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Geology report on Wabush Lake, area.

NEWFOUNDLAND AND LABRADOR CORPORATION LIMITED

REPORT ON WABUSH LAKE AREA

1953

Report to: Dr. S. Melihercsik, Newfoundland & Labrador Corporation Ltd.

On: Wabush Lake Area

By: W.P. Boyko

INTRODUCTION

During the summer of 1953 the Newfoundland and Labrador Corporation began a geological exploration program to determine the economic possibilities of their concessions in Newfoundland and Labrador.

This report covers the Wabush Lake area in Labrador. The area is bounded on the south by Quebec near latitude 52°40'; on the west, going northward, by longitude 67°00', then the east shores of Long Lake and Wabush Lake; on the north by the shores of Julienne and Shabogamo Lakes; on the east by longitude 66°30' and the Quebec-Labrador Divide. Approximately 400 square miles were examined.

GENERAL GEOLOGY

General Statement

Late Precambrian rocks occupy the area mapped. These rocks have been metamorphosed to gneisses quartzites and crystalline limestone. Gneisses in the eastern half of the map area have been intruded by diorite-gabbro, diorite and amphibolite.

The rocks have been concluded to be late Precambrian due to their association with metamorphosed iron formations. These iron formations are thought to be the counterparts of iron formations occurring with less metamorphosed late Precambrian rocks elsewhere in the Labrador Trough. The paragneisses and crystalline limestone are probably higher metamorphosed equivalents of the "Trough" sediments.

TABLE OF FORMATIONS

Late Precambrian	Intrusions	Pegmatites Diorite (2) Amphibolite Diorite-Gabbro (1)
		FOLDING
	Precambrian Sediments	Iron Formations (4) White Quartzite (3) Crystalline Limestone (2) Impure Quartzite (1)
	Gneisses	Hornblende-garnet gneiss {3} Mica-garnet gneiss {2} Hybrid gneiss Feldspar-quartz-biotite gneiss (1)

Note: The numbers in parentheses correspond to color subdivision used on the map.

The above sequence is very general and is not to be taken as accurately representing the relative ages of the formations. Gneisses are interbanded with the sediments. This maybe an original occurrence or due to folding and faulting. Age relationships will be discussed further with the descriptions of the rock types.

LATE PRECAMBRIAN

Feldspar-quartz-biotite Gneiss:

The most prevealent and probably the oldest rock in the map area is a feldspar-quartz-biotite gneiss. Variable amounts of hornblende may occur with the biotite, and sparsely distributed garnets are present in some bands. The amount of mafic minerals varies and this produces a light grey to medium grey fresh surface. Bands, a fraction of an inch to tens of feet thick, of varying composition, color and texture are present. These bands are unmistakably beds and in places a gneissosity is found at an angle to relict bedding coinciding with the banding. West of the south end of Julienne Lake wide bands of uniform composition, color and texture possess a faint lamination as may appear in arkoses. The writer believes that this rock has escaped intense metamorphism.

Graphitic bands up to 10 feet occur in the feldspar-quartz-biotite gneiss. These are present southwest of Moose Head Lake. The graphite occurs as disseminated flakes to a solid seam up to 2 inches thick. Rust is always associated with the graphitic bands.

The stratigraphic position of the feldspar-quartz-biotite gneiss is not definitely known. It both underlies and overlies a crystalline limestone.

Hybrid Gneiss:

Feldspar-quartz-biotite gneiss contorted and injected by granitic bands has been mapped as a hybrid gneiss. These gneisses in many cases have been grouped with the feldspar-quartz-biotite gneiss. A detailed survey would be required to differentiate between highly granitized feldspar-quartz-biotite gneiss and hybrid gneiss.

Orthogneisses:

Orthogneisses are rare in the area. Rocks mapped as granite gneiss, possessing a granitic composition, and a structure varying from a foliation to gneissosity, occurs east of Roche Lake. The gneiss possesses a uniform composition and lacks the banding typical of paragneisses. Contacts between this rock and the feldspar-quartz-biotite gneiss are gradational and therefore the granite gneiss maybe a highly granitized paragneiss.

Mica-garnet Gneiss:

The mica-garnet gneiss contains biotite, muscovite or sericite, quartz and garnets. Kyanite bands occur in this rock type. The garnets average half an inch in diameter and are readily visible on the weathered surface. The weathered surface is light grey and possesses a silky luster due to the sericite. Quartz varies in abundance. Where quartz is negligible the structure is schistose, otherwise a gneissic to schistose structure is common.

The mica-garnet gneiss both underlies and overlies the limestone structurally and stratigraphically, It usually occurs at the contact between crystalline limestone or associated quartzite and the feldspar-quartz-biotite gneiss. Crystalline limestone has been seen to lense out in the mica-garnet gneiss. However, the mica-garnet gneiss may be missing at the contact and the feldspar-quartz-biotite gneiss maybe in ~~the~~ contact with the limestone. The mica-garnet gneiss also occurs as lenses in the feldspar-quartz-biotite gneiss.

Hornblende-garnet Gneiss:

Hornblende and garnet are the main constituents of the hornblende-garnet gneiss. The garnets are deep red and average about 3/16 of an inch in diameter. Quartz and feldspar are minor constituents and in places occur in very small amounts or are absent. The rock is dark gray where leucocratic minerals occur, and is black where the rock grades into a garnetiferous amphibolite. The hornblende-garnet gneiss is bedded, but only slightly gneissic. In places the only structure present is a faint hornblende lineation.

A definite stratigraphic position has not been proven to be occupied by the hornblende-garnet gneiss and it occurs at different horizons. On several locations it has been seen to lense out in the mica-garnet gneiss.

Impure Quartzite:

Impure quartzite contains amphibolite, fine graphite flakes, hematitic stain, and in places disseminated sulphides. Some of the iron stain may be due to the weathering of sulphides. Tenors of crystalline limestones are present in the quartzite, and the quartzite grades into overlying crystalline limestone. At the base, the ferruginous quartzite is garnetiferous and grades into a mica-garnet gneiss. The quartzite also occurs on other horizons and no definite position has been ascribed to it.

Crystalline Limestone:

Next to the feldspar-quartz-biotite gneiss, crystalline limestone is the most abundant metamorphosed sediment. The crystalline limestone varies from thick massive beds of limestone with only a few lenses of quartzite to an intimate interbedding of limestone and quartzite. The quartzite may contain disseminated sulphides. Graphite flakes are also present in the quartzite and the limestone. Tremolite beds are present. These vary from tremolite crystals intermixed with limestone

and quartzite to beds composed solely of tremolite several feet thick. Beds rich in actinalite are also present.

The fresh surface of the limestone varies from a creamy white to grey. Interfingering of creamy and grey limestone was noticed.

The crystalline limestone is interbedded with the feldspar-quartz-biotite gneiss. It may occur at more than one horizon.

White Quartzite:

A bedded white quartzite occurs in the Julienne Lake and Gibralter Lake areas. In the Julienne Lake area white quartzite overlies iron formations. Overturning is suspected here as Iron Ore Company geologists have found the iron formations overlying white quartzite in a syncline on the east side of Long Lake. The stratigraphic position of this white quartzite relative to the discussed rocks is not known as they are separated by a fault. In the Gibralter Lake area a similar white quartzite overlies a hornblende-garnet gneiss. Iron formations are not present here. It is possible that there is more than one white quartzite in the area.

Iron Formations:

The iron formations consist of varying amounts of specular hematite of varying texture in quartzite. Concentrations of specular hematite are present. The iron formations are described in more detail under the discussion on "Iron Ore Deposits".

Igneous Rocks:

Diorite-gabbro intrudes gneisses irregularly and as sills in the eastern map area. Mineralogically the rock consists of plagioclase and augite in approximately equal proportions. Both minerals occur as subhedral crystals. The texture varies from medium to coarse grained. The structure is massive. Along the contacts with para-gneisses the diorite-gabbro is garnetiferous and slightly gneissic. Fine garnets surround the plagioclase crystals.

Dark green amphibolite occurs south of Moose Head Lake. The amphibolite consists of amphibole, slightly altered to chlorite, and minor amounts of plagioclase. With increase in the plagioclase the amphibolite grades into a diorite. The two have been mapped separately. Inclusions of diorite-gabbro occur in the diorite and amphibolite.

Pegmatites are abundant and these intrude the diorite-gabbro and the gneisses. Mineralogically they are composed of feldspar, quartz and biotite leaves. The pegmatites form irregular discontinuous intrusions.

STRUCTURE

Primary sedimentary structures have been wiped out by metamorphism and top determinations are not vailable. Secondary structures such as drag folding, and intersection of gneissosity (axial plane cleavage) and relict bedding had to be relied upon, but these are few in number and the possibility of hidden faults and overturning has made them useless when applied over any lateral extent. A sparse distribution of outcrops and lack of visible contacts also hindered the determination of a stratigraphic sequence.

The general trend of the bedding is approximately north-south, or slightly west of north and the dip is to the east. The majority of the axial planes therefore dip to the east. Suspected overturning is towards the west.

Faulting is difficult to prove as it lies in the low areas. Shearing which has been noticed is always parallel to the general trend of the gneisses and dips approximately 60 degrees east. The faulting has caused the frequent repetition of the same beds and it is thought that probably for this reason the crystalline limestone appears in the southeast part of the map area. Synclinal limbs, in may places probably overturned, occupy the high ridges, the anticlines having been eroded away.

On the premise that overturning takes place in the direction from which the pressure is applied, the folding and faulting has been caused by forces acting from the west and southwest.

ECONOMY GEOLOGY

Iron Deposits

Burden No.1

A band of iron formations 3 miles long and 1 mile wide occurs at the south end of Wabush Lake between Wabush Lake and Long Lake. The iron formatons strike approximately east-west, dip steeply both ways, and are at an angle to the general trend of the band. No other rocks are in contact with the iron formations and the iron formations are thought to be bounded by faults on the southeast and northwest.

The iron formations consist of specular hematite and varying amounts of magnetite mixed with quartzite. Burden No.1 deposit occurring at the north end of the iron formation band consists of a concentration of specular hematite in the quartzite. At this location the specularite is coarse-grained and is mixed with loose textured, coarse-grained quartzite. Along an approximate east-west strike the deposit extends for a visible length of 500 feet, and is then covered by thick overburden. Laterally the deposit extends for approximately 450 feet. Eighteen analyses of the iron ore show that it contains 40 percent iron and 38 percent silica.

The iron formations to the south contain bands of specularite concentrations, but these are narrow and the high percentage of quartzite does not permit the mineralization to be classed as ore. Outcrops, however, are scarce and a careful examination may prove iron ore in these iron formations.

Boyko No. 1

Concentrations of iron ore occur in iron formations at the north end of the peninsula between Wabush and Julienne Lakes. Iron formations present here cover an area of approximately 4000 feet square. The concentrations are very erratic with bands of rich hematite up to 10 feet wide grading into very lean quartzite. The iron ore also grades in texture from dense lenses of hematite several inches thick to bands of coarse specular hematite in quartzite.

Kyanite

Kyanite occurs in bands in the mica-garnet gneiss. Traces of kyanite are wide-spread and are present in nearly all locations where mica-garnet gneiss occurs.

Mica-garnet gneiss with rich kyanite bands occurs west of the south end of Flora Lake on the Wabush map sheet. A band of mica-garnet gneiss 1500 feet long and 100 feet wide contains kyanite lenses. The kyanite varies from traces to approximately 20 percent.

Kyanite traces and amounts up to 5 percent are present in the mica-garnet gneiss south of Gibraltar Lake and on the islands in Gibraltar Lake. Kyanite in mica-garnet gneiss is also present in a synclinal structure north of Gibraltar Lake. Occurrences of kyanite have also been found south of Jean Lake on the Wabush Lake sheet.

North of Moose Head Lake kyanite occurs in a coarse micaceous feldspar-quartz gneiss. The band is about 6 to 10 feet wide and long blades of kyanite constitute about 4 percent of the rock. A similar band, presumably the same one, occurs 3000 feet to the southwest.

Sulphides

Disseminated sulphides occur in impure quartzite and in quartzitic lenses in the crystalline limestone east and south of Long Lake. Pyrite and pyrrhotite have been identified, but these occur in traces only.

Graphite

Impure quartzites and crystalline limestone contain disseminated graphite. Graphitic schists commonly occur in the feldspar-quartz-biotite gneiss and in the mica-garnet gneiss. A solid seam of graphite approximately 2 inches thick occurs in mica-garnet gneiss on the south shore of Flora Lake. The graphite seam does not extend for much more than 10 feet in length, but a rusty graphitic zone continues for about 100 feet. Graphitic zones are usually accompanied by rust.

CONCLUSIONS AND RECOMMENDATIONS

1. Iron formations occur at the south end of Wabush Lake and on a peninsula between Wabush and Julienne Lakes.

2. Beneficiating iron ore containing 40 percent iron and 38 percent silica is present at the south end of Wabush Lake (Burden No.1). The deposit is visible for a length of 500 feet and a width of 450 feet, but it is highly probable that the ore extends both in length and in width under the overburden. A futher examination of the iron formations to the south of Burden No.1, may prove the presence of economic iron ore.

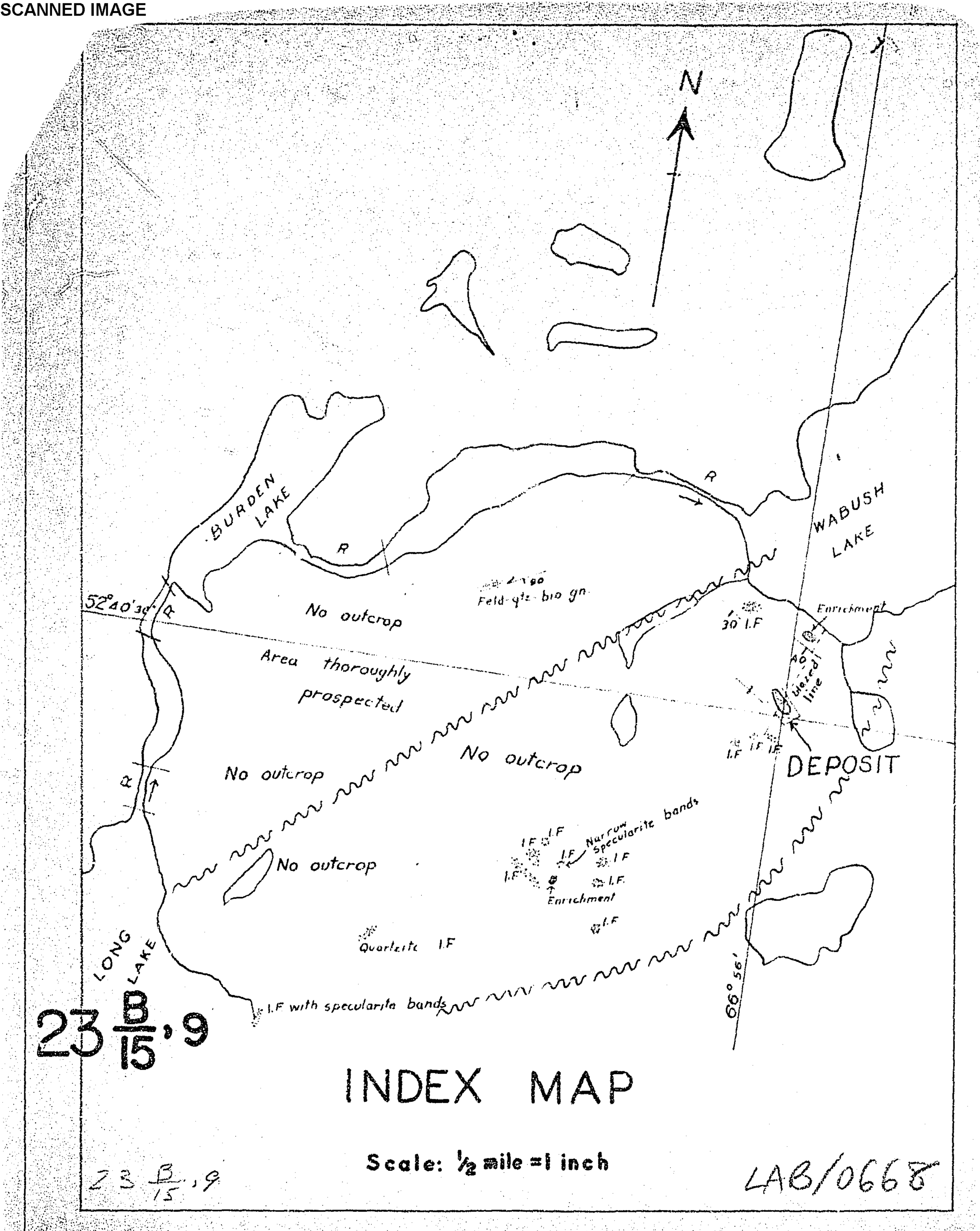
3. Erratic concentrations of iron ore occur in iron formations on a peninsula between Wabush and Julienne Lakes (Boyko No.1). Due to an erratic distribution of rich iron ore bands and lean quartzite bands a systematic sampling is necessary to determine whether the average composition will be of ore grade.

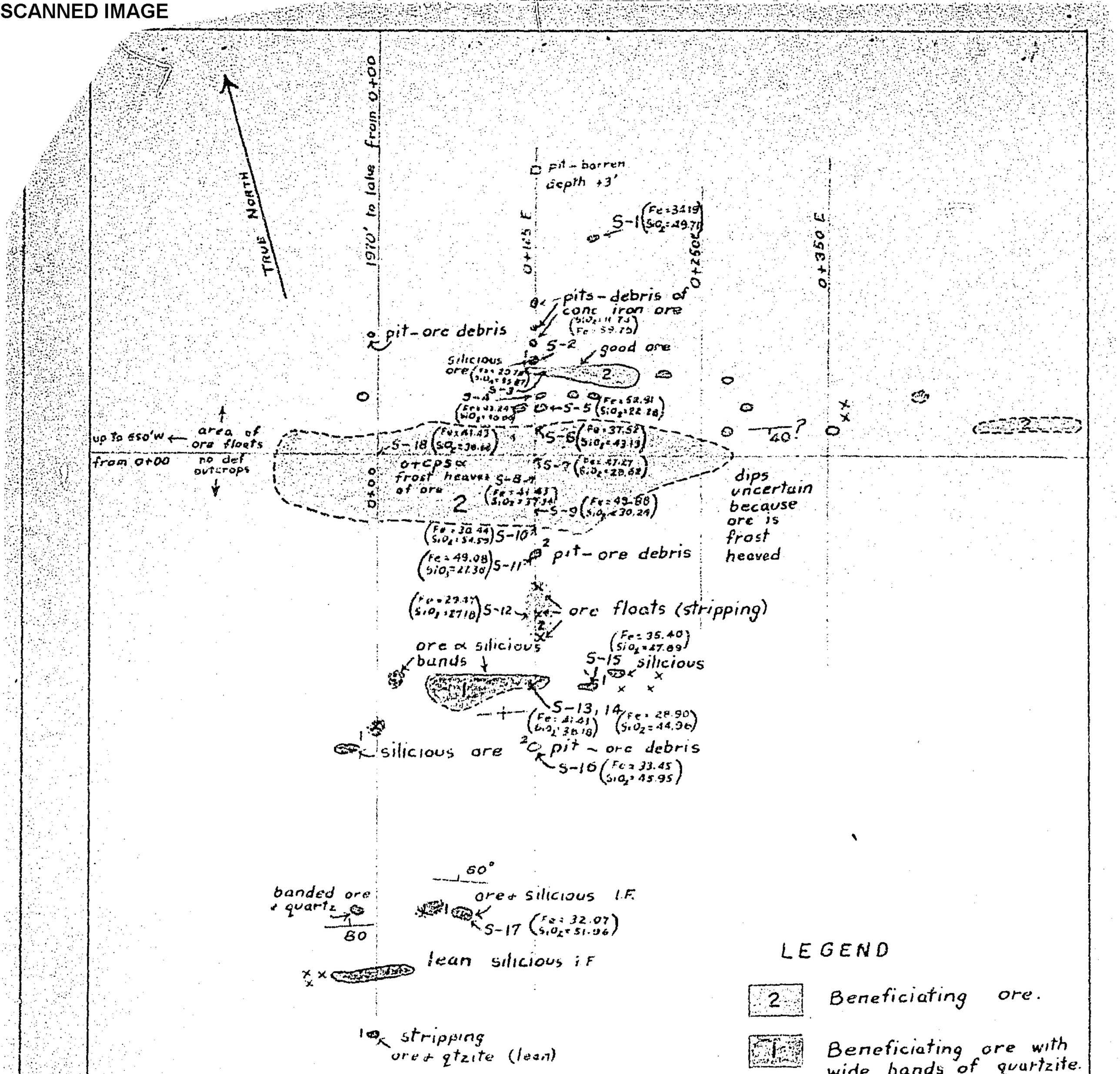
4. A kyanite band 1500 feet long and 100 feet wide occurs west of the south end of Flora Lake. The kyanite was estimated to vary in amount from traces to 20 percent. A similar deposit occurs on the west shore of Rectangle Lake. It is probable that other rich bands of kyanite maybe present in the mica-garnet gneiss, as varying amounts of kyanite are widespread in this rock type throughout the area.

5. Pyrite and pyrrhotite occur in minute disseminated quantities throughout the impure quartzite and do not appear to be concentrated in any one locality.

Wally Boyko.

SCANNED IMAGE





LEGEND

2 Beneficiating ore.

1 Beneficiating ore with wide bands of quartzite.

23 B/15,7

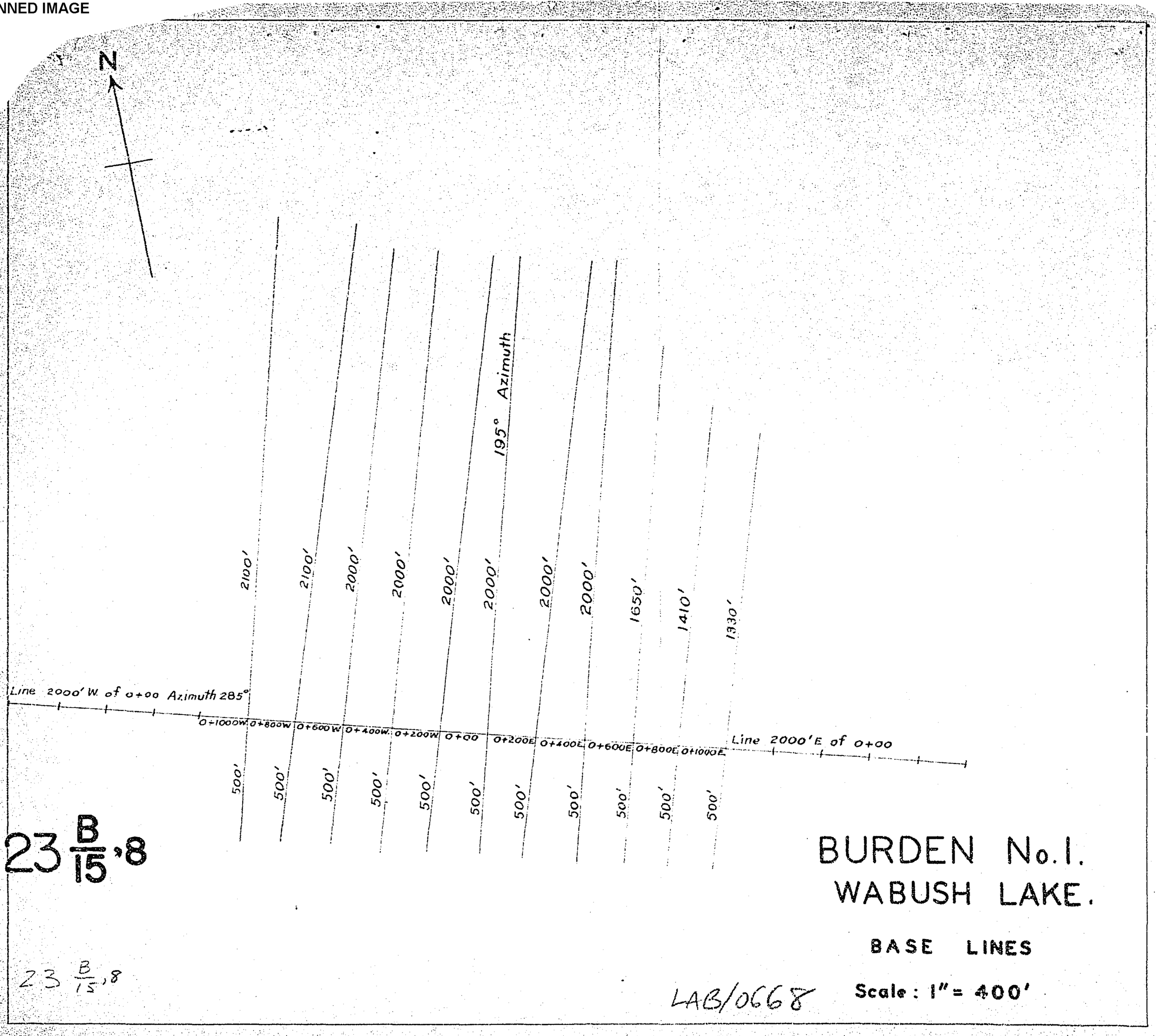
BURDEN No. 1

WABUSH LAKE

Scale: 100' = 1" approx.

23 B/15,7

LAB/0668



23 B/15, 8

BURDEN No. I.
WABUSH LAKE.

BASE LINES

23 B/15, 8

LAB/0668

Scale : 1" = 400'