 58738 58800	58745	58716 58716 58710	5 736 00 6 8600	59750	588°6 58800- 58760	58765 ×	58176	58690	-58702	58694	58730 58767	58776 58781	58745 58745 -	58714	58680 58700 58722	59716 58 58710	58853 58715 58687	58727 -58747	58786	58687 58700 58700	18742 -8719
304-80 N		58732	58800 58777	58762 58680	58734 (58719	58785	58731 58799	58772 58766	58710 -58679	58785	58820	58708	58766	5879858	59719	58769 58744	58774	58804 58728	58772	593372	59736 59960 58756 58724	58760 58753	58813 58612	58756	58737 58507 00	58755	58713	58735	58733	58715	58675 5	1744 18702
274-32 N		58734 G	58104	58703 58787	58788 58752	58769	58755	58740 -58728	58727 587 8 6	58796	58689	58700	58706	58 189	58701	58800	5-8739 5-8717	58754 58761	58712 58763	58732 58762	58743 58738	58769	58828 58845	5 8828 58835	59892	58893	5 8688	58695	59716	58714	5 8665 S	-1773
243 84 N	Ĭ	58750 58742	58752 - 56747	58709 58729	<u>58785</u> 58776	58766	58759 58800 58812	58801	58780 58758	58788	57681	58723	58676	51668	59706	58738 58795	58735	59757 58733	58730 58731	58 774 58745	58747 ` 58748	58784	58835	58810 58198	55829 58 904	587670	59045	58898)	58695	5 8680-58 58678	59533) 5 600 59653 5	8700 8725
213-36 N		58770 58785	58774 (58787	588955	58780	58763 58777	58771	58781	58727 58797	58818-	580-4 580-95 57377	58700 58795	58720	59381	58712	58793	587.13	57747 58700	58734	58756 58754	58756 58762	5 87 42	58831	58787	59822	58796	5 2799	58790/ 58754 58744	58690	\$\$719 58712	59709 5	8771 18761
182-88 N		58776	58781	58741	58780 68769	5 87 55 587 56	58733 58730	58741	58815	58858	58800 58756	50693	58727	58821 58821 58800- 58714	59716	58790	58749 (58723	58698	58708 58732	58763	58756 58744	58736	58870	58778	50740 58780	58762	58793	58719	58465	58719 58729	5872) 5 (87743 5	**747 : ****
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