



42A03NE0041 63.1509 MCARTHUR

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REPORT ON
A GEOLOGICAL SURVEY OF
THE McARTHUR TOWNSHIP PROPERTY
OF
NORTH FRONTIER EXPLORATIONS LIMITED

North Frontier Explorations Limited holds a group of claims in McArthur Township, Timmins area. During the summer of 1965 geological mapping and diamond drilling were carried out under the writer's supervision. The following is a resume of observations.

PROPERTY

The property consists of 18 contiguous unpatented claims situated in the east-central part of McArthur Township, about 20 miles south of Timmins, Ontario. Claim numbers are P79611 to 79628 inclusive. Access is via a gravel logging road which passes about three miles west of the group, or by aircraft to McArthur Lake immediately southeast of the group.

WORK DONE

A 300 foot line grid had been cut over the group during the course of geophysical surveys the previous winter. Geology was mapped by pace and compass methods with traverses made on all grid lines, and in intervening areas where required. Results and interpretations are plotted on the accompanying plan at a scale of one inch to two hundred feet.

The property was mapped at the same time as the adjoining ground to the south. Certain features not particularly obvious on the North Frontier ground became more apparent when the area as a whole is examined.

The various surveys were followed by 9 holes totalling 3110 feet of diamond drilling.

FORM NO. L.S. 11. P. REPORT PAPER GRAND A. TOY LIMITED

GENERAL GEOLOGY

The table of formations is as follows:

KEMENAWAN	Diabase dikes and irregular masses.
ALCOMAN	Granite - batholithic masses, and feldspar porphyry dikes.
HAIIEYBURIAN	Diorite Gabbro - feldspar porphyry and anorthosite in part. Ultrabasic Complex - Peridotite with pyroxinite, amphiblite and feldspar-rich variants.
KELWATIN	Volcanics - dacite, andesite, basalt, tuffs and altered equivalents.

The relative ages of the gabbro, diorite, granite, and diabase could not establish other than that they are all younger than the ultrabasics, which in turn intrude the volcanics. The eras assigned are those conventional in the area.

VOLCANICS

Volcanics are confined to a narrow strip in the northeast part of the group, plus a few inclusions. All have undergone some considerable degree of alteration and are converted in large part to amphibolites and chloritic schists. Well-bedded tuffs are the most prominent volcanics, with altered and schistose equivalents of what appeared to be basaltic, andesitic, and dacitic flows in lesser quantities. Outcrop areas are too limited to trace specific horizons for any distance.

ULTRABASICS

Peridotite and various related rocks underlie the great bulk of the claim group. The typical ultrabasic is a dense black, uniformly fine-grained featureless rock with olivine the only mineral recognizable in hand specimen.

Fine (1/8" - 1/4") asbestos stringers are common, and there are fairly extensive areas of green dunite and of serpentization. Talc-chlorite-magnesite-carbonate schists are widespread as observed in drill core, though these extremely soft rocks very seldom outcrop.

Two textural phenomena were widespread, locally termed "bun" and "chicken track" peridotite. The bun peridotite resembles a pillow lava in that it appears to be made up of 3 inch to 9 inch rounded or ellipsoidal buns. These are particularly prominent on weathered surfaces though also recognized at considerable depth in drill core and it is quite possible to pick whole "buns" out of an outcrop. The interior of the buns is typical fine-grained peridotite; no mineralogical variation could be recognized across the interface between buns, other than development of some serpentine and a little carbonate. It is suggested that this texture is the result of movement after partial consolidation of the intrusive.

Bun peridotite is very widespread and will make up large outcrop areas. "Chicken track" on the other hand is a very local alteration feature and appears to be linear or tabular in distribution - i.e. distributed for one or a few feet on either side of a fracture, shear plane, contact, etc. - with the chicken track texture resulting from the development of platy or bladed pyroxenes and amphiboles with a random orientation. Other variations in the peridotite are areas of pyroxene-rich rock, and some coarser-grained gabbroic sections containing appreciable feldspar. These pyroxenite and gabbroic variations, as far as could be established, are not separate intrusives, but rather are local differentiates or areas of alteration.

An unexplained feature in the peridotite is a strong magnetic high which extends completely across the north contact of the ultrabasics.

While the magnetic feature is very well-defined and suggests a more basic dike or perhaps iron formation, neither outcrops nor drill holes showed any visible variation from the less-magnetic peridotite to the south.

GABBRO

A large gabbro dike or sill that appears to be intrusive into the ultrabasics is found in the extreme westerly part of the North Frontier group, and is better exposed in the claims adjoining to the south. It is exposed over a horizontal width of 800 feet and has been traced on various properties for a length of some miles. It varies considerably in appearance and composition and has been termed gabbro, diorite, feldspar porphyry, syenite and granodiorite by different workers in the area. The writer has examined it over a strike length of $1\frac{1}{2}$ miles and considers all to be the same rock. Where best exposed, south of North Frontier it is a typical coarse-grained gabbro composed of $1/8$ to $1/2$ inch plagioclase and pyroxene crystals, though with perhaps a slightly higher than normal feldspar content. There are areas where the feldspars increase in both content and size forming a feldspar porphyry. Occasionally the feldspar is stained a pinkish color but more commonly is a greenish white. At one location south of North Frontier, the contact is exposed; here the rock is an anorthosite - entirely white to greenish feldspar - and is in contact with a sheared and schistose talc-chlorite-serpentine rock.

DIORITE

The principal exposure of diorite is in claim P79619. It is a medium grained fairly siliceous rock, with in places a high content of disseminated pyrrhotite. It appears quite limited in extent.

Other dioritic rocks are exposed within the volcanics, and would appear to be re-crystallized volcanics rather than intrusive.

GRANITE

Granite is exposed only in the northeast part of the group. It is a typical Algoman granite, rather gneissic, medium-coarse grained, and in part hybrid, consisting of partially absorbed volcanics.

DIABASE

Diabase is found only in the northeasterly part of the group, intruding volcanics. There would appear to be a fairly large mass of diabase with numerous inclusions of volcanics. Rock exposures are not good; there did not appear to be any single well-defined dike. The rock is a typical Keweenaw-type diabase, medium-grained, with texture varying from ophitic to gabbroic.

STRUCTURAL GEOLOGY

The absence of good horizon markers and few contact exposures tend to obscure structural features. The ultrabasics are believed to be one or several northwest-striking and southwest-dipping sills. The large gabbro body conforms to this attitude.

Intense shearing and schistosity is very widespread though usually overburden-covered and found only in drill holes. Two northeast-trending faults are known to exist as shown on the accompanying plan. These are marked by intense shearing, slight right-hand displacement and pronounced topographic lows. A northeast-trending fault is postulated as following the most prominent topographic feature on the property - a steep-walled and straight swamp-filled valley. Numerous other northwest and northeast topographic and magnetic features suggest

faulting also, but definite evidence is lacking; the magnetics in particular suggest numerous east-northeast faults with slight right-hand displacement.


DIAMOND DRILLING

Nine holes totalling 3110 feet were drilled at various locations, as shown in the attached plan. Each was drilled to test a geophysically-indicated target in the ultrabasics. All but one cut similar material - a zone of intense shearing and schistosity, with the rock converted almost entirely to a soft mud of talc, serpentine, chlorite, etc. Graphite is usually present, and films and streaks of pyrrhotite with lesser chalcopyrite are common. While these do carry slight nickel values, the mineralization is too sparse to justify further investigation. Holes 2 and 9 also intersected a mineralogical curiosity - numerous hairline fracture-fillings and small pods of chalcophanite - a manganese-zinc-bearing mineral. Hole 3, unlike the others, cut 180 feet of diorite, carrying 1 to 20% disseminated pyrrhotite. The pyrrhotite is barren of nickel.

CONCLUSIONS AND RECOMMENDATIONS

No mineral deposits of economic significance have been found to date. It is recommended that work be suspended pending results on surrounding properties which may direct attention to new areas on the North Frontier claims.

Respectfully submitted,



I. G. Phelan, M.A.Sc., P.Eng.
Consulting Geologist

Toronto, Ontario
19 October, 1965



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REPORT ON
MAGNETIC AND ELECTROMAGNETIC SURVEYS
ON McARTHUR TOWNSHIP CLAIMS
PREPARED FOR
NORTH FRONTIER EXPLORATIONS LIMITED

North Frontier Explorations Limited holds a group of 18 contiguous unleased claims, P79611 to P70628 inclusive, situated in the east-central part of McArthur Township, about 20 miles south of Timmins, Ontario. Access is via a gravel logging road which passes about three miles to the west of the group, or by aircraft to McArthur Lake, just southeast of the group.

During the winter of 1964-65 magnetic and electromagnetic surveys were carried out under the writer's supervision. The following is a resume of observations.

GENERAL GEOLOGY

Published geological information is sparse. The claims are in a "greenstone" area of acid to basic volcanics with minor sedimentary iron formation, all cut by a series of basic to ultrabasic intrusives.

A gold occurrence is known in volcanics just south of the claim group, while substantial nickel deposits with some associated copper are known in the ultrabasics at the Temont mine about two miles to the south, and at the McWatters property about fourteen miles to the northeast. The principal purpose of the current exploration program is to search for similar base metal occurrences.

WORK DONE

An east-west base line was cut from which north-south picket lines were run at 300 foot interval. Lines were chained and stations

established at 100 foot interval on all lines. Tie lines were cut and chained along the north and south boundaries. A total of 24.7 miles of lines were cut and 1128 stations established.

A magnetometer survey was carried out over this grid using a Sharpe M.F.I. fluxgate magnetometer with 20 gamma per scale division accuracy. Readings were taken at all stations with additional detailing where indicated. Results were corrected for diurnal variation, plotted and contoured on an accompanying 200 foot to the inch plan.

An electromagnetic survey was carried out over the same line grid, using a Sharpe S.E. 250 vertical coil unit. The parallel line method was used, with 300 foot coil separation and transmitter to the west at all times. In certain cases where considered necessary "square searches" and detailing of certain conductors was done. Results are plotted on an accompanying 200 foot to the inch plan.

MAGNETOMETER SURVEY

The property adjoining to the southeast was also surveyed at the same time. With the larger area, certain trends and features not particularly prominent in the North Frontier claims alone, stand out much more clearly.

The most prominent magnetic feature is an intense linear high crossing the north part of the group in a northwesterly direction. This is considered to represent either a band of iron formation or a basic dike with high magnetite content. To the north of this is a low area thought to represent granite.

Southwest of the iron formation are five irregular magnetic high areas interpreted as representing basic or ultrabasic rocks intrusive into volcanics.

Three east-northeast trending magnetic linears that interrupt the iron formation and mark boundaries of the basic intrusives, are interpreted as faults with right-hand displacement.

A northwest-trending linear, more pronounced on the property to the south, dissecting the largest of the basic intrusive masses, is also interpreted as representing a fault.

The over all magnetic pattern is a remarkably rectilinear one suggesting that the location of the basic intrusives is determined by two pre-existing sets of northwest- and northeast-striking fracture or fault systems.

ELECTROMAGNETIC SURVEY

Five moderately strong zones of conductivity were outlined, plus a great many weaker and less definite features. Of the five stronger anomalies two are located on magnetically interpreted fault zones, and two others are situated at or close to basic intrusive contacts (i.e. both geologically favorable locations); the fifth is situated in an area believed underlain by volcanics.

Less definite indications of conductivity are found along an east-west fault zone, at the contact of the iron formation or dike, and within and at contacts of the various basic intrusive bodies.

CONCLUSIONS AND RECOMMENDATIONS

The magnetometer survey has indicated geological condition similar to those under which base metal deposits are known to occur elsewhere in the vicinity.

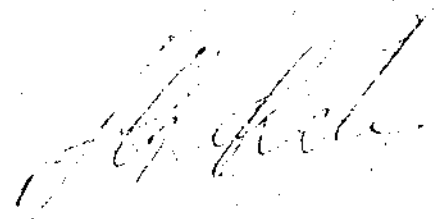
The electromagnetic work has outlined zones of conductivity in geologically favorable locations, which may be caused by sulfide

deposits.

It would be desirable to assess these anomalies more fully, by checking with another geophysical method, and where possible, by more detailed geological information prior to selecting drilling targets.

Geological mapping has been recommended, at an estimated cost of \$2000. Induced polarization checks of the more promising conductors is recommended at an estimated cost of \$2500.

Respectfully submitted,



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Consulting Geologist

Toronto, Ontario
17 May, 1965

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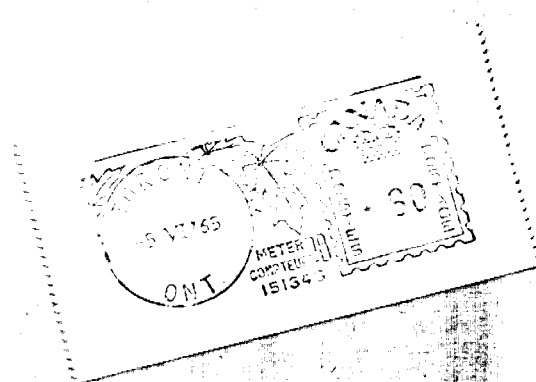
L. O. Phelan

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TORONTO 1, ONTARIO

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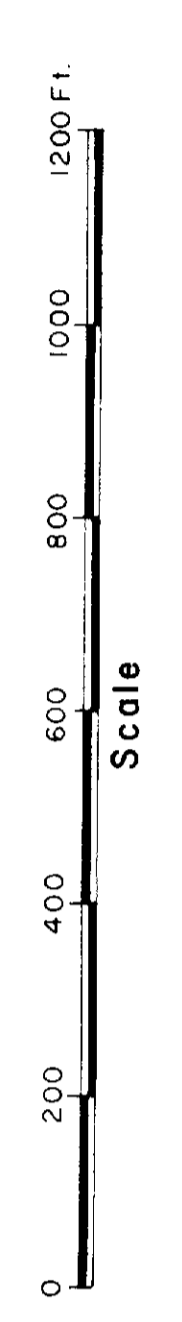


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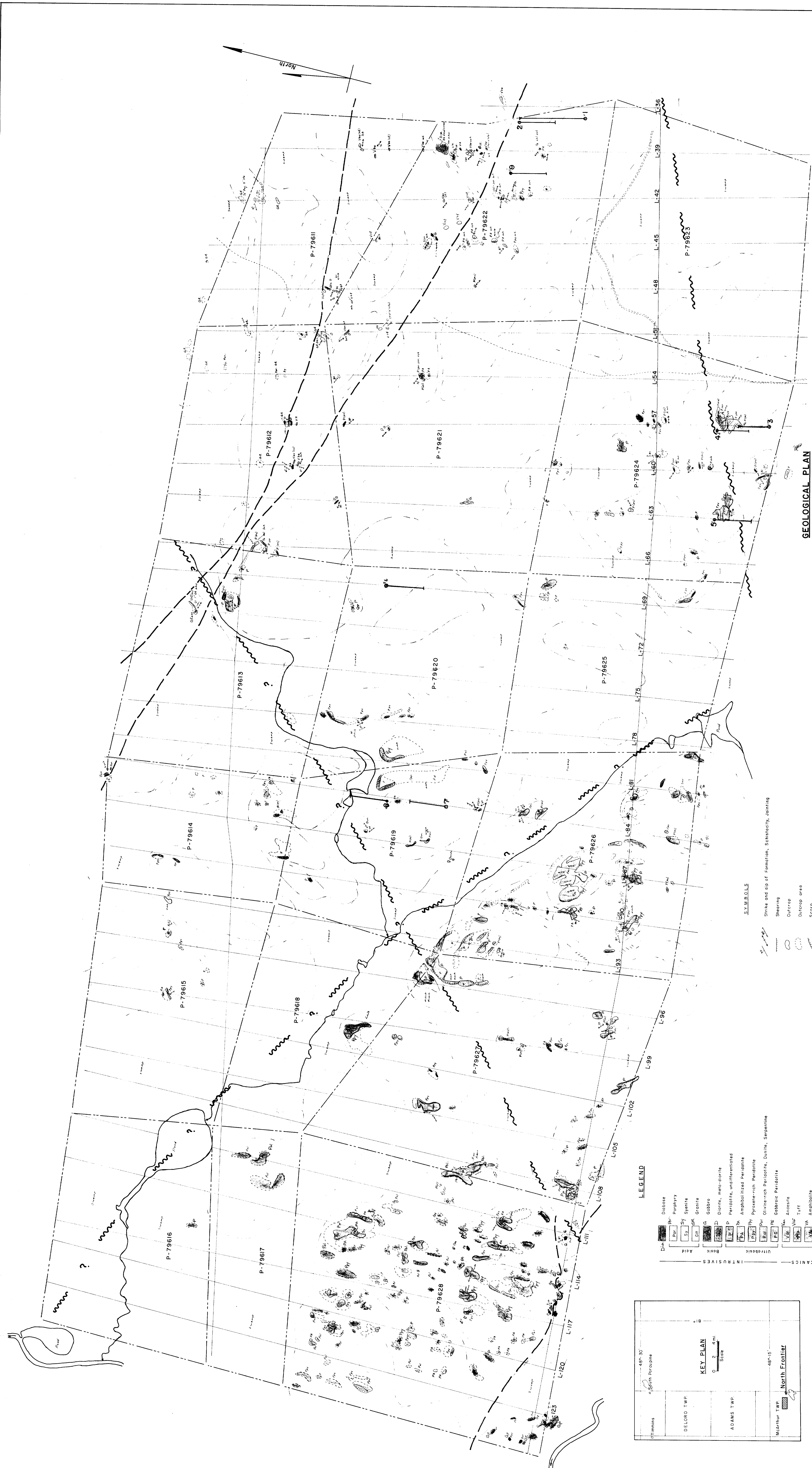


ONTARIO DEPARTMENT OF MINES
PARLIAMENT BUILDINGS
QUEEN'S PARK, TORONTO

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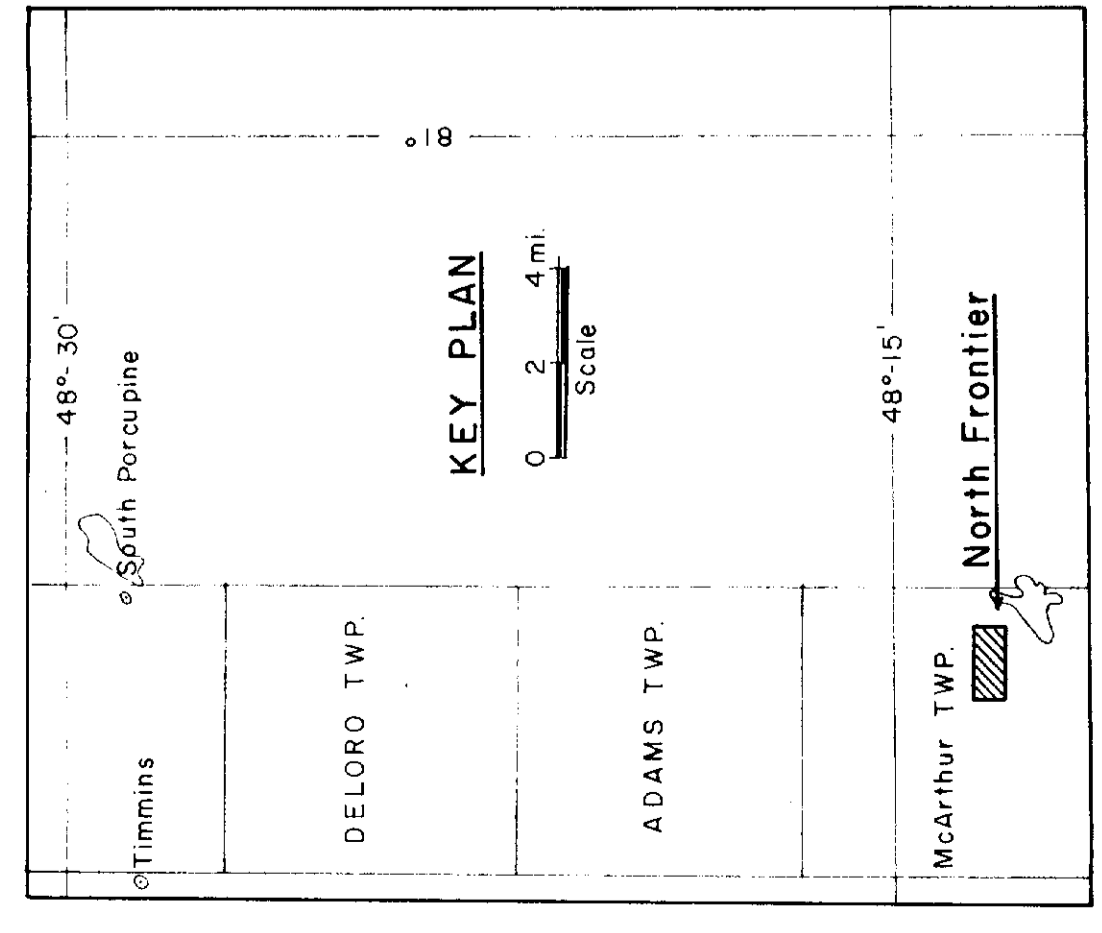


GEOLOGICAL PLAN



LEGEND

	Diabase		S - Sulphides
	Porphyry		Fe - Felspar
	Syenite		Serp - Serpentine
	Gabbro		Qtz - Quartz
	Diabase, meta-schist		Ol - Olivine
	Peridotite, undifferentiated		
	Amphibolite		
	Pyroxene-rich Peridotite		
	Olivine-rich Peridotite, Dunite, Serpentine		
	Gabbro Peridotite		
	Andesite		
	Tuff		
	Amphibolite		
	Dacite		
	Basalt		
	Chlorite		
	Talc		
	Serpentine		
	Quartz		
	Olivine		

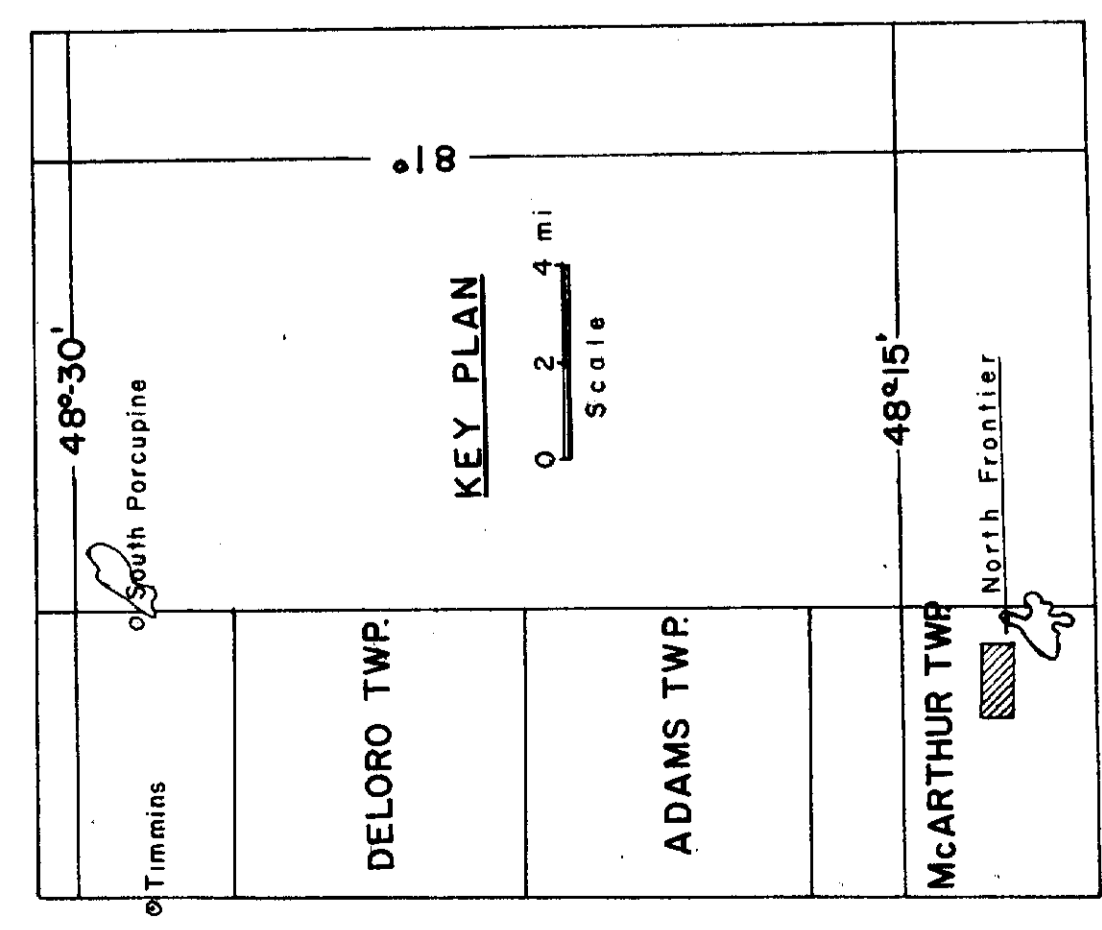
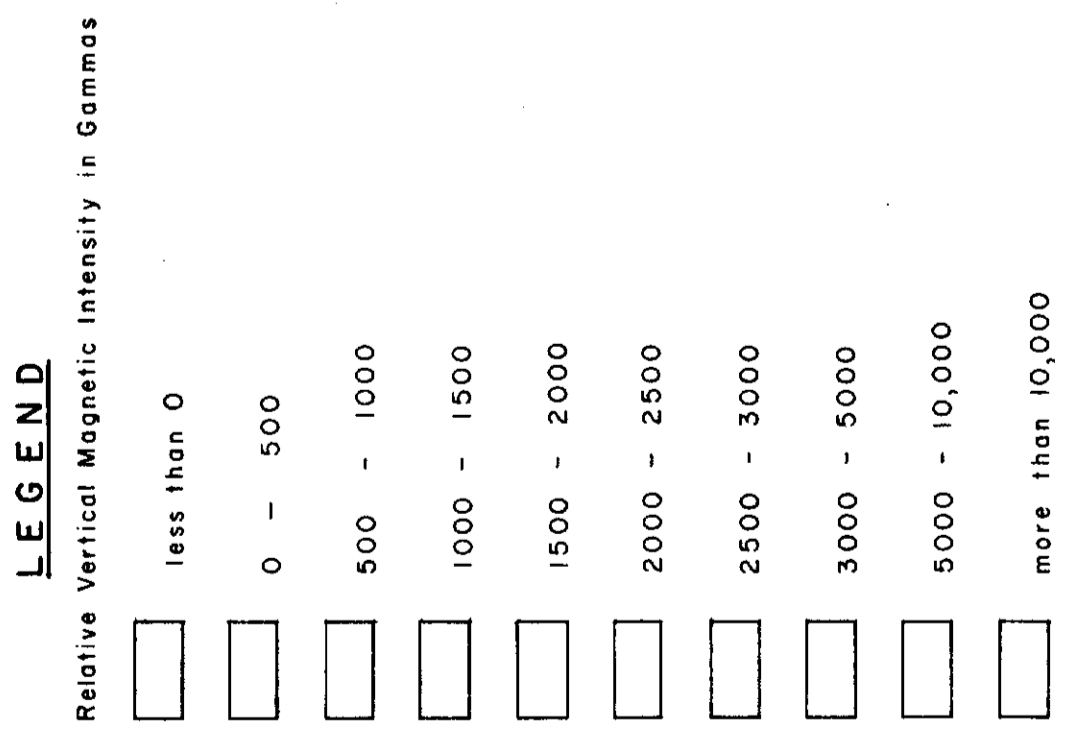
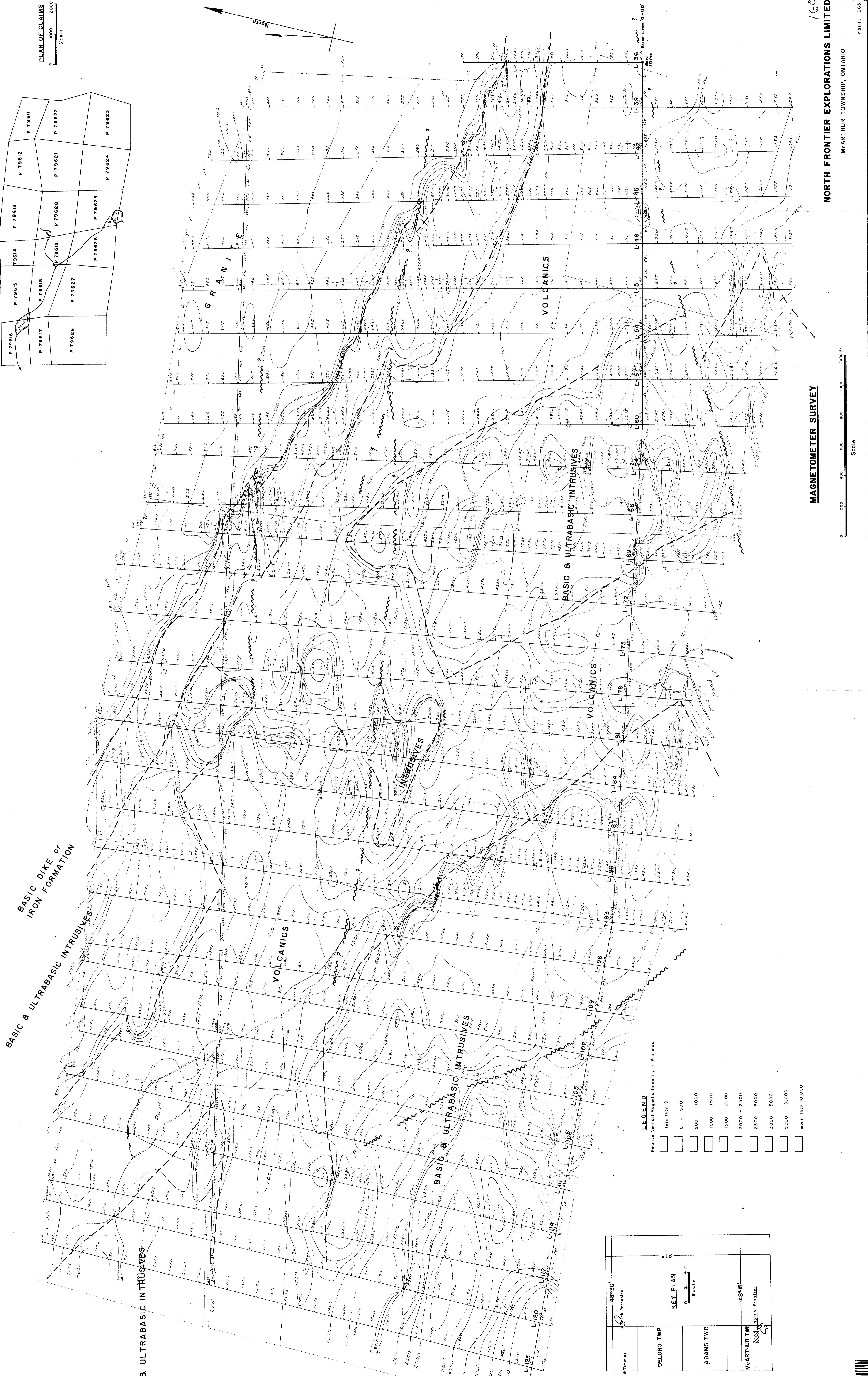
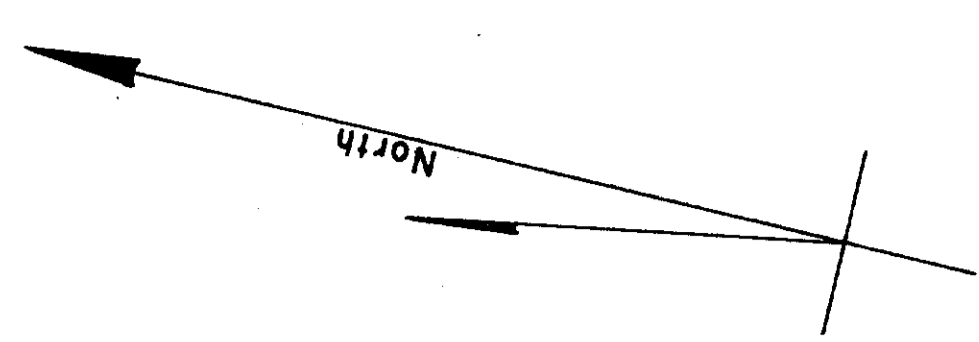


S.Y.M.B.O.L.S

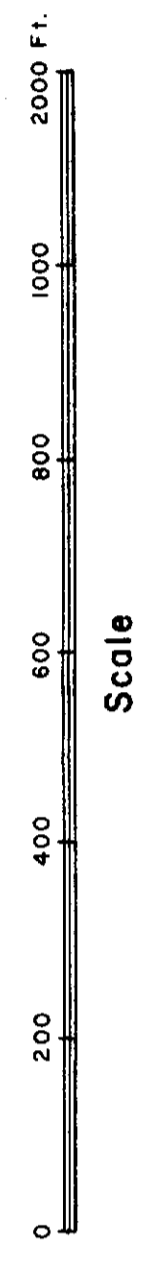
	Strike and slip of Formation, Schistosity, Jointing
	Shearing
	Outcrop
	Outcrop area
	Scarp
	Topographic trend
	Tractor road, trail
	Fault
	Geological boundary
	Diamond drill hole

PLAN OF CLAIMS
 0 1000 2000 FT.
 Scale

P 79616	79614	P 79613	P 79612	P 79611
P 79617	P 79618	P 79619	P 79620	P 79621
P 79622	P 79623	P 79624	P 79625	P 79626



MAGNETOMETER SURVEY

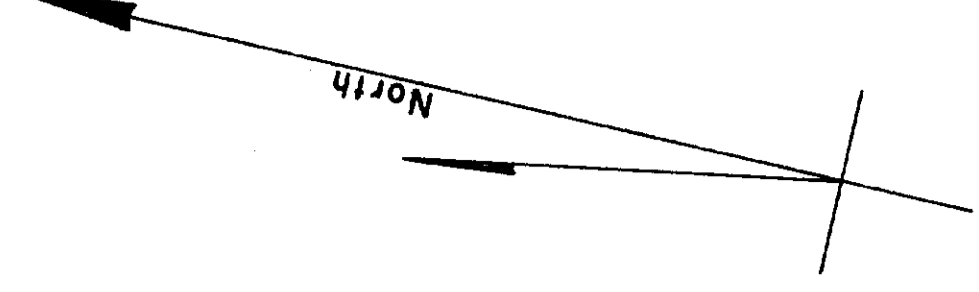


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 NORTH FRONTIER EXPLORATIONS LIMITED
 MCARTHUR TOWNSHIP, ONTARIO

April, 1965

PLAN OF CLAIMS
0 1000 2000 Ft.
Scale

P 79616	P 79615	79614	P 79613	P 79612	P 79611
P 79617	P 79618	P 79619	P 79620	P 79621	P 79622
P 79628	P 79627	P 79626	P 79625	P 79624	P 79623



BASIC DIKE or
IRON FORMATION

BASIC & ULTRABASIC INTRUSIVES

BASIC & ULTRABASIC INTRUSIVES

VOLCANICS

BASIC & ULTRABASIC INTRUSIVES

BASIC & ULTRABASIC INTRUSIVES

VOLCANICS

VOLCANICS

LEGEND
Relative Vertical Magnetic Intensity in Gamma

- less than 0
- 0 - 500
- 500 - 1000
- 1000 - 1500
- 1500 - 2000
- 2000 - 2500
- 2500 - 3000
- 3000 - 5000
- 5000 - 10,000
- more than 10,000

48°30'	48°15'
DELORO TWP.	ADAMS TWP.
McARTHUR TWP.	McARTHUR TWP.

EM LEGEND
South Tilt
Scale: 1/10 in. = 10' III
CONDUCTORS
North Tilt
Scale: 1/10 in. = 10' III
Details
Insulate
Possible
Vertical Loop - Parallel Line Method with Transmitter to West.

ELECTROMAGNETIC SURVEY
and
MAGNETOMETER SURVEY

0 200 400 600 800 1000 2000 Ft.
Scale

1609

NORTH FRONTIER EXPLORATIONS LIMITED
McARTHUR TOWNSHIP, ONTARIO

April, 1965