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MINERAL INDUSTRY AND DEVELOPMENT
in the
ATLANTIC PROVINCES

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MINERAL INDUSTRY AND DEVELOPMENT

in the

ATLANTIC PROVINCES

A review of the mineral industry of Atlantic Canada was undertaken to evaluate the state of the industry and to identify those opportunities for development that presently are constrained by various technical, social and institutional factors from attaining maximum realization in both the short and long term.

Statistical data released by Federal and Provincial Governments, Departmental annual reports, and interviews with government and industry officials form the basis of the report.

Interviews and discussions were conducted with the following:

Newfoundland:

Mr. J. McKillop,
Director, Mineral Resources,
Department of Mines, Agriculture,
and Resources
St. Johns, Newfoundland

J. M. Fleming,
Senior Geologist,
Department of Mines, Agriculture,
and Resources,
St. Johns, Newfoundland

Mr. Roger March,
Mines Branch,
Department of Mines, Agriculture,
and Resources,
St. Johns, Newfoundland

Mr. Glynn Bartlett,
Mineral Economist,
Mineral Resources Branch,
Department of Mines, Agriculture,
and Resources,
St. Johns, Newfoundland

Mr. Jim Hartt,
Manager, Buchans Division,
American Smelting and Refining
Co. Ltd.,
Buchans, Newfoundland.

Nova Scotia:

Dr. J. P. Nowlan,
Deputy Minister,
Department of Mines,
Halifax, Nova Scotia

Mr. F. Shea,
Director, Geological Branch,
Department of Mines,
Halifax, Nova Scotia.

Mr. E. D. Brown,
Retired Manager,
National Gypsum (Canada) Ltd.,
Dartmouth, Nova Scotia.

New Brunswick:

Mr. R. L. Bishop,
Deputy Minister,
Department of Natural Resources
Fredericton, New Brunswick.

Dr. R. R. Potter,
Chief Geologist,
Department of Natural Resources,
Fredericton, New Brunswick.

Mr. R. W. Warren,
Director, Mines Branch,
Department of Natural Resources,
Fredericton, New Brunswick.

Mr. Basil Small,
Department of Regional Economic
Expansion,
Fredericton, New Brunswick.

Mr. James Addison,
President,
New Brunswick Development
Corporation,
Fredericton, New Brunswick.

Mr. P. J. Fowler,
Manager, Brunswick Smelting
Division,
Brunswick Mining & Smelting Corp.
Belledune, New Brunswick.

Mr. J. Moreman,
Manager, Brunswick Mining
Division,
Brunswick Mining & Smelting Corp
Bathurst, New Brunswick.

Mr. W. Seymour,
Manager, Caribou Project,
Anaconda of Canada Ltd.,
Bathurst, New Brunswick.

Mr. R. Baker, Manager,
Heath Steele Mines Ltd.,
Newcastle, New Brunswick.

Mr. A. Kirkland,
Manager of Mines,
K. C. Irving Ltd.,
Saint John, New Brunswick.

Mr. K. Wilson, President,
Snowflake Lime Ltd.
Saint John, New Brunswick.

General:

Dr. G. E. Cooper,
 Manager, Eastern Canada,
 Noranda Exploration Ltd.,
 Bathurst, New Brunswick

Mr. L. Beliveau,
 Vice President - Mines,
 Sullivan Mining Group,
 Montreal, Quebec.

Mr. John Selwyn,
 Senior Development Geologist,
 Canada Cement LeFarge Ltd.,
 Montreal, Quebec.

Mr. W. G. Brissenden,
 Vice President - Mines,
 Noranda Mines Ltd.,
 Toronto, Ontario.

Mr. G. N. Moore,
 Manager of Exploration,
 Cominco Ltd.,
 Toronto, Ontario.

The mineral industry of Atlantic Canada plays an important part in the economic life of the area. The gross value of mineral production (1971) was \$505,000,000 and represents a substantial contribution to the employment opportunities and the gross provincial product. All provinces are represented, although Prince Edward Island contributes only about \$500,000, which reflects local sand, gravel and aggregate production.

Value of Mineral Production by Class, 1971 (\$x000)

	<u>Nfld.</u>	<u>P. E. I.</u>	<u>N. S.</u>	<u>N. B.</u>
Metals	\$309,344	-	\$ 215	\$ 91,641
Non-Metals	18,793	-	20,706	2,975
Fuels	-	-	23,232	4,174
Structural Materials	<u>8,578</u>	<u>650</u>	<u>15,383</u>	<u>8,571</u>
TOTALS:	\$336,715	\$650	\$59,536	\$107,361

MINERAL PRODUCTION ATLANTIC PROVINCES, 1971

	'000	Newfound- land	Prince Edward Island	Nova Scotia	New Brunswick
<u>METALS</u>					
Bismuth	lb.	-	-	-	37
Cadmium	lb.	-	-	-	135
Copper	lb.	25,750	-	33	19,917
Gold	oz.	4	-	-	5
Iron ore	ton	22,600	-	-	-
Lead	lb.	19,535	-	830	142,781
Silver	oz.	420	-	55	5,011
Zinc	lb.	30,212	-	-	319,134
<u>NON-METALS</u>					
Asbestos	ton	77	-	-	-
Barite	ton	-	-	120	-
Fluorspar	ton	80	-	-	-
Gypsum	ton	600	-	4,932	80
Peat	ton	-	-	10	75
Quartz	ton	109	-	4	-
Salt	ton	-	-	850	-
Pyrophyllite	ton	32	-	-	-
Sulphur in smelter gas	ton	-	-	-	40
<u>FUELS</u>					
Coal	ton	-	-	1,946	510
Natural Gas	Mcf.	-	-	-	106
Petroleum crude	bbl.	-	-	-	10
<u>STRUCTURAL MATERIALS</u>					
Clay products	dollar	-	-	1,765	660
Cement	dollar	2,478	-	4,818	3,811
Sand and gravel	ton	6,100	850	7,700	4,700
Stone	ton	100	-	900	1,300

Mineral production on the Island of Newfoundland has a gross value of about \$50,000,000, with the remainder of the total provincial figure (\$287,000,000) representing the production of iron ore from western Labrador.

The impact of the mining industry on the economic life of the Region is extremely important, when one considers that there are more than 13,000 direct jobs dependent on the industry.

The direct jobs and their multiplier effect has made a substantial difference to certain areas. However, much of the impact on regional development or on closing the regional disparity gap is lessened due to the fact that the major employment has traditionally been a part of the industrial scene in the Region and that new opportunities in the past 15 years have resulted in local improvements rather than substantial regional benefits.

An analysis of the direct employment figures will indicate that of the 13,000 jobs, close to 5,000 are related to the coal industry; 3,000 to the iron ore industry in Labrador (little direct effect other than tax revenues for the Atlantic area); and 700 to the old Buchans Mine. New jobs, exclusive of Labrador, in the mineral sector have been the 2,300 in the Bathurst-Newcastle area of New Brunswick, and about 800 jobs in the Baie Verte area of Newfoundland.

DIRECT EMPLOYMENT IN MINERAL INDUSTRY - 1972

<u>Newfoundland</u>	2,000	
<u>Labrador (iron ore)</u>	<u>3,050</u>	5,050
<u>Nova Scotia</u>		
Gypsum	260	
Coal	4,500	
Other	<u>560</u>	5,320
<u>New Brunswick</u>		
Metals	1,700	
Smelter	700	
Coal	220	
Gypsum	100	
Other	<u>100</u>	<u>2,820</u>
		13,190

DEVELOPMENT OPPORTUNITIES:Newfoundland

- (a) pyrophyllite deposit
- (b) magnesite
- (c) base metals near Buchans
- (d) gypsum
- (e) base metals - Daniels Harbour

Nova Scotia

- (a) gypsum
- (b) salt
- (c) lead - Salmon River
- (d) zinc - Meat Cove
- (e) barite-fluorite - Lake Ainslie
- (f) aggregate

New Brunswick

- (a) base-metals - Bathurst-Newcastle
 - (i) Chester
 - (ii) Anaconda
- (b) potash
- (c) salt
- (d) Brunswick Tin
- (e) aggregate

CONSTRAINTS TO DEVELOPMENT:

- (a) technological - metallurgy and mineral dressing; eg. Base-metals; Brunswick Tin; magnesite deposits; barite-fluorite, Lake Ainslie.
- (b) Lack of Processing Facilities - gypsum, base-metals.
- (c) International Markets, tariffs - base-metals, Bathurst-Newcastle; lead, Salmon River.
- (d) Transportation - rail, road, harbour facilities - Buchans; Base-metals, N. B., Labrador.
- (e) Skilled labour - productivity

(f) Low return on investment.

(g) Environmental concern.

SUGGESTED INCENTIVE PROGRAMS AND PROJECTS:

1. Metallurgical and Mineral Dressing Research

There are deposits throughout the region that are of sufficient size and grade to be considered ore bodies in the ground. However, low recoveries and technological problems prevent economic exploitation.

- (a) magnesite deposit - Gander Bay, Newfoundland
- (b) barite-fluorite - Lake Ainslie, Nova Scotia
- (c) base-metals - Bathurst-Newcastle, New Brunswick
- (d) tin-tungsten-molybdenum - Mt. Pleasant, New Brunswick

(a) Magnesite - Gander Bay, Newfoundland - There is a large tonnage of magnesite outlined by diamond drilling. The opinion is that the deposit could be worked; but, at present, the high silica content makes a final product unacceptable. Considerable metallurgical work has been performed; and local opinion suggests that, if a technology were developed for removing the silica, the deposit would be mined.

(b) Barite-fluorite - Lake Ainslie, Nova Scotia - The deposit is controlled by International Mogul. There is a large deposit, but the rate of return on investment capital is not high enough. A metallurgical grade fluorite (96%) can be made which gives too low revenues. If a chemical grade (acid grade >97%) fluorite could be produced, then the return is much greater and the deposit would be mined. Barite is the major impurity and, in order to increase grade, the total recoveries are very low.

(c) Base-metals - Bathurst-Newcastle, New Brunswick -

Many of the base-metal deposits in the Bathurst area would be developed if increased recovery of metals could be obtained. With the exception of Anaconda and Chester Mines, it is unlikely that any additional development will take place until the metallurgical problem is solved. Brunswick has obtained fairly good recoveries but still discharges to the tailings pond some \$10,000 per day of metals. Even a slight improvement in the metallurgy would substantially improve the economics of the deposits. Metallurgy is a more significant constraint than metal prices or markets.

(d) Tin-tungsten-molybdenum - Mt. Pleasant, New Brunswick -

The deposit has a very large tonnage of complex ore materials. Much work has been done and hopefully a solution will be found. Could be a large development.

A major research effort should be initiated under proper supervision for metallurgical work on selected deposits in the Atlantic Region. The program could be in the form of direct financial assistance to Companies for "in-house" research, a funded program in private commercial laboratories, and more work in the Mines Branch, Ottawa. The program should be oriented toward new processes and increased metal recoveries. A jointly funded program by interested mining companies and the federal and provincial governments may be possible.

The potential return from such a program could be extremely high and involve many thousands of jobs and large capital investment in the region.

2. Processing

The question of further processing of the primary resource in the region is very important and must be carefully analyzed in light of economics and international trade. There are three major areas that could return substantial benefits to the region if properly developed.

- (a) base-metals, New Brunswick
- (b) gypsum - Nova Scotia
- (c) pyrophyllite - Newfoundland

(a) Base-metals - New Brunswick - The region produces a sufficient tonnage of zinc concentrates to support a conventional zinc smelter. The major constraints to the development are the high capital cost, high electrical power costs, and international tariff barriers. The region is a logical geographic location and would handle custom concentrates from the United States and Canada.

The high capital costs and suggested low return on investment appears to be holding back this development. The government should consider the construction of a smelter in joint participation with industry. The government would have an equity position similar to most smelter developments in Europe.

(b) Gypsum - Nova Scotia - Nova Scotia and Newfoundland export 5,000,000 and 600,000 tons, respectively, of raw gypsum to the east coast of the United States. With improvements in transportation and packaging, some of this exported material should be processed in the Provinces. New Brunswick processes about 80,000 tons per year

METAL PRODUCTS (tons)

	<u>Lead Concentrates</u>	<u>Zinc Concentrates</u>	<u>Copper Concentrates</u>	<u>Bulk</u>
Newfoundland	16,853	29,870	22,157	-
New Brunswick	<u>174,586</u>	<u>337,762</u>	<u>53,321</u>	<u>72,994</u>
	191,439	367,632	75,478	72,994

1. Bulk concentrate contains roughly 35,000 tons of lead equivalents and 35,000 tons of zinc equivalents.
2. Conversion of Belledune Smelter to Lead Smelter can process about 200,000 tons of lead concentrates per year. Smelter will process 100 per cent of Brunswick lead concentrates with no excess capacity for custom smelting.
3. Volume of zinc concentrates would easily support a domestic smelter.

into wall board and plasters with a total employment in the plant and quarry of 100 men. Even if 20 to 40 per cent of the raw gypsum were processed in the Province, a large number of jobs would be created. The Nova Scotia government has periodically looked at this problem.

(c) Pyrophyllite - Newfoundland - About 32,000 tons of pyrophyllite are exported from Newfoundland to the United States annually. The material is used to manufacture ceramic tile. The deposit should be examined and a feasibility study made to determine if such material could be processed locally for the domestic and export market.

3. Transportation

There was a need expressed for year-round harbour facilities on the north shore of New Brunswick that could act as both a bulk cargo loading facility and for speciality products (pulp and paper).

The need for governmental participation or total involvement in building access roads to small mineral deposits is recognized. In many cases, the deposit is not of sufficient size to justify a major expenditure on road building. This applies particularly in Northern New Brunswick and Newfoundland. A Road to Resources program is required.

All companies expressed a sense of frustration in dealing with the Railroads. Complaints centered about the lack of rolling stock, irrational rate structure, and uncertainty of delivery.

4. Financial

Most mineral deposits in the region are undeveloped because of the low rate of return on capital investment under present technological knowledge. In some instances, both at the primary and secondary resource development stages, the provision of financial assistance is desirable. Cash grants and government guarantees do not appear to be favourable methods as they reduce the sound business judgements necessary for effective management decisions. It is suggested that a system of providing relief of high interest rates on capital borrowings may be an effective method of stimulating development. If government does get involved in mineral developments, it should be in an equity position with the right to purchase of the government's interest by the private partner.

5. Exploration Incentives

There have not been any major mineral discoveries in the region for the past ten years. Most geologists would rate the exploration potential as high, therefore methods should be found to encourage exploration expenditures in the region. In addition to the Provincial governments' geological programs (funded by DREE) and the maintenance of a good legislative exploration climate, the Federal government should examine methods of direct involvement without violating Provincial jurisdiction for mineral deposits.

A practical method would be for the Federal government to establish an exploration company in Atlantic Canada to carry out both primary exploration programs and to participate financially with private industry. This would mean that private industry could carry out more intensive exploration with less risk. The Company would be similar to SOQUEM, the Quebec government exploration company, that has successfully worked with private industry in the Province.

MAJOR OPERATORS - MINERAL INDUSTRY - ATLANTIC PROVINCES

NAME	OWNER	PRODUCT	DESTINATION
<u>Newfoundland:</u>			
Asarco - Buchans Division Buchans	American Smelting & Refining	zinc concentrate lead concentrate copper concentrate	West Germany; England; Belgium France; Norway
Consolidate Rambler Mines Baie Verte	Northern Canada Mines K. C. Irving interests	copper concentrates	Canada - Gaspé Copper Mines
Iron Ore Co. of Canada Wabush	Hollinger - Hanna	iron ore	U.S.; England; Canada; Japan; Belgium; Italy
Wabush Mines Wabush	Pickands - Mather	iron ore	Quebec; U.S.
Newfoundland Fluorspar Works of Alcan St. Lawrence	Aluminum Co. of Canada	fluorite	Arvida, Quebec
Advocate Mines Baie Verte	Johns Mansville (manager) Patino	asbestos fiber	U.S.; Africa; Europe.
Flintkote Co. Canada St. Georges	Flintkote Inc.	gypsum	New Jersey; Oakville, Ont.; some to Corner Brook
Newfoundland Minerals Ltd. Manuels	American Olean Tile Co. Inc.	pyrophyllite	Pennsylvania
Newfoundland Enterprises Ltd Villa Marie	Sicotte & Sons Ltd.	quartzite	ERCO plant at Long Harbour

MAJOR OPERATORS - MINERAL INDUSTRY - ATLANTIC PROVINCES (Cont'd)

NAME	OWNER	PRODUCT	DESTINATION
<u>Nova Scotia:</u>			
Dresser Minerals Walton	Dresser Industries Ltd.	barite	U. S. ; Venezuela; Trinidad; Canada
Georgia Pacific, Bestwall Div. River Denys	Georgia Pacific Corp.	gypsum	U. S.
Domtar Construction Materials McKay Settlement	Domtar Chemicals Ltd.	gypsum	Canada
Fundy Gypsum Miller Creek	U. S. Gypsum	gypsum	U. S.
Little Narrows Gypsum Little Narrows	U. S. Gypsum	gypsum	U. S. ; Canada
National Gypsum (Canada) East Milford	National Gypsum	gypsum	U. S. ; Canada
Canadian Rock Salt Pugwash	Morton Salt	salt	Canada; U. S.
Sifto Salt (1960) Nappan	Domtar Chemicals Ltd.	salt	Atlantic Provinces

MAJOR OPERATORS - MINERAL INDUSTRY - ATLANTIC PROVINCES (Cont'd)

NAME	OWNER	PRODUCT	DESTINATION
<u>New Brunswick:</u>			
Brunswick Mining & Smelting Bathurst	Noranda	Lead concentrates zinc concentrates copper concentrates	New Brunswick Belgium; France Gaspé
Heath Steele Mines Newcastle	American Metals Climax International Nickel Co.	lead concentrates zinc concentrates copper concentrates	Mexico; U. S. A. U. S. ; Japan; Europe Europe
Consolidated Durham Mines Lake George	Consolidated Durham Spooner Oil	antimony	Japan
Canadian Gypsum Co. Hillsborough	U. S. Gypsum Co.	gypsum	New Brunswick