GM 32212

A STUDY OF THE PRINCIPAL INFRASTRUCTURE REQUIREMENTS AND POTENTIALITIES FOR DEVELOPMENT OF THE OTELNUK LAKE IRON DEPOSITS

Énergie et Ressources naturelles
Québec

A S T U D Y

OF THE

PRINCIPAL INFRASTRUCTURE REQUIREMENTS AND POTENTIALITIES

FOR

DEVELOPMENT OF THE OTELNUK LAKE IRON DEPOSITS

Prepared for

KING RESOURCES COMPANY a n d GLOBAL ARCTIC ISLANDS LTD.

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1.0 SUMMARY

An investigation of the principal infrastructure requirements and potentialities for the development of the Otelnuk Lake iron deposits was undertaken by W. J. Riddell, P.Eng. during June and September of 1975.

Discussions with management personnel of the Quebec North Shore & Labrador Railway revealed that there should be no difficulty in hauling an additional 10 million tons of iron concentrate from Otelnuk to Seven Islands. The present QNS&L installation is designed and equipped to haul 46 million tons of iron ore per year; however, an annual rail capacity increase to 66 million tons could be accomplished with relative ease by increasing the train size, lengthening the existing sections of passing tracks and altering passenger and freight train schedules.

A preliminary railroad site selection was made between Schefferville, Quebec and Otelnuk Lake. The rail distance will be approximately 120 miles; the maximum grade against the load should not exceed 0.5%; the degree of curvature on the railroad should be low; and there will be no major bridges.

Rail construction between Schefferville and Otelnuk Lake has the options of a private railroad or extension potential of the QNS&L railroad; relative merits are reviewed.

An investigation of the potential hydro electric power supply for the Otelnuk mining and beneficiation operation revealed that although power could be delivered by Quebec Hydro either from Churchill Falls or the James Bay development project the cost of power from these sources would be very high and large additional capital commitments would be required for the construction of a high tension transmission line. Therefore a local privately constructed hydro electric facility would appear to be the most economically feasible and should be capable of generating and delivering adequate power at a cost in the neighborhood of 5 to 6 mills per KWH.

On the other hand additional power requirements at Schefferville, plus electrification of the QNS&L could initiate construction of a major power line from Churchill Falls to Schefferville. This line could be extended to Otelnuk if the costs are justifiable at Otelnuk's development stage.

With respect to iron ore shipping, the bay at Seven Islands has few good sites left for construction of a major ship loading facility. All of the suitable locations are presently held by private owners and are within the municipality of Seven Islands. Long and tedious negotiations would result if a new privately owned wharf was to be built. The vice-president of the Iron Ore Co. of Canada could see no reason why their own installation or the Wabush Mines shiploading facility, both on the bay at Seven Islands,

could not load 10 million tons per year of Otelnuk iron concentrates or pellets on a custom basis.

A townsite at Otelnuk Lake will be required to house the local employees. Access road construction between Schefferville and Otelnuk should create no problem.

Recommendations are to continue to carefully monitor the activities and costs of iron ore operations and hydro electric power developments in the area until such times as a formal feasibility study gets underway for the Otelnuk iron deposits.

2.0 INTRODUCTION

In May of 1975 King Resources Company of Denver, Colorado commissioned M P H Consulting Limited of Toronto, Ontario, Canada to undertake a preliminary engineering study of the infrastructure requirements and potentialities related to the development of the iron deposits at Otelnuk Lake, Quebec. The study was undertaken by W.J. Riddell, P.Eng. and involved discussions with officials of the Iron Ore Co. of Canada, the Quebec North Shore & Labrador Railroad Co., Quebec Hydro and Churchill Falls Power Corp.

Investigations concerned the availability and problems of the following infrastructure facilities:

Railroad Transportation

Electric Power Supply

Harbour Facilities

Townsite

Roads

The various officials with whom discussions were held are as follows:

Mr. M. Bossiere	Industrial Development Department, Quebec Hydro, Montreal, Quebec
Mr. W. Switzer	General Manager, Quebec North Shore & Labrador Railroad, Seven Islands, Quebec
Mr. R. Girardin	Manager, Port and Harbour, Iron Ore Co. of Canada, Seven Islands, Quebec
Mr. M. Morin	Manager of Marine Services, Iron Ore Co. of Canada, Seven Islands, Quebec
Mr. G. Dmytryk	Supervisor of Electrical Services, Iron Ore Co. of Canada, Carol Lake, Labrador

In addition, more wide ranging discussions were also conducted with Mr. R. Geren, Vice President of the Iron Ore Co. of Canada, dealing with the operational problems being faced by iron ore producers already operating mines in New Quebec and Labrador.

A meeting with Quebec Hydro was held on June 18, 1975 in Montreal and with the IOC-QNS&L on September 4, 5, 6, 1975 in Seven Islands and Labrador City. This report was prepared during October and November of 1975.

3.0 GLOSSARY

Arnaud Junction	Junction of Arnaud Railway Co. with the QNS&L 8.3 miles north of Seven Islands.
Arnaud Railway Co.	Railroad which carries Wabush concentrate from Mile 8.3 on the QNS&L to the Wabush pellet plant at Pointe Noire, on Seven Islands Bay.
Carol Lake, Labrador	(Carol) Low grade iron ore mining and beneficiating unit of IOC located near Wabush Lake, Labrador.
Churchill Falls Power Co.	(Churchill Falls) Public Utility of the Newfoundland Government operating a hydro electric generating station at Churchill Falls, Labrador.
Goose Bay, Labrador	A major town located on the Atlantic coast of Labrador.
Gull Rapids, Labrador	A site on the Churchill River presently being developed for production of hydro electric power.
Iron Ore Co. of Canada Ltd.	(Iron Ore, I.O.C.) A large iron ore company mining direct shipping iron ore at Schefferville, Quebec and low grade iron ore at Carol Lake, Labrador.
James Bay Energy Corp.	(James Bay) A crown corporation of the Province of Quebec developing four hydro electric power sites on the La Grande River, Quebec. The Company is wholly owned by Quebec Hydro.

Labrador	(Coast of Labrador) The mainland portion of the Province of Newfoundland. Separated from the Province of Quebec by the Atlantic Watershed. Parts of Quebec are commonly referred to as Labrador.
Menehik, Labrador	A hydro electric power site in Labrador located 30 miles south of the Town of Schefferville, Quebec. The site supplies power to the I.O.C. operations at Schefferville.
Moisie River	A major river flowing into the St. Lawrence River twenty miles east of Seven Islands. The QNS&L is built along the shores of the Moisie.
Montagnais, Quebec	A major Quebec Hydro sub station which receives electric power from Churchill Falls and transmits it at a lower voltage to Mount Wright.
Mount Wright, Quebec	The site of the new iron ore mine of Q.C.M.
National Harbour Board	A Federal agency responsible for port operation within the bay at Seven Islands.
Port Cartier, Quebec	The port on the St. Lawrence River from which the ore produced by Q.C.M. is shipped.
Pointe Noire, Quebec	The site of the port and pelletizing plant of Wabush Iron.

Quebec Cartier Mining Company	(Quebec Cartier, Q.C.M.) A subsiduary of the United States Steel Co. mining and beneficiating low grade iron ore at Mount Wright and Lake Jeannine, Quebec.
Quebec Cartier Railway Co.	The private railroad owned by Q.C.M. which moves iron ore from Mount Wright and Lake Jeannine to Port Cartier.
Quebec Hydro Electric Power Commission	(Quebec Hydro) A public utility, owned by the Province of Quebec and responsible for electric power generation, transmission and sale within the Province.
Quebec North Shore and Labrador Railway Co.	(QNS&L) A common carrier railroad, owned by I.O.C. and hauling iron from the two operations of I.O.C. and from Wabush Mines.
Ross Bay Junction	The junction point at mile 224 on the QNS&L with the Wabush Lake Railway Co. Ltd.
Schefferville, Quebec	The townsite housing employees of I.O.C. who mine direct shipping and beneficiating high grade iron ores from nearby deposits in both Quebec and Labrador.
Seven Islands, Quebec	(Sept Iles) The town on the St. Lawrence River housing the employees of I.O.C., Wabush, QNS&L and the Arnaud Railway. The bay at Seven Islands contains the loading docks for I.O.C. and Wabush. The latter at Pointe Noire.
Twin Falls, Labrador	The site of a hydro electric generating station built in 1962 by I.O.C. and Wabush. It is now owned by Churchill Falls and is not operating.

Wabush Mines Ltd.	(Wabush) A large iron producer mining and beneficiating low-grade ore at Wabush Lake, Labrador.
Wabush Lake Railway Co.	A 37-mile privately owned railway hauling concentrated iron ore from Wabush and Carol Lake, Labrador to Ross Bay Junction on the QNS&L.

4.0 RAILROAD TRANSPORTATION

Mr. W. Switzer, retiring General Manager of the QNS&L Railway in Seven Islands, discussed at length the present railroad operation and future plans concerned with moving iron ore from Schefferville, Quebec and the Wabush Lake, Labrador region to Seven Islands, Quebec. Mr. Switzer described the development of the QNS&L as follows:

Originally, in 1959, when the QNS&L was incorporated as a common carrier, the railroad was designed to haul 20 million tons per year of direct shipping iron ore from Schefferville to Seven Islands during a 7 to 8 month period from April to November. A passenger freight service was also operated on a twelve month basis.

The operations at Carol Lake were started in 1962 at a production rate of 10,000,000 tons per year. The iron ore produced was in the form of dried concentrate and it was possible to haul this material to Seven Islands on a twelve month basis.

At almost the same time the Wabush Mines operation commenced producing 6 million tons per year of iron ore concentrate. The extra requirement of hauling 16 million tons in addition to the 8 to 10 million tons from Schefferville required upgrading of the QNS&L between Ross Bay Junction and Seven Islands.

This was satisfied by an improved

signal system, and by hauling trains with more cars. The longer trains demanded additional locomotives and longer passing tracks.

In 1972 the decision was made to double the capacity of the Carol Lake plant and the QNS&L commenced studies to increase their haulage capacity to 46 million tons per year. Once again the section of railroad between Ross Bay Junction and Seven Islands required all of the upgrading as the tonnage from the Schefferville operations was not expected to exceed 12 million tons per year.

The QNS&L to meet this demand made many changes in their operation commencing in 1973. The original 1750 HP locomotives were replaced by ones powered by 3000 HP engines. With the new locomotives it was possible to pull more cars. Presently 280 cars are moved in one train with three locomotives at the front end and two slave units two-thirds of the way toward the rear end of the train. The total ore hauled per train amounts to 28,000 tons. Passing tracks were extended to handle 400 car trains on the heavily travelled section of the main line. An improved communication system was also installed.

The increased traffic on the railroad during 1974 immediately resulted in a number of derailments, delaying the operation and pointing out emphatically the need for better maintenance-of-way. At present four hours per day is alloted exclusively to maintenance operations. High speed

heavy duty equipment was purchased for the four-hour maintenance period and it is now possible to entirely replace the ballast, ties and rails once every five years.

Mr. Switzer is confident that train size can be increased to 305 cars and beyond if necessary. Thirteen trains may be operated simultaneously on the railroad at one time which would include six loaded trains. Theoretically, the capacity of the railroad amounts to 66 million tons per year which could be enlarged by increasing the number of cars per train. A further increase would result by omitting the two passenger trains which leave Seven Islands each week.

Clearly, the QNS&L is fully capable of hauling additional tonnages of ore on the railroad if requested.

The QNS&L is a common carrier and the tariffs are public documents. The charges for hauling iron ore to both the Iron Ore Co. who own QNS&L and to Wabush Iron Co. are as follows:

Wabush Mines

Ross Bay Junction to Arnaud Junction	-	$1.75/long ton
(216 miles)		$0.0081/Lt-mile

Iron Ore Co. of Canada

Schefferville to Seven Islands	-	$2.17/long ton
(352 miles)		$0.0062/Lt-mile (average cost)

The QNS&L must be in a loss position at

present and a request for higher rates would seem inevitable in the foreseeable future. The amount of increase is difficult to forecast, however, the movement of Wabush Iron Co. concentrate (a competitor) is expected to be increased so that it becomes a profitable operation. An increased tariff charged for hauling the concentrates from Wabush Iron would be followed by an increase in the tariff charged to Iron Ore Co., the owners of the QNS&L. It follows that the profits of Iron Ore would be reduced. How the tariff question will be reconciled cannot be forecast without the benefit of full financial and taxation information from the Iron Ore Co.

It is forecast that the tariffs will be raised to both Iron Ore and Wabush so that the Wabush tariff is at least a paying proposition. A cost to Wabush of $2.00/ long ton from the Ross Bay Junction to Seven Islands is forecast. This is a distance of 216 miles. The revised tariff will then amount to $0.0093 long-ton mile.

The tariff for hauling Otelnuk concentrate from Schefferville to Seven Islands a distance of 360 miles is forecast to amount to $3.35/long ton.

4.1 SCHEFFERVILLE TO OTELNUK - A preliminary railroad route location from Schefferville to Otelnuk Lake has been completed, employing Government topographic maps. The location may be found on the attached map. The total distance is 120 miles and the maximum grade against the load is 0.5% for a distance of 10 miles in one location and 13 miles in another. All other sections would be virtually

level.

Railroad construction between Schefferville and Otelnuk should be relatively simple. The location is primarily on the upper slopes of the Swampy Bay River system and construction will entail a great deal of side hill cutting. Only in a very few locations will heavy, long rock cuts be required and only in one place, at mileage 97 is the curvature of the location excessive. There are no major river crossings and no bridges should be required.

An estimate of construction cost for the work would amount to $200,000/mile. This cost would include construction of the sub-grade, installation of culverts, laying of rail and switches, plus full ballasting.

The rolling stock and locomotive power to haul from Otelnuk to Schefferville would be comprised of 7 locomotives and 600 ore cars, plus additional vans, flat and box cars. In addition a fully equipped maintenance crew would be required plus a signal system. The cost of this equipment is estimated to be $32,000,000.

The total cost of building and equipping a railroad between Schefferville and Otelnuk is estimated to amount to $56,000,000.

The cost of hauling concentrate from Otelnuk to Schefferville on a privately owned railroad is estimated to

amount to $0.90/long ton.

In discussions held with the QNS&L the enquiry was made concerning expansion of the railroad. As presently constituted, the QNS&L has the same railroad mileage as that built in the early 1950's. Since that time all additional trackage has been built by private operators. This includes the railroad link from Wabush Lake to Ross Bay Junction and from the Arnaud Junction at Seven Islands to the Pointe Noire pellet plant of Wabush Mines Ltd.

The opinion of Mr. Switzer and Mr. R. Geren concerning expansion of the QNS&L was that it was entirely possible. This could occur if the right opportunity presented itself. For this reason consideration should be given to requesting the QNS&L to extend the railroad to Otelnuk Lake and in this way reduce the operating problems of owning a private railroad. The cost of construction, rolling stock and motive power would almost certainly have to be borne by the Otelnuk Lake operation with a return of capital through a formula of reduced freight rates. This proposal may be very attractive to the Iron Ore Co. as the extension from Schefferville to Otelnuk would pass close to some of their more remote iron deposits located to the north of Schefferville.

The cost of hauling concentrate from Otelnuk to Seven Islands, assuming extension of the QNS&L from Schefferville to Otelnuk, is estimated to amount to $4.50/long ton. This estimate assumes completion of the refunding of all capital supplied by Otelnuk for construction, rolling stock and motive power.

4.2 QUEBEC CARTIER RAILROAD - The private railroad owned by the Quebec Cartier Mining Co. runs between the Mount Wright operation and the harbour at Port Cartier. The railroad will move approximately 24 million tons per year of iron ore during 1976. The railroad is built to the same high standards as the QNS&L and with improvements in signalling and length of passing tracks could handle the same tonnage as the QNS&L.

Looping of the two railroad systems would be a relatively simple matter although the link between Port Cartier and Seven Islands would require a major bridge and some costly sub-grade construction.

It would seem that the QNS&L can handle all the tonnage demanded of it over its own line during the foreseeable future. The option exists to divert Otelnuk Lake ore from the QNS&L at Ross Bay Junction through Wabush Lake to Mount Wright and thence to Port Cartier and/or Seven Islands.

It is an expensive option but does exist.

In summary, it can be stated that no immediate problems present themselves if 10 million tons of concentrate per year were to be moved from Otelnuk Lake to Seven Islands. If the QNS&L extended their line north of Schefferville to Otelnuk Lake there would be no need to construct and operate a private railroad.

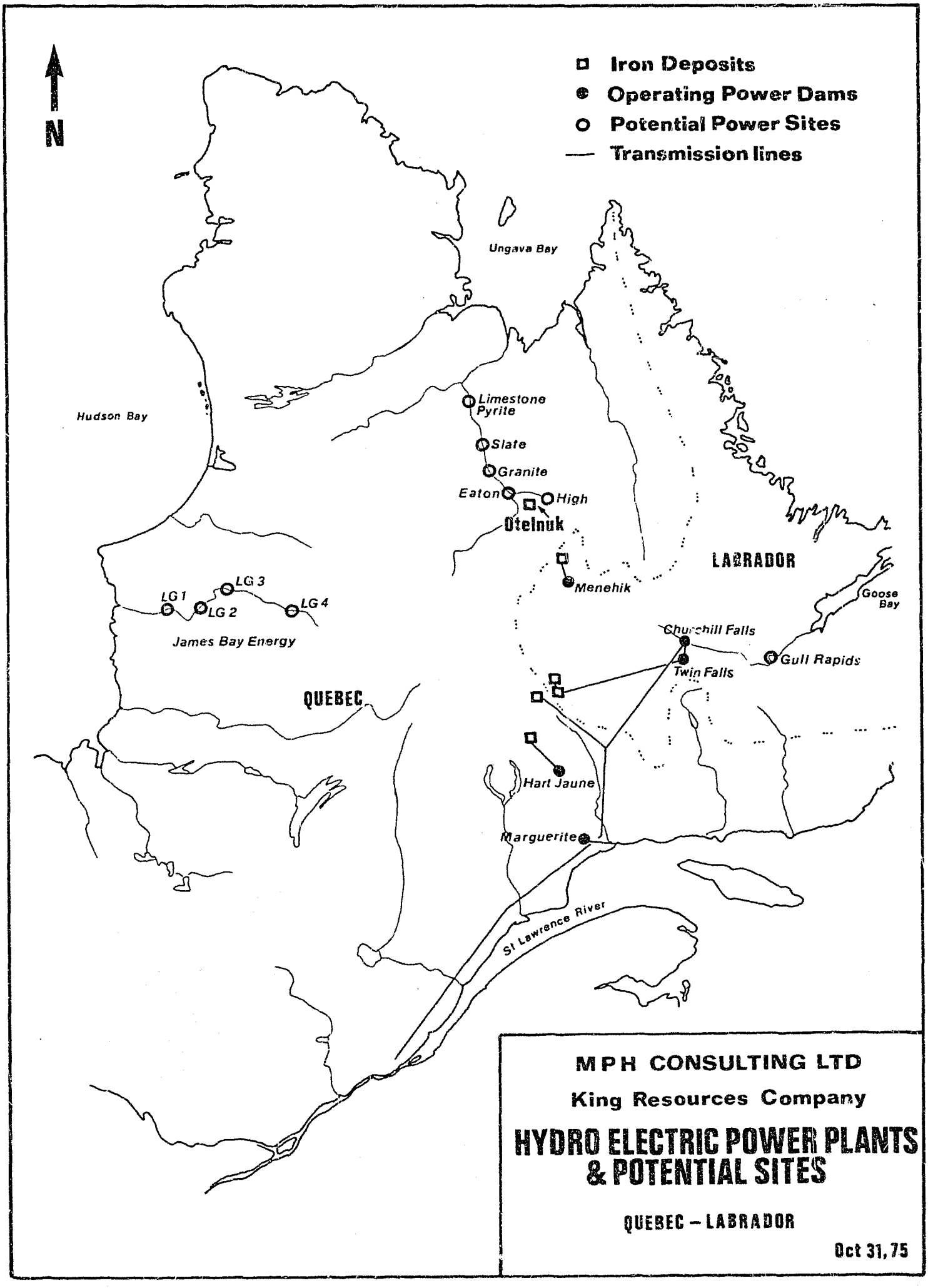
5.0 ELECTRIC POWER

5.1 QUEBEC HYDRO - The Quebec Hydro Electric Power Commission is responsible for the distribution and sale of all electric power within the Province of Quebec. They own all water rights and must approve the use of the water rights and the construction of power dams.

A discussion was held with Mr. M. Bossiere of Quebec Hydro in Montreal on June 18, 1975. Mr. Bossiere outlined the policies of Quebec Hydro concerned with the distribution of electric power within the province.

A basic network was established within the province some years ago and electric power costs within the network are the same for all consumers. Outside the network charges are higher depending on distance from the basic network and the amount of power consumed. Costs are negotiated.

Mr. Bossiere pointed out that Otelnuk Lake was a great distance from any existing power lines and he expressed the view that Quebec Hydro would have little interest in supplying power to such a remote area. He reported that he was unaware of any power potential studies that had been undertaken by Quebec Hydro in the Otelnuk area. This is in conflict with the potential of the various sites near Otelnuk reported in previous M P H Consulting reports to King Resources, acquired a number of years ago from the Quebec Department of Natural Resources.



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In essence Mr. Bossiere intimated that a development at Otelnuk Lake would require the construction of a local power dam to generate the required electric power. Quebec Hydro would not be able to contribute any power from their present network.

If Otelnuk was to develop a power site Mr. Bossiere recommended that authorization should be requested through the Quebec Department of Natural Resources. Ultimately the request for approval would be made to Quebec Hydro and Mr. Bossiere considers this would be a mere formality. He indicated that Quebec Hydro would have final approval of dam design and the type of electrical installation to assure that they would be compatible with the future plans of Quebec Hydro. It is his belief that ultimately the Quebec Hydro network would extend to Otelnuk Lake, after completion of the James Bay development and also of dams on the rivers to the east of Seven Islands.

A discussion was also held with Mr. Bossiere concerning the possibility of supplying electric power from Churchill Falls or the James Bay development project. Quebec Hydro purchases the majority of the power generated at Churchill Falls which is located in the Province of Newfoundland. The power is transmitted by 735,000 volt power lines along the north shore of the St. Lawrence River to the industrialized regions of Quebec. A large part of the power is sold to the United States.

The James Bay development project will be in full opera-

tion during the middle 1980's.

5.2 JAMES BAY ENERGY CORP. - One dam of four to be built by the James Bay Energy Corp. on the Le Grande River will be a straight line distance of 250 miles from Otelnuk Lake. This dam (LG-4) will not be completed until 1982-84. Mr. Bossiere indicated that he believed that the cost of the transmission line from this dam to Otelnuk Lake could not be justified.

5.3 CHURCHILL FALLS POWER CO. - A telephone conversation with Mr. R. Thom of the Churchill Falls Power Co. revealed that all power generated by the development was fully committed to consumers such as the IOC and Wabush operations, both located in Labrador, and to Quebec Hydro. Power lines owned by Churchill Falls, but originally built by IOC-Wabush, transmit power from Churchill Falls to Wabush Lake for distribution to the two mining operations. Quebec Hydro transmits power from Churchill Falls and, at Montagnais within the Province of Quebec, taps off the main transmission line and delivers power at a reduced voltage northward to the Mount Wright development of Quebec Cartier.

In addition to the main Churchill Falls development there still exists the Twin Falls power development on the Churchill River watershed which was built originally by IOC-Wabush to supply electric power to the original developments at Wabush Lake. This power site is now owned by Churchill Falls and is mothballed. It could

be reactivated if a power demand developed. At Gull Rapids some 80 miles down river from Churchill Falls a new development is under construction which is intended to supply power to the island of Newfoundland and to Goose Bay. Some of the power generated at this site could be fed westward to join the power generated at Churchill Falls.

In summary, there is additional power available on the Churchill River system which could be used for development in Labrador. Otelnuk Lake is located in Quebec and the view was expressed that it would be doubtful if Quebec Hyudro would construct another transmission line through Labrador into the northern part of New Quebec. It is the belief that any transmission lines built by Quebec Hydro would be either the extension of their line to Mount Wright or a new line from the James Bay development.

5.4 MENEHIK DAM-IRON ORE CO. - The Menehik power site is located 30 miles south of Schefferville and was originally built to supply power to the Schefferville operation of the Iron Ore Co. The dam is now generating at its full capacity (15000 KVA) and is unable to supply enough power to Schefferville during the winter months. Schefferville has grown to such an extent that studies have been made to increase the generation capacity of the dam. This would be done by raising the various control dykes and dams by five feet and installing a

fourth turbine.

It is the opinion of some that the high cost of this work is unwarranted and that a powerline carrying Churchill Falls power must be built to Schefferville from Mont Wright or Carol Lake.

In addition to the Schefferville power demand, studies have been made of the benefits which would result from electrifying the QNS&L railroad. It is the belief of the management of the QNS&L that this will ultimately be done at least between Ross Bay Junction and Seven Islands and if additional tonnage was to be hauled from Otelnuk the total railroad would be electrified. This consideration points to the possibility of a major transmission line to the north carrying Churchill Falls power.

5.5 ELECTRIC POWER COSTS - Electric power costs in 1980 have been forecast to be in the order of 12 to 15 mills per KWH from electricity generated from the James Bay Energy Corp. This is clearly indicative of the future cost of power which will be sold by Quebec Hydro in the Province of Quebec. It is further estimated that 20 mills per KWH would be the charge by Quebec Hydro to deliver electric power to Otelnuk during the early 1980's. In addition the operation would be faced with a capital expenditure of approximately $20 million for a transmission line from LG4 or Mount Wright which would be refunded through lower power costs over a number of years. It was

reported that the Menihik Dam is now generating power at a cost of 1.8 mills per KWH. The low cost is due to complete amortization of the original investment. A new dam, privately built, could generate power at an estimated cost of 5 to 6 mills per KWH, including amortization charges.

Compared with the estimated Quebec Hydro tariff and the capital expenditure required for a transmission line it would seem obvious that a power dam should be built privately by the Otelnuk operation to supply both the mining complex and an electrically heated townsite. This estimated power requirement for both functions is approximately 130,000 HP.

6.0 HARBOUR AND PORT FACILITIES

The harbour and port facilities at Seven Islands were investigated through extended discussion with Mr. R. Girardin and Mr. M. Morin of the Iron Ore Co. Mr. Girardin is responsible for all port and harbour facilities for the Iron Ore Co. while Mr. Morin is responsible for the marine services of the Company.

It was determined that the Municipality of Seven Islands incorporates the complete bay at Seven Islands plus additional land extending many miles to the east and west along the shore of the St. Lawrence River. If a pellet plant or loading facility were to be constructed within the town limits, it would be necessary to obtain approvals for the development through the Planning Commission of the City.

Residential and commercial zoning has been instituted in the town and it is generally true that shoreline has been zoned residential while land located back from the shore, in chosen locations, has been zoned commercial. An examination of the shoreline for a distance of perhaps twenty miles both within and without the city limits now shows extensive residential development.

Some land may still exist in remote corners of the municipality that is not privately owned but the vast amount of land is in private hands plus large tracks of land to the east and west of the city within the con-

fines of the County of Duplessis.

Disregarding the municipal and the zoning restrictions, there are four possible sites for a port facility and only one of these is within the confines of the bay. Another site is on the St. Lawrence River to the west of the city of Seven Islands and was considered recently as a possible site for a super-tanker port to be used for transhipment of petroleum products by lake boat to consumers on the Great Lakes. Another site is on one of the islands within the bay. To the east of Seven Islands and the Moisie River a large bay exists which would give some protection to vessels while loading. The water depths in the bay are relatively shallow and extensive dredging would be required.

Ship movements and offshore installations within the bay of Seven Islands are controlled by the National Harbour Board, a Federal agency. Construction of wharves and loading facilities within the bay would require approval of the Board. Operational control of vessels within the bay is of minor consequence to the Board due to the adequate manoeuvering room available. Seven Islands is not a congested harbour and is becoming less so due to the increased size of vessels that arrive to load iron ore.

In summary it can be stated that there are few remaining good sites within the bay for a wharf and loading facility to handle large ocean going vessels in

the 250,000 DWT class. If a site was chosen long negotiations with the owners, the municipality and the Harbour Board would be inevitable.

At a discussion with Mr. Geren concerning the loading facility, he expressed the view that there should be no reason why one of two present installations within the bay, either I.O.C. or Wabush, could not be used to load ten million tons per year of Otelnuk pellets. He pointed out that there is abundant capacity at the two facilities and that his company (I.O.C.) would welcome additional business to make better use of the labour and facilities that are being utilized to a low degree at present. The utilization of men and equipment in the harbour is expected to decrease even further as the size of vessels carrying iron ore increases.

The proposal of Mr. Geren would seem to be logical and would greatly reduce the initial capital cost of bringing the Otelnuk Lake deposits into production. A pellet plant located inland on cheap and available land could produce pellets and transfer them to one of the loading facilities by rail or conveyor belt. The charges for loading are estimated to be approximately $0.50/ton.

7.0 TOWNSITE

The present townsite at Schefferville is used to house the employees of the Iron Ore Co. plus the familites of the suppliers of goods and services, to both the IOC employees and to the tourist trade which has expanded rapidly during the past five years. As outlined in the section of the report dealing with Electric Power, Schefferville is very short of electric power at this time. If it was wished to house the employees of the Otelnuk Lake operation at Schefferville then a major expenditure would be required to supply additional electric power.

The majority of the energy used for heating at Schefferville is supplied by petroleum products which are increasing in costs as the years pass. At Fermont, the new townsite of the Mount Wright operation of Quebec Cartier Mining, the maximum use of electrical heating is employed due to the very low cost of hydro electric power available from Churchill Falls.

The present and future difficulties of electric power supply and heating cost at Schefferville obviates the use of this town to house the Otelnuk Lake employees.

Construction of a new townsite at Otelnuk Lake should be undertaken using the principles employed at Fermont. Electric energy input per dwelling is estimated to amount to 12 KVA.

8.0 ACCESS ROADS

Access roads between Schefferville and Otelnuk would follow the route of the railroad. Construction costs should be reasonable as no major rock cuts or river crossings are necessary.

The route of both the railroad and access road will pass over concessions leased by the Iron Ore Co. and containing iron deposits which will be mined in the future.

Mr. Geren of I.O.C. could see no legal or physical problem of acquiring a right-of-way over the concessions. In fact, if both railroad and roads were built close to some of the remote deposits it would be of real assistance to I.O.C. in planning their development.

9.0 CONCLUSIONS

The results of the studies outlined in this report indicate that no major problems exist in developing the infrastructure to serve an iron ore operation at Otelnuk Lake. In some cases a reduction in capital costs is possible from those estimated in the MPH Consulting Limited report dated May 1, 1974.

The study of the railroad location between Schefferville and Otelnuk presented no serious problems. The ability of the QNS&L to haul an additional 10 million tons per year between Schefferville and Seven Islands also was discovered to be entirely within the capability of the present installation.

The electric power studies confirmed that construction of a power dam in the vicinity of Otelnuk Lake would be the wisest course to follow considering the projected cost of power from Quebec Hydro and the capital cost of a transmission line. An electrically heated townsite also appears the most logical as a means of supplying heat to homes, shops and business establishments.

The lack of good port facilities at Seven Islands and the difficulties inherent in dealing with public bodies brought out the advantages of using the loading docks of either I.O.C. or Wabush. Both of these installations are only partially utilized.

The use of Schefferville as a centre for housing employees of Otelnuk was rejected due to the lack of electric power and the need for heating with petroleum products. The distance from Otelnuk was in the first case a major deterrant but consideration of Schefferville as an Otelnuk dormitory had to be given. Access roads between Schefferville and Otelnuk presents no forseeable construction or maintenance problems.

10.0 RECOMMENDATIONS

It is recommended that continual monitoring should be carried out of the developments, operational activities and costs of the iron ore producing and exploring companies, and public bodies operating in the New Quebec-Labrador region. Further additional infrastructure studies are not necessary at this time.

Consideration should be given in the near future to undertaking an evaluation of the various hydro electric power sites in the Otelnuk region. A preliminary capital and operating cost estimate should be completed on a selected site.

W.J.Riddell, P.Eng.