INDUSTRIAL MINERALS IN LABRADOR WEST

by

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An industrial mineral survey was carried out in the Wabush/Labrador City area of western Labrador during the 1984 field season. The aim was to evaluate the potential of quartzites as a source of silica and dolomitic marbles for industrial filler and possible use in the pelletization of iron ore concentrate. The best exposures of both commodities were chip sampled and described to determine their purity, consistency, structure, size, and accessibility.

The Wishart quartzite and Denault marble are two formations of the Aphebian Knob Lake Group within the Labrador Trough. Sediments of the Knob Lake Group were deposited in a miogeosyncline at the eastern edge of the Superior craton. The Denault Formation is predominantly a dolomitic marble unit thought to have been deposited as shelf carbonates (Zajac, 1974), and the Wishart quartzites are thought to have been a littoral facies both overlying and forming a western equivalent to the Denault Formation (Rivers, 1983). Both formations are overlain by the Sokomon Formation which contains the rich banded iron formations of western Labrador.

In this southernmost extension of the Labrador Trough, the sediments are metamorphosed and deformed to a much higher degree than equivalent sediments to the north. Rivers (1983) has described three generations of Grenvillian folding, two of which form a strong structural interference pattern in the quartzites, resulting in dome structures which present good potential quarry sites.

MARBLE DEPOSITS

The Denault Formation is a dolomitic to calcitic and siliceous marble unit that underlies much of the area along the east side of Wabush Lake and a large area to the south of the lake. It is commonly massive in appearance and may contain quartz as isolated inclusions, stringers, lenses and/or beds. These have been identified as chert nodules, lenses, and conformable beds in unmetamorphosed equivalent rocks to the north. The formation is generally recessive and most chip samples were obtained from low outcrops along roads that cut through the formation. In the Duley Lake and Elephant Head Lake areas, exposures are more resistant and ridge-forming due to the presence of calc-silicate interbeds. These areas have little potential because of these impurities.

There are two prospects which are considered to have good potential for high quality dolomitic marble (Figure 1). The most promising prospect is 7 km east of Labrador City near the southern end of the Javelin Road. The exposure is flat-lying, 20 m by 25 m in size, and rises slightly above the surrounding area. On a fresh surface, the marble is white, coarsely crystalline (2.5 mm in diameter), with a very uniform texture and a bright vitreous appearance. There are no quartz or tremolite bands visible across the entire outcrop. A 15 kg sample was obtained from this prospect by using a portable rock saw to make three sets of parallel cuts 3-6 cm deep and spaced 4-5 cm apart over a strike length of 1.5 to 2.0 metres. The surface weathering was chiselled off first, and the marble being very brittle, was easily chipped out of the channels. This prospect is in the middle of a synform (approximately 1.5 km wide) which tapers to the southeast and widens to the northwest. It is adjacent to a road and is very accessible for drilling if the preliminary analyses are encouraging.

The second prospect is 700 m north of Leila Wynne Lake. The exposure is excellent, outlining an area at least 150 m wide which rises 5-10 m above the bog to the south, and extends a minimum of 500 m to the north. The marble is equigranular (1.5 mm crystals), flesh pink to light yellow in color on fresh surfaces, and occasionally stained a deep red with rust coated fractures. Two channel samples of 15-20 kg, each representing over 5 m in strike length, were obtained at this location. The marble does not break away from this outcrop in a brittle fashion. This may reflect the impurities, which include 3-5% pink to light yellow tremolite in 1-4 cm long fibrous crystals, and traces of chalcocite, malachite, and pyrite. There is no quartz visible in either channel sample; however resistant quartz veins, up to 1 cm thick, are present in the area between the two samples. There are bands of tremolite which also stand out on weathered surfaces as widely spaced, slightly resistant 2-5 mm wide parallel ridges. These generally trend northeast and may represent original bedding. This site is also accessible for drilling, being only 750 m from a winter road that trends southeast off the north end of the Javelin Road.

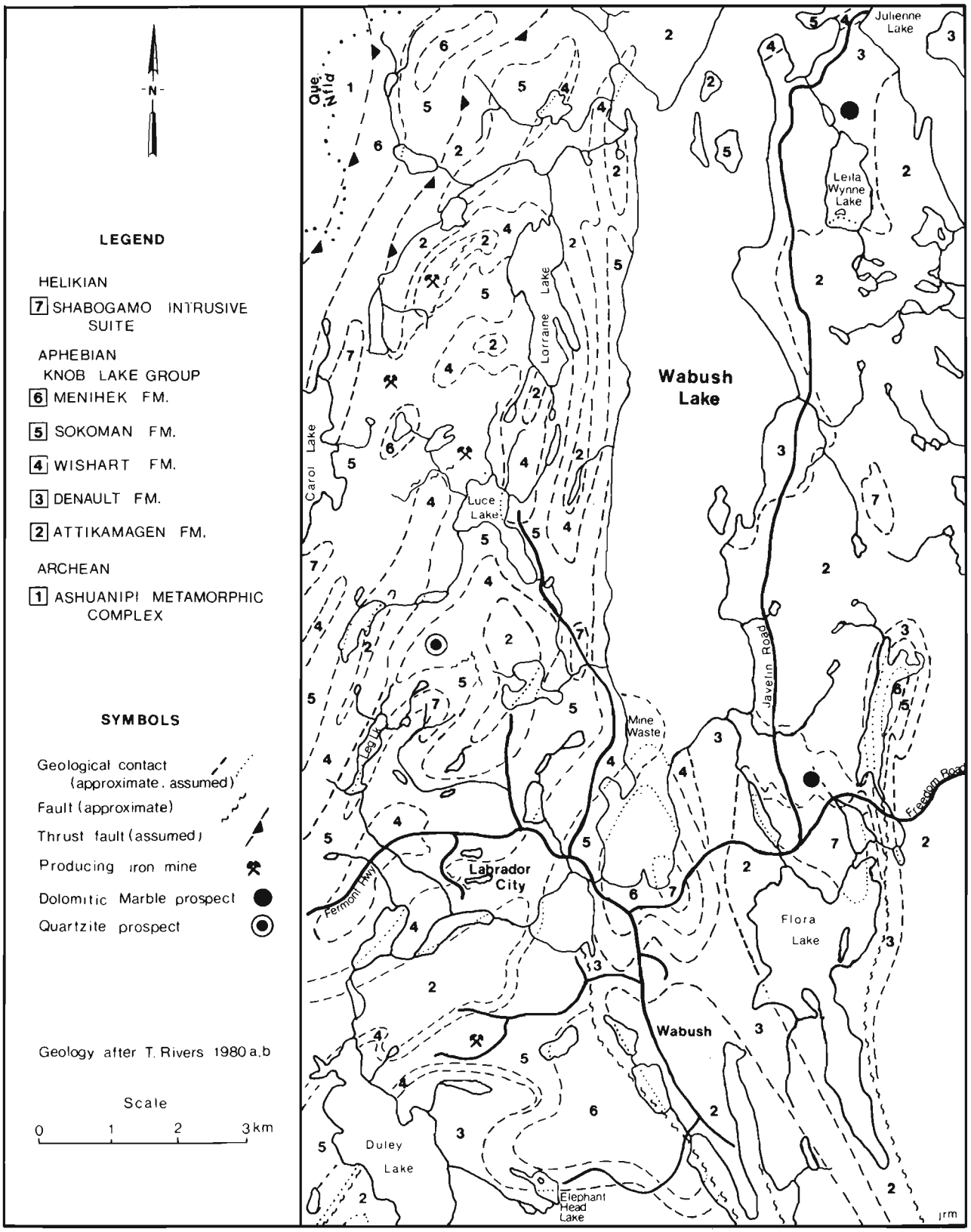

Figure 1: *Geological map of Labrador City/Wabush area.*

SILICA DEPOSITS

The Wishart Quartzite is a prominent physiographic unit exposed on the west side of Wabush Lake. The white quartzite ridges north and west of Labrador City are particularly clean and represent significant reserves of high quality silica. Most of the larger ridges are within 5 km of the town of Labrador City and several are adjacent to existing iron ore mining operations.

The quartzite ridges vary in size from 100 m long by 10 m wide to 3000 m long by 700 m wide and some have more than 100 m of vertical relief. Many ridges are adjacent to iron oxide deposits since the Wishart Formation generally underlies the iron bearing Sokomon Formation in the Wabush Lake area.

The quartzites occur as four distinct types. (1) Massive white recrystallized quartzite forms the largest and most prominent ridges. It is remarkably free of impurities and shatters when broken by a hammer. Outcrops are generally brilliant white, often glacially polished, and may contain local, narrow diffuse light brown to pink zones. (2) Granular quartzite is generally white to gray and has a distinct rough, granular weathered surface. Ridges dominated by this type often contain zones of massive whiter quartzite and narrow bands of micaceous quartzite may also occur. (3) Micaceous quartzite occurs in bands generally less than 1 m thick and contains up to 10% muscovite, chlorite, biotite and other silicates. These minerals may represent original muddy layers within the quartzites. (4) White friable quartzite occurs only in one area on the north side of the Fermont highway, 1.5 km west of Labrador City. This unique exposure is so friable that it may be sampled with an ordinary shovel and can be considered to be a silica sand deposit.

The sample program was carried out by collecting chip samples from sections that were measured perpendicular to the strike of the best exposed ridges. The sections were divided into 7-10 m intervals and rock chips were collected every 0.5 to 1 m. There are 383 samples presently undergoing major element analysis, and they represent 33 sections of 25 to 500 m in length. Evaluation of the quartzite ridges will be based on these analyses, field descriptions and accessibility.

The best of many excellent prospects, is a well rounded hill of white massive quartzite which is approximately 750 m in diameter with a minimum of 100 m relief. It is 4 km south of the Iron Ore Company of Canada's Smallwood pit, and within 1 km of existing roads (Figure 1). It is visually the most pure exposure of quartzite and its structure and relief offer excellent quarry potential. This single exposure represents approximately 200 million tonnes of relatively pure silica.

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