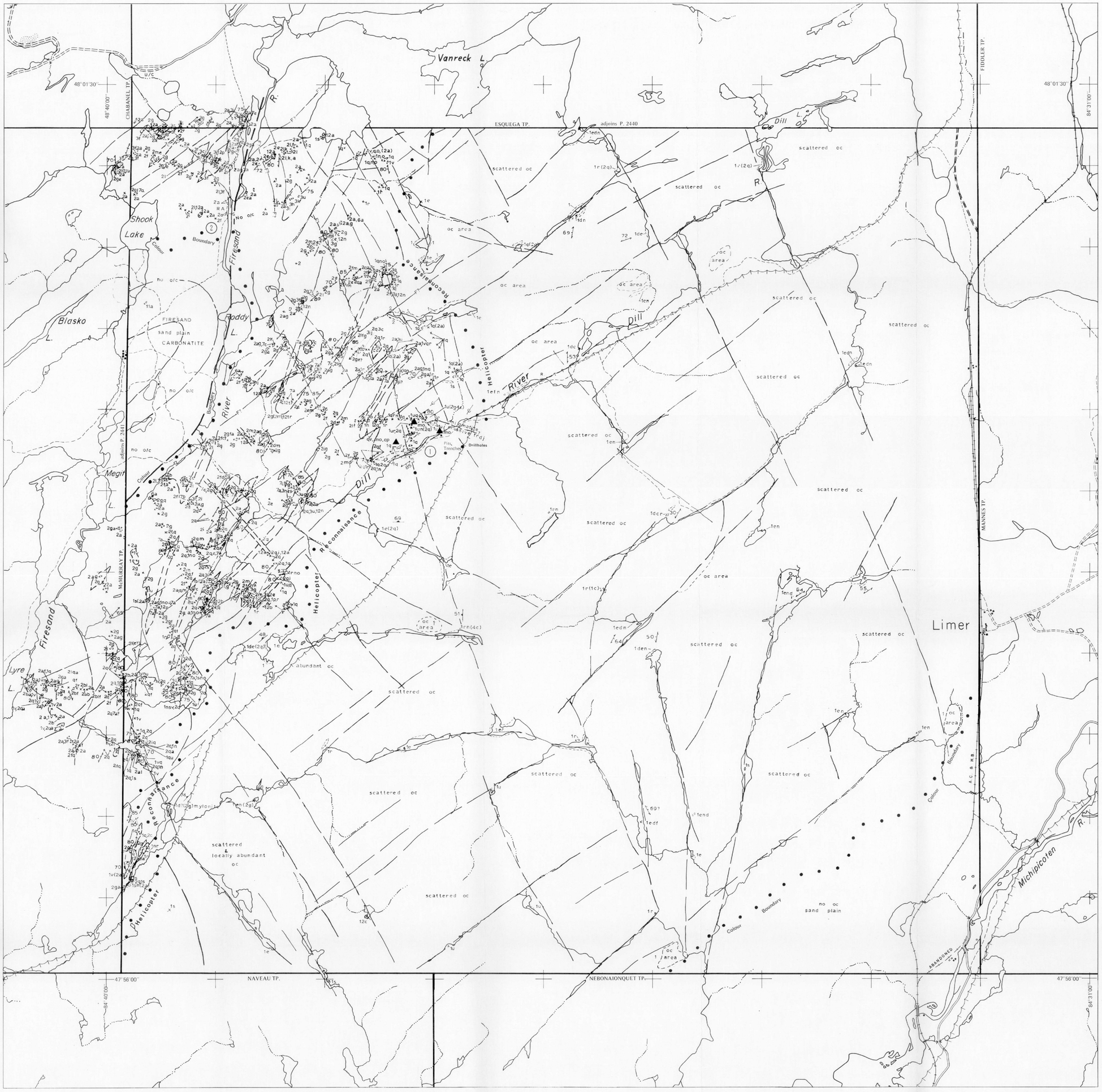

LEGEND[a]

PHANEROZOIC
CENOZOIC
QUATERNARY
PLEISTOCENE AND RECENT
Organic soils, sandy till, glaciofluvial sand and gravel

UNCONFORMITY

PRECAMBRIAN
LATE PRECAMBRIAN
MAFIC INTRUSIVE ROCKS

12 — 12 Unsubdivided
12a Diabase
12b Porphyritic (feldspar) diabase
12c Glomeroporphyritic (feldspar) diabase
12d Diabase with minor biotite
12n Carbonatite
12p Olivine lamprophyre
12q Carbonatite-silicocarbonatite[b]
12r Ferruginous carbonate
12s Syenite
12t Biotite lamprophyre
12u Porphyritic (feldspar) lamprophyre

CARBONATITE INTRUSIVE ROCKS
FIRESAND CARBONATITE

11 — 11a Sovite[c]
11b Silicocarbonatite[b]
11c Rauhaugite (ferruginous dolomite)

INTRUSIVE CONTACT

EARLY PRECAMBRIAN (ARCHEAN)
FELSIC INTRUSIVE ROCKS

7 — 7 Unsubdivided
7a Quartz-feldspar porphyry
7b Feldspar porphyry
7c Quartz porphyry
7d Diorite, quartz diorite[d]
7e Granodiorite, granite[e]
7f Aplite
7g Diorite, granodiorite
7k Felsic dikes
7m Trondhjemite, granodiorite, quartz feldspar porphyry[f]
7o Porphyritic granodiorite, granite
7p Intrusive breccia
7r Porphyritic (plagioclase) diorite, granodiorite

INTRUSIVE CONTACT

MAFIC TO ULTRAMAFIC INTRUSIVE ROCKS

6 — 6 Unsubdivided
6a Gabbro, diorite
6b Anorthositic gabbro
6c Anorthosite
6d Diabase
6f Hornblende diorite
6g Peridotite
6h Pyroxenite
6i Talc schist
6j Mafic dikes
6k Quartz diorite, trondhjemite[g]
6m Quartz gabbro
6n Xenolithic gabbro
5o Porphyritic gabbro, diorite
6p Carbonatized or carbonate-bearing mafic intrusive

INTRUSIVE CONTACT

METASEDIMENTS
CHEMICAL METASEDIMENTS

5 — 5 Unsubdivided
5a Magnetite, hematite ironstone[h], chert
5b Carbonate ironstone[h]
5c Sulphide ironstone[h]
5d Chert, sideritic, pyritic or graphitic
5e Graphite
5f 5a, 5d (1:1)
5g 5d, 5d (1:1)
5h 5c, 5d (1:1)
5i Chert, graphite, argillite
5j Chert
5k 5d, 5d, 5a
5m Chert, wacke, siltstone
5n Chert, wacke, magnetite ironstone
5o Magnetite ironstone, wacke
5p Chert breccia

CLASTIC METASEDIMENTS

4 — 4 Unsubdivided
4a Volcanic clast wacke
4b Chert
4c Plagioclase-quartz-biotite schist
4d Wacke, lithic wacke
4e Argillite
4f Interlaminated siltstone, mudstone
4g Conglomerate with granite clasts
4h Volcanic clast conglomerate
4j Siltstone, sandstone, lithic sandstone
4k Quartz arenite, arkose, lithic arkose
4m Carbonate-rich metasediment
4n Lithic arkose
4p Thinly bedded wacke, siltstone
4q Carbonate, ferruginous limestone

METAVOLCANICS
INTERMEDIATE-TO FELSIC METAVOLCANICS

3 — 3 Unsubdivided
3a Sericite schist
3b Heterolithic breccia
3c Monolithic lapilli tuff
3d Tuffaceous quartz eye, feldspar clast, sericite schist
3e Banded tuff with flamme
3f Massive flow
3g Monolithic breccia (felsic matrix, mafic clasts)
3h Porphyritic (feldspar) flow
3i Feldspar crystal tuff, intermediate
3j Porphyritic (quartz) flow
3k Spherulitic flow
3m Flow banded lava
3n Autoclastic monolithic breccia
3o Intermediate tuff
3p Heterolithic lapilli tuff
3q Quartz eye crystal tuff
3r Heterolithic quartz eye crystal tuff, lapilli tuff
3s Heterolithic crystal tuff, breccia
3t Tuff
3u Laminated tuff
3v Chlorite-sericite schist
3w Feldspar crystal tuff, felsic
3y Crystal (quartz-feldspar) tuff
3z Heterolithic (cataclastic) breccia

MAFIC TO INTERMEDIATE METAVOLCANICS

2 — 2 Unsubdivided
2a Massive flows
2b Pillowed flows
2c Chlorite schist
2d Heterolithic breccia
2e Monolithic breccia (mafic matrix, felsic clasts)
2f Porphyritic (feldspar) flows
2g Massive medium-grained flows[e]
2h Magnetite-bearing flows
2i Tuffaceous chloritic schist
2j Pillowed porphyritic (feldspar) flows
2k Variolitic flows
2l Amygdaloidal flows
2m Feldspar (quartz) crystal tuff
2p Heterolithic breccia (mafic matrix, intermediate to felsic clasts)
2q Amphibolite
2r Laminated tuff, lapilli tuff
2s Crystal (feldspar) tuff, crystal lithic tuff
2t Talc-actinolite, actinolite rock
2u Monolithic breccia (mafic matrix, mafic clasts)
2v Laminated tuff
2w Lapilli tuff
2y Porphyritic (amphibole) flows
2z Tuff, chloritic schist with quartz[i]

UNCONFORMITY

EARLY FELSIC PLUTONIC ROCKS
GNEISSIC GRANITIC ROCKS
MASSIVE GRANITIC ROCKS[e]

1 — 1n Aplite, pegmatite dikes
1p Diorite, quartz diorite
1q Trondhjemite
1r Granodiorite, quartz monzonite
1s Monzonite, quartz monzonite
1t Porphyritic monzonite, quartz monzonite
1u Granodiorite, trondhjemite, weakly foliated
1v Porphyritic granodiorite
1w Massive quartz monzonite

Bx — Brecciated
Carb — Carbonatized
Sil — Silicified

NOTES

a) This is a field legend and may be changed subsequently to laboratory investigations. The legend applies to Chabanel, McMurray, Lastheels and Esquega Townships and units listed may not all be present in each township.
b) Greater than 50 percent silicate-oxide minerals.
c) Greater than 50 percent carbonate.
d) Colour index 20 to 40.
e) Colour index 10 to 25.
f) Transitional porphyritic to non-porphyritic.
g) Associated with mafic intrusive rocks.
h) A chemical sedimentary bed which contains 33 percent or more of the common iron minerals by volume. This does not include commonly associated interbeds of chert or clastic sedimentary material. A sufficiently extensive mappable unit containing a significant proportion of ironstone interbeds may be designated as an iron formation.
e) Dorè type conglomerate
j) Green mica may be present.
k) May be intrusive in part.
l) Greater than 5 percent quartz
m) Possibly contemporaneous with unit 7 rocks.

G The Lithology was either interpreted or inferred from geophysical data.
D The lithology was either interpreted or inferred from drillhole data.

Where a rock-unit code precedes a second rock-unit code enclosed in brackets, xenoliths of the second unit occur within the first unit.

Superscript on any symbol means data was compiled from map P. 828, by R. J. Rupert, 1975.

Superscript on RAP refers to the assays listed in Table 3.

Many drillholes, pits, trenches, and all surveyed claims were not plotted on maps due to lack of space.

Ministry of Natural Resources — Ontario

Hon. Alan W. Pope, Minister
W. T. Foster, Deputy Minister

ONTARIO GEOLOGICAL SURVEY
MAP P. 2442
GEOLOGICAL SERIES - PRELIMINARY MAP

PRECAMBRIAN GEOLOGY
of
LASTHEELS TOWNSHIP
WAWA AREA
ALGOMA DISTRICT

Scale 1:15 840

Mile ½ 0 ½ 1 Mile
Metres 100 0 0.2 0.4 0.6 0.8 1 Kilometre

NTS Reference: 41N/15, 42C/2
ODM-GSC Aeromagnetic Maps: 2191G, 2192G
ODM Geological Compilation Map: 2220

This map is published with the permission of E.G. Pye, Director, Ontario Geological Survey.

LOCATION MAP — Scale: 1: 1 584 000 or 1 inch to 25 miles

METAL AND MINERAL ABBREVIATIONS

cp ..... Chalcopyrite
mo ..... Molybdenite

LIST OF PROPERTIES

1. Aldo Palma Claims, Amax Minerals Canada Limited.
2. Mid-North Engineering [1956].

SYMBOLS

- Schistosity, inclined, vertical
- Lineation. m = mullion structure, c = clast, p = pillow, sl = slickensides, b = biotite
- Glacial striae
- Pillowed volcanics with dip and facing direction indicated
- Pillow elongation, inclined, vertical, facing direction unknown
- RA — Radioactivity
- Minor shear, inclined, vertical
- Major shear, attitude uncertain, attitude indicated
- IF — Iron formation
- Trench
- Pit
- Banding, inclined, vertical
- Kinkband, inclined, vertical with plunge of fold and direction of movement indicated
- Minor fold, strike and dip of axial plane, bearing and plunge of fold axis.
- Geological boundary, observed
- Geological boundary, interpreted
- Geological boundary, geophysically inferred
- gos — Gossan
- Fe — Iron staining
- chl — Chloritoid
- Bedding, top (arrow) from grain gradation, inclined, vertical, overturned
- Bedding, top (arrow) from cross bedding, inclined, vertical, overturned
- Bedding top (arrow) indicated by flame structures in interbedded sandstone-siltstone, inclined, vertical, overturned.
- Paleocurrent direction as suggested by ripple marks.
- Jointing, inclined, vertical
- Lineament
- Lineament, possibly a fault zone
- Shaft-depth in feet

SOURCES OF INFORMATION

Base map derived from the Forest Resources Inventory Maps, Lands and Waters Group, Ontario Ministry of Natural Resources.

Geology is not tied to surveyed lines.

Resident Geologist's Files, Ontario Ministry of Natural Resources, Sault Ste. Marie.

Assessment Work Library Report 10.

McMurray Tp. and Parts of Surrounding Townships, District of Algoma, Ontario Division of Mines, Preliminary Map, P. 828, by R. J. Rupert, 1975, scale 1:15 840 or 1 inch to ¼ mile.

Magnetic declination was approximately 6°4' in 1980.

MARGINAL NOTES

LOCATION AND ACCESS

The centre of Lastheels Township is located at approximately 47°59' north Latitude 84°35' west Longitude. Access to most of the township is poor. A rough trail extends from the Firesand River to the molybdenite showing in the northwest corner of the township. The southern half of the township has little or limited access. Access to the area underlain by the supracrustal rocks is by long traverse from the Firesand River or by helicopter.

MINERAL EXPLORATION

The principal mineralized showing known to exist in the township is the molybdenite showing found near the Dill River in the northwest quadrant of the township. This showing has in the past been known as the Peters-Quilty molybdenite property. This property was controlled by International Ranwick Uranium Mines Limited and Pax International Mines Limited during the 1950s and early 1960s, and a considerable amount of trenching was completed. During this period 1896 (568.8 m) of diamond drilling was completed in three holes. Assay data on file indicate values of nil to 0.25 percent Mo (Resident Geologist's Office File 63-3189, Sault Ste. Marie, Ontario). The mineralization occurs in subparallel quartz veins striking southeast and dipping 20 to 50 degrees north. The molybdenite occurs as coarse-grained rosettes in the quartz and as seams of fine-grained molybdenite along the contact of the quartz veins with the granitic host rock. The granitic host rock varies from trondhjemite to quartz diorite in composition and locally contains abundant xenoliths of amphibolite and biotite-quartz-plagioclase schist. The mineralized zone occurs near the area of contact between a xenolith-rich (migmatite) granitic rock and a relatively xenolith-free granitic rock. The showing is currently known as the Aldo Palma property and is being evaluated by Amax Minerals Canada Limited.

In 1956 Mid-North Engineering completed three short diamond drillholes totalling 174.5 feet (52.4 m) on a radioactive showing west of the Firesand River in the northwest corner of the township (Assessment Files Research Office, Ontario Geological Survey, Toronto, Library Report 10). The results of this work are unknown. This showing may be related to olike rocks associated with the Firesand Carbonatite intrusion.

On the basis of aeromagnetic data, the Firesand Carbonatite projects into the northwest corner of Lastheels township. The complex has not been extensively tested for its niobium, apatite, or rare earths content in the Lastheels Township portion of the intrusion.

GENERAL GEOLOGY

The rocks found in the northwestern one third of the Township consist predominantly of massive mafic flows and fine- to medium-grained amphibolites which may be either thick flow centres or mafic sills. Subordinate mafic breccia, tuff, and porphyritic rocks are present. The units are tabular to lensoid in plan view with their long axis striking in a northeasterly direction.

The felsic metavolcanics occur in the extreme northwest corner of the Township and consist of crystal tuffs of intermediate composition, feldspar porphyry and spherulitic flows, and fine-grained tuffs. These units are limited in extent and concordant with the associated mafic metavolcanics.

The volcanic rocks have been metamorphosed to amphibolite rank close to the granite-supracrustal contact and fall to greenschist or upper greenschist rank westward away from the contact.

The supracrustal and surrounding granitic rocks are cut by northwest-trending diabase dikes which commonly contain buff to pale green plagioclase phenocrysts. These dikes are thought to be Late Precambrian in age.

On the basis of aeromagnetic data, one outcrop, and limited diamond drilling, a portion of the Firesand River Carbonatite Complex extends from McMurray Township into the northwestern corner of Lastheels Township. This complex has been dated by K-Ar isotopic techniques as being 1048 m.y. in age (Wanless, 1970).

The southeastern two-thirds of the township consist of granitic rocks ranging from quartz diorite to quartz monzonite in composition. The quartz monzonite is massive, equigranular, and relatively homogeneous. These rocks cut the less potassic phases. The less potassic phases are generally also relatively massive, equigranular, and homogeneous, however they are locally schistose to gneissic and contain amphibolite and biotite quartz plagioclase inclusions.

STRUCTURAL GEOLOGY

Schistosities and gneissosities within the metavolcanics display a northeast trend and a subvertical to steeply dipping attitude. The trend becomes more northerly in the extreme northwest corner of the township.

The granitic-metavolcanic contact displays both intrusive and tectonic relations. Small to large blocks of metavolcanics appear to have been stoped or plucked from the supracrustals, and locally it is difficult to define the contact of the granitic mass. The contact has been placed where granitic rock becomes dominant. Local linear features displaying a prominent foliation are present, suggesting at least local shearing or faulting within the contact area.

Within the northwestern corner of the township a number of linears are thought to be representative of faults though geological evidence for offset is lacking. The north-trending foliations found in the northwest corner of the township appear to abut sharply against northeast trending structures found in the southwest corner of adjoining Esquega Township. A fault zone likely exists in this area.

ECONOMIC GEOLOGY

The molybdenite showing on the Dill River is the most significant occurrence of mineralization in the township. Grade and tonnage figures for this showing are unavailable.

RECOMMENDATIONS FOR PROSPECTING

The mafic metavolcanics may offer some potential for base-metal mineralization but evidence of significant sulphide mineralization was not observed.

Molybdenite mineralization in quartz veins is common near the Dill River and prospecting for similar occurrences may be warranted. The contact zone between the metavolcanics and granitic intrusives should be the initial area of search for this type of mineralization.

REFERENCE

Wanless, R.K.
1970: Isotopic Age Map of Canada. Geological Survey of Canada, Map 1256A. Scale 1:5 000 000.

CREDITS

Geology by R. P. Sage, E. Sawitsky and assisted by J. Turner, P. Leeselleur, and E. Sagle, 1979.

Every possible effort has been made to ensure the accuracy of the information presented on this map; however, the Ontario Ministry of Natural Resources does not assume any liability for errors that may occur. Users may wish to verify critical information; sources include both the references listed here, and information on file at the Resident or Regional Geologist's office and the Mining Recorder's office nearest the map-area.

Issued 1982

Information from this publication may be quoted if credit is given. It is recommended that reference be made in the following form:

Sage, R.P., Sawitsky, E., Turner, J., Leeselleur, P., and Sagle, E.
1982: Precambrian Geology of Lastheels Township, Wawa Area, Algoma District; Ontario Geological Survey Preliminary Map P. 2442, Geological Series, Scale 1:15 840 or 1 inch to ¼ mile. Geology 1979.