UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

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PLATE 4

GEOLOGIC MAP OF THE CLIFTON MINE AND VICINITY, SOUTHEAST RECTANGLE, RUSSELL QUADRANGLE, ST. LAWRENCE COUNTY, NEW YORK

Topography by U.S. Geological Survey:
B. F. Leonard, C. L. Rogers, and P. E. Hotz, Sept.–Oct. 1948;
P. K. Sims, B. F. Leonard, and G. S. Koch, Jr., June–July 1949;
B. F. Leonard and R. M. Sneider, July 1950

Control by transit surveys of Hanna Coal and Ore Corp. and by plane-table triangulation by U.S. Geological Survey. Coordinate system is that used by Hanna Coal and Ore Corp. in 1950

Drill holes and main buildings from maps and notes of Hanna Coal and Ore Corp.

100 0 100 200 300 400 500 FEET

CONTOUR INTERVAL 10 FEET
DATUM IS APPROXIMATELY MEAN SEA LEVEL

Geology by B. F. Leonard and A. F. Buddington

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—10324

EXPLANATION

QUATERNARY — Recent

tailings — Tailings
Waste, artificial fill, glacial debris, and lake deposits not shown

PRECAMBRIAN

om, ol, os, mr — Magnetite replacing pyroxene skarn and local sköls or marble

om, *medium-grade ore, generally 44–45 percent total Fe or ~38 percent magnetic Fe. Range is roughly 37–54 percent total Fe or ~34–46 percent magnetic Fe. High-grade ore layers not shown separately*
ol, *low-grade ore, generally 25–26 percent total Fe or ~21–22 percent magnetic Fe*
os, *subore, generally or ~15–20 percent magnetic Fe*
mr *mineralized rock, contains thin seams or disseminated areas of magnetite. In a few places, includes a little material of ore grade, too thin or too scattered to be mined*

gagns — Alaskite gneiss
Generally pinkish, fine to medium grained, slightly or distinctly foliated. Contaminated by xenocrysts or schlieren derived from metasedimentary rocks

gr — Alaskitic granite
Pink, green, or white; medium grained, locally pegmatitic; locally pyroxenic. May be related to alaskite or to phacoidal granite gneiss. (Several small bodies, present in pit, are not shown on map)

ghgn — Hornblende granite gneiss (deformed facies of hornblende-microperthite granite)
Pink, medium to fine grained, distinctly foliated, and generally uncontaminated where exposed. Locally carries ribbons of pegmatite a few inches wide

mdb — Metadiabase
Dark greenish gray, fine grained, faintly but regularly foliated, commonly garnetiferous

sgp — Phacoidal granite gneiss
Normally pink but locally greenish or white; normally hornblendic but locally alaskitic; normally phacoidal but locally schistose; rarely medium grained and equigranular

sps — Contaminated, commonly syenitic facies of phacoidal granite gneiss
Pink, gray, greenish, or white; equigranular, gneissic, or distinctly phacoidal. Contains layers or schlieren of metasedimentary material, or mafic xenocrysts derived therefrom; wollastonite absent. Part of this rock may have been derived from alaskite or granite pegmatite of the granite and granite gneiss series

spw — Wollastonite-pyroxene syenite
White or buff, locally gray; locally scapolitic or quartzose; commonly medium-grained equigranular, but locally phacoidal or schistose

ms — Metasedimentary rocks, undivided

msp — Pyroxene gneiss
In part, greenish or gray, fine grained, laminated or well foliated, locally with lenticles of dark skarn; in part, greenish or rarely pinkish, medium grained, well foliated to blotchy and almost massive, locally involved with pegmatite or other granitic material. In places, includes a little quartz-feldspar granulite

msb — Biotite gneiss
Dark, fine to medium grained, moderately to indistinctly foliated, generally rich in biotite

msl | msk | mskdph | mskp | mskgp | mskg | mskm

Approximate order of evalution is from left to right, above

msl, *marble; generally white, medium grained, massive to streaky, and partly silicated. In places, contains a few boudins of skarn or metasedimentary gneiss*
msk, *skarn, undivided; locally includes some modified skarn and metasedimentary gneisses*
mskdph, *diopside-phlogopite skarn; light green to grayish; foliated, contorted, or rarely massive; commonly graphitic. Contains local silvery or light-green phlogopite sköls. Includes some calcareous diopside skarn and a few thin zones of medium or dark green pyroxene skarn. In places, the rock contains a little magnetite*
mskp, *pyroxene skarn; medium to dark green, fine to medium grained, massive to faintly foliated, locally with a little calcite. Contains sporadic thin biotite sköl near ore body*
mskgp, *garnet-pyroxene skarn; locally garnet-rich, locally pyroxene-rich*
mshg, *garnet skarn; dark brown, fine to medium grained, massive, locally containing a little calcite or relict dark-green pyroxene. Pyrrhotite is conspicuous in places*
mskm, *pyroxene skarn modified by introduction of quartz, potassic feldspar, or scapolite; generally dark, grained, massive or somewhat foliated, locally garnetiferous. Colorless fluorite is present locally. Brown sphene is conspicuous in some varieties*

msq — Quartz-feldspar granulite
Gray, greenish, white, buff, or pink; fine grained, granulose, and highly felsic. Faint to distinct planar structure locally resembles bedding. Granulites are in part homogeneous, in part interlayered with other metasedimentary rocks

msq – msp
Groups of letter symbols indicate compound rock units
In these, if there is a dominant rock type, it is given first, subordinate types following. Symbols in parentheses represent rock units sparingly present but significant for correlation or mineralization

Note: Stratigraphic relations of the metasedimentary rocks are indeterminate

Limit of outcrop

Contact

Concealed contact
Queried where form, position, or existence is questionable. (Horizontal projection of its suboutcrop)

75–80
Shear zone, showing dip

Anticline, showing trace of axial plane and direction of axial plunge
Dashed where inferred

Syncline, showing trace of axial plane and direction of axial plunge
Dashed where inferred

Overturned anticline, showing trace of axial plane and direction of axial plunge
Dashed where inferred

Overturned syncline, showing trace of axial plane and direction of axial plunge
Dashed where inferred

Note: Axial line and axis not everywhere distinguishable

Axes of rolls and warps
Synclinal or anticlinal character indicated where feasible

50
Plunge of crenulations and small folds

5
Plunge of minor anticline

15
Plunge of minor syncline

20
Plunge of subparallel elongate minerals or mineral aggregates, clots of rock, rodding, and fluting

20
Plunge of slickensides and lineations given by imbricate mica flakes

Mappable asymmetric folds, showing movement sense

10 30 50
Strike and dip of foliation

Strike of vertical foliation

Horizontal or subhorizontal foliation

Note: Lineation and foliation symbols may be combined

Edge of open pit

DDH 41
45°
Diamond-drill hole
Showing horizontal projection and inclination. Dashed where restored in pit

DDH 5
45°
Diamond-drill hole
Showing direction and inclination, where known; depth unknown. Dashed where restored in pit

DDH 7
35°
Vertical diamond-drill hole

DDH 1
35°
Diamond-drill hole logged by U.S. Geological Survey
Dashed where restored in pit