

GM 38153

REGIONAL GEOLOGY PROGRESS REPORT, THEMINES PROJECT

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Québec 

MATTAGAMI LAKE MINES LTD
EXPLORATION DIVISION
BELL RIVER JOINT VENTURE
THEMINES PROJECT
REGIONAL GEOLOGY
PROGRESS REPORT

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SUMMARY

During the 1978 field season, reconnaissance and grid mapping were continued in order to gather more information about the geology of the Themines project area. Additional research work also aided in the geological interpretation.

The major rock type found in the area is an andesitic to basaltic lava which is generally massive but may also be amygdaloidal or pillowed. These Keewatin mafic lavas are interbedded with Archean sediments and intruded by granite and gabbro plutons. Some acid volcanics and tuffs are found in the northern part of the project area where the Flordin gold mine operated from 1938 to 1941. Diorite and quartz-porphyry dykes cut the volcanics and sediments. Geochemical analyses show that most of the volcanic rocks belong to the tholeiitic series but several calc-alkaline rocks are also found. Some anomalous copper values are obtained in the vicinity of group 0. No other encouraging assay results were recorded.

Detailed mapping has been recommended on groups C and H as well as some reconnaissance mapping around these two groups. It is also recommended that possible outcrop locations in Fraser township be investigated.

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The 1977 mapping crew under the supervision of D. Garden.

The 1978 mapping crew: Joseph Lye

Brian Williamson

Karen McKenna

Julien Gadoury

Jean Gadoury

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INTRODUCTION

This report describes the geology of the Thémines project area which comprises an area of about 325 square miles in Abitibi East country in the Matagami area of northwestern Québec.

During the 1978 field season, reconnaissance as well as grid mapping was continued on the project area. Additional research work was done in order to establish which areas had been previously worked by other companies in previous years. This information is used to aid the geological interpretation in areas of little outcrop.

The following report will discuss the main geological features of the Thémines project area using the results of geological and geophysical surveys, rock sample analyses and compilation reports done from existing assessment work information.

PROPERTY DESCRIPTION

At the present time, there are twenty (20) groups belonging to the Thémines Project which is a joint venture with the James Bay Development Corp. The groups are labelled alphabetically and cover about 14,644 acres. Their locations and acreages are included in the appended table in this report.

LOCATION AND ACCESS

The Thémines Project area is located about 40 miles southeast of the town of Matagami, P.Q. and twelve miles northwest of the town of Label-sur-Quévillon, P.Q. It covers portions of Fonteneau, Thémines, Comtois, Fraser, Franquet, Cramolet and Desjardins townships. An outline of the project area is appended at the end of this report.

Access may be gained to the northeast portion of the area by means of the Quévillon-Chibougamau highway, route 113, as well as the CNR railway track which passes through southern Desjardins township.

There are numerous lumber roads in the southwestern portion of the project area which provide relatively good access to the various groups in Fonteneau, Thémines, Fraser, Comtois and Cramolet townships.

TOPOGRAPHY

Outcrop is most abundant in the northeast half of the project area where there are small, forest covered hills. New roadcuts on route 113 also provide good rock exposures.

Within this half of the project area, there is one major lake, Cameron Lake and three rivers, the Florence in Desjardins and Franquet townships, the Wedding in Franquet township and the Bell which forms the boundaries between Franquet and Fraser townships and Comtois and Quévillon townships.

In the southwestern half of the area, there is low lying land with few outcrop exposures except for the large hills in southern Fonteneau township. A large portion of this area is cutover which is drained by the Laflamme, Bigniba and Bernetz Rivers.

PREVIOUS WORK

A fair amount of work has been done by other companies in this area in previous years. This assessment work is summarized in the various township compilation reports.

It would be useful here to list the work which has been done by other companies on the various groups now held by Mattagami Lake Mines Ltd in the joint venture with the James Bay Development Corporation.

GROUP A

Desjardins Township

New Jersey Zinc Explorations Ltd

1949: geophysical surveys: magnetic, 900-cycle inductive, self potential, resistivity.

1950: geological survey

1950: geophysical surveys: 135-cycle inductive, Boliden loop frame self potential, 900-cycle inductive, magnetometer, gravity

1950-51: diamond drilling: holes No. 13 and 14 are located on group A and intersected agglomerates, sediments and acid lavas. The massive pyrite found in both these holes could represent a conductor.

It does not appear that these two drill holes were put down on the conductor that Mattagami Lake Mines is seeking to test.

GROUP B

Desjardins township

New Jersey Zinc Explorations Ltd

1950: geological surveys

1951: geophysical surveys: magnetometer, Boliden loop frame, 900-cycle inductive

1950-51: diamond drilling: 17 holes drilled on group B. These holes intersected predominantly granite and andesite and passed through pyrite-pyrrhotite conductors.

It seems that these drill holes were drilled off a granite contact in a semi-circle. In the field, these drill holes were located north of the grid area and therefore were not drilled on the conductor that Mattagami Lake Mines is seeking to test.

GROUP C

Desjardins Township

Adjoins Flordin Mine property. No assessment records available to the public for this area.

GROUP D

Desjardins Township

Timmins, N.A. Explorations (1938) Ltd.

1950: Magnetometer survey.

Hollinger Exploration Co. Ltd.

1936: Diamond drilling: no location map is available for these holes which intersected lavas, basalts, agglomerates and some rhyolite. No conductors appear to have been drilled, therefore the conductor Mattagami Lake Mines is interested in has not been previously tested.

GROUP E

Desjardins and Franquet Townships

There does not appear to have been any work done on this group in previous years by other companies.

GROUP F

Desjardins Township

There does not appear to have been any work done on this group in previous years by other companies.

GROUP H

Franquet Township

There does not appear to have been any work done on this group in previous years by other companies.

GROUP M

Franquet Township

West grid: no previous work recorded

East grid: a diamond drill hole was located which is presumed to have been drilled by Shell Minerals in 1976. No log is available for this hole.

South grid:

Canadian Shield Mining Corp.

1957: magnetometer survey

1957: diamond drilling

Hole No. F2-2 encountered andesite with fine magnetite and minor pyrite.

The hole drilled on the East grid by Shell Minerals in 1976 has already tested the conductor that Mattagami Lake Mines was interested in. It would seem logical to assume that no interesting mineralization was encountered in this hole since the claims were allowed to lapse shortly after the drilling.

Hole F2-2 appears to have been drilled on a magnetic high slightly northwest of the group M south grid. The Mattagami Lake Mines conductor does not appear to have been drilled.

GROUP N

Fraser Township

Kerr Addison Mines Ltd

1967: geophysical surveys: EM (vertical loop) and magnetometer.

1967: diamond drilling: 5 holes intersected rhyolite, andesite and tuffs with pyrite, pyrrhotite and graphite conductors, (2 holes drilled on same target, one was abandoned).

1968: diamond drilling: one hole intersected rhyolite and andesite with a pyrite conductor.

It would seem that anomaly No. 198-D on group N was tested by drill holes No. KA5-67-1A, No. 67-1 and No. 67-2. Pyrite, pyrrhotite conductors were found. Hole No. 68-1 appears to have been drilled along the strike of anomaly No. 200-E.

GROUP O

Fraser Township

There does not appear to have been any work done on this group in previous years by other companies

GROUP P

Fraser Township and Cramolet Township

There does not appear to have been any work done on this group in previous years by other companies.

GROUP Q

Cramolet Township

No information available at the present time.

GROUP R

Cramolet Township

No information available at the present time.

GROUP S

Comtois and Thémis Townships

Ventures Ltd.

1961: diamond drilling: one hole which intersected greywacke, argillite and presumably a graphite conductor.

This drill hole was put down on the conductor that Mattagami Lake Mines was seeking to test.

GROUP T

Comtois and Thémis Townships

Ventures Ltd.

1961: diamond drilling: one hole which intersected greywacke and graphitic schists; presumably a graphite conductor.

This drill hole was put down on anomaly No. 142-B on Group T.

GROUP U

Fonteneau Township

No previous work recorded.

GROUP V

Fonteneau Township

No previous work recorded.

GROUP W

Fonteneau Township

No previous work recorded.

GROUP X

Thémines Township

Hudson's Bay Exploration and Development Co. Ltd.

1960: EM survey

GROUP Z

Thémines Township

No previous work recorded but an old grid was located on the property by the mapping crew.

FIELD WORK

During the summer of 1977, mapping was begun on the groups in the Thémines project area.

In 1978, a crew of four persons continued mapping the following areas:

- 1) Cameron Lake, highway 113, southern claims on group M (east grid), reconnaissance traverses in Franquet township.
- 2) Grid mapping on groups U and V.
- 3) Reconnaissance mapping on groups W, X and Z.
- 4) Reconnaissance mapping around groups O, N, P and R.

Another two persons mapped most of the major rivers in the area, the Bell River, the Laflamme River, the Florence River and the Wedding River.

REGIONAL GEOLOGY

The Thémines area is found within a greenstone belt and is underlain by the Archean, Precambrian rocks of the Abitibi orogenic belt in the southeastern part of the province. The Abitibi greenstone belt trends east-west across parts of northwestern Québec and northeastern Ontario. It is bounded

on the east by the northeast trending, crystalline rocks of the Grenville province and on the west by the Kapuskasing subprovince.

The geology of this belt is characterized by east-west trending metavolcanic and metasedimentary rocks, generally metamorphosed to the greenschist facies, which have been intruded by granites and gabbros and numerous diabase dykes.

The volcanic rocks are generally Keewatin mafic lavas which are interbedded with metasedimentary rocks consisting of argillites, arkoses, conglomerates and magnetite and hematite-specularite-bearing sediments. Isolated piles of rhyolitic lavas and pyroclastics are found within the volcanics and sediments.

Much of the area is covered by unconsolidated sediments whose origins may be glacial, lacustrine, fluvial or organic. Heavy overburden and numerous swamps make for poor outcrop exposure in the Abitibi.

GENERAL GEOLOGY

The Thémines area is underlain predominantly by Keewatin-type mafic lavas which are andesitic to basaltic in composition. In places, the volcanics are interbedded with metasedimentary rocks which are presumed also to be Archean in age. These lavas and sediments are intruded by large masses of granite and gabbro and cut by dykes which may range from acid to basic in composition. Pyroclastic rocks are found as tuffs and agglomerates particularly in the northeastern half of the project area.

The geological contacts are approximate in most cases and have been determined with the aid of the airborne geophysical maps and old diamond drill hole logs.

The andesites are dark grey to green, fine grained and massive however, in some places, they are pillowed or amygdaloidal. These structures are more common in the southwest half of the area where the volcanics are more basaltic in composition. These rocks are metamorphosed generally to the greenschist facies and show much shearing and alteration.

The sediments are also metamorphosed which generally obliterates primary structures and makes the identification of these rocks quite difficult. The schistosity in these rocks may represent original bedding planes but the rocks are so highly sheared that a positive statement cannot be made.

A large magnetite-bearing iron formation is found trending east-west across central Desjardins township.

Large masses of granite are found which are generally pink, medium to coarse grained and massive. Slight alteration of the mafic minerals, which may be hornblende or biotite, can be seen but usually, the granites are fairly fresh and are younger than the surrounding volcanics.

Two large gabbro intrusives were found, one of which forms a hill on Group H in Franquet township. Lenses of gabbro may be found within the andesites, particularly on route 113, north of the Desjardins township line. A layered gabbro sill was found in Fraser township along the Laflamme River.

Other intrusives include a diorite dyke in southern Thémines and Fonteneau townships, a diorite dyke in Franquet township and an ultramafic (hornblendite) dyke in Fraser township. The diorite dykes are oriented in a general northeast-southwest direction but the hornblendite is oriented north-south.

Tuffaceous rocks are found mostly in the north-eastern half of the project area where roadcuts provide good exposure. These may be pink or green in color with quartz clasts and are highly sheared. Thin section work done on

these tuffs suggests that they may also be classified as altered quartz-feldspar porphyries.

DESCRIPTIVE GEOLOGY

In order to adequately cover the geological descriptions, the Thémines project area has been divided into five separate areas as follows:

- a) Cameron Lake Area
 - 1) Southeast quarter of Desjardins township
 - 2) Franquet township: Eastern half of Ranges VII, VIII, IX, X
- b) Florence River Area
 - 1) Southwest quarter of Desjardins township
 - 2) Franquet township: Western half of Ranges VI, VII, VIII IX, X
- c) Wedding River Area
 - 1) Franquet township: Eastern half of Range VI; all of Ranges I, II, III IV, V
- d) Laflamme River Area
 - 1) All of Fraser township
 - 2) Lots 1 to 20 in Ranges I to X in Comtois township
- e) Bigniba and Bernetz Rivers Area
 - 1) South half Cramolet township
 - 2) All Thémines township
 - 3) Fonteneau township: lots 10 to 62 in Ranges I to X

CAMERON LAKE

This area is quite interesting due to the presence of already established gold occurrences.

The Flordin mine shaft which is located in Desjardins township, was sunk on the gold bearing Cartright vein in 1938. Here, gold bearing quartz veins and lenses occur in sheared and partially carbonatized rhyolites, andesites and tuffs. Some diorite, syenite and feldspar porphyry dykes are present near and along the carbonatized and mineralized zones and are, in places, sheared, altered and cut by quartz veins. The gold occurs in the quartz associated with pyrite, or in the adjacent pyrite-impregnated wall rocks.

VOLCANICS

Andesites

The predominant volcanic rock in this area is a dark grey to black, fine grained, massive andesite. Compositionally, the rocks vary from andesitic to basaltic and contain coarser grained gabbro lenses. Often, these andesites are sheared and in places, have been altered to chlorite schists. Where a large amount of shearing has occurred, the rocks are carbonatized. The strike of the andesites is generally northwest with steep dips to either the north or south. Some pillow structures were observed in southwestern Desjardins township by New Jersey Zinc Ltd. Quartz-carbonate veinlets are common and in one location, an epidote rich vein was found. Small amounts of pyrite, both disseminated and cubic, are found throughout the andesites.

I. Dresser, J.A. and Denis, T.C. Geology of Quebec, Volume III, Que. Bur. Mines, Geological Report No. 20, 1949 p. 34.

As one approaches the granite pluton in northeastern Franquet township, the andesite becomes magnetic.

In places, the andesites are very altered and a thin section study done on a road outcrop in Range VII, describes the rock as a fine-grained amphibolite. This large amount of alteration may be due to its proximity to the granite pluton.

ACID VOLCANICS

The acid volcanics mentioned in the Preliminary Report of the Thémines project (D. Garden, 1977) on Group H are now thought to consist of tuffs or altered quartz porphyries.

The remaining volcanic rocks are found in Desjardins township and consist of trachytes and other intermediate volcanics. These are described in detail by E.A. Goranson in his 1950 report on the Agar Zinc property (New Jersey Zinc Explorations Ltd, GM 554).

INTRUSIVES

Granite

There are three granitic intrusives located in this area which are generally pink in color. The largest one is located in northeastern Franquet township and is a fairly fresh hornblende granite. It is a medium grained, equigranular rock with an average composition of about 40% K-spar, 5% plagioclase, 35% hornblende, 20% quartz and perhaps some biotite. There has been some chloritization of the mafic minerals.

Xenoliths of predominantly mafic minerals are found within the granite which are oblong in shape and up to 12 inches in length. The main mafic mineral within the xenoliths is hornblende.

A contact was observed between this granite and the andesite in Franquet township, northern lot 59, Range VII. It was not a clean contact as there were many fingers, pods and lenses of granite in the andesite. The second intrusive has been named the Cameron Lake granite stock by E.A. Goranson of New Jersey Zinc Ltd. (1950).

The third granite plug was outlined mainly by drilling (New Jersey Zinc Ltd, 1950-51) and is located in southern Desjardins township, about one mile east of the north-south township centre line.

These latter two granites are mainly reddish in color but may vary from pink to grey. Generally, they are medium grained but pegmatitic dykes consisting of coarse, reddish feldspar and quartz cut the Cameron Lake stock.

GABBRO

A fairly large gabbro pluton was located by mapping and diamond drilling in north-central Franquet township. This intrusive outcrops as a large hill in the southern portion of group H. The gabbro is medium to coarse grained, dark grey and appears to be altered somewhat.

Diorite (or gabbro) dykes, sills and stocks are reported to occur within the volcanics in Desjardins township and are described by E.A. Goranson (1950).

TUFFS

Some small, acidic tuffs were located on group H (1977) which are dark grey, finely banded and contain some medium sized, cherty clasts.

Acidic tuffs were also located in drill holes in southeastern Desjardins township and northeastern Franquet township. These are thought to form a band which trends slightly north of west across southern Desjardins township.

Other pyroclastic rocks, including breccias and agglomerates were located on the Agar-Zinc property in southeastern Desjardins township.

METASEDIMENTS

A large iron formation trends east-west over the central part of Desjardins township. It is a banded formation which is fairly schistose and shows numerous contorted quartz veins. This formation is well defined on the airborne geophysical map and is highly magnetic on the outcrop exposures.

According to the 1977 Preliminary Report, a black, friable meta-sediment outcrop was found just south of group C in Desjardins township.

FLORENCE RIVER

Most of the geological information in this area has been gathered from diamond drill records. Some outcrop was found along the shoreline of the Florence River by the Mattagami Lake Mines' crew.

VOLCANICS

Again, the most common volcanic rock is the fine grained meta-andesite which has been described under the Cameron Lake heading. These

rocks are again sheared and are pillowed in places. The presence of magnetite was noted in some outcrops.

A fault zone has been assumed in order to explain the change in the strike of the andesites from northeast on the Bell River to northwest on the southern Florence River. This fault is assumed to strike northwest-southeast in the western portion of Ranges VII, VIII and IX in Franquet township.

This change in strike of the andesites may also represent the southern limb of a major fold but there is not enough evidence to support this theory.

The presence of rhyolites was noted in several drill holes but these have not been described in detail.

Mineralization was noted in Franquet township, ranges VIII and IX, lots 28 to 40 along a zone of shearing which extends N35°W for at least three quarters of a mile in a banded silicic greenstone (probably a tuff). The zone is cut by pink felsic dykes that are highly folded and sheared. Pyrite and some chalco-pyrite was found in both the dykes and greenstone. In one trench, a mineralized zone 75 feet wide was found.

INTRUSIVES

Gabbro

The western portion of the gabbro intrusive described under the Cameron Lake heading is located here in Ranges VIII, IX and X of Franquet township.

OTHER INTRUSIVES

An ultramafic dyke was located in a drill hole in Range VI, Franquet township as were some porphyry dykes.

PYROCLASTICS

The presence of tuffs and agglomerates has been noted in drill holes and found in outcrop.

In Desjardins township, a slightly northwest trending band of tuffs is thought to exist. Perhaps another small lens of tuffs and sediments strikes north-south in Range VIII, Franquet township. The presence of an agglomerate was also noted within this lens.

SEDIMENTS

The iron formation discussed in the Cameron Lake area continues to trend east-west across the northern part of the southwest quarter of Desjardins township.

Some siliceous sediments were located on group F in Desjardins township (1977). These are described as being slatey and highly sheared.

The presence of other sediments was noted in drill holes in Range VIII, Franquet township.

Trenching done in the 1930's in Range IX, Franquet township, lots 30 to 35, revealed sediments which were silicified and mineralized. Quartz veins were reported to carry some values in gold and a channel sample assayed .008 ^{oz}/ton Au.

WEDDING RIVER

Volcanics

The black, fine-grained, sheared andesite is again the most common volcanic rock. The schistosity generally trends east-west and various jointing directions are found. The andesite may again be basaltic in composition and may also be pillowed, amygdaloidal and vesicular with feldspar and quartz forming the amygdules.

In some places, due to poor outcrop exposure and more intense metamorphism the volcanics have been labelled as simply intermediate to basic. In one place (R III, lot 65), these volcanics have been altered to a chlorite schist.

A thin section study describes these "andesites" as chlorite-epidote-carbonate schists which were probably originally vesicular basic lavas.

Pyrite is commonly found in these rocks and in one location, near group M, a small seam of massive pyrite was found. Minor pyrrhotite is also found.

Acid volcanics were located in the southeastern part of Range III which are approximately rhyolitic in composition. Although these rocks were mapped as volcanics, they may also be minor intrusives due to the many quartz eyes which give the rock a porphyritic texture. The rocks are medium greenish grey and highly sheared and altered making positive identification difficult.

INTRUSIVES

Granite

The largest intrusive in this area is a pink, hornblende granite which covers a large portion of the south-western quarter of Franquet township. Outcrop of this rock type was found on the Bell River and the Colline Franquet is a large granite outcrop (as reported by other sources).

OTHER INTRUSIVES

One gabbro outcrop was located in the southern end of Lot 59, Range II. It is a dark grey, fine grained, massive rock which comes in contact with a pyrite mineralized tuff or quartz porphyry. The presence of gabbro was also noted in a drill hole in the south end of lot 45, Range III.

In the area of the gabbro outcrop, a Keewenawan-type diabase dyke was mapped by the Canadian Shield Mining Corp. The diorite outcrop found on the highway follows the same trend as the diabase. This rock may in fact be part of the diabase dyke because it has some diabasic features such as the presence of plagioclase laths and the general lack of free quartz. However, it is a very coarse grained rock for the typical Keewenawan diabase which is usually much finer grained.

A northeast trending basic dyke cuts through a tuff outcrop just south of the Wedding River on route 113. It is a dark grey, fine grained, sheared rock which is altered and contains some carbonate.

TUFFS

Several acid tuff outcrops were mapped along route 113, just south of the Wedding River which are interbedded with schistose metasediments.

The two types of tuff thought to exist can be distinguished by a pink or green color. These coarse grained tuffs are interlayered and contain coarse quartz fragments up to 6 mm in size. Needles of hornblende were also found in the pink tuff. Pyrite is common in the tuffs.

Thin section studies on these rocks revealed that they have been metamorphosed to sericite phyllites. The green "tuff" has now been given an origin of quartz-feldspar porphyry due to the euhedral and subhedral form of the large quartz crystals and the homogeneity of the ground mass.

These rocks were originally mapped by W.W. Longley as quartz porphyries in 1937. He located one along the southern side of the Wedding River in Franquet township and another in southeast on Franquet township.

The pink "tuff" is given a possible origin of quartz-feldspar crystal tuff.

Due to extensive alteration of these rocks, an exact classification is difficult and the origin difficult to determine. However, there seems to be more evidence that these rocks are altered quartz-feldspar porphyries rather than tuffs.

The tuffs located by the Canadian Shield Mining Corp. in Range I are similar to those located on route 113. They too may be altered quartz-feldspar porphyries. Nodules and seams of massive pyrite are found in this location which are often associated with quartz veining.

The Canadian Shield Mining Corp. also noted the presence of an agglomerate and porphyritic rhyolite in eastern Range III. The porphyritic rhyolite may be similar to the green tuffs previously discussed.

Just north of the Franquet-Quévillon township line on route 113, large, elongated feldspar fragments were found which may be up to 4 inches long. The occurrence of these fragments would suggest that this rock be classified as an agglomerate. The direction of elongation of these fragments in 263°.

SEDIMENTS

Metasediments are found interlayered with tuffs on route 113, south of the Wedding River. Some other sediment outcrops were located on group M by the 1977 mapping crew.

These sheared metasediments are dark grey to black in color. They are fine grained in some places but others contain visible quartz and feldspar fragments. Cubic and disseminated pyrite is found which is confined to certain layers. Quartz and calcite veins cut the sediments and appear to have been folded and crenulated.

Thin section work describes these rocks as biotite phyllites containing minor amounts of pyrite and magnetite.

LAFLAMME RIVER

Volcanics

The black, fine grained andesites previously described are the most common volcanic rocks in the Laflamme River area. These may be massive or schistose and approach basalts in composition. Chlorite alteration is common, and in some locations, chlorite schists are found.

Pillowed andesites are found with tops believed to be facing south. Some coarser grained andesites are also found which are thought to represent flow centres. Small gabbro lenses are found in the andesites and in one location, epidote was observed.

In places, the andesites are very altered and thin section studies have described them as amphibolites. This again may be due to their proximity to large granite masses.

In outcrops along the Laflamme River, in Range VI of Fraser township, granitic dykes are found within the andesite. Here too, a fine grained, grayish green rock is found which is highly sheared but contains large elongate feldspar crystals. This is a gabbroic sill which shows "graded bedding" of the feldspar phenocrysts. At the top of the sill, the phenocrysts are small but they become very much larger towards the bottom of the sill where an anorthositic composition is reached. This is a characteristic feature of some of the "layered gabbros" found elsewhere in the Abitibi.

A possible rhyolite outcrop was located along the Laflamme River in Range I, Fraser township. This outcrop may be part of a northeast trending band of rhyolite as rhyolites were reported in several drill holes put down by Kerr Addison Ltd. in Ranges III and IV, Fraser township. It must be noted however, that there is little to substantiate this postulation.

Several interesting things may be noted in one outcrop area in Fraser township. Blasting has recently been done in the area where route 800 crosses the Laflamme River in order to construct a new bridge. A vein

of pink, soft rhodochrosite was found within andesitic rocks and some blebs of chalcopyrite were seen. Some mineralized quartz veins were also found within these andesites.

INTRUSIVES

Granite

Several granite plutons are found in the following locations:

- a) central portion of Ranges III, IV, V, Fraser township
- b) 1) western portion of Ranges IV, V, VI, Fraser township
2) most of Ranges VII, VIII, IX, X, Fraser township
3) "Ile Canica" granite also extends across Cramolet Fonteneau townships.
- c) portion of small stock, R1, Fraser township.

These are generally hornblende granites which vary in color from dark grey to pink to buff. They are coarse to medium grained, massive and fairly fresh. Around group 0, the granites become sheared and somewhat schistose. In one location (Fraser township, RIV, lot 21), a chert band was found within the granites.

OTHER INTRUSIVES

Gabbro

A small gabbro pluton was outlined in northern Comtois township by several outcrop exposures along the Laflamme River.

HORNBLENDITE

A basic dyke which has been termed a hornblendite cuts north-south through volcanic rocks in lots 50 to 51 of Ranges I, II and III, Fraser township. This dyke is well outlined on the aeromagnetic map.

This intrusive is a dark, coarse to medium grained rock which contains up to 70% hornblende. The larger hornblende crystals are well formed in a feldspar matrix and are often twinned. Pyrite was found in minor amounts and the hand samples collected were slightly magnetic.

Evidence of old trenching operations were found in the vicinity of this outcrop.

PORPHYRIES

The outcrops mapped as containing tuffaceous layers or lenses are now thought to contain small dykes or xenoliths of quartz-feldspar porphyry. They occur as lenses wedged between a felsic dyke and an andesite in the vicinity of group 0.

METASEDIMENTS

The existence of two sedimentary bands is postulated from diamond drill hole information and airborne geophysical information.

In southern Comtois township, a tuff and sediment appears to strike east-west. Some schists and andesites are also found in drill holes here, suggesting a proximity to an area of volcanic rocks.

The second band is part of a large northeast-southwest trending band of sediments which is described below under the Bigniba and Bernetz River heading.

BIGNIBA RIVER AND BERNETZ RIVER AREA

Volcanics

Andesitic hills form a large topographic high in southern Fonteneau township. These andesites sometimes approach basalts in composition and

show well developed pillows in one outcrop just off route 801 (R111, Lot 46). From this outcrop, the pillow tops are thought to be facing south. These altered andesites are fine grained, medium to dark grey and show traces of pyrite mineralization. In places, the grain size becomes coarser, suggesting the possibility of flow centres.

Outcrops located just north of these hills were more porphyritic with rounded, greyish-white feldspar phenocrysts up to 10 mm in diameter.

Several other andesite outcrops were found west of Lac à la Femelle which trend northeast. These rocks are also found to be basaltic in composition in some places and generally resemble the andesite hills just described. The occurrence of a vesicular lava was noted here in which quartz sometimes filled the vesicles, forming amygdules.

These andesites are close to a large granite pluton and in the vicinity of the granite, pinkish-white feldspar laths were seen on the weathered surface of the andesite.

In an andesite outcrop northwest of Lac à la Femelle, a gabbro lens was found which contained minor pyrite.

An andesite outcrop was found in northern Fonteneau township as an isolated exposure and is therefore thought to be an andesite xenolith within the granite pluton which is described below. Quartz veins were found here which are often displaced, not continuous and show well developed boudinage.

TUFFS

Some tuffaceous rocks were found which generally occurred as lenses or in thin layers within the andesite/basalts located west of Lac à la Femelle. The weathered surface of these rocks was brown to grey and

showed some differential weathering with small pits sometimes showing parallel arrangement. These rocks are very siliceous and have been classified as acid and felsic (crystal?) tuffs.

The presence of other tuffs was noted in drill holes in south central Themines township. The geology here seems fairly complicated and a structural picture is difficult to determine given only the diamond drill hole logs.

INTRUSIVES

Granite

A large granite pluton covers the northern portion of the Bernetz-Bigniba River area. This is a pink, coarse grained, massive biotite or hornblende granite.

In an exposure in northern Fonteneau township, the pale granite is fine grained and intruded by small pegmatitic dykes which are oriented at varying angles. These dykes are generally several inches in thickness with fine grained margins and coarser grained centers.

In one location (Fonteneau township, RX, lot 51), the granite becomes more mafic and contains a greater amount of K-spar and small dyke-like intrusions. Xenoliths of largely mafic minerals are found in this outcrop which are generally oval in shape with an average size of about six inches. In this outcrop, some foliation is observed which strikes north-south.

DIORITE

Diorite outcrops are found along the Bernetz River in southern Thémimes township. These diorites are greyish-green in color, medium grained, generally massive and very altered. Much chloritization has taken place and in one exposure, a chlorite schist was found. These rocks do not contain much quartz but do contain feldspars and therefore may be dioritic to gabbroic in composition. Quartz veining is also common and the presence of epidote in some places was noted. In one sample, individual laths of plagioclase can be found and in another, large quartz fragments were seen. Some pyrite was found in most of the outcrops.

The outcrops located near the bridge where the Abiex Route 115 crosses the Bernetz River are somewhat complicated as both diorite and andesite are found. No contact between the two rock dykes is exposed but alteration of the andesite to a chlorite schist is noted close to the presumed contact.

OTHER INTRUSIVES

Some quartz porphyries and rhyolitic porphyries were noted in drill holes in south central Thémimes township.

METASEDIMENTS

A band of metasediments strikes northeast-southwest over the southern parts of the Bernetz-Bigniba River area. The presence of this sedimentary band is outlined on the airborne geophysical map by the presence of a conspicuous formational trend consisting of high magnetometer readings and numerous EM anomalies.

The sediments outcrop just south of the project area in Bernetz township and appear to dip steeply to the northeast at this location. These sediments are generally dark grey to black, fine grained and contain some fine magnetite bands. In some drill holes, the presence of graphite and pyrite was noted. These sediments show quartz veining and some shearing.

STRUCTURE

In Desjardins township, top determinations of pillow lavas and sediments determined by E.A. Goranson (1950, GM637) lead to the postulation that the rocks in the southeast corner of the township lie on the south flank of a lightly folded major syncline. The axis of the syncline is thought to strike east-west and lie just south of the iron formation and associated sediments which are thought to overlie the volcanic series.

Evidence of fault zones was also found by New Jersey Zinc Ltd (1950, GM637) in Desjardins township but no displacements of any extent were noted.

The presence of a northwest striking fault zone in Franquet township is suggested in order to explain a change in the strike of the andesites from northwest-southeast on the southern Florence River to northeast-southwest on the Bell River. This change in strike of the andesites may also represent the south limb of a major fold but there is not enough evidence at the present time to support such a theory.

Jointing is a common feature in many of the andesite outcrops. Where the outcrop exposure was good, several jointing directions were found. By plotting these directions on a stereonet, one can determine a general fracture pattern for the Cameron Lake area and the Wedding River area. The general fracture directions are strike 355° , dip 89° E for the Cameron Lake

area and strike 14° , dip 83°E for the Wedding River area.

GEOCHEMISTRY

In 1977 and 1978, a total of 171 rock samples was sent to the Mattagami Lake Mines' Assay office for trace metal investigation. The majority of these samples was also assayed for major elements as well. These results are listed in appendix V of this report.

By plotting the assay results on an A-F-M diagram, one finds that most of the samples belong to the tholeiitic series. Several samples plotted in the calc-alkaline series with which the volcanogenic Cu-Zn ore bodies of the Abitibi are exclusively associated.

Three of the samples that plot in the calc-alkaline series are located relatively near one another in Franquet township, Range V, close to the Wedding River. The other two samples are located along the Laflamme River but isolated from each other. The numbers of these samples are: 3917, 3920, 0129, 3923 and 3924 and may be located on the traverses and samples map included with this report. Sample No. 3924 is interesting because it was classified as a possible rhyolite outcrop. There is a possibility of more outcrop in this area (southern Fraser township) which would warrant mapping

The average copper, nickel and zinc contents for the tholeiitic series of the Abitibi are listed by J. Descarreaux (1973) as follows: 120 ppm Cu, 109 ppm Ni and 99 ppm Zn for basalts and 93 ppm Cu, 51 ppm Ni, 117 ppm Zn for the andesites. If we presume that a geochemically anomalous value will be at least three times the background readings, then we find several areas which show some anomalous copper values.

The first area is located around group 0 in Fraser township where samples No. 0170, 0171, 0172 and 0174 show some anomalous readings of up to 495 ppm Cu in an andesite.

One anomalous copper value was located along Route 113 in Currie township where chalcopryite was noted in an andesitic outcrop.

No anomalous nickel or zinc values were found within the volcanics.

ECONOMIC GEOLOGY

The Flordin mine in southeastern Desjardins township was a gold mine which operated from 1938 to 1941. Group C of the Thémines Project is located very near the Flordin shaft. The samples taken by the 1977 crew were not assayed for gold and silver, therefore, we cannot tell if there are even trace amounts of these metals on the group.

Previous work by New Jersey Zinc Ltd located mineralization in outcrops but the assays generally returned negligible amounts of gold.

Gold bearing quartz veins occur in the volcanics near the north-south centre line of Franquet township, less than 1000 feet south of the Franquet-Desjardins township line. 2

Small amounts of chalcopryite were noted in Fraser township where route 800 crosses the Laflamme River but the assay results showed no anomalous copper values. In this area though, around group 0, several anomalous copper values were found.

2. Ibid

Pyrite mineralization is common throughout most of the Thémines rock types but seems to be somewhat more abundant in the tuffs/ quartz-feldspar porphyries in Franquet township. Minor pyrrhotite mineralization is found in some of the andesites.

No encouraging assay results were found in other samples.

CONCLUSIONS AND RECOMMENDATIONS

The most interesting areas for continued detail mapping are in and around Groups C and H.

Since Group C is located so close to an old gold mine, it would be worthwhile to do some detailed mapping and sampling here in order to become familiar with the rock types associated with the gold mineralization. This time, the samples should be assayed for gold and silver. If a good series of samples is collected, then the rock types surrounding the mine can be easily identified if found elsewhere in the project area or in drill core.

Detailed mapping and sampling should be done on Group H where the outcrop exposure is very good. By doing this some of the conductors may be able to be picked up at surface. If this is not possible, then a trenching program may be considered.

It is also recommended that reconnaissance work be done around Groups C and H, particularly west of Group H in Range X where gold was reported in quartz veins (Dresser and Denis, 1949).

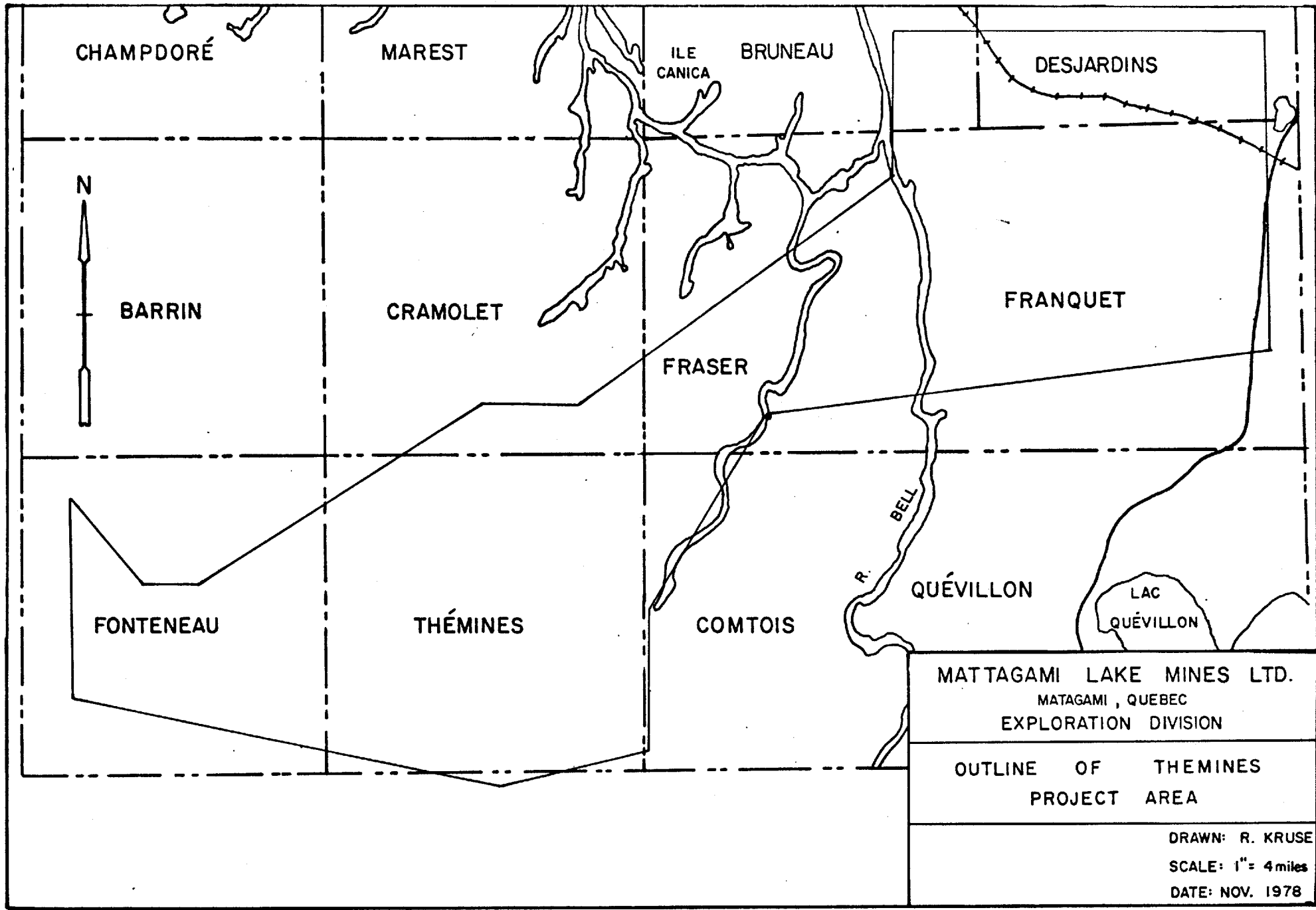
A possible rhyolite outcrop was located in Fraser township on the shore of the Laflamme River in range 1. From air photo studies, there is thought to be some outcrop located south of this shore outcrop which should be investigated.

Near Group N there also appears to be some outcrop which should be examined. These areas of probable outcrop are outlined on the Traverses and Samples Map (1978).

Groups B and E in the northeast half of the project area have not been mapped. It is therefore recommended that this mapping also be completed.

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MATTAGAMI LAKE MINES LTD.
MATAGAMI, QUEBEC
EXPLORATION DIVISION

OUTLINE OF THEMINES
PROJECT AREA

DRAWN: R. KRUSE
SCALE: 1" = 4 miles
DATE: NOV. 1978

THEMINES PROJECT

Group	Location	Acreage
A	Desjardins twp.; 1.5 mi N of Franquet twp line, 1.5 mi W of Currie twp line	400
B	Desjardins twp.; 1 mi E of Desjardins centre line 1.75 mi N of Franquet twp line	440
C	Desjardins twp.; $\frac{1}{4}$ mi N of Franquet twp line 1.5 mi E of Desjardins twp centre line	300
D	Desjardins twp.; $\frac{1}{2}$ mi N of Franquet twp line straddles centre line of Desjardins twp	320
E	Desjardins twp.; 2 mi W of Desjardins centre line Franquet twp.; RX, Lots 28-31 (part)	484
F	Desjardins twp.; $\frac{1}{2}$ mi N of Franquet twp line	480
H	Franquet twp.; R VIII, Lots 44-52; RIX, Lots 44-52; R X, Lots 45-49	2200
M	Franquet twp.; RV, Lots 51-59; RIV, Lots 57-67; RIII, Lots 65-66 and S 51-52	1829
N	Fraser twp.; RIII, Part lots 42, 43, 44, 46; RIV, Lots 37-45	965
O	Fraser twp.; RIII, Lots 16-18, RIV, Lots 15-18	544
P	Fraser twp.; RIII, Lots 1-4, RIV, Lots 2-5, RII, Lot 1 Cramolet twp.; RIII Lots 60-62, RII Lot 60-62	839
Q	Cramolet twp.; RI, Lots 50-56; RII, Lots 50-56	1050
R	Cramolet twp.; RI, Lots 40-43, RII, Lots 40-43	373
S	Thémines twp.; RIV Lot 61, RV, Lots 60-62 Comtois twp.; RIV Lots 1-3, RV, Lots 1-3	661
T	Thémines twp.; RI, part lots 51-59; RII, Lots 53-55, RIII, Lot 59 Comtois twp.; RII, Lots 1-4, RIII, Lots 1 & 2	1483
U	Fonteneau twp.; RVI, Lots 51-55	500
V	Fonteneau twp.; RV Lots 43-45	300
W	Fonteneau twp.; RIII, Lots 25-28 RIV, Lots 25-30, RIII, Lots 24-30	1700
X	Thémines twp.; RII, Lots 21-24	400
Z	Thémines twp.; RV, Lots 30-32	300
Total 20 groups:		14,644 acres

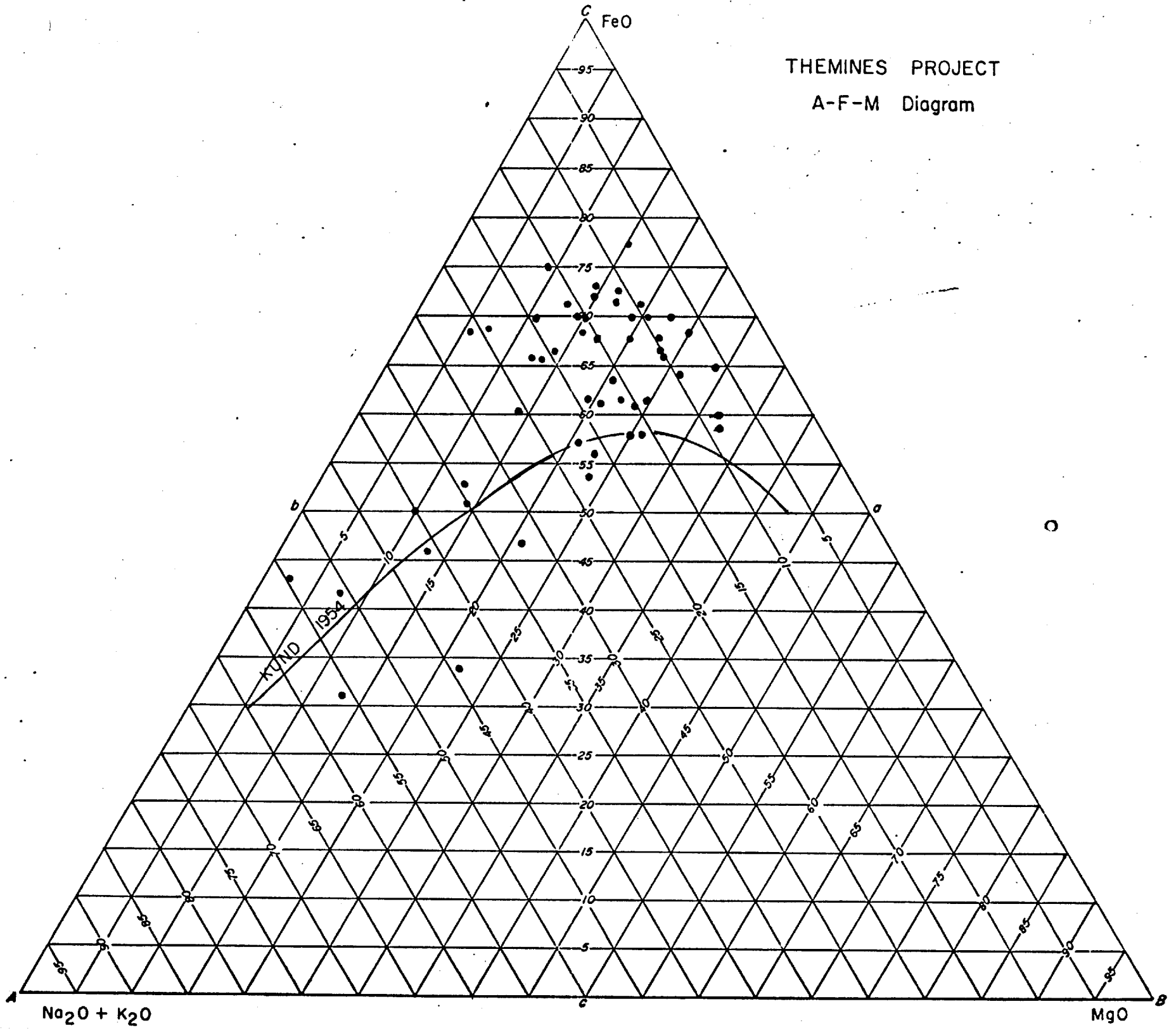
TABLE OF FORMATIONS

Laflamme River Area

Pleistocene & Recent	Sand, gravel, varved clays, muskeg deposits
LARGE UNCONFORMITY	
Post-Keewatin (Algoman?)	Batholiths: granite, granodiorite Dykes or sills (more recent) : granite, aplite, pegmatite, rhyolite, feldspar porphyry, diorite, diabase
INTRUSIVE CONTACT	
Keewatin	Volcanic rocks: basalt, andesite, rhyolite, trachyte and their schistose derivatives; gabbro, diorite, amphibolite Sedimentary rocks (?): Intrusive rocks: diorite

From: Région de la Rivière Laflamme Inférieure
Rapport Géologique No. 2, QDNR
P.E. Auger and W.W. Longley, 1939

THEMINES PROJECT
A-F-M Diagram



PROJECT: THEMINES NE 1/2 (1978)

SAMPLE	LOCATION	DESCRIPTION	GEOCHEMICAL ANALYSIS												
			SiO ₂ %	K ₂ O %	Na ₂ O %	CaO %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	Au ppm	Ag ppm
0115	Franquet twp RVIII Road outcrop Route 113	V6	48.0	1.5	2.2	2.0	2.2	6.9	282	100	43	2	44	-	-
0116	Franquet twp Road outcrop RIV Route 113	V9 (green) Qfp	68.0	1.3	3.5	1.0	.4	1.8	199	36	36	4	10	-	-
0117	Franquet twp Route 113 RIV Road outcrop	V9 (pink)	68.5	1.4	3.5	.7	.4	1.8	185	26	20	3	10	-	-
0118	Franquet twp Route 113 RIV Road outcrop	S	63.7	.5	.4	3.9	2.2	10.5	1900	157	80	6	274	-	-
0119	Franquet twp RVII Road outcrop Route 113	V6	53.0	.4	3.2	1.6	2.0	8.4	680	50	80	4	19	-	-
0120	Currie twp Road outcrop Route 113	3G	45.7	.4	1.8	5.8	3.1	10.9	299	150	35	3	40	-	-
0121	Currie twp Road outcrop Route 113	V6	54.1	.6	1.7	1.3	1.3	8.2	362	134	26	1	61	-	-
0122	Franquet twp RX Road outcrop Route 113	V6-schistose	49.2	2.4	3.7	6.1	1.6	5.8	1275	101	53	13	58	-	2
0123	Franquet twp Route 113 RIII Road outcrop	V5	44.2	.9	1.3	11.1	2.3	9.0	1575	78	66	4	33	-	-
0124	Franquet twp RI Road outcrop Route 113	V5	54.5	2.2	3.4	1.2	1.7	11.9	594	237	50	8	100	-	-
0125	Quevillon twp RX Road outcrop Route 113	VI	70.3	.9	3.1	.5	.2	2.4	418	70	50	9	24	-	-
0126	Franquet twp RVI Lot 61	V6	53.3	.2	1.3	2.8	2.5	6.6	436	77	46	4	28	-	-
0127	Franquet twp RVI Lot 61	V6	48.6	.1	1.1	7.0	2.7	6.8	860	75	45	1	18	-	-

PROJECT: THEMINES NE 1/2 (1978)

SAMPLE	LOCATION	DESCRIPTION	GEOCHEMICAL ANALYSIS												
			SiO ₂ %	K ₂ O %	Na ₂ O %	Ca O %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	Au ppm	Ag ppm
0128	Franquet twp RV Lot 63	V6	50.1	.1	1.2	4.8	3.9	6.9	456	52	27	1	22	-	-
0129	Franquet twp RVI Line Lot 60	V6	53.3	.2	2.7	4.0	3.0	5.2	339	36	25	3	11	-	-
0130	Franquet twp RVI Line Lot 61	V6	52.3	.2	2.3	4.7	3.0	6.5	556	70	50	2	30	-	-
0131	Franquet twp RVI Line Lot 61	V6	41.4	.7	.9	5.3	3.6	10.1	925	150	89	4	48	-	-
0132	Franquet twp RVI Line Lot 61	V6	48.6	.2	1.5	4.2	3.1	6.0	410	73	45	4	22	-	-
0133	Franquet twp RVII Lot 67	V9, py, sil. (Qfp?)	75.1	4.2	2.4	.3	.3	2.6	451	48	42	8	18	-	-
0134	Franquet twp RI Lot 56	V9, acid	66.4	1.8	2.4	1.4	.4	2.2	422	28	28	1	15	-	-
0135	Franquet twp RI Lot 56	V9, py min. section	38.3	1.0	2.1	.2	.1	23.3	46	22	21	9	38	-	1
0136	Franquet twp RIII Line Lot 68	VI (Qfp?)	56.3	.5	1.5	2.8	1.8	6.6	626	53	54	5	36	-	1
0137	Franquet twp RII Lot 67	VI (Qfp?)	57.2	.5	1.7	6.8	3.0	6.4	1100	52	75	6	62	-	1
0138	Franquet twp RII Lot 67	VI (Qfp?)	70.7	1.3	2.4	1.3	.5	2.3	239	44	27	1	16	-	-
0139	Franquet twp RIII Lot 63 E line	V5	44.4	.1	2.2	6.2	2.8	9.9	1550	91	66	2	18	-	-
0140	Duplicate No. 134	V9, acid (Qfp?)	67.1	1.3	3.9	1.1	.1	2.1	525	35	35	3	11	-	-

PROJECT: THEMINES (1978)

SAMPLE	LOCATION	DESCRIPTION	G E O C H E M I C A L A N A L Y S I S												
			SiO ₂ %	K ₂ O %	Na ₂ O %	Ca O %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	Au ppm	Ag ppm
0141	Franquet twp RIII Lot 63 E line	V5	50.4	.3	2.4	3.1	3.1	6.8	750	32	45	4	15	-	-
0142	Franquet twp RIII Lot 65	V5	48.2	.2	2.5	5.4	4.0	7.1	600	95	51	4	54	-	-
0143	Franquet twp RIII Lot 66 E line	V6	46.5	1.6	.8	4.8	2.9	8.5	800	86	50	5	31	-	-
0144	Franquet twp RIV Lot 67	S	25.5	.1	.1	15.5	1.2	9.3	1630	163	77	17	482	-	3
0145	Themines twp Bernetz River Lot 20, RIII	2D	45.9	<.1	1.1	9.7	4.3	9.1	567	184	79	13	233	-	-
0146	Themines twp Bernetz River Lot 21, RIII	2D	42.9	.1	3.1	9.9	2.6	10.8	1370	63	76	16	106	-	-
0147	Themines twp Bernetz River Lot 22, R III	2D	55.0	.5	2.6	6.0	3.2	6.2	432	134	47	9	114	-	-
0148	Fonteneau twp RI, Lot 57	V5	46.7	.2	.9	9.1	4.9	6.9	453	103	37	5	138	-	-
0149	Fonteneau twp RII, Lot 48 Route 801	V5	47.2	.1	1.5	11.2	6.7	9.2	682	180	106	7	224	-	-
0150	Fonteneau twp RX, Lot 52 Route 801	V5	44.2	.5	1.9	9.8	3.9	7.3	303	101	51	5	77	-	-
0151	Fonteneau twp RVI, Lot 44 Route 801	V5	47.1	.2	1.5	9.9	4.1	8.6	171	138	44	4	61	-	-
0152	Fonteneau twp RII, Lot 47 Route 801	V6	47.0	<.1	.9	9.1	3.7	8.3	443	153	49	3	100	-	-
0153	Fonteneau twp RI, Lot 47 Route 801	V6	46.8	.2	.9	9.0	5.1	8.7	703	138	212	9	150	-	-

PROJECT: THEMINES (1978)

SAMPLE	LOCATION	DESCRIPTION	GEOCHEMICAL ANALYSIS												
			SiO ₂ %	K ₂ O %	Na ₂ O %	Ca O %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	Au ppm	Ag ppm
0154	Fonteneau twp RI, Lot 47 Route 801	V6	48.3	.2	1.1	8.1	3.3	7.5	585	130	120	9	117	-	-
0155	Fonteneau twp RI, Lot 46 Route 801	V6	46.5	.2	1.9	8.8	3.3	11.2	435	140	65	8	70	-	-
0156	Fonteneau twp RI, Lot 49	V5	44.7	2.1	1.8	8.8	4.4	9.6	872	230	91	7	262	-	-
0157	Fonteneau twp RI, Lot 49	3G	48.9	.1	2.2	7.8	2.6	9.9	792	125	85	12	72	-	-
0158	Fonteneau twp RV, Lot 40, W line	V7	48.7	.6	2.9	7.2	2.6	9.3	280	62	85	8	58	-	-
0159	Fonteneau twp RV, Lot 40	V9	66.7	.1	4.9	1.9	.4	3.1	212	78	42	2	98	-	-
0160	Fonteneau twp RV, Lot 40	V7	49.7	.7	.8	9.9	1.8	10.6	381	92	47	6	94	-	-
0161	Fonteneau twp RV, Lot 41	V6/V7	46.4	1.2	1.8	7.2	4.8	8.2	491	162	86	21	178	-	-
0162	Fonteneau twp RV, Lot 41	V7	50.3	.2	3.1	7.6	1.9	9.1	507	66	80	4	90	-	-
0163	Fonteneau twp RV, Lot 41	V9	66.2	1.3	3.6	3.7	.4	4.7	377	88	55	5	94	-	-
0164	Fonteneau twp RV, Lot 41	V7	48.4	.9	1.4	8.7	3.5	9.6	240	88	35	4	61	-	-
0165	Fonteneau twp, RVI, Lot 47	V7	47.4	.7	2.3	9.5	3.2	8.3	422	171	50	11	139	-	-
0166	Fraser twp RI, Lot 41	V6	47.6	.1	2.9	8.9	5.2	5.0	286	106	64	-	51	-	-

PROJECT: THEMINES (1978)

SAMPLE	LOCATION	DESCRIPTION	G E O C H E M I C A L A N A L Y S I S												
			SiO ₂ %	K ₂ O %	Na ₂ O %	Ca O %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	Au ppm	Ag ppm
0167	Fraser twp RIV, Lot 7	V6	46.8	.3	1.2	10.8	5.0	6.7	519	364	45	-	147	-	-
0168	Fraser twp RIII, Lot 25	V6	54.0	.3	2.7	8.1	1.9	7.4	370	286	20	-	54	-	-
0169	Fraser twp RII, Lot 23	V6	45.4	.4	2.2	10.9	5.3	10.7	417	258	30	-	44	-	-
0170	Fraser twp RV, Lot 19	V6	49.6	.2	1.4	10.4	5.0	8.3	502	465	33	-	84	-	-
0171	Fraser twp RV, Lot 19	V6	49.2	.3	1.5	9.7	5.4	8.5	536	390	27	-	91	-	-
0172	Fraser twp RIV, Lot 19	V6	47.3	.7	1.9	10.9	4.1	7.4	431	330	20	-	75	-	-
0173	Fraser twp RIV, Lot 21	Chert band within granite	89.0	.5	.9	.9	.3	2.7	264	255	13	-	43	-	-
0174	Fraser twp RIII, Lot 19	V6	47.1	.4	2.4	7.1	3.3	8.2	452	332	23	-	62	-	-
0175	Fraser twp RIII, Lot 20	V5 □ flow	58.1	.6	3.4	3.6	1.4	4.6	482	211	62	-	51	-	-
3901	Bruneau twp RIII Bell Riv.	V7 mas	49.4	.4	1.0	3.3	1.4	4.8	90	105	32	2	90	-	-
3902	Fraser twp RVIII Bell River	V7 cbn	41.7	-	.7	11.5	1.9	6.6	905	143	44	2	145	-	-
3903	Fraser twp RVII Bell River	V7 mas, cbn	43.7	-	.9	6.4	1.8	7.0	672	92	45	1	73	-	-
3904	Fraser twp RVIII Bell River	V7, sid, qtz, py mag							1185	98	64	1	72	-	-

PROJECT: THEMINES (1978)

SAMPLE	LOCATION	DESCRIPTION	GEOCHEMICAL ANALYSIS													
			SiO ₂ %	K ₂ O %	Na ₂ O %	Ca O %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	oz/ ton Au	Ag ppm	
3905	Fraser twp R VII Bell River	V7 m Sid. qtz & py								1270	228	80	2	57	.001	-
3906	Fraser twp R VII Bell River	Sid, qtz, py								1120	45	43	2	72	.002	-
3907	Fraser twp R VI Laflamme River	Qtz + Fp <input type="checkbox"/> dyke Tr py								281	106	55	1	64	-	-
3908	Fraser twp R VI Laflamme River	IG sill Tr py								412	117	33	1	52	-	-
3909	Fraser twp R VI-S Laflamme River	IG Sill								583	75	83	1	62	.001	-
3910	Fraser twp R VI-S Laflamme River	Qtz vein 6"								122	69	6	1	52	-	-
3911	Fraser twp R VI-S Laflamme River	3G Sill - Anorth.	46.6	.2	1.1	1.9	1.3	4.0	306	100	30	1	107	-	-	
3912	Fraser twp R VI-S Laflamme River	IG Sill								377	50	25	-	44	-	-
3913	Fraser twp R VI-S Laflamme River	IG Sill								412	40	22	-	37	.001	-
3914	Fraser twp R III Laflamme River	Rusty zone in V7 po, py, cpy								308	212	31	1	138	-	-
3915	Fraser twp R III Laflamme River	V7 mas	48.7	.3	1.8	6.2	2.2	8.8	356	180	17	1	148	-	-	
3916	Fraser twp R II Laflamme River	Rusty zone in V7 Py								682	101	52	1	48	-	-

PROJECT: THEMINES (1978)

SAMPLE	LOCATION	DESCRIPTION	GEOCHEMICAL ANALYSIS												
			SiO ₂ %	K ₂ O %	Na ₂ O %	CaO %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	^{oz/ton} Au	Ag ppm
3917	Franquet twp R.V Lot 62 Wedding Riv	V7⊙	59.4	1.6	3.4	3.4	1.6	4.3	447	66	57	-	36	-	-
3918	Franquet twp R.V. Lot 58 (L-68W, 7+50M) GR.M-Wedding R.	V9⊠ † Ser., sid?	66.3	3.1	3.0	3.1	.7	1.5	390	22	38	-	23	-	-
3919	Franquet twp R IV Lot 52, Wedding R.	V9⊠ † Ser. sid	65.3	1.8	3.6	3.2	.6	1.3	308	19	35	-	26	-	-
3920	Franquet twp RV Lot 66, Wedding R.	V7 † light green	56.0	.6	4.1	4.2	3.1	5.3	488	62	52	-	95	-	-
3921	Comtois twp R VIII Lot 8 Laflamme Riv	Chlorite schist V7 †	59.8	1.3	3.9	2.0	2.5	3.3	451	37	47	-	70	-	-
3922	Comtois twp R VIII Lot 8 Laflamme R.	Magnetite bed 3"	51.2	.04	.1	2.6	1.1	23.2	631	146	45	-	77	-	-
3923	Comtois twp R VII Lot 3-4, Laflamme R	Syenite?	54.9	2.8	5.3	4.9	4.1	4.8	742	63	99	-	140	-	-
3924	Fraser twp R I Lot 22, Laflamme R.	V2, tr cpy, Cu 0.	66.0	1.9	4.4	1.6	1.4	2.6	432	261	66	-	75	-	-
3925	Themines twp R I Lot 46, Laflamme R.	Sediments cbn Rich rock quartz vein	46.8	.3	.6	5.4	11.5	7.2	1085	86	61	-	231	-	-
3926	Franquet twp RVIII Lot 14-15, Florence River	V7, py mag. octahedra	46.8	.2	6.2	5.1	2.5	7.1	1390	40	118	-	23	-	-
3927	Franquet twp RVIII on main road	V6 mas, ep	52.5	.6	2.6	7.2	3.1	6.3	400	162	38	-	132	.002	-
3928	Franquet twp RVIII on main road	Rusty zone 25'-30' po, py, tr cpy	32.5	3.9	2.3	3.4	2.7	22.3	776	142	197	-	94	-	-

PROJECT: THEMINES (1978)

SAMPLE	LOCATION	DESCRIPTION	G E O C H E M I C A L A N A L Y S I S													
			SiO ₂ %	K ₂ O %	Na ₂ O %	Ca O %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	Au ppm	Ag ppm	
3536	Fonteneau twp Rt. 801 RI	V6/V7									.08%	Nil			Nil	Nil
3537	Fonteneau twp Rt 801 RI	V6/V7									.06%	Nil			Nil	Nil

PROJECT: THEMINES (1977)

SAMPLE	LOCATION	DESCRIPTION	GEOCHEMICAL ANALYSIS													
			SiO ₂ %	K ₂ O %	Na ₂ O %	Ca O %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	Au ppm	Ag ppm	
0101	Group H 56W, 34+00N	V6									125	35		53	Nil	Nil
0102	Group H 56W, 16+00N	V6									85	106			Nil	
0103	Group H 60W, 32+00N	V6									134	56			Nil	
0104	Group H 60W, 38+00N	V9, acid									168	22			Nil	
0105	Group H 64W, 54+50N	V6									66	57			Nil	
0106	Currie twp Rt 113, 100' N of Desjardins twp line	3G, py									218	140		141	Nil	Nil
0107	Currie twp Rt 113, 800' N of Desjardins twp line	3G, py									195	45		73	Nil	Nil
0108	Franquet twp R 111, Lot 65 Route 113	S									56	73				
0109	Franquet twp R 111, Lot 65 Route 113	V1, V9									101	74			.002 oz/T	Nil
0110	Franquet twp Rt. 113, .5 mi N of RR	V6, py, calcite									85	69			Nil	Nil
0111	Franquet twp Rt. 113 5600' N of Wedding River	V6, py									138	34			.001 oz/T	Nil
0112	Group M L00, 3+00S	V1, V9	69.9		2.79	0.22	3.7	2.4	28	23	78		15	Nil		
0113	Group H L56W, 58+00N	V6									184	51				

PROJECT: THEMINES (1977)

SAMPLE	LOCATION	DESCRIPTION	GEOCHEMICAL ANALYSIS													
			SiO ₂ %	K ₂ O %	Na ₂ O %	Ca O %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	Au ppm	Ag ppm	
0114	Group H L56W, 34+00N	V6									111	66		45		
0701	Group H L56W, 58+00N	V6	52.6		1.59	6.29	3.51	9.5	76	206	42		122			
0702	Franquet twp 3000'S of RIV line on Rt. 113	V6, py	47.1		2.70	10.50	2.52	6.8	203	61	57		25			
0703	Franquet twp 3300' S of RIV line on Rt. 113	V6, py	44.6		2.92	6.55	3.82	10.5	174	68	82		42			
0704	Franquet twp Rt. 113, .5 mi N of RR	V6, py, calcite	44.5		2.66	9.10	1.82	7.0	120	90	75		114			
0705	Franquet twp Rt. 113, 16000' N of Wedding R.	V6	47.2		3.88	5.61	2.36	9.0	75	288	77		115			
0706	Group M RIV Lot 66	V9, acid									70	74			001 oz/T	Nil
0707	Group M RIV Lot 66	V9, acid									169	49			Nil	3
0708	Group M RIV Lot 66	V9, acid									67	257			Nil	Nil
0709	Group M RIV Lot 66	V9, acid									33	19			002 oz/T	Nil
0801	Group C L16+00W at 3+80S	V6	53.4	.2	2.49	4.0	2.2	10.9	957	94	108		78			
0802	Group C 100'N & 300'E of post 2, C1.366751-5	V6	51.7	1.51	2.60	9.2	3.8	8.7	383	96	52		29			
0803	Group C 100'N of BL at 17+20W	V6									92	84				

PROJECT: THEMINES (1978)

SAMPLE	LOCATION	DESCRIPTION	G E O C H E M I C A L A N A L Y S I S												
			SiO ₂ %	K ₂ O %	Na ₂ O %	Ca O %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	Au ppm	Ag ppm
0804	Group H 44W, 58+50N	V6	52.5	0.61	2.66	7.2	4.9	7.0	489	94	51		65		
0805	Group H 44W, 57+00N	V7	49.3	1.01	2.70	7.8	3.9	6.6	371	117	90		111		
0806	Group H 48W, 59+80N	V6	53.8	0.58	2.65	8.5	6.8	5.0	200	143	22		51		
0807	Group H 48W 52+00N	V6								119	130				
0808	Group H B1, 48+60W	3G	44.3	1.47	2.04	11.3	9.6	4.9	245	88	5		77		
0809	Group H 52W, 56+55N	V6	55.5	0.98	3.48	9.4	3.2	4.9	428	118	67		68		
0810	Group H 76W, 52+40N	V6	54.9	1.08	3.40	10.9	4.7	4.6	399	161	16		71		
0811	Group H 76W, 52+30N	V9, acid	68.0	3.83	5.08	2.1	0.8	1.9	264	72	15		29		
0812	Group H 76W, 0+80N	3G	44.5	0.55	2.24	10.3	9.7	6.0	317	117	9		105		
0813	Group H 80W, 52+00N	V6	59.0	1.45	3.96	6.8	1.5	3.8	385	216	32		119		
0814	Group H 60W, 9+20S	3G								135	25		33		
0815	Group H 64W, 6+00S	3G								153	27		57		
0816	Group H 56W, 4+00S	3G	45.4	0.96	1.49	10.2	9.7	5.8	278	123	13		126		

PROJECT: THEMINES (1977)

SAMPLE	LOCATION	DESCRIPTION	G E O C H E M I C A L A N A L Y S I S													
			SiO ₂ %	K ₂ O %	Na ₂ O %	Ca O %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	Au ppm	Ag ppm	
0817	Group H STL, 35+80W	3G									170	35		58		
0818	Group H 38W, STL	V6	55.6	2.28	5.72	5.6	2.2	4.9	655	113	88		71			
0819	Group F L00 at 16+00S	S	50.7		3.02	6.06	2.56	7.1	118	49	89		57			
0820	Group F L00 at 18+00S	S	52.3		1.35	3.44	1.68	11.5	183	19	155		10			
0821	Group F L8W, 35+15S	S	30.8		0.24	6.02	4.69	17.2	205	59	161		87			
0822	Group F L8W, 36+20S	V								60	78					
0823	Group F TL38S, 9+00W	3G								24	133					
0824	Group F TL38S, 9+00W	3G	46.3		1.58	4.59	6.98	9.2	187	32	133		394			
0825	Franquet twp 1520' W of Rt 113 on RR track	V9, acid	52.8		3.41	6.51	1.41	4.1	89	137	34		143			
0826	Franquet twp 1762' W of Rt 113 on RR track	Va, acid								63	12				Nil	
3747	Currie twp Rt 113, just N of Desjardins twp line	V5, quartz, calcite cpy								495	154		178	Nil	2	
3748	Currie twp Rt 113, just N of Desjardins twp line	V5, quartz, calcite, cpy								186	64		78	Nil	Nil	
3749	Currie twp Rt. 113, just N of Desjardins twp line	V5, quartz calcite, cpy								33	117			Nil	4	

PROJECT: THEMINES (1977)

SAMPLE	LOCATION	DESCRIPTION	GEOCHEMICAL ANALYSIS													
			SiO ₂ %	K ₂ O %	Na ₂ O %	Ca O %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	Au ppm	Ag ppm	
3750	Currie twp Rt. 113, just N of Desjardins twp line	V5, quartz, calcite, cpy									480	31			Nil	1
4416	Access line Wofgroup 0	7A									82	98			Nil	Nil
4417	Group 0 L32E, 25N	1S									191	239			Nil	1
4418	Bigniba road Traverse, Mi 23	1G									61	31			Nil	Nil
4419	Laflamme River Rt 800, NW corner	7A	48.3	.1	2.9	4.5	4.5	10.4	137	103	80		39	Nil	1	
4420	Laflamme, Rt. 800, N Side	V7, py, cp	41.4	.1	2.2	7.7	4.7	10.5	168	95	124		57	Nil	1	
4421	Group 0 1900' N of access, Sta. 8	7A	45.6	0.4	1.7	8.1	3.2	11.6	116	123	95		50	Nil	Nil	
4422	Group 0 3800' E of access, Sta. 8	7A	37.3	0.1	0.7	10.6	5.4	10.3	63	272	50		54	Nil	1	
4423	Group R L20E, 20N	V6	52.7	0.2	2.7	5.3	3.2	7.1	58	108	77		50	Nil	Nil	
4424	Laflamme River 1 mi N of Rt 800	∅ V6, py, trcp	57.7	.2	2.8	4.5	2.5	7.6	78	101	63		52	Nil	Nil	
4425	Laflamme River 1.5mi N of Rt 800	V7	42.6	.5	1.3	8.9	4.7	11.1	41	200	91		72	Nil	Nil	
4426	Laflamme River 3 mi N of Rt 800	2D, py	54.0	.9	1.9	3.7	2.7	4.6	50	92	94		37	Nil	Nil	
4427	Laflamme River Rt 800, NW corner	3G, py, po	49.8	.1	2.6	4.3	3.9	9.5	121	707	116		42	Nil	Nil	

PROJECT: THEMINES (1977)

SAMPLE	LOCATION	DESCRIPTION	GEOCHEMICAL ANALYSIS												
			SiO ₂ %	K ₂ O %	Na ₂ O %	Ca O %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	Au ppm	Ag ppm
4428	North of Group 0	V6, Ⓞ	47.6	.1	1.8	8.0	4.2	7.4	20	130	19		27	Nil	Nil
4429	Laflamme River Rt. 800 bet bridges	V7, py, cpy	39.9	.1	1.0	8.6	4.2	12.0	258	52	101		45	Nil	1
4430	Rt. 800, Laflamme River - Falls	V7	43.4	.1	2.8	7.7	3.5	8.5	136	86	86		58	Nil	1
4409	Franquet twp Rt. 113, 0.8 mi N of S twp line	V9, acid, py								870	145	120	79	.004 oz/T	6
4410	Franquet twp Rt. 113, 0.8 mi N of Wedding River	V6, carb, py								65	76	8	59	.002 oz/T	1
4411	Franquet twp Rt. 113, 1.0 mi N of Wedding River	V1, py, cp, po								74	189	10	13	Nil	1
4412	Franquet twp Rt. 113, 3.0 mi N of Wedding River	V1								103	65	12	13	Nil	Nil
4413	Franquet twp Rt. 113, 0.7 mi N of S twp line	V9, acid, py								172	180	10	15	Nil	1
4414	Franquet twp Rt. 113, 3.1 mi N of S twp line	V1, py, cp								92	84	5	18	Nil	Nil
4415	Franquet twp Rt. 113, 3.9 mi N of S twp line	V1, py, cp								58	75	9	93	.001 oz/T	2
4601	Cameron Lake Shoreline 300' N of beach	3G								103	9		79		
4602	Cameron Lake Shoreline 300' N of beach	3G	46.4		1.69	8.29	5.53	7.6	49	127	10		96		
4603	Cameron Lake Shoreline 2000' N of beach	V6	54.8		2.16	6.72	3.02	8.2	52	225	42		79		

PROJECT: THEMINES (1977)

SAMPLE	LOCATION	DESCRIPTION	G E O C H E M I C A L A N A L Y S I S													
			SiO ₂ %	K ₂ O %	Na ₂ O %	Ca O %	MgO %	Fe %	Mn ppm	Cu ppm	Zn ppm	Pb ppm	Ni ppm	Au ppm	Ag ppm	
4604	Cameron Lake Shoreline 3000' N of beach	V6									273	26		98		
4605	Group M 100' E of L8W at 40S	V9, acid	73.3		4.65	.18	.11	.4	3	17	4		10			
4606	Group M 105' E of L8W at 40S	S	85.6		.49	.18	.05	3.3	35	35	10		17			
4607	Franquet twp RIV Lot 66 Rt 113	S								61	212			.002 oz/T	Nil	

SPECIMEN No. - RT-2-1

Assay No.: not assayed

Location: Franquet township, Range IV, Route 113

ROCK NAME - BIOTITE PHYLLITE - PROBABLY ORIGINALLY A SEDIMENT

MINERALOGY - GREEN BIOTITE

FELDSPAR
QUARTZ
CARBONATE
SERICITE
PYRITE
LEUCOXENE
APATITE
MAGNETITE

DESCRIPTION - THIS ROCK IS VERY FINE GRAINED, FINELY LAMINATED, AND HIGHLY SCHISTOSE, WITH A TYPICALLY PHYLLITIC TEXTURE. THE AVERAGE GRAIN SIZE IS ABOUT 0.01 MM OR LESS, AND THE ROCK CONSISTS OF VARYING PROPORTIONS OF GREEN BIOTITE, FELDSPAR, QUARTZ AND CARBONATE, WITH SMALLER AMOUNTS OF THE OTHER MINERALS LISTED. THE QUARTZ AND FELDSPAR FORM TINY EQUIGRANULAR ANHEDRA WHICH CREATE A MOSAIC THROUGHOUT WHICH THE TINY BIOTITE FLAKES AND CARBONATE CRYSTALS ARE SCATTERED. WHERE BIOTITE IS VERY ABUNDANT CARBONATE TENDS TO BE SPARSE, AND VICE VERSA. THE BIOTITE FLAKES ARE DEEP GREEN IN COLOUR, VERY FRESH, AND SHOW A VERY WELL DEVELOPED PREFERRED ORIENTATION, WHICH GIVES THE ROCK ITS SCHISTOSITY. WHERE IT IS MOST ABUNDANT, BIOTITE MAKES UP ABOUT 60% OF THE ROCK. CARBONATE TENDS TO OCCUR IN FINELY DISSEMINATED CRYSTALS, WHICH ARE SOMEWHAT COARSER THAN THE QUARTZ AND FELDSPAR, AND ALSO IN ABUNDANT SMALL LENSES, WHICH ARE ELONGATED WITHIN THE PLANE OF THE SCHISTOSITY. THERE ARE ALSO OCCASIONAL FRACTURES, FILLED BY CARBONATE, WHICH CROSS CUT THE SCHISTOSITY AT A HIGH ANGLE, AND ALSO SOME IRREGULAR STRINGERS OF CARBONATE, OF QUITE LARGE SIZE. THERE ARE OCCASIONAL, RATHER IRREGULARLY SCATTERED, SMALL CUBES OF PYRITE PRESENT IN THE ROCK, ALONG WITH VERY SPARSE SMALL CRYSTALS OF MAGNETITE, AND SMALL LENSES OF LEUCOXENE. THERE ARE ALSO ACCESSORY AMOUNTS OF APATITE, IN VERY TINY PRISMATIC CRYSTALS. TINY FLAKES OF SERICITE TEND TO OCCUR WITHIN FELDSPAR CRYSTALS, AND ARE ALSO SCATTERED THROUGHOUT THE ROCK, PARTICULARLY WHERE BIOTITE IS RELATIVELY SPARSE.

THE LAMINATED NATURE OF THIS ROCK, WITH BANDS OF VARYING COMPOSITION, SUGGESTS THAT IT IS PROBABLY OF SEDIMENTARY ORIGIN. THERE ARE ALSO OCCASIONAL SMALL, ROUNDED, CLOTS OF CLEAR QUARTZ MOSAIC, WHICH MAY POSSIBLY REPRESENT ORIGINAL, RELATIVELY LARGE, DETRITAL QUARTZ CRYSTALS. THESE ARE UP TO ABOUT 1 MM ACROSS. THE RELATIVE ABUNDANCE OF QUARTZ ALSO TENDS TO SUGGEST A SEDIMENTARY ORIGIN, WHILE THERE IS NO SPECIFIC EVIDENCE IN THIS ROCK WHICH WOULD SUGGEST EITHER A TUFFACEOUS OR AN IGNEOUS ORIGIN.

SPECIMEN No. - RT-2-2

Assay No.: 0116

Location: Franquet township, Route 113, Range IV

ROCK NAME - SERICITE PHYLLITE (SHEARED AND METAMORPHOSED QUARTZ-FELDSPAR PORPHYRY)

MINERALOGY - PHENOCRYSTS - PLAGIOCLASE
QUARTZ

GROUNDMASS - QUARTZ
SERICITE
FELDSPAR
CARBONATE
CHLORITE
PYRITE
LEUCOXENE
APATITE
ZIRCON

DESCRIPTION - THIS ROCK CONSISTS OF RELATIVELY LARGE CRYSTALS OF QUARTZ AND PLAGIOCLASE, SET IN A VERY FINE GRAINED, SHEARED LOOKING, MATRIX VERY RICH IN QUARTZ AND SERICITE. SOME OF THE LARGE QUARTZ CRYSTALS RETAIN A EUHEDRAL OR SUBHEDRAL CRYSTAL FORM, SUGGESTING THAT THEY ARE PHENOCRYSTS, RATHER THAN DETRITAL FRAGMENTS. THESE PHENOCRYSTS COULD BE PRESENT IN EITHER A TUFFACEOUS, OR AN INTRUSIVE OR EXTRUSIVE ROCK. THE AMOUNT OF SHEARING WHICH HAS TAKEN PLACE MAKES IT IMPOSSIBLE TO BE SURE WHICH OF THESE ORIGINS IS THE CORRECT ONE. HOWEVER, THE GROUNDMASS IS QUITE HOMOGENEOUS, AND SHOWS NO SPECIFICALLY TUFFACEOUS CRITERIA, SO IT SEEMS PROBABLE THAT THIS ROCK IS A PORPHYRY. WHETHER IT IS EXTRUSIVE OR INTRUSIVE IS IMPOSSIBLE TO DETERMINE.

QUARTZ 'PHENOCRYSTS' ARE QUITE ABUNDANT, UP TO ABOUT 5 MM ACROSS, AND USUALLY ANHEDRAL. ALTHOUGH OCCASIONAL CRYSTALS DO SHOW EUHEDRAL TO SUBHEDRAL FORM. THE LARGER CRYSTALS ARE STRONGLY STRAINED, AND SOMETIMES CUT ACROSS BY CARBONATE FILLED FRACTURES. PLAGIOCLASE 'PHENOCRYSTS' ARE VERY ABUNDANT, AND TYPICALLY PARTIALLY FRACTURED AND OFTEN DRAWN OUT INTO A NUMBER OF CLOSELY ADJACENT FRAGMENTS FORMING AN 'EYE' SHAPED AGGREGATE ELONGATED WITHIN THE PLANE OF THE SCHISTOSITY. THE PLAGIOCLASE 'PHENOCRYSTS' ARE TYPICALLY STRONGLY SERICITISED, AND CUT ACROSS BY FRACTURES FILLED BY FILMS OF SERICITE OR VERY FINE CARBONATE. THEY ARE UP TO ABOUT 5 MM IN SIZE.

THE GROUNDMASS IS EXTREMELY FINE GRAINED. IT IS COMPOSED PREDOMINANTLY OF TINY ANHEDRA OF QUARTZ, AROUND 0.01 MM GRAIN SIZE OR LESS, INTERMINGLED WITH VERY ABUNDANT TINY FLAKES OF SERICITE WHICH SHOW AN EXTREMELY WELL DEVELOPED PREFERRED ORIENTATION, GIVING THE ROCK ITS SCHISTOSITY. SOME FELDSPAR IS INTERMINGLED WITH THE QUARTZ, BUT THE FINE GRAIN SIZE MAKES IT DIFFICULT TO DISTINGUISH PROPORTIONS. SERICITE PROBABLY MAKES UP ABOUT 30% OF THE GROUNDMASS. THERE IS ALSO A FAIR AMOUNT OF FINE GRAINED CARBONATE, IN RATHER IRREGULARLY DISTRIBUTED STRINGERS, PATCHES AND LENSES. THE SCHISTOSITY OF THE GROUNDMASS CURVES AROUND THE 'PHENOCRYSTS', GIVING THEM AN 'EYE' LIKE APPEARANCE. THERE ARE OCCASIONAL SMALL PATCHES OF GREEN CHLORITE, OCCASIONAL STRINGERS OF PYRITE, SMALL PATCHES OF LEUCOXENE, AND TINY CRYSTALS OF APATITE AND ZIRCON, IN ACCESSORY AMOUNTS.

SPECIMEN No. - RT-2-3

Assay No.: 0117

Location: Franquet township, Route 113, Range IV

ROCK NAME - SERICITE PHYLLITE (POSSIBLY ORIGINALLY A QUARTZ-FELDSPAR
CRYSTAL TUFF)

MINERALOGY - LARGE CRYSTALS - PLAGIOCLASE
QUARTZ

GROUNDMASS - QUARTZ
SERICITE
FELDSPAR
CARBONATE
CHLORITE
LEUCOXENE
APATITE

DESCRIPTION - THIS ROCK IS VERY SIMILAR TO SPECIMEN RT-2-2, IN THAT IT CONSISTS OF RELATIVELY LARGE CRYSTALS OF QUARTZ AND PLAGIOCLASE, SET IN A VERY FINE GRAINED MATRIX RICH IN QUARTZ AND SERICITE AND HIGHLY SCHISTOSE. HOWEVER, IN THIS ROCK, THE QUARTZ IS VERY ANGULAR LOOKING, WHILE THE GROUNDMASS IS RATHER MORE PATCHY LOOKING, WITH OCCASIONAL AREAS OF SLIGHTLY DIFFERING TEXTURES AND RELATIVE PROPORTIONS OF MINERALS, SUGGESTING THAT THIS ROCK MAY BE OF TUFFACEOUS ORIGIN. I WOULD STRESS THAT THIS IS BY NO MEANS DEFINITE, NO DISTINCT CRITERIA ARE PRESENT. IT IS MERELY A TENTATIVE SUGGESTION.

THE LARGE QUARTZ CRYSTALS ARE UP TO ABOUT 3 MM ACROSS, AND TYPICALLY ANGULAR AND MODERATELY STRAINED LOOKING. THE LARGE PLAGIOCLASE CRYSTALS ARE TYPICALLY HIGHLY STRAINED AND OFTEN FRACTURED INTO NUMEROUS ADJACENT PIECES, SO THAT THE AGGREGATE NOW HAS AN 'EYE' SHAPED OUTLINE LYING WITHIN THE SCHISTOSITY PLANE. THEY ARE OF SIMILAR SIZE TO THE QUARTZ, AND ARE TYPICALLY HIGHLY SERICITISED AS WELL AS INCLUDING SMALL CRYSTALS OF CARBONATE. NARROW FILMS OF SERICITE USUALLY FILL THE CRACKS IN THE PLAGIOCLASE CRYSTALS. THERE IS ONE PATCH, SEVERAL MILLIMETRES ACROSS, WHICH CONTAINS SEVERAL PLAGIOCLASE CRYSTALS WHICH ARE RELATIVELY UNAFFECTED BY THE SHEARING, AND WHERE THE SURROUNDING GROUNDMASS IS RELATIVELY UNSHEARED AND LOW IN SERICITE. THIS MAY POSSIBLY REPRESENT A TUFFACEOUS ROCK FRAGMENT.

THE GROUNDMASS IS VERY FINE GRAINED - 0.01 MM OR LESS. IT IS COMPOSED PREDOMINANTLY OF TINY ANHEDRA OF QUARTZ, DOTTED THROUGHOUT BY TINY FLAKES OF SERICITE. THERE IS SOME FELDSPAR IN THE MATRIX ALSO, BUT THE VERY FINE GRAIN SIZE MAKES THE PROPORTION DIFFICULT TO ESTIMATE. SERICITE MAKES UP PERHAPS ABOUT 20% OF THE GROUNDMASS. THERE IS ALSO A FAIR PROPORTION OF CARBONATE, RATHER IRREGULARLY DISSEMINATED IN PATCHES, STRINGERS AND LENSES, AND IN ONE CROSS CUTTING VEINLET WHICH ALSO CONTAINS SOME QUARTZ. THERE IS A VERY LITTLE GREEN CHLORITE, USUALLY ASSOCIATED WITH CARBONATE, AND OCCASIONAL TINY PATCHES OF LEUCOXENE.

THESE PATCHES TEND TO BE STRUNG OUT WITHIN THE PLANE OF THE SCHISTOSITY WHICH IS DEFINED BY THE SERICITE FLAKES.

SPECIMEN No. - RT-3-2A Assay No.: 0119
Location: Franquet township, Route 113, Range VII

ROCK NAME - FINE GRAINED AMPHIBOLITE (POSSIBLY A METAMORPHOSED
IMPURE CALCAREOUS SEDIMENT)

MINERALOGY - PLAGIOCLASE
HORNBLLENDE
QUARTZ
EPIDOTE
MAGNETITE
SPHENE

DESCRIPTION - THIS IS A FINE GRAINED ROCK COMPOSED PREDOMINANTLY OF FELDSPAR AND HORNBLLENDE, DOTTED THROUGHOUT BY LESSER AMOUNTS OF QUARTZ AND EPIDOTE. THE HORNBLLENDE SHOWS A FAIRLY WELL DEVELOPED PREFERRED ORIENTATION, WHICH GIVES A SCHISTOSITY TO THE ROCK. THE ORIGIN OF THIS ROCK IS NOT EASY TO DETERMINE. IT COULD BE DERIVED FROM A FINE GRAINED BASIC IGNEOUS ROCK, OR FROM AN IMPURE CALCAREOUS SEDIMENT. THE ORIGINAL TEXTURE HAS BEEN VIRTUALLY COMPLETELY OBSCURED. THE ONLY POSSIBLE CLUE IS THAT THERE ARE SCATTERED, RELATIVELY LARGE, CRYSTALS OF QUARTZ DOTTED THROUGH THE ROCK, WHICH COULD POSSIBLY REPRESENT ORIGINAL DETRITAL FRAGMENTS, LEADING TO THE SUGGESTION THAT A SEDIMENTARY ORIGIN FOR THIS ROCK MAY POSSIBLY BE THE CORRECT ONE.

THE BASE OF THIS ROCK IS AN EXTREMELY FINE FELDSPATHIC 'MUSH'. THIS IS SO FINE GRAINED, WITH PATCHY LOOKING EXTINCTION PATTERNS, THAT IT IS DIFFICULT TO DISTINGUISH INDIVIDUAL CRYSTALS OVER MUCH OF IT. DOTTED THROUGH THIS FELDSPATHIC BASE THERE ARE ANHEDRA OF HORNBLLENDE, USUALLY ELONGATE IN FORM, WHICH RANGE FROM VERY TINY UP TO ABOUT 1 MM IN LENGTH AND ARE VERY FRESH LOOKING. HORNBLLENDE MAKES UP ABOUT 35% OF THE ROCK. ALSO DOTTED THROUGH THE FELDSPATHIC BASE THERE ARE OCCASIONAL VERY TINY GRAINS OF EPIDOTE (PERHAPS ABOUT 5%) AND TINY PATCHES AND ANHEDRA OF QUARTZ. THERE ARE ALSO OCCASIONAL ANHEDRA OF QUARTZ, AROUND 0.5 MM ACROSS, WITH A GENERALLY ROUNDED FORM, WHICH ARE THOSE MENTIONED ABOVE AS POSSIBLY DETRITAL. THIS 'DETRITAL' QUARTZ MAKES UP ABOUT 5% OF THE ROCK. THE OTHER NOTICEABLE CONSTITUENT OF THE ROCK IS MAGNETITE, WHICH FORMS TINY CLOTS OF GRAINS, USUALLY SURROUNDED BY A FRINGE OF VERY FINE GRAINED SPHENE. THE TWO TOGETHER MAKE UP ABOUT 15% OF THE ROCK.

SPECIMEN No. - FRI-A-1B

Assay No.: 0127

Location: Franquet township, Range VI, Lot 61

ROCK NAME, - CHLORITE-EPIDOTE-CARBONATE SCHIST (PROBABLY AN ALTERED
VESICULAR BASIC LAVA)

MINERALOGY - 'VESICLES' - QUARTZ
CARBONATE
MATRIX - CHLORITE
EPIDOTE
FELDSPAR
QUARTZ
CARBONATE
MAGNETITE

DESCRIPTION - THIS ROCK CONSISTS OF A VERY FINE GRAINED MIXTURE OF CHLORITE, EPIDOTE AND FELDSPAR, THROUGHOUT WHICH ARE DOTTED 'EYES' OF QUARTZ AND ELONGATE LENSES OF CARBONATE. THE MINERALOGY OF THE MAIN PART OF THE ROCK, ALONG WITH A FEW SMALL AREAS WHICH RETAIN A SUGGESTION OF AN IGNEOUS TEXTURE, SUGGEST THAT IT WAS PROBABLY ORIGINALLY A BASIC LAVA. THE 'EYES' OF QUARTZ, AND POSSIBLY THE LENSES OF CARBONATE, PROBABLY REPRESENT ORIGINAL VESICLES IN THE ROCK.

THE QUARTZ 'EYES' ARE ABOUT AROUND 1 - 2 MM ACROSS, OVAL IN SHAPE, AND ARE FILLED BY A CLEAR QUARTZ MOSAIC, SOMETIMES ACCOMPANIED BY A LITTLE CARBONATE. THESE HAVE A DEFINITELY VESICULAR APPEARANCE. CARBONATE LENSES, ON THE OTHER HAND, RANGE FROM OVAL CROSS-SECTIONS, SIMILAR IN SIZE AND FORM TO THE QUARTZ FILLED AREAS, TO EXTREMELY ELONGATE PATCHES OF CARBONATE MOSAIC WHICH MAY BE SEVERAL MILLIMETRES LONG AND ONLY A FRACTION OF A MILLIMETRES THICK. THESE ARE ELONGATED WITHIN THE PLANE OF THE SCHISTOSITY AND PROBABLY REPRESENT CARBONATE FILLED VESICLES WHICH, BEING LESS RESISTANT THAN THE QUARTZ, HAVE BEEN DISTORTED AND DRAWN OUT DURING THE METAMORPHISM.

THE BASE OF THE ROCK, OVER MOST OF THE SECTION, CONSISTS OF A VERY FINE GRAINED (0.02 MM OR LESS) MIXTURE OF CHLORITE AND EPIDOTE, WITH SUBSIDIARY AMOUNTS OF TINY UNTWINNED FELDSPAR GRAINS (PROBABLY ALBITIC) THE CHLORITE FLAKES SHOW A WELL DEVELOPED PREFERRED ORIENTATION, WHICH GIVES THE ROCK ITS SCHISTOSITY. A LITTLE QUARTZ AND CARBONATE ARE ALSO DISSEMINATED THROUGH THE GROUNDMASS, AS ARE OCCASIONAL RELATIVELY LARGE MASSES OF MAGNETITE. OVER MOST OF THE ROCK, THE GROUNDMASS HAS A GRANULAR MOSAIC TEXTURE, APART FROM THE CHLORITE, BUT OVER SOME SMALL AREAS THERE IS A SUGGESTION OF A CRISS CROSSING PATTERN OF PLAGIOCLASE LATHS, WHICH SUGGESTS AN ORIGINAL IGNEOUS COMPOSITION FOR THIS ROCK. WHERE THIS TEXTURE IS PRESENT, CHLORITE AND EPIDOTE ARE SLIGHTLY LESS PROMINENT, ALTHOUGH STILL ABUNDANT. OVER MOST OF THE ROCK, CHLORITE AND EPIDOTE BETWEEN THEM MAKE UP ABOUT 70% OF THE ROCK, WITH CHLORITE BEING SOMEWHAT MORE ABUNDANT THAN EPIDOTE.