GM 43734

GEOLOGICAL MAPPING & SAMPLING REPORT, ALLARD LAKE CLAIM GROUPS

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Énergie et Ressources naturelles
Québec

GEOLOGICAL MAPPING & SAMPLING REPORT

O N

T.I. RESOURCES LIMITED'S

ALLARD LAKE CLAIM GROUPS

Ministère de l'Énergie et des Ressources
Service de la Géoinformation
Date: 25 FEV 1987
No G.M.: 43734

ÉNERGIE ET RESSOURCES - SECTEUR MINES
REÇU
29 AOUT 1986
BUREAU RÉGIONAL
ROUYN-NORANDA

July 21, 1986

H.P. Hutteri, H.B.Sc.

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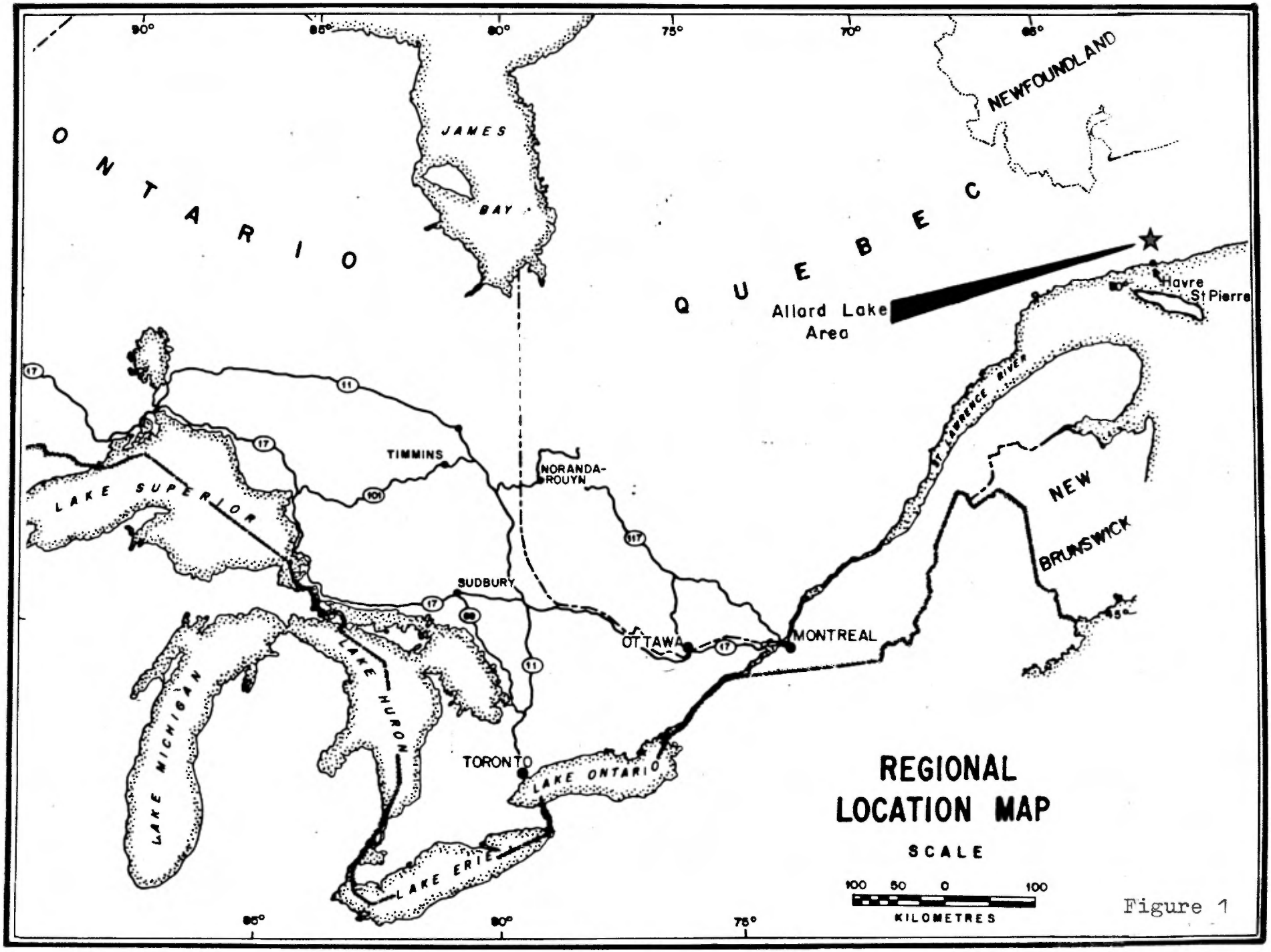
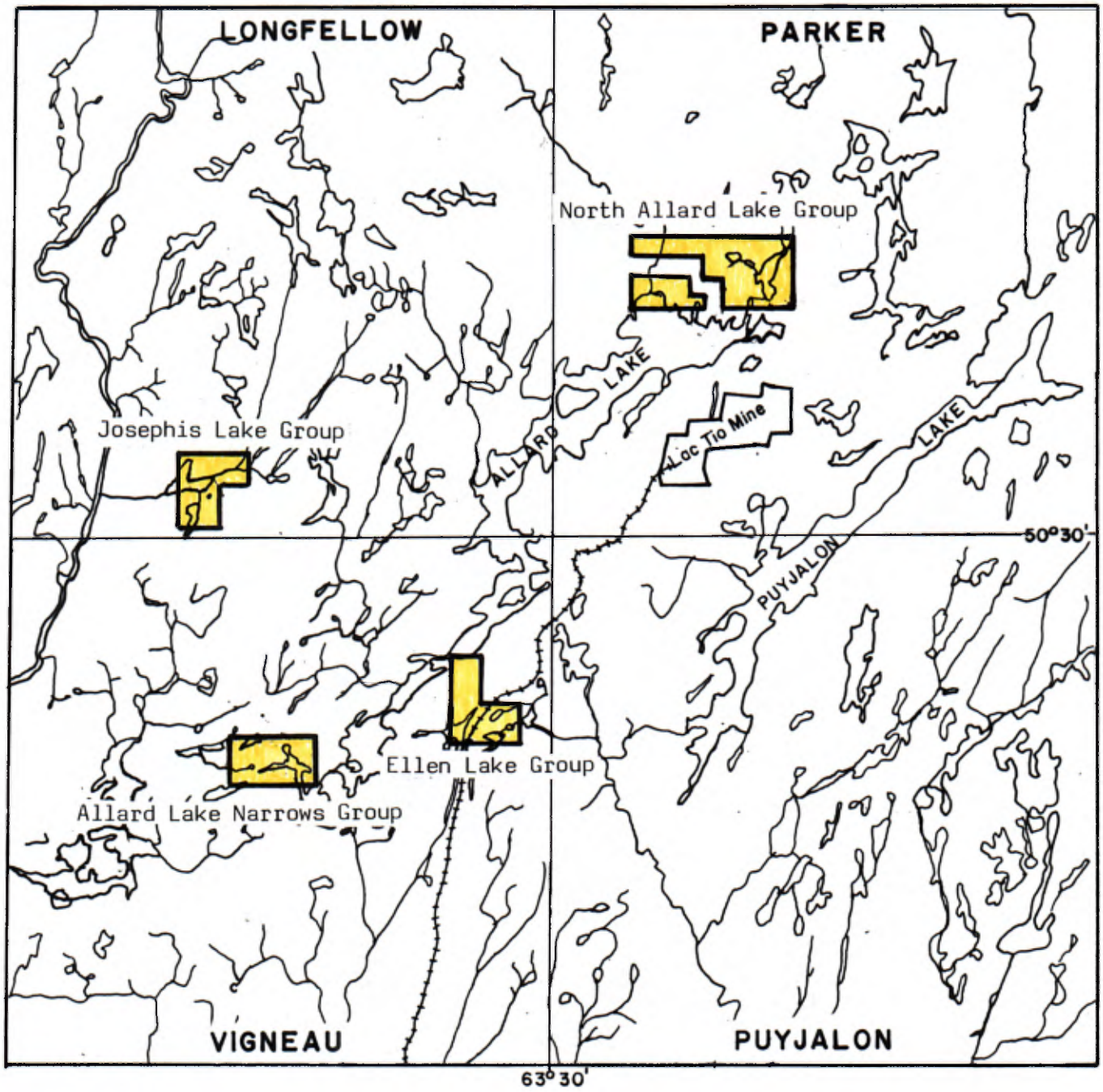

90°
85°
80°
75°
70°
65°
ONTARIO
JAMES
BAY
NEWFOUNDLAND
QUEBEC
Allard Lake
Area
Havre
St Pierre
ST LAWRENCE RIVER
NEW
BRUNSWICK
TIMMINS
NORANDA-
ROUYN
LAKE SUPERIOR
SUDBURY
OTTAWA
MONTREAL
LAKE MICHIGAN
LAKE HURON
TORONTO
LAKE ONTARIO
LAKE ERIE
REGIONAL
LOCATION MAP
SCALE
100 50 0 100
KILOMETRES

Figure 1



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CLAIM LOCATION MAP

ALLARD LAKE AREA

SCALE

0 2 4 6

MILES

Figure 2

INTRODUCTION

T.I. Resources Limited holds 102 claims in four claim groups within the Allard Lake area of Saguenay County, Eastern Quebec (figure 1 & 2). All of the claim groups were visited in June, 1986 and samples of massive ilmenite were collected from each of the occurrences. Disseminated ilmenite in anorthosite was also sampled for platinum content. No grid systems were established for detailed mapping of the showings, however, geological sketch maps of each occurrence showing sample sites are provided along with brief descriptions in this report.

LOCATION AND ACCESS

The four claim groups held by T.I. Resources Limited lie within the Allard Lake area, approximately 25 miles north of Havre St. Pierre, Quebec. This small fishing village lies on the north shore of the Gulf of St. Lawrence and can be reached by travelling Highway 138 for approximately 400 miles northeast from Quebec City. From Havre St. Pierre, a float equipped aircraft is needed to gain access to the Allard Lake area. All claim groups lie within six miles of the Quebec Iron and Titanium Corporation's Railroad which is used to transport ore from the nearby Lac Tio Mine to the loading docks in Havre St. Pierre.

GEOLOGY

The Allard Lake ilmenite deposits occur within a large oval shaped anorthosite intrusion, 2 to 15 miles from its eastern border within the Grenville structural province.

The anorthosite varies from an almost pure

GEOLOGY cont'd

plagioclase anorthosite to gabbroic anorthosite, norite, ilmenite rich anorthosite and gabbro. The most abundant anorthosite is medium to coarse grained, contains less than five percent mafic minerals and varies from light to dark grey, pinkish to brown or greenish brown. Mafic minerals consist mainly of hypersthene with minor augite, ilmenite, amphibole and bitote. The anorthosite is generally massive but banding or foliation occurs in places. Numerous north to northeast striking steeply dipping faults occur throughout the region as well.

The numerous ilmenite deposits which occur mainly in the eastern part of the anorthosite complex occur as massive, medium to coarse grained dikes, sills, lenses or irregular bodies. The largest of these deposits is the Lac Tio deposit. It consists of an irregular mass 3600 feet long, 3400 feet wide and up to 300 feet thick and is located on a major fault zone striking north with a steep dip. Ore reserves were estimated to be approximately 125 million tons of ore, averaging 32% TiO_2 and 36% Fe. The oxide mineralization within the Allard Lake area consists of a medium to coarse grained aggregate of ilmenite containing gangue minerals such as feldspar, pyroxene, biotite, pyrrhotite and chalcopyrite.

PREVIOUS EXPLORATION

1895 - Ilmenite within anorthosite was first noted by A.P. Low in the Romaine River area.

1941 - Dr. J.S. Retty, working for the Quebec Department of Mines, located several outcrops of ilmenite within the Allard Lake area. Results of his field work were published later in 1942 and 1944.

PREVIOUS EXPLORATION cont'd

1944 - 1946: Geologists working for Kennco Explorations Limited located several ilmenite deposits one of which was the main Lac Tio deposit, located south of Lac Petit Pas using geological mapping, prospecting and dip needle surveys. The Quebec Iron and Titanium Corporation (Q.I.T.) was subsequently formed to develop the Lac Tio deposit by Kennecott Copper Corporation and the New Jersey Zinc Company.

1947: Aeromagnetic surveys were conducted over the Allard Lake area.

1960 - 1961: E.O. Dearden working for Kennco Explorations Limited re-evaluated several properties in the area belonging to the Quebec Iron and Titanium Corporation which had not been brought to lease. A program consisting of ground magnetometer and gravity surveys, geological mapping and prospecting was carried out. Several claim groups containing ilmenite occurrences were eventually dropped.

T.I. Resources Limited later acquired several of the ilmenite occurrences and is at present re-evaluating them in light of increasing demands for titanuim.

CLAIM GROUPS

One hundred and two claims are presently held by T.I. Resources Limited. These claims are in four separate claim groups, which lie within the Allard Lake area of Eastern Quebec (figure 2). The claim groups are

CLAIM GROUPS cont'd
discussed below.

Ellen Lake Group

The Ellen Lake Group is located approximately five miles southwest of the Lac Tio Mine, and southeast of Allard Lake. The Q.I.T. railway tracks cross the lower portion of the claim group less than one mile northwest of Ellen Lake. The property consists of 23 claims which cover Ellen Lake in the northeast corner of Vigneau Township and are listed as follows:

416069 1 - 5
416068 1 - 5
419044 1 - 4
416076 1 - 5
419024 1 - 4

There are four massive ilmenite occurrences within this claim group and they are situated as shown on figure 3.

Showing #1 can be described as a large funnel shaped body of coarse grained massive ilmenite located on the face of a northeast striking ridge located immediately northeast of Ellen Lake (figure 4). Massive ilmenite is well exposed on the cliff face and on top although there is little rock outcrop in the northwestern section. The massive ilmenite body has a width of approximately 180 feet at the top of the cliff and decreases to 125 feet at the base where the ilmenite disappears below rubble. The strike of the ilmenite mass appears to be N35^{o}W with contacts dipping steeply inward. A large inclusion of anorthosite was also noted to lie within the body of ilmenite along with other smaller ones. Five samples were taken; samples EL86-2

Ellen Lake Group cont'd

to EL86-5 were of massive ilmenite and sample EL86-6 was of disseminated ilmenite within anorthosite (figure 4).

Massive ilmenite also occurs as a small lens located approximately 250 feet south of the aforementioned showing. There are three exposures of massive ilmenite over 125 feet. The lens strikes N20°E and dips 65° southeast. It varies in width from 25 feet to 7 feet from south to north. Sample EL86-1 consisted of massive ilmenite from this occurrence.

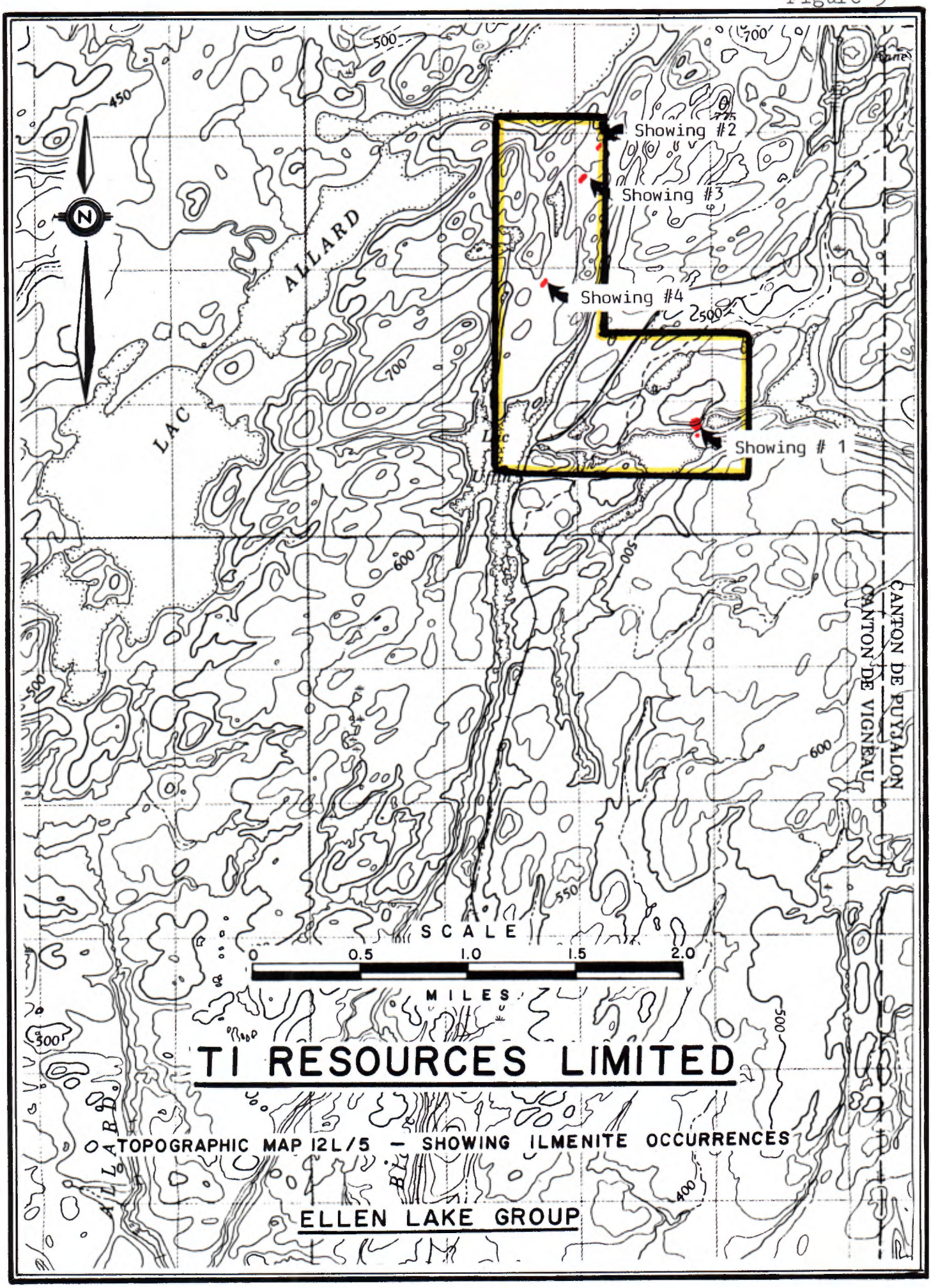
Showing #2 can be described as a poorly exposed zone of ilmenite rich anorthosite which strikes northeast (figures 3 & 5). This zone extends for at least 150 feet and consists of disseminated ilmenite. No massive ilmenite was seen, however, there were only a few rock exposures. Samples EL86-7 and EL86-8 consist of strongly disseminated ilmenite in anorthosite from the showing.

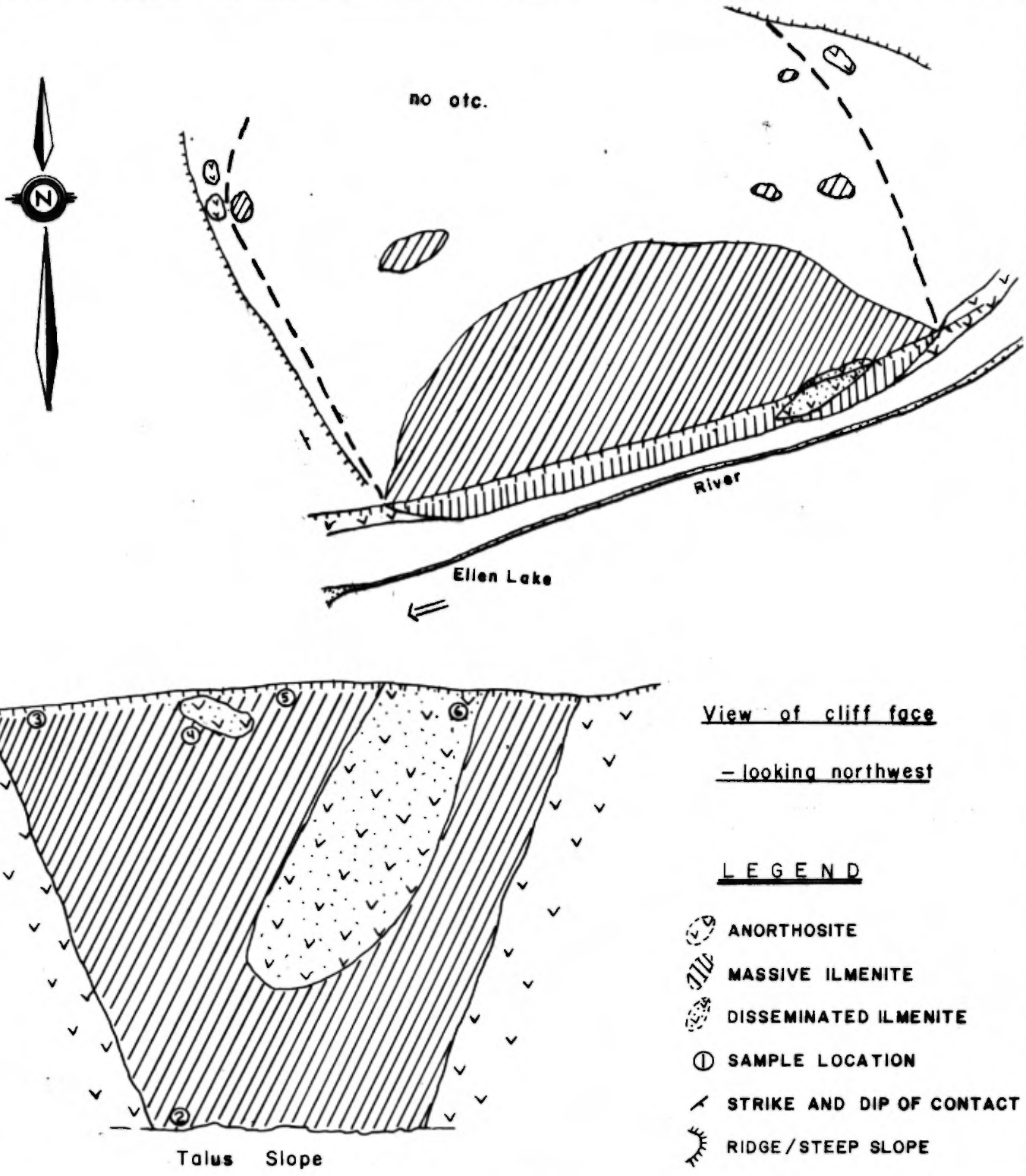
Showing #3 is similar to showing #2 in that it consists of a zone of mainly disseminated ilmenite which strikes N60°E for at least 125 feet (figure 3 & 6). Bedrock exposure is poor, however one small outcrop in the northeast part of the zone exposed massive ilmenite bordering disseminated material. This massive lens is considered to be small in size. This ilmenite rich zone appears to end fairly abruptly in the southwest, however its northeast end remains open due to limited bedrock exposure; sample EL86-9 consists of massive ilmenite and samples EL86-10 and EL86-11 consist of disseminated ilmenite in anorthosite.

ELLEN LAKE GROUP cont'd

Showing #4 consists of a small lens of ilmenite rich material which was located using geophysics by Kennco Explorations Canada Limited (figure 3). There are no surface exposures of this zone, therefore no samples were taken.

Figure 3


Showing #2
Showing #3
Showing #4
Showing # 1
ALLARD
LAC
CANTON DE PUYJALON
CANTON DE VIGNEAU
SCALE
0 0.5 1.0 1.5 2.0
MILES
TI RESOURCES LIMITED
TOPOGRAPHIC MAP 12L/5 — SHOWING ILMENITE OCCURRENCES
ELLEN LAKE GROUP



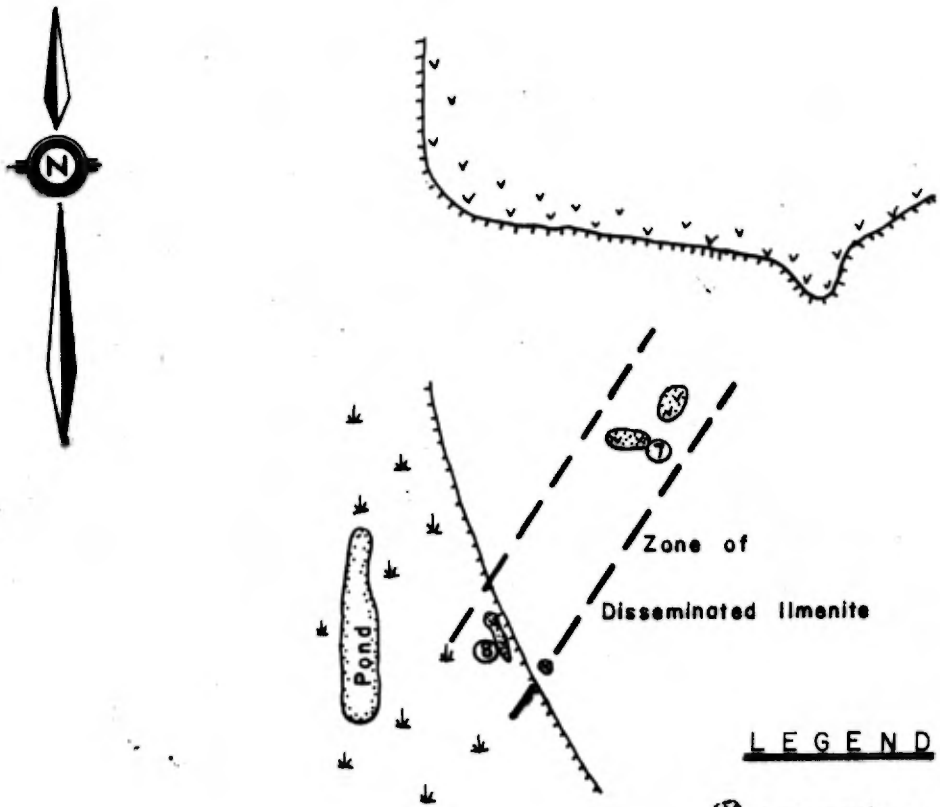
TI RESOURCES LIMITED

GEOLOGICAL SKETCH MAP - SHOWING NO. 1

SCALE
0 25 50 75 100
FEET

ELLEN LAKE GROUP

H.P. HUTTERI



LEGEND

- ANORTHOSITE
- MASSIVE ILMENITE
- DISSEMINATED ILMENITE
- SAMPLE LOCATION
- STRIKE AND DIP OF CONTACT
- RIDGE/STEEP SLOPE

SCALE

0 50 100 150 200

FEET

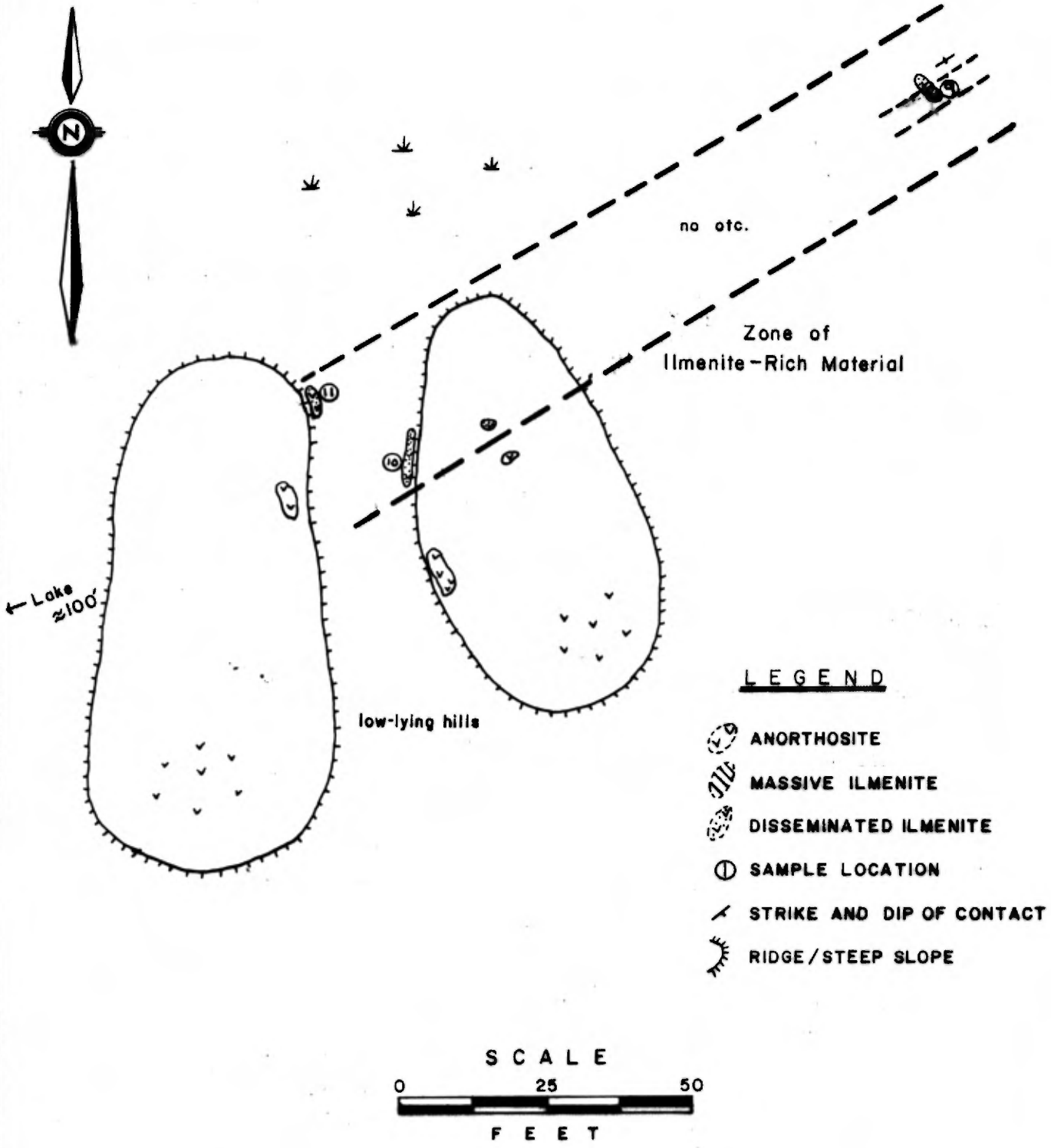
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GEOLOGICAL SKETCH MAP – SHOWING NO.2

ELLEN LAKE GROUP

H.P.HUTTERI

Figure 6



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GEOLOGICAL SKETCH MAP – SHOWING NO.3

ELLEN LAKE GROUP

H.P.HUTTERI

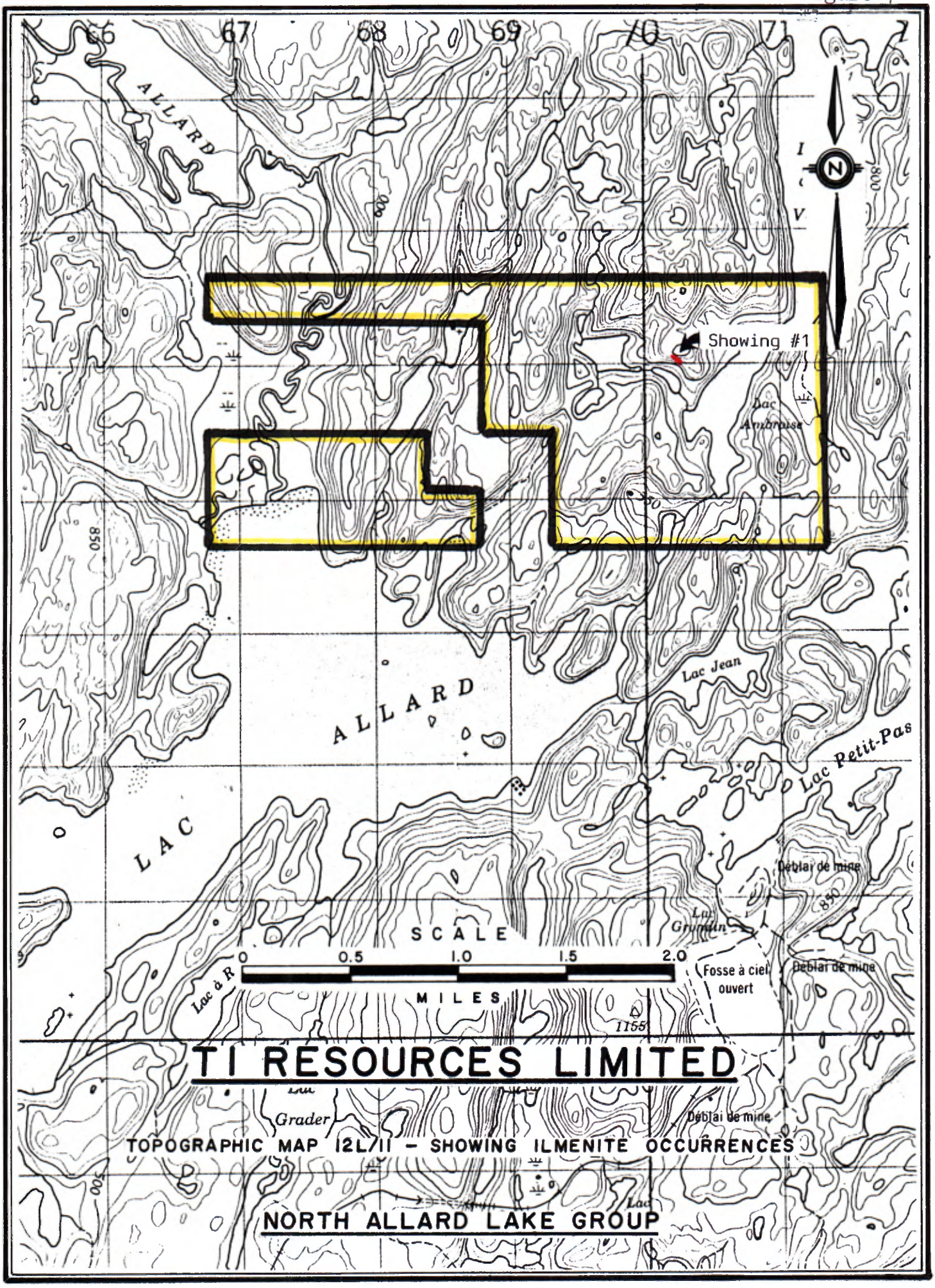
NORTH ALLARD LAKE GROUP

The North Allard Lake Group is located approximately two miles north of the Lac Tio Mine site, on the north shore of Allard Lake, within Parker Township (figure 2 & 3). The property consists of 42 claims which surround in part the Springer Lake Group, formerly held by the Quebec Iron and Titanium Corporation. The claim numbers are listed as follows:

433422 1 - 5
433421 1 - 5
433420 1 - 4
433419 1 - 5
433418 1 - 4
433417 2 - 5
433416 1 - 5
433415 1 - 5
433414 1 - 5

This is one known massive ilmenite occurrence within the claim group as shown in figure 7. The showing consists of an irregularly shaped lens of massive ilmenite exposed for approximately 100 feet on an east trending cliff face (figure 8). The lens seemed to have an apparent thickness to 30 to 40 feet in the eastern end and appeared to decrease in size westward along the face of the cliff. An accurate measurement of its dimensions and attitude was not possible at the time due to the steepness of the cliff face. Sampling was restricted to the lower portion of the cliff where access was possible. Previous workers who conducted detailed mapping and geophysical surveys over this showing reported that the massive ilmenite lens had a northwest strike and southwest dip. These surveys also concluded that the exposed ilmenite had little strike extension. Samples NAL86-1 to NAL86-3 consisted of massive ilmenite.

Figure 7



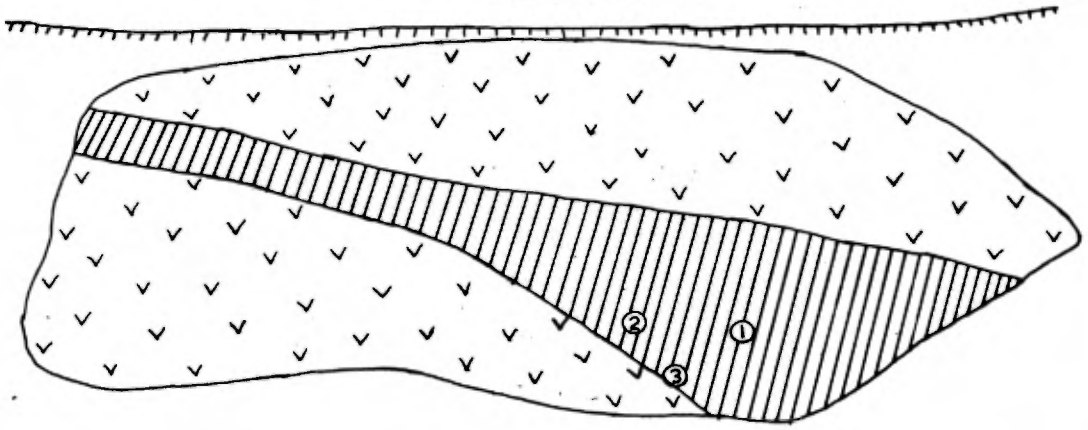
TI RESOURCES LIMITED

TOPOGRAPHIC MAP 12L/11 - SHOWING ILMENITE OCCURRENCES

NORTH ALLARD LAKE GROUP

View of Cliff Face

- Looking North



LEGEND

Overgrown Talus

Slope

ANORTHOSITE

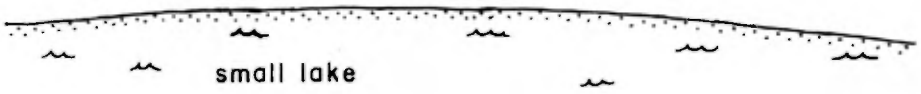
MASSIVE ILMENITE

DISSEMINATED ILMENITE

① SAMPLE LOCATION

STRIKE AND DIP OF CONTACT

RIDGE/STEEP SLOPE



SCALE

0 25 50

FEET

TI RESOURCES LIMITED

GEOLOGICAL SKETCH MAP - SHOWING NO. 1

NORTH ALLARD LAKE GROUP

H.P. HUTTERI

JOSEPHIS LAKE GROUP

The Josephis Lake Group is located approximately six miles northwest of the Q.I.T. railroad west of Allard Lake within Longfellow Township (figure 2). The property covers the east half of Josephis Lake and consists of 19 claims, listed as follows:

416065 1 - 5
416064 1 -3
416063 1,4,5
416062 2 - 5
416070 2,3
416072 2,3

Four ilmenite showings were mapped and sampled within the claim group and these are located as indicated on figure 9.

Showing #1 can be described as two closely spaced lenses of massive ilmenite lying southeast of Joephis Lake (figure 10). The lenses strike N80^{o}W, dip 75^{o} to the south, and exceed 150 feet in length. The more northerly lens varies from 50 feet in the west to 20 feet in the east. The more southerly lens varies from 55 feet in the west end to 65 feet in the east end. A narrow unit of anorthorite, bearing dissiminated ilmenite lies between the two massive ilmenite lenses. The ilmenite is well exposed along two small northeast trending ridges on the side of a large hill, however strike length determination was impossible due to a lack of rock exposure to the east and west of these ridges. Sample JL86-10 consisted of disseminated ilmenite in anorthosite, while samples JL86-11 to JL86-14 were of massive ilmenite (figure 10).

JOSEPHIS LAKE GROUP cont'd

Showing #2 consists of a poorly exposed and relatively narrow massive ilmenite lens located on the side of a steep and overgrown north striking hillside (figure 11). The lens is relatively narrow, probably not exceeding 25 feet in thickness and has a dip of 45° south. Although no outcrop was located on the top of the hill, the massive ilmenite lens is known to have an easterly strike from previous geophysical surveys. A second flat lying massive ilmenite dyke was also seen in the vicinity. Sample JL86-9 was taken of disseminated ilmenite in anorthosite while samples JL86-6 to JL86-7 were taken of the massive ilmenite.

Showing #3 consists of a large zone of disseminated ilmenite which outcrops along a northeast trending ridge on the northeast side of Josephis Lake (figure 9 & 12). The zone extends over a length of 500 feet, a width of 100 feet, has a northeast strike and a shallow dip of approximately 30° south. No massive ilmenite was observed, however, the upper portion of the cliff face was not accessible for the most part and some massive ilmenite may have escaped detection. Samples JL86-1 to JL86-5 of disseminated ilmenite in anorthosite were taken from the showing.

Showing #4 consists of two lenses of massive ilmenite which were detected under overburden by Kennco Explorations Limited for Q.I.T. in the 1960's (figure 9). One lens was interpreted to be about 100 feet long while the other about 300 feet long. One poor rock exposure containing some massive ilmenite in the area, which lies between showing #1 and the eastern end of Josephis Lake. Sample JL86-15 consists of massive ilmenite from this small rock exposure.

Figure 9

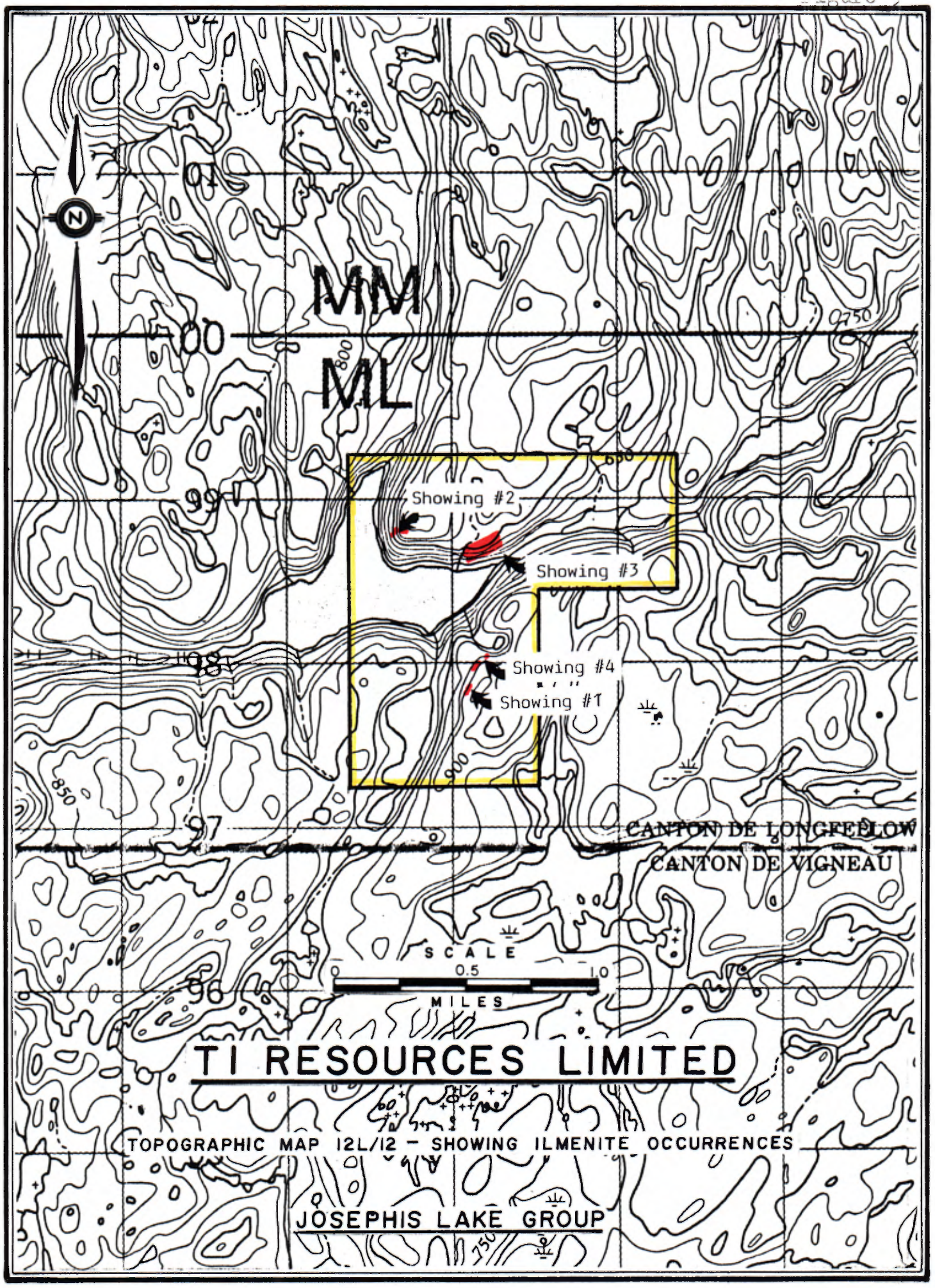
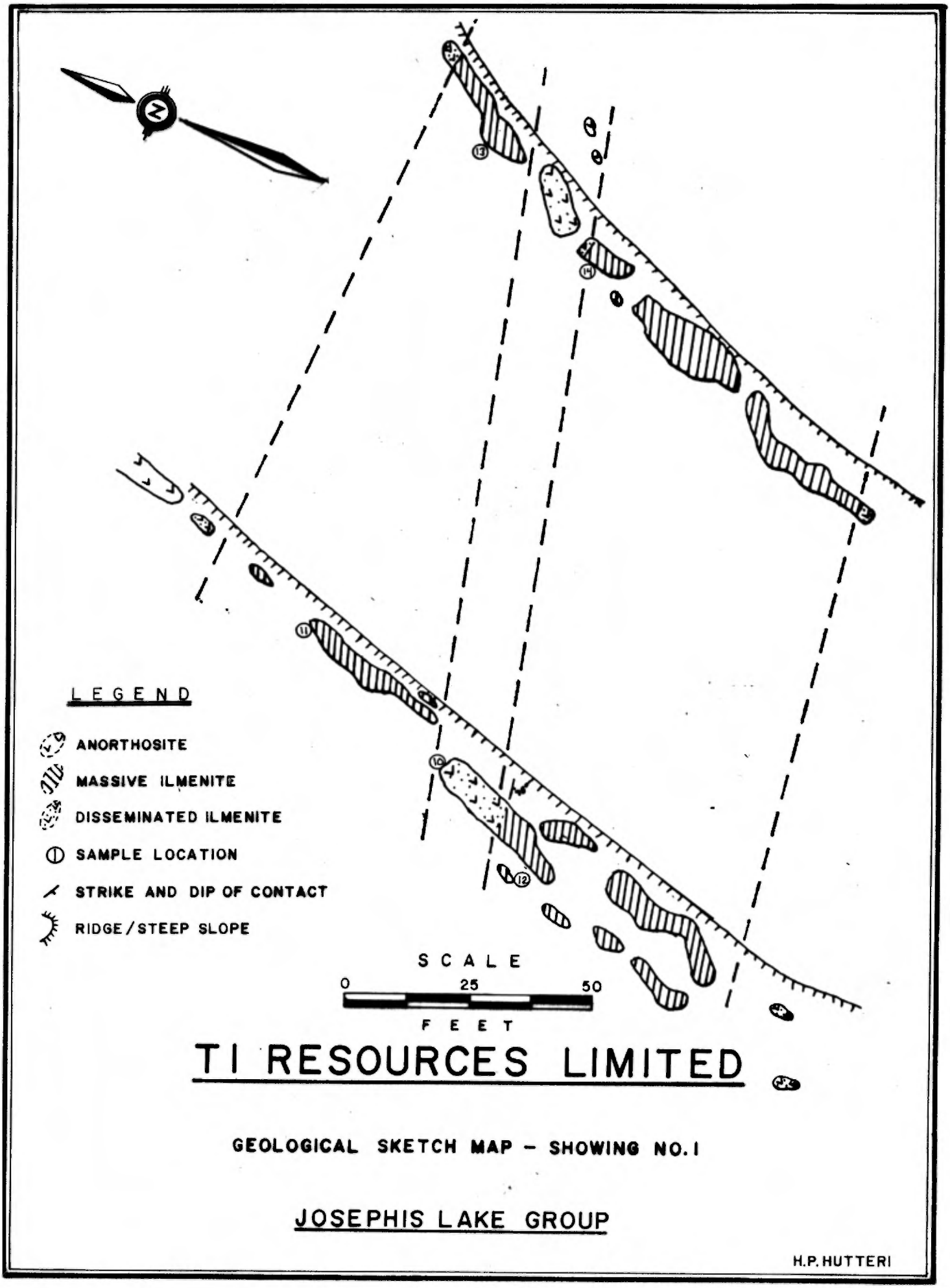
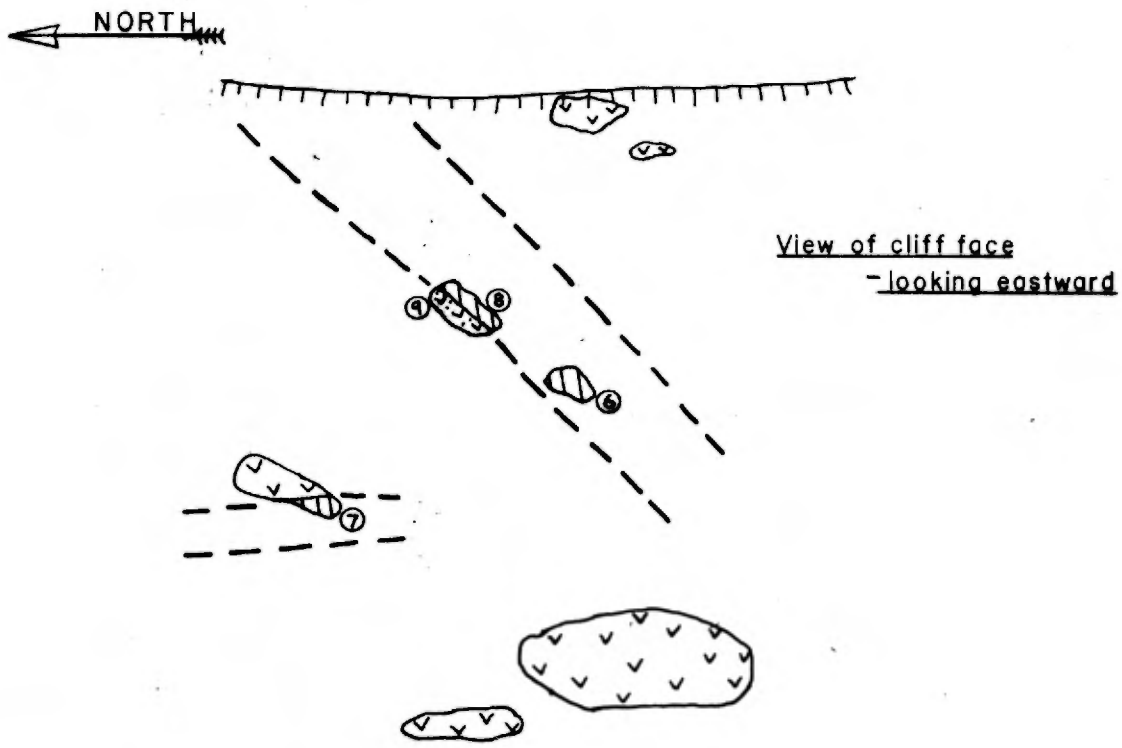

N
MM
00
ML
99
98
97
96
Showing #2
Showing #3
Showing #4
Showing #1
CANTON DE LONGFELLOW
CANTON DE VIGNEAU
SCALE
0.5
1.0
MILES
TI RESOURCES LIMITED
TOPOGRAPHIC MAP 12L/12 - SHOWING ILMENITE OCCURRENCES
JOSEPHIS LAKE GROUP

Figure 10


N
LEGEND
ANORTHOSITE
MASSIVE ILMENITE
DISSEMINATED ILMENITE
SAMPLE LOCATION
STRIKE AND DIP OF CONTACT
RIDGE/STEEP SLOPE
SCALE
0
25
50
FEET
TI RESOURCES LIMITED
GEOLOGICAL SKETCH MAP - SHOWING NO.1
JOSEPHIS LAKE GROUP
H.P. HUTTERI



LEGEND

- ANORTHOSITE
- MASSIVE ILMENITE
- DISSEMINATED ILMENITE
- ① SAMPLE LOCATION
- STRIKE AND DIP OF CONTACT
- RIDGE/STEEP SLOPE

SCALE

0 25 50

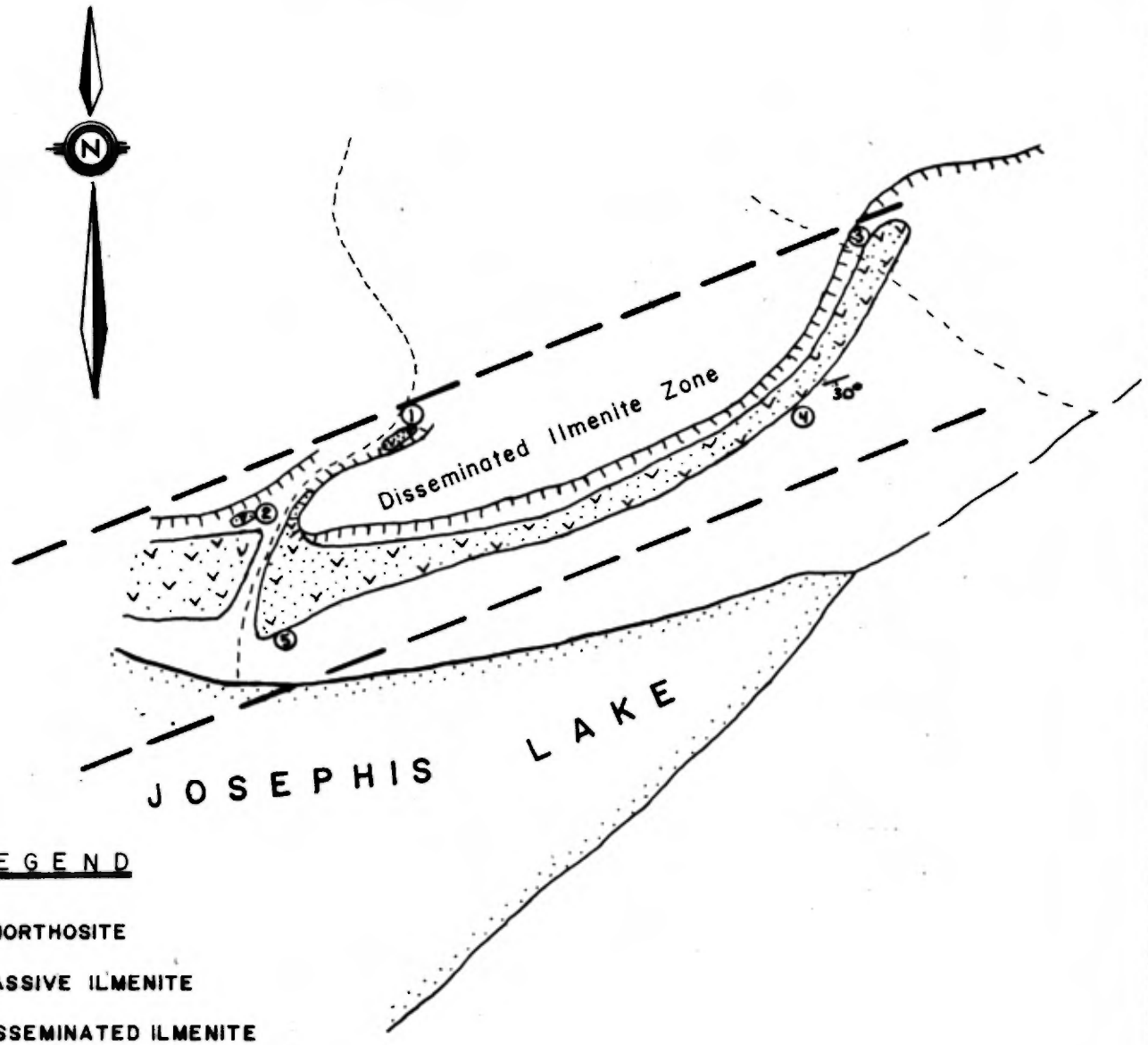
FEET

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GEOLOGICAL SKETCH MAP – SHOWING NO. 2

JOSEPHIS LAKE GROUP

H.P.HUTTERI



LEGEND

- ANORTHOSITE
- MASSIVE ILMENITE
- DISSEMINATED ILMENITE
- SAMPLE LOCATION
- STRIKE AND DIP OF CONTACT
- RIDGE/STEEP SLOPE

SCALE

0 50 100 150 200

FEET

TI RESOURCES LIMITED

GEOLOGICAL SKETCH MAP - SHOWING NO.3

JOSEPHIS LAKE GROUP

H.P.HUTTERI

ALLARD LAKE NARROWS GROUP

The Allard Lake Narrows Group is located approximately 2.5 miles west of the Q.I.T. railroad in the southern extremity of Allard Lake (figure 2). The property consists of 18 claims in the centre of Vigneau Township which are described as follows:

419046 1 - 4
419045 1 - 5
419026 1 - 4
419025 1 - 5

There are four ilmenite occurrences within the property and they are situated as shown on figure 13.

Showing #1 consists of an easterly striking lens of massive ilmenite exposed along the sides of a hill (figure 13 & 14). The lens appears to be at least 20 feet thick and has a mininum strike length of 200 feet. It appears to vary in strike direction since the general pattern of exposed ilmenite doesn't quite match the one observed strike of the contact in the eastern end. The dip of the lens is also quite variable. In the eastern end of the lens the massive ilmenite near the top of the exposed rock dips approximately 70^{o} to the south, however, further down the dip changes to approximately 30^{o} south. Numerous large inclusions of anorthosite were also noted in the upper portion of the lens in the eastern end.

Two small irregularly shaped lenses of massive ilmenite were also exposed immediately north of the main lens. One exposed contact gave a strike direction of $N70^{o}E$ and a dip of 30^{o} south.

ALLARD LAKE NARROWS GROUP cont'd

Samples ALN86-1 to ALN86-4 were of massive ilmenite from the main lens and sample ALN86-5 was of massive ilmenite from one of the smaller lenses to the north.

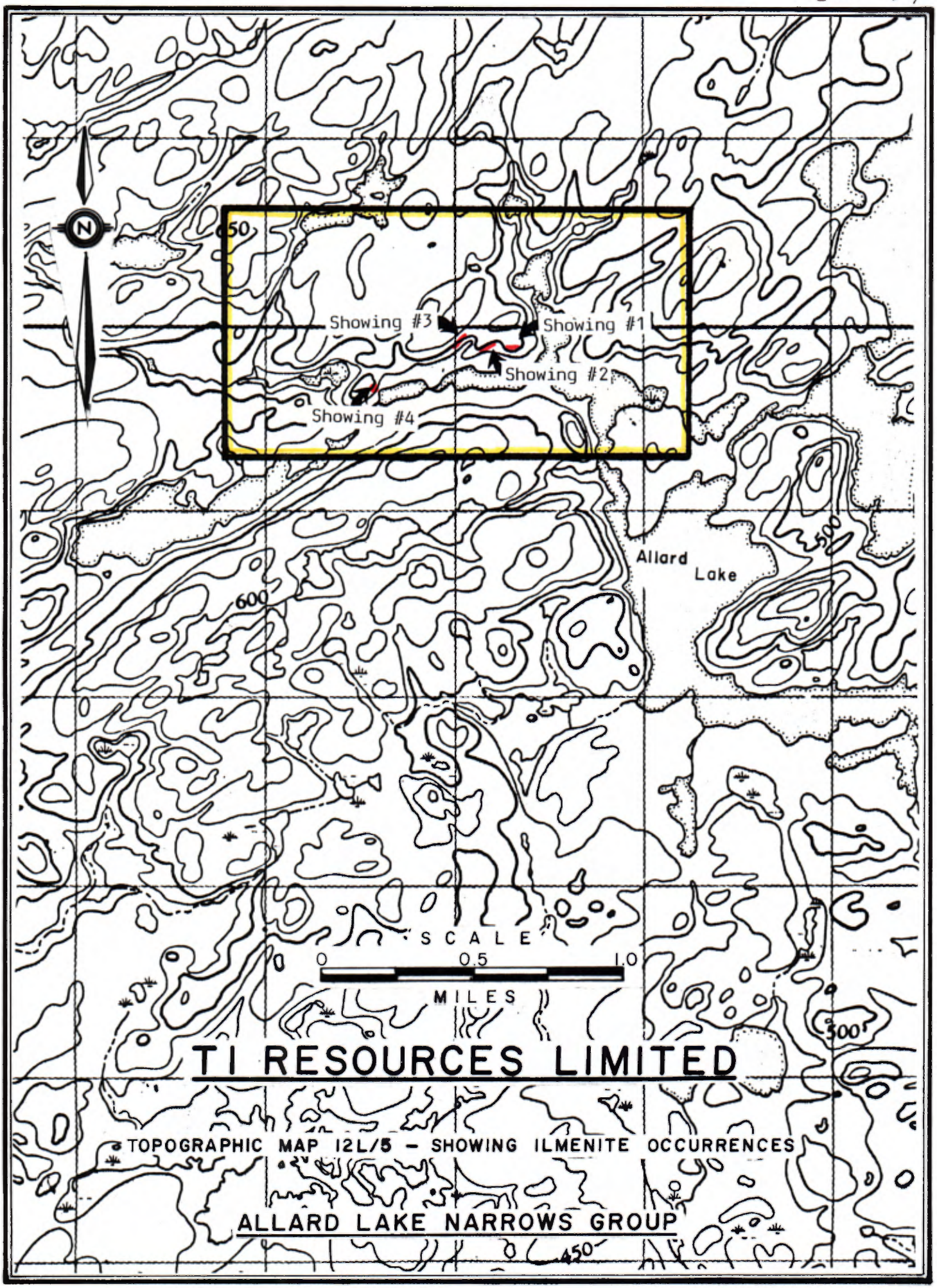
Showing #2 consists of a long narrow dyke-like body of massive ilmenite located along a northeast trending ridge approximately 400 feet west of showing #1 (figure 13 & 15). It was exposed over a strike length of 300 feet, and a width of at least 30 feet. An accurate estimation of the width was impossible due to very few anorthosite contacts being exposed. The strike of this unit was N40^{o}E and the dip, although slightly variable, averaged 43^{o} northwest. The west end of the showing disappeared under overburden at the base of the slope while the eastern end did so at the top of the slope. The eastern one-third of the massive ilmenite dyke also contained numerous large flat-lying inclusions of anorthosite near the base of the exposed ilmenite. Samples ALN86-6 to ALN86-10 were taken of the massive anorthosite from the showing.

Showing #3 consisted of a small zone exposed for 100 feet, containing narrow lenses of massive ilmenite. The zone is located as indicated in figure 13, and has a northeast strike and appears to have a shallow dip northwest. Samples ALN86-11 to ALN86-13 consisted of massive ilmenite from along this zone.

Showing #4 consists of an occurrence of disseminated ilmenite in anorthosite located while prospecting around a magnetic low detected by an airborne survey. Its location is indicated in Figure 13.

ALLARD LAKE NARROWS GROUP cont'd

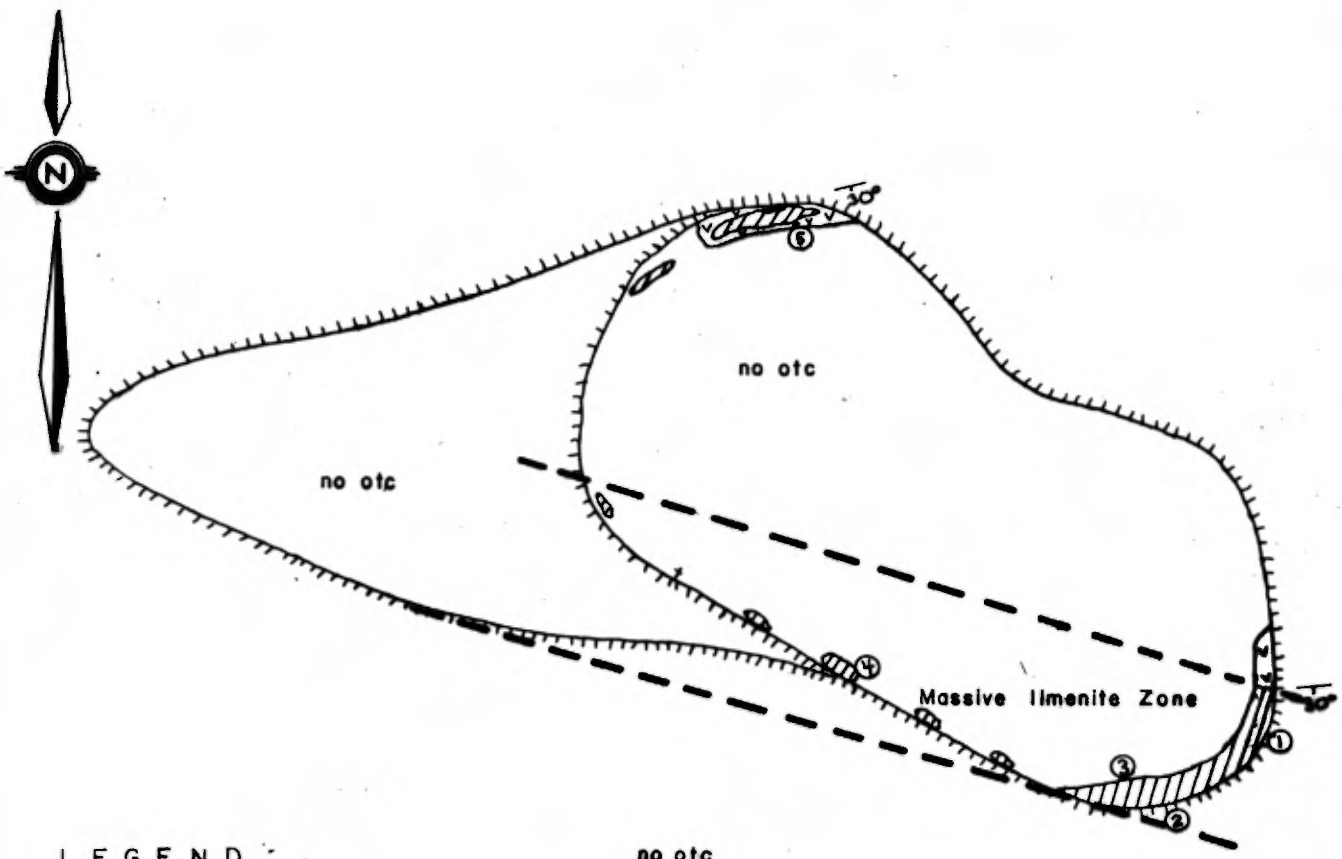
No Massive ilmenite was observed, however large angular blocks of it were observed in overburden in the immediate vicinity of the showing. ALN86-14 consisted of a sample of the disseminated ilmenite in anorthosite from this occurrence.



TI RESOURCES LIMITED

TOPOGRAPHIC MAP 12L/5 - SHOWING ILMENITE OCCURRENCES

ALLARD LAKE NARROWS GROUP



LEGEND

- ANORTHOSITE
- MASSIVE ILMENITE
- DISSEMINATED ILMENITE
- SAMPLE LOCATION
- STRIKE AND DIP OF CONTACT
- RIDGE/STEEP SLOPE

SCALE

0 25 50 75 100

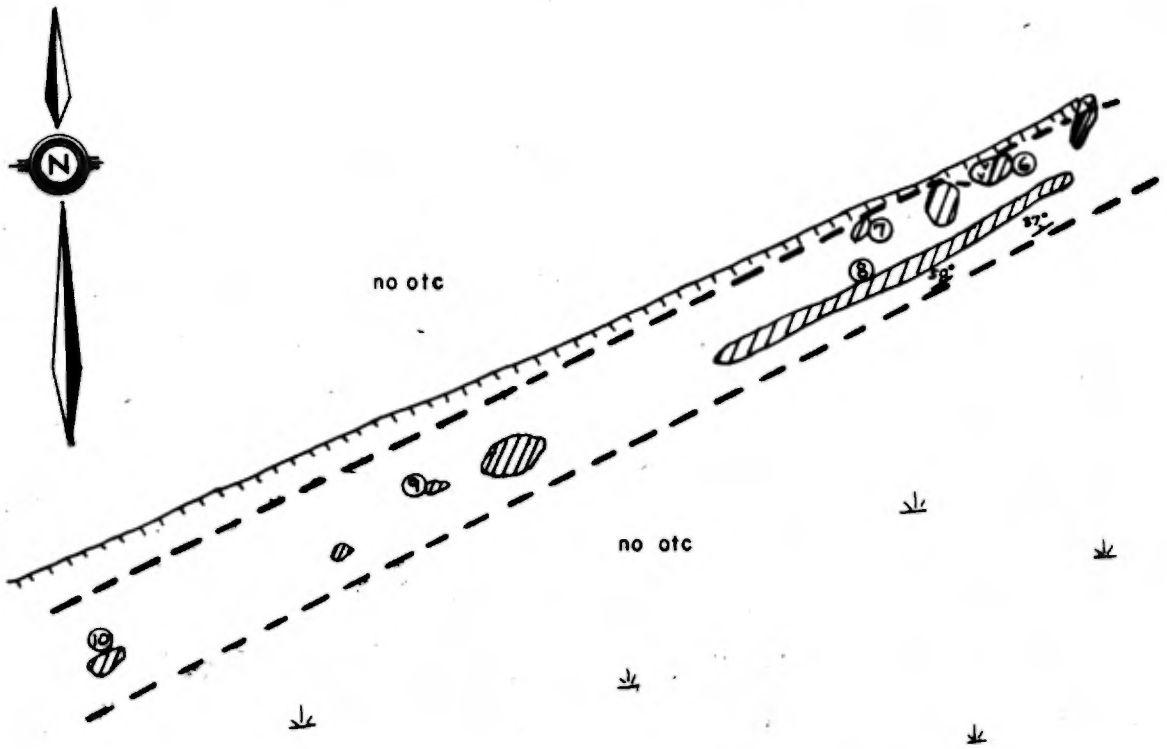
FEET

TI RESOURCES LIMITED

GEOLOGICAL SKETCH MAP - SHOWING NO. 1

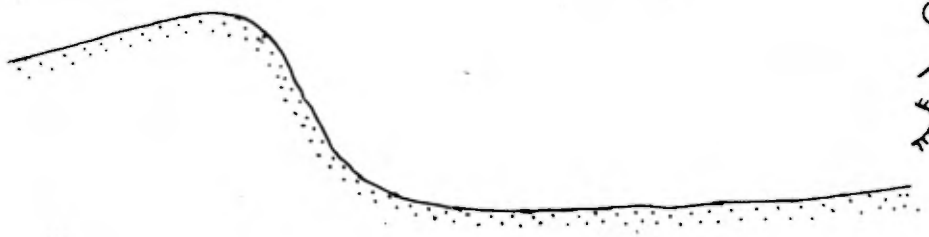
ALLARD LAKE NARROWS GROUP

H.P.HUTTERI



LEGEND

- ANORTHOSITE
- MASSIVE ILMENITE
- DISSEMINATED ILMENITE
- SAMPLE LOCATION
- STRIKE AND DIP OF CONTACT
- RIDGE / STEEP SLOPE



Allard Lake

SCALE

0 25 50 75 100

FEET

TI RESOURCES LIMITED

GEOLOGICAL SKETCH MAP - SHOWING NO. 2

ALLARD LAKE NARROWS GROUP

H. P. HUTTERI

CONCLUSIONS AND RECOMMENDATIONS

T.I. Resources Limited holds four separate claim groups located within the Allard Lake area of Eastern Quebec. Several massive and disseminated ilmenite occurrences lie within these claim groups. These occurences were mapped and then sampled for titanium oxide content within the massive ilmenite and for platinum group metals within the disseminated ilmenite.

It is recommended, depending on the results of the sampling program, that the most promising looking ilmenite occurrences be selected for a further work program. This would consist in part of closely spaced cut grid lines over the immediate vicinity of the occurrence. A total field magnetic survey would be conducted over the grid lines in order to determine strike lengths and widths of the massive ilmenite lenses. These occurrences would then be evaluated to determine if diamond drilling is warranted.

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CERTIFICATE

I, Henry P. Hutteri, of Timmins, Ontario hereby certify that:

1) I hold an Honour Bachelor of Science Degree in Geology from Laurentian University, Sudbury, Ontario having graduated in June 1985.

2) I have based my conclusions and recommendations contained in this report on knowledge of the area, my previous experience and on the results of field work conducted on the property.

3) I hold no interest directly or indirectly in the property held by T.I. Resources Limited nor do I expect to receive any interest in the property other than professional fees.

Henry P. Hutteri

Henry P. Hutteri, H.B.Sc.