52φ/025E-0013

Load: 16 kN
35 mm

63.983
A MAGNETIC SURVEY REPORT

on

THE STEEROLA EXPLORATION LIMITED PROPERTY

at

LAKE ST. JOSEPH

PATRICIA MINING DIVISION

ONTARIO.

C. G. Reed, P. Eng.,
Steep Rock Lake, Ontario.

March 1959
TABLE OF CONTENTS

Introduction .............................................. 1
Location .................................................. 1
Accessibility ............................................. 2
Ownership and Claims .................................... 2
Summary of Exploration Work to Date .................... 4
Personnel Conducting Magnetic Surveys .................. 4
Instrument ............................................... 5
Line Cutting and Surveying ............................... 5
Description of Survey ..................................... 6
Results of Survey .......................................... 7

APPENDIX

Chart Showing Assessment Credit Applied For

MAP ENVELOPES

Airborne Magnetic Survey

Sheet 1  Ground Magnetic Survey
Sheet 2  Ground Magnetic Survey
Sheet 3  Ground Magnetic Survey

Magnetic Profile over Drill Holes 12 & 12A, 13, 10, 11, 8, 5 & 6.
Magnetic Profile over Drill Holes 4, 7, 3, 2, 1 & 9.
MAGNETIC SURVEYS ON THE STEEROLA EXPLORATION LIMITED
PROPERTY AT LAKE ST. JOSEPH, ONTARIO.

INTRODUCTION:

The claims held by Steerola Exploration Limited cover an area of magnetic disturbance which was discovered in 1956 by dip needle traverses. The presence of a previously unknown iron formation of considerable extent was suspected.

In order to quickly outline the area of possible importance an airborne magnetometer survey was conducted. Results of this survey indicated a large magnetic anomaly in excess of 13,000 gammas, 1500 to 2500 feet wide and including en echelon overlaps, ten miles long. Seven miles of strike length are contained within the property limits.

From previous dip needle work it was obvious that all of the area enclosed by the broad anomaly was not iron formation. In order to delineate the bands of iron formation a ground magnetometer survey was made.

LOCATION:

The property is located on the south shore of the eastern portion of Lake St. Joseph in the Patricia Mining Division. A number of claims cover most of a narrow south westerly trending bay of Lake St. Joseph into which flows a creek from Thelma and Dorion Lakes.
The center of the claim group lies at approximately 51 degrees 05 minutes north latitude and 90 degrees 30 minutes west longitude. It is 89 air miles north-northeast of Sioux Lookout, Ontario and 56 air miles north of Savant Lake station on the Canadian National Railway.

ACCESSIBILITY:

A good all weather gravel road passes about five miles east of the property. This road connects the gold mining communities of Pickle Lake and Central Patricia with the Canadian National Railway at Savant Lake. The road distance from Pickle Lake to Savant Lake is about 120 miles. The road distance from a point near the property to Savant Lake is 72 miles.

Access distance by boat or canoe from Ace Lake on the road to the property is about 8 miles. Access may also be gained by float aircraft.

OWNERSHIP AND CLAIMS:

The property consists of 99 contiguous mining claims in the Patricia Mining Division of Ontario. The claims are all currently in good standing and are held by virtue of transfers duly recorded in the name of Steerole Exploration Limited, License No. A-32869, 21 Birch Road Atikokan, Steep Rock Lake P.O., Ontario. The property originally consisted of a greater number of claims but those not listed below are
being allowed to lapse. The 99 claims in question are listed in numerical order as follows:

Pa. 17227 - Pa. 17242 inclusive

Pa. 17260 - Pa. 17291 inclusive

Pa. 18278

Pa. 19172

Pa. 19151

Pa. 22515
SUMMARY OF EXPLORATION WORK TO DATE:

The property came under ownership of Steerola Exploration Limited during the early months of 1957. Since that time the following exploration work has been completed:

Drilling
- Feb. and March 1957: 8 holes, 4,116 feet
- Feb. and March 1958: 5 holes, 3,324 feet

Total Footage: 7,440 feet

Geological Surveying
- May to September 1957
- September to October 1958

Geophysical Surveying
- February 1957: Airborne Magnetometer
- May to September 1957: Ground Magnetometer
- January to March 1958: Ice Magnetometer

Laboratory Work
- Thin Section study: July 1958
- Analysis and Concentration tests on Drill core:
  - Steep Rock Iron Mines - June and July 1957
  - Steep Rock Iron Mines - June and July 1958
  - Ontario Research Foundation - Feb. and March 1958

Thus far only the drilling has been applied for assessment credit. Concurrently with this report, application is being made for assessment credit for the geological mapping.

PERSONNEL CONDUCTING MAGNETIC SURVEYS:


2. Ground Survey
   - Kenneth MacLeod - party chief - 56 N. High St., Port Arthur, Ont.
   - Victor T. Young - instrument man - Queen's University, Kingston, Ontario.
   - John J. White - chainman - 256 McCaul Street, Toronto 2B, Ont.
   - Neilo Anderson - chainman - Sioux Lookout, Ontario.
For purposes of the ground and ice surveys a Sharpe Model DL-M magnetometer was used.

**Specifications**

- Sensitivity: 60 gammas per degree deflection
- Measureable Intensity Range: 50,000 gammas
- Range of Auxiliary Magnet: 2,500 to 25,000 gammas

**LINE CUTTING AND SURVEYING:**

In order to properly conduct this survey a grid system was laid out. In all 14.40 miles of baseline were surveyed and 72.77 miles of picket lines were cut and chained. In addition some 27.36 miles of chained picket lines were established on the ice. The grid system was tied to mile post 21 on an east-west township line south of the property. Mile post 21 is 825 feet south and 1506 feet east of No. 2 post claim 19158.
The picket lines were established at intervals of 400 feet with chainages marked every 100 feet. All claim corners, streams, lakes and rock outcrops were chained to the grid system.

**DESCRIPTION OF SURVEY:**

Readings were taken at 100 foot intervals along lines 400 feet apart. In areas where abrupt changes in magnetic intensity were noted readings were taken at 50 foot intervals. A total of 4,726 readings were taken on the property.

There are no Ontario Department of Mines magnetic base stations in the area. The airborne magnetic survey map shows an average magnetic base level for the area of about 1,700 gammas.

Due to the size of the area covered the survey is plotted on three sheets. Check points were selected for each of the map sheets with co-ordinate locations as follows:

- Check point sheet 1 - N 25000 E 17200
- Check point sheet 2 - N 24300 E 30000
- Check point sheet 3 - N 25000 E 35000

Readings are plotted directly on the map without being converted to their gamma equivalent. It is our opinion that due to the abrupt change in magnetic intensities at iron formation boundaries and the high readings obtained over the iron formation as compared to the surrounding rock types the calculation to change scale readings to gammas is unnecessary.
RESULTS OF THE SURVEY:

Two major zones of iron formation were outlined by the ground survey, which may ultimately prove to be of economic importance. Several minor lenses of iron formation were also outlined. It is to be noted that the major zones of iron formation underlie areas of little outcrop. Without this survey no reasonable interpretation of the extent of the iron formation is currently possible. The indicated location of the iron formation has already been confirmed by diamond drilling in several locations.

No major fault displacements are indicated.

All geological data is covered in a separate report submitted concurrently.

Respectfully submitted,

C. C. Reed,

P. Eng.
Scope and Nature of Report:

This report is based on the study of 15 thin sections of surface and drill core specimens from the Lake St. Joseph property of Steep Rock Iron Mines Limited. The report is purely petrographic. I am writing it without knowledge of the field relations of the rocks in question, and without examining the hand specimens.

General:

The specimens examined are all metamorphic rocks and most, if not all, of them appear to be metasediments. Low to medium metamorphic conditions have changed the original sediments to an assemblage consisting of chlorite schist, biotite schist or gneiss, garnet and/or staurolite schists and gneisses and quartz-magnetite schists.

The "rolled" nature of some of the garnet metacrysts suggests that folding accompanied metamorphism.

There is considerable variation in the degree of recrystallization of the rocks. For example, some of the garnet schists have grains measuring up to 1 cm in diameter whereas in other rocks (including the iron formation) there appears to have been only a very minor increase in grain size during metamorphism. This variation may be due to differences in original composition or to the degree of metamorphism or both.

Rock Description:

(1) Iron Formation:

The iron formation is a typical recrystallized sedimentary cherty iron rock. Metamorphism has converted the chert to fine quartz and the present rock is composed of a mosaic of somewhat flattened quartz grains showing sutured
contacts with magnetite both interstitial to and within quartz grains. Minor amounts of chlorite, amphibole, biotite and sphene make up the remainder of the rock.

There is no textural evidence for assuming that the iron has been introduced or that it has moved appreciably during metamorphism. This conclusion is supported by the fact that the iron rich rocks contain the normal average of from 20 to 35 per cent iron so common in sedimentary iron deposits the world over.

It is significant to note that several of the specimens of iron formation contain minor amounts of carbonate. Possibly some of the magnetite developed from siderite during metamorphism. Most of it, however, is probably primary.

One specimen (No. 6) contains 10 per cent or more of sphene as well developed metacrysts. The specimen also contains porphyroblasts of garnet up to 4 mm. in diameter. It is significant that the sphene is concentrated in this highly altered iron rich rock and not in the more normal iron formation. Perhaps it will be possible to outline and eliminate titanium rich areas in the mine.

Specimen No. 1 - Rich iron formation. Composed chiefly of magnetite and quartz with minor chlorite. The specimen exhibits very fine banding. Magnetite as anhedral to subhedral grains makes up almost half of the volume. Individual magnetite grains range from 0.01 to 0.1 mm. in diameter.

Specimen No. 6 - Metamorphosed lean iron formation - Garnet - Magnetite gneiss. This rock is composed of quartz, magnetite, garnet, sphene and tremolite. Garnet and sphene occur as well developed metacrysts. The rock still shows some of the original banding. Magnetite occurs as very fine (0.01 mm.) anhedral grains within the iron rich bands, and as well developed crystals averaging about 0.15 mm. in diameter randomly spread throughout the rock.
Specimen No. 24 - Magnetic iron formation, medium banded. Composed chiefly of quartz and magnetite with some carbonate, tremolite and biotite. The carbonate occurs in discrete grains with quartz. Quartz is notably coarser grained in the carbonate rich bands. Magnetite occurs as anhedral to subhedral grains ranging from 0.001 to 0.25 mm in diameter. Average magnetite grain size is about 0.07 mm. This is a typical recrystallized sedimentary iron formation.

Specimen No. 22 - Magnetic iron formation, lean-fine banded. Composed mainly of quartz and magnetite with minor carbonate and biotite. Quartz exhibits sutured to mosaic fabric with magnetite grains either surrounded by quartz grains or within individual quartz grains. Magnetite grains measure from 0.001 to 0.1 mm in diameter with the average around 0.03 mm.

Specimen No. 28 - Magnetic iron formation. Composed principally of quartz and magnetite with minor wollastonite? carbonate and muscovite. Magnetite is in subhedral to anhedral grains from 0.001 to 0.2 mm in diameter. Average magnetite grain measures 0.06 mm. Normal metamorphosed sedimentary iron formation.

Specimen No. 29 - Magnetite-hematite iron formation. Composed of quartz, magnetite and hematite with minor biotite. The relative proportion of hematite and magnetite are not determined. Oxide grains are sub-rounded and average about 0.075 mm in diameter.

(3) Well Rocks:

Specimen No. 5 - Quartz-biotite schist. Fine grained rock composed of quartz, feldspar and biotite. Exhibits slightly schistose texture. Shows delicate banding which may be an original sedimentary feature.
Specimen No. 9 - Actinolite schist. Composed of quartz, actinolite, chlorite, clinozoisite, with minor carbonate. Distinctly schistose-acicular and layer minerals show pronounced preferred orientation. Probably a recrystallized sedimentary rock.

Specimen No. 11 - Garnet biotite schist. Composed of quartz, feldspar, biotite and garnet. Garnet occurs as metaclasts and exhibits sieve texture. Chlorite and magnetite are minor constituents. The abundance of quartz suggests that this is a metasediment.

Specimen No. 12 - Exhibits mortar type texture with scattered large broken and sericitized crystals of plagioclase in a fine, even grained matrix of quartz and feldspar. The matrix has a typical mosaic texture. Biotite and muscovite are the only other important minerals. Very slight foliation.

Specimen No. 16 - Staurolite schist. Composed of quartz, brown biotite, staurolite and garnet. Distinct foliation. This rock is a metasediment.

Specimen No. 18 - Quartz-biotite schist. Composed of lenticular 'eyes' of quartz (and locally feldspar) in a matrix of very fine quartz showing mosaic texture. Biotite and muscovite parallel the schistosity and fold around the quartz 'eyes'.

Specimen No. 27 - Garnet-biotite schist. Specimen composed of garnet, biotite, quartz, carbonate, tremolite and chlorite. It is coarse grained with garnets up to 4 mm in diameter. It is probably a metasediment. The coarseness of grain may be due to the carbonate content.

Specimen No. 30 - Chlorite-actinolite schist. Composed of amphibole, quartz, feldspar and chlorite with scattered carbonate. Probably a metamorphosed calcareous sediment.
Specimen No. 31 - Garnet - biotite schist (gneiss). Composed of quartz, feldspar, garnet, biotite, actinolite and an unidentified mineral. This is a normal metamorphic rock.

Henry Lapp

July 21, 1958
A GEOLOGICAL REPORT

on

THE STEEROLA EXPLORATION LIMITED PROPERTY

at

LAKE ST. JOSEPH

PATRICIA MINING DIVISION

ONTARIO

C. C. Reed, P. Eng.
Steep Rock Lake, Ont.

March 1959.
## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Location</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility</td>
<td>1</td>
</tr>
<tr>
<td>Ownership and Claims</td>
<td>2</td>
</tr>
<tr>
<td>Summary of Exploration Work to Date</td>
<td>3</td>
</tr>
<tr>
<td>Personnel Involved in Geological Studies</td>
<td>3</td>
</tr>
<tr>
<td>Line Cutting</td>
<td>4</td>
</tr>
<tr>
<td>Table of Formations</td>
<td>5</td>
</tr>
<tr>
<td>Rock Descriptions:</td>
<td></td>
</tr>
<tr>
<td>Keewatin</td>
<td>6</td>
</tr>
<tr>
<td>Algoman</td>
<td>10</td>
</tr>
<tr>
<td>General Comments re Rock Classifications</td>
<td>12</td>
</tr>
<tr>
<td>General Geology</td>
<td>12</td>
</tr>
<tr>
<td>Structural Geology</td>
<td>14</td>
</tr>
<tr>
<td>Economic Geology</td>
<td>15</td>
</tr>
<tr>
<td>References</td>
<td>16</td>
</tr>
</tbody>
</table>

### APPENDIX

- Thin Section Study Lake St. Joseph Iron Deposit - Dr. H. Lepp
- Chart Showing Assessment Credit Applied for

### MAP FOLDER

- Sheet 1
- Sheet 2
- Sheet 3
LOCATION:

The property is located on the south shore of the eastern portion of Lake St. Joseph in the Patricia Mining Division. A number of claims cover most of a narrow south westerly trending bay of Lake St. Joseph into which flows a creek from Thelma and Dorion Lakes. The center of the claim group lies at approximately 51 degrees 05 minutes north latitude and 90 degrees 30 minutes west longitude. It is 89 air miles north-northeast of Sioux Lookout, Ontario and 56 air miles north of Savant Lake station on the Canadian National Railway.

ACCESSIBILITY:

A good all weather gravel road passes about five miles east of the property. This road connects the gold mining communities of Pickle Lake and Central Patricia with the Canadian National Railway at Savant Lake. Road distance from Pickle Lake to Savant Lake is about 120 miles. Road distance from a point near the property to Savant Lake is 72 miles.

Access distance by boat or canoe from Ace Lake on the road to the property is about 8 miles. Access may also be gained by float aircraft.
OWNERSHIP AND CLAIMS:

The property consists of 99 contiguous mining claims in the Patricia Mining Division of Ontario. The claims are all currently in good standing and are held by virtue of transfers duly recorded in the name of Steerola Exploration Limited, License No. A-32869, 21 Birch Road, Atikokan, Steep Rock Lake P.O., Ontario. The property originally consisted of a greater number of claims but those not listed below are being allowed to lapse. The 99 claims in question are listed in numerical order as follows:

Pa. 17227 - Pa. 17242 inclusive
Pa. 17260 - Pa. 17291 inclusive
Pa. 18278 - Pa. 19172
279     173
281     174
284     175
285     177
286     178
287     179
288     181
291     182
292     183
293     185
294     186
295     188
745     189
746     192
747     195
748     197
Pa. 19151 - Pa. 198
152     199
156
157
158     Pa. 22515
161     516
162     517
163     518
166
167
168
SUMMARY OF EXPLORATION WORK TO DATE

The property came under ownership of Steerola Exploration Limited during the early months of 1957. Since that time the following exploration work has been completed:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Dates</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling</td>
<td>Feb. and March 1957</td>
<td>8 holes 4,116 feet</td>
</tr>
<tr>
<td></td>
<td>Feb. and March 1958</td>
<td>5 holes 3,324 feet</td>
</tr>
<tr>
<td>Total Footage</td>
<td></td>
<td>7,440 feet</td>
</tr>
<tr>
<td>Geological Surveying</td>
<td>May to September 1957</td>
<td></td>
</tr>
<tr>
<td></td>
<td>September to October 1958</td>
<td></td>
</tr>
<tr>
<td>Geophysical Surveying</td>
<td>February 1957</td>
<td>Airborne Magnetometer</td>
</tr>
<tr>
<td></td>
<td>May to September 1957</td>
<td>Ground Magnetometer</td>
</tr>
<tr>
<td></td>
<td>January to March 1958</td>
<td>Ice Magnetometer</td>
</tr>
<tr>
<td>Laboratory Work</td>
<td>Thin Section study July 1958</td>
<td>Analysis and Concentration tests on Drill core:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Steep Rock Iron Mines - June and July 1957</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Steep Rock Iron Mines - June and July 1958</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ontario Research Foundation-Jan. to March 1958</td>
</tr>
</tbody>
</table>

Thus far only the drilling has been applied for assessment credit.

Concurrently with this geological report, application is being made for assessment credit for the geophysical surveys and line cutting.

PERSONNEL INVOLVED IN GEOLOGICAL STUDIES:

All geological work both in the field and in the office has been under the direction of Mr. J. F. White, Exploration Geologist, Steep Rock Iron Mines Limited, Steep Rock Lake, Ontario. Throughout the various phases of the work Mr. White has been guided by Dr. A. W. Jolliffe, Professor, Geology Department, Queen's University, and Mr. Hugh M. Roberts, Mining Geologist, 306 Lonsdale Building, Duluth, Minnesota, who are consulting geologists for Steep Rock Iron Mines Limited.
Thin section studies of field specimens and drill core were made by Mr. Wm. Huston, Chief Geologist, Steep Rock Iron Mines Limited and Dr. Henry Lepp, Professor, Department of Geology, University of Minnesota at Duluth.

All field work and drafting was done by the staff of the Exploration Department, Steep Rock Iron Mines Limited namely:

- Mr. Calvin C. Reed, B. Sc., (Queen's 1950) geologist
- Mr. William J. Power, B. Sc., (St. Francis Xavier 1957) geologist
- Mr. Angus King, B. Sc., (St. Francis Xavier 1957) geologist
- Mr. Victor T. Young, (Queen's University) Kingston
- Mr. Wallace Hannon, Steep Rock Lake, Ontario.

**LINE CUTTING:**

In conjunction with, and as a necessary part of, the program of geological mapping and geophysical surveying of this property, a series of baselines and picket lines were cut and chained. In all, 14 miles of baselines and control lines were surveyed and about 80 miles of picket and tie lines were cut and chained. All lakes, streams, claim posts and rock outcrops were chained to the grid system.
TABLE OF FORMATIONS

PRE-CAMBRIAN

ALGOMAN

Satellite dikes or sills
Porphyry, Pegmatite, granite, trap or lamprophyre
Quartz veins
3a Pink granite
3b Gray granite

KEEWATIN

2 Magnetic iron formation
1a Metacrystic meta (sediment or flow)
1b Metacrystic schist
1c Metadiorite
1d Mafic Schist
1e Amphibolite
1k Quartz-Biotite Schist
1g Staurolite-Garnet Schist
1h Aggloserate and Tuff
ROCK DESCRIPTIONS

KEEWATIN

2. Magnetic Iron Formation
   (Description by Dr. H. Lepp based on a microscopic study of six thin sections)

   The iron formation is a typical recrystallized sedimentary cherty iron rock. Metamorphism has converted the chert to fine quartz and the present rock is composed of a mosaic of somewhat flattened quartz grains showing sutured contacts with magnetite both interstitial to and within quartz grains. Minor amounts of chlorite, amphibole, biotite and sphene make up the remainder of the rock.

   There is no textural evidence for assuming that the iron has been introduced or that it has moved appreciably during metamorphism.

   It is significant to note that several of the specimens of iron formation contain minor amounts of carbonate. Possibly some of the magnetite developed from siderite during metamorphism. Most of it, however, is probably primary.

1a Metacrystic Meta (sediment or flow)
   (Description based on megascopic examination)

   This rock type consists of white feldspathic metacrysts in a dark fine grained groundmass. The metacrysts vary in form from
ghost-like shadows to well formed crystal lathes greater than 1/4 inch in length; and make up from 15% to 50% of the volume of the rock. The groundmass may be composed of biotite, varying amounts of quartz (from negligible to about 40%); and plus or minus varying small amounts of amphibole, chlorite, and feldspar.

1b  **Metacrystic Schist**  
(Description based on megascopic examination)

This rock (1b) is the schistose equivalent of (1a).

1c  **Metadiorite**  
(Description based on megascopic examination)

The metadiorite is a black and white medium to coarse grained rock which in the field resembles a diorite. It is found at or near the contact of the Algoman granite with the Keewatin rocks.

1d  **Mafic Schist**  
(Description based on megascopic examination)

The mafic schist is a fine grained, schistose, black rock, consisting of biotite, amphibole, and chlorite with little or no visible quartz and/or feldspar.

1e  **Amphibolite**  
(Description based on megascopic examination)

The amphibolite (1e) is a coarse grained mafic rock associated with the mafic schist (1d); the two rock types being gradational one to the other. Hornblende exists as crystals, up to 1/4 inch in size, within a groundmass of biotite, amphibole, and chlorite; plus or minus quartz and/or feldspar.
Ik Quartz-Biotite Schist
(Description based on megascopic examination)

The quartz-biotite schist is a light brown to dark gray brown, fine grained, schistose rock consisting of quartz, biotite, and feldspar. In some cases well developed quartz eyes may be noted in the groundmass.

(Description by Dr. R. Lepp based on Thin Section Study)

Thin Section No. 5

Quartz-biotite schist - Fine grained rock composed of quartz, feldspar and biotite. Exhibits slightly schistose texture and shows delicate banding which may be an original sedimentary feature.

Thin Section No. 18

Quartz-biotite schist - Composed of lenticular "eyes" of quartz (and locally feldspar) in a matrix of very fine quartz showing mosaic texture. Biotite and muscovite parallel the schistosity and fold around the quartz "eyes".

Ig Staurolite - Garnet Schist
(Description based on megascopic examination)

This rock type (or types) commonly occur as a banded schist, the alternating bands being made up of staurolite schist and garnet schist. The bands may vary in width from about six inches to six feet.
The staurolite crystals are usually well developed both singly and as "sawhorse twins" and attain a size of up to one inch or greater. Well crystallized red garnets are commonly 1/8 inch or greater in size, and may occupy up to 10% of the rock by volume.

(Description by Dr. H. Leap based on Thin Section Study)

Thin Section No. 11

Garnet biotite schist - Composed of quartz, feldspar, biotite and garnet. Garnet occurs as metacrysts and exhibits sieve texture. Chlorite and magnetite are minor constituents. The abundance of quartz suggests that this is a metasediment.

Thin Section No. 22

Garnet-biotite schist - Specimen composed of garnet, biotite, quartz, carbonate, tremolite and chlorite. It is coarse grained with garnets up to 1/2 mm. in diameter. It is probably a metasediment. The coarseness of grain may be due to the carbonate content.

Thin Section No. 16

Staurolite schist - Composed of quartz, brown biotite, staurolite and garnet. Distinct foliation. This rock is a metasediment.
1h **Agglomerate and Tuff**  
(Description based on field examination)

Agglomerate is well exposed on an island on claims 18745 and 18746, map sheet No. 3. Leucocratic bombs or rounded to subangular fragments up to one foot in size are noted in an intermediate groundmass. The bombs are all of the same composition and occupy up to 50% of the rock by volume.

Well bedded tuff outcrops are found on claim 17235. It is a fine grained, alternately light and dark bedded rock, the beds being 1/4 to 1/2 inch in thickness.

---

3a **Pink Granite**  
(Description based on field examination)

This rock is a pink, medium to coarse grained, hypidiomorphic aggregate, consisting of approximately 50% orthoclase, 20% quartz, 20% plagioclase, and 10% hornblende and biotite. Near the contact with the Keewatin rocks (see map sheet No. 1) the rock may more properly be called a porphyritic granite because of the development of large phenocrysts of orthoclase.

(Description by W. J. Power based on Thin Section Study)

Thin Section No. 9

Granite - This rock consists of quartz and orthoclase with some biotite and hornblende crystals. Many of the mafic minerals show inclusions of quartz and feldspar.
Thin Section No. 12

Porphyritic Granite - This rock consists of large phenocrysts of orthoclase in a finer grained groundmass of orthoclase, plagioclase, quartz, and some biotite. The plagioclase is in the oligoclase range.

3b Gray Granite
(Description based on field examination)

An hypidiomorphic equigranular aggregate consisting of 40% quartz, 40% white feldspar, and 20% hornblende and biotite.

Satellitic Dikes or Sills
(Description based on field examination)

(1) Porphyry - The rock consists of approximately 60% plagioclase, 30% quartz, 5% biotite, (plus or minus 2% hornblende?), 3% pyrite. Quartz eyes or feldspar crystals, or both, may be noted as phenocrysts.

(2) Pegmatite - This rock is composed of very coarsely crystallized white and pink feldspars, and quartz.

(3) Granite - These dikes or sills are similar in composition to the large granitic intrusion.

(4) Trap - A fine grained black rock of undetermined composition.

Quartz Veins

Several veins of white or milky quartz have been noted. No sulphide mineralization is associated with the quartz.
GENERAL COMMENT CONCERNING THE ROCK CLASSIFICATION

The Keewatin series of rock types excluding the iron formation is divided into eight sub groups. This classification is offered as a result of field observations and is based on apparent physical characteristics.

Thin Section work indicates these rocks to be closely related, and with the exception of the agglomerate and tuff all are probably of sedimentary origin.

The remaining rocks as classified require no further comment.

GENERAL GEOLOGY

The rocks underlying the claim group are pre cambrian in age. The highly metamorphosed Keewatin series, intruded by the Algoman granite and its satellitic rocks, consists chiefly of metasediments, agglomerate and tuff, and magnetic iron formation.

The metasediments comprised of sub groups 1(a) to 1(g) inclusive, as shown on the geological map, offer little or no field evidence as to their origin.

1. No definite bedding was noted, thus formational top or bottom determinations were not possible.
2. Ellipsoidal or pillow structures or remnants of such features were not observed.
3. Each of the sub groups change, one to the other, along as well as normal to the strike.
4. The well banded staurolite and garnet schists 1(g) are derived from sedimentary rock.
Thin Section Study as previously described under "Rock Descriptions" indicates the series to be chiefly derived from sedimentary rocks; however the presence of metacrysts in a basic groundmass (1a), mafic schist (1d), and amphibolite (1e), offers the possibility of volcanic derivation.

The distinctive agglomerate and tuff observed in the north-east portion of the claim group occupies a horizon about 1000 feet north and parallel to the north zone of iron formation.

The low weathering magnetic iron formation (2), is mostly concealed by overburden and to the east extends under Lake St. Joseph. The general outline of the iron formation is determined by geophysical interpretation, examination of available rock outcrops, and diamond drilling. Drill core study reveals many small inclusions of country rock within the iron formation. Magnetite occurs as thin bands, uniformly fine grained, usually in quartz-biotite schist. Only very minor amounts of iron sulphide and specular hematite are present.

A granitic stock intrudes the Keewatin series on the south-west portion of the claim group. Small irregular intrusions of granite, porphyry, pegmatite, and trap or lamprophyre, are noted at random locations throughout the mapped area. Where possible, geophysical data was used in conjunction with rock exposures to determine the geological contacts. However because of the similarity of magnetic intensity over the acidic rocks and the overburden the locations of various contacts were assumed.
The Pleistocene deposits over the claim group are represented by shallow overburden which consists of sand and gravel, and muskeg.

**Structural Geology**

The claim area is situated on the north limb of a large syncline. The synclinal axis trends in an east west direction and is located about three miles south of the claim group.

The strike of the formations in the area in question (when considered from west to east) varies from southeast through east to northeast. The formations usually dip steeply to the south, however, in some cases may be vertically inclined or even more rarely may dip to the north. The steep dips on both the north and south limbs of the syncline would indicate the possibility of the extension of the formations to great depth.

Local folding or formational contortion was not observed other than in the magnetite bands in some of the outcrops of iron formation. In a very few cases drag folding was noted in accordance with the major synclinal structure.

Major faulting does not exist as is evident from observation of the footwall contact of the northmost iron zone. Minor faulting was noted on an island in Lake St. Joseph on map sheet No. 3.

Two distinct continuous zones of iron formation as well as many small irregular masses have been mapped. Consideration of the
REFERENCES

(1) (a) Iron Formation of Lake St. Joseph by E. L. Bruce,

(b) Eastern Part of Lake St. Joseph by E. L. Bruce,
Ontario Department of Mines, Vol. XXXI, part VIII, 1922

(2) Geology of the Pashkokogan-Misemkow Area, by W. S. Dyer,
Ontario Department of Mines, Vol. XLII, part VI, 1933.
# GEOLOGICAL MAPPING - LAKE ST. JOSEPH CLAIMS

## 66 Land Claims for Assessment Credit

<table>
<thead>
<tr>
<th>Name</th>
<th>Occupation</th>
<th>Office Work Dates</th>
<th>Office Work Days</th>
<th>8 hr. Days</th>
<th>Assessment Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>W. J. Huston</td>
<td>Geologist</td>
<td>June 1958</td>
<td>14</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>Henry Lepp</td>
<td>Geologist</td>
<td>July 1958</td>
<td>14</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>A. R. King</td>
<td>Geologist</td>
<td>Sept.-Dec./57</td>
<td>95</td>
<td>380</td>
<td></td>
</tr>
<tr>
<td>W. J. Power</td>
<td>Geologist</td>
<td>Sept.-Dec./57</td>
<td>95</td>
<td>380</td>
<td></td>
</tr>
<tr>
<td>C. C. Reed</td>
<td>Geologist</td>
<td>Oct.-Dec./58</td>
<td>36</td>
<td>152</td>
<td></td>
</tr>
<tr>
<td>J. F. White</td>
<td>Geologist</td>
<td>Oct.-Dec./58</td>
<td>35</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>K. MacLeod</td>
<td>Draughtsman</td>
<td>Apr.-June/58</td>
<td>32</td>
<td>128</td>
<td></td>
</tr>
<tr>
<td>A. W. Jolliffe</td>
<td>Consultant</td>
<td>July 1958</td>
<td>6</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>W. M. Roberts</td>
<td>Consultant</td>
<td>June 1958</td>
<td>3</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field Work</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. R. King</td>
<td>Geologist</td>
<td>June 1-Aug./57</td>
<td>90</td>
<td>135</td>
<td>540</td>
</tr>
<tr>
<td>C. C. Reed</td>
<td>Geologist</td>
<td>Sept.6-Oct.6/58</td>
<td>30</td>
<td>45</td>
<td>180</td>
</tr>
<tr>
<td>W. J. Power</td>
<td>Geologist</td>
<td>Sept.6-Oct.6/58</td>
<td>30</td>
<td>45</td>
<td>180</td>
</tr>
<tr>
<td>V. T. Young</td>
<td>Assistant</td>
<td>Sept.6-Oct.6/58</td>
<td>30</td>
<td>45</td>
<td>180</td>
</tr>
<tr>
<td>J. F. White</td>
<td>Geologist</td>
<td>July 1957</td>
<td>12</td>
<td>18</td>
<td>72</td>
</tr>
<tr>
<td>W. Hannon</td>
<td>Line Cutter</td>
<td>Sept.6-Oct.6/58</td>
<td>30</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>F. Leppanen</td>
<td>Line Cutter</td>
<td>May 25-Aug.30/57</td>
<td>96</td>
<td>144</td>
<td>144</td>
</tr>
<tr>
<td>I. Loon</td>
<td>Line Cutter</td>
<td>July 2-Aug.28/57</td>
<td>56</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td>J. Loon</td>
<td>Line Cutter</td>
<td>July 2-Aug.28/57</td>
<td>56</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td>W. Loon</td>
<td>Line Cutter</td>
<td>July 2-Aug.28/57</td>
<td>56</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>3,459</strong></td>
</tr>
</tbody>
</table>

**NOTE:** Application for assessment credit is claimed for 66 claims only or a total of (66 x 40) 2,640 days for geological mapping.
overall outline of the iron formation as one entity, in conjunction with the interpretation of the airborne magnetic survey, a large compressed "S" shaped drag fold is indicated. This structure, if true, would accord with the synclinal concept; however a close study of the available strikes and dips precludes the idea.

It is probable the iron formation originally was deposited by intermittent deposition of iron rich beds. The small areas of iron formation would represent vary local conditions of sedimentation.

ECONOMIC GEOLOGY

The claim group is of interest because of the possibility of economic development of the iron formation.

Few quartz veins were noted and these were barren of sulphide, arsenide, or precious metal mineralization.

A gossan zone about 100 feet long and ten feet wide, bearing minor pyrite, was noted on an island in Lake St. Joseph and is shown on map sheet No. 3. A surface channel sample chosen for gold assay purposes returned negative results.

Respectfully submitted,

C. C. Reed, P. Eng.,
Steep Rock Lake, Ontario,
March 1959.

CCR/ma
## Geophysical Survey Lake St. Joseph Claims

<table>
<thead>
<tr>
<th>Name</th>
<th>Occupation</th>
<th>Field Work</th>
<th>Office Work</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Dates</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 hr.</td>
<td>8 hr.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Days</td>
<td>Days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jan. - Mar./58</td>
<td>40</td>
</tr>
<tr>
<td>V. T. Young</td>
<td>Instrument Man</td>
<td>May 25-Aug.30/57</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. C. Reed</td>
<td>Party Chief</td>
<td>Jan.25-Mar.16/58</td>
<td>40</td>
</tr>
<tr>
<td>J. J. White</td>
<td>Chainman</td>
<td>May 25-Aug.30/57</td>
<td>96</td>
</tr>
<tr>
<td>N. Anderson</td>
<td>Chainman</td>
<td>May 25-Aug.30/57</td>
<td>96</td>
</tr>
<tr>
<td>F. Leppanen</td>
<td>Line Cutter</td>
<td>May 25-Aug.30/57</td>
<td>96</td>
</tr>
<tr>
<td>I. Loon</td>
<td>Line Cutter</td>
<td>July 2-Aug.28/57</td>
<td>56</td>
</tr>
<tr>
<td>W. Loon</td>
<td>Line Cutter</td>
<td>July 2-Aug.28/57</td>
<td>56</td>
</tr>
<tr>
<td>J. Loon</td>
<td>Line Cutter</td>
<td>July 2-Aug.28/57</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sept./57-Jan.58</td>
<td>90</td>
</tr>
<tr>
<td>K. MacLeod</td>
<td></td>
<td>Jan.-Mar./59</td>
<td>30</td>
</tr>
<tr>
<td>C. C. Reed</td>
<td></td>
<td>Jan.-Mar./59</td>
<td>30</td>
</tr>
<tr>
<td>W. J. Power</td>
<td></td>
<td>Feb.-Mar./59</td>
<td>15</td>
</tr>
<tr>
<td>J. F. White</td>
<td></td>
<td>TOTAL</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Application for assessment credit is claimed for 99 claims only or a total of (99 x 40) 3,960 days for Geophysical Survey.

Application for assessment credit by line cutting is claimed for 66 land claims only or a total of (66 x 5) 330 days.
For Additional Information

See Maps:

520/025E-0013 #1-#12