


ÉTUDES ET
RECHERCHES
EN TRANSPORTS



LIQUID BULK TRANSPORTATION ON THE ST. LAWRENCE RIVER

RÉJEAN LECLERC
SERGE LÉVEILLÉ

SOCIO-ÉCONOMIE
DES TRANSPORTS



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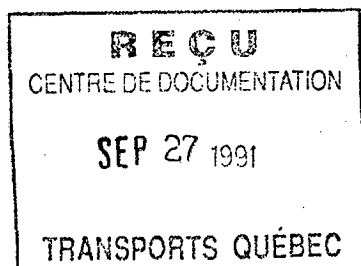
MINISTÈRE DES TRANSPORTS
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200, RUE DORCHESTER SUD, 3^e
QUÉBEC, (QUÉBEC)
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LIQUID BULK TRANSPORTATION ON THE ST. LAWRENCE RIVER

prepared by

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Ministère des Transports du Québec
Direction du transport maritime,
aérien et ferroviaire

Québec City
September 1990

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This report is published by the
Direction des communications of the
ministère des Transports du Québec.
To obtain a copy, call (418) 643-6860 or
write to:

Direction des communications
Ministère des Transports du Québec
700, boulevard Saint-Cyrille Est
18^e étage
Québec (Québec)
G1R 5H1

Legal Deposit: 3rd quarter 1991
Bibliothèque nationale du Québec
ISBN 2-550-22342-x



Titre et sous-titre du rapport LIQUID BULK TRANSPORTATION ON THE ST. LAWRENCE RIVER				N° du rapport Transports Québec RTQ-90-14			
				Rapport d'étape <input type="checkbox"/> An Mois Jour			
				Rapport final <input checked="" type="checkbox"/> 9, 0 0, 9 0, 3			
Auteur(s) du rapport Réjean Leclerc, Serge Léveillé				N° du contrat			
				Date du début d'étude Date de fin d'étude			
				8, 9 0, 5 0, 1 9, 0 0, 9 0, 3			
Étude ou recherche réalisée par (nom et adresse de l'organisme) Direction du transport maritime, aérien et ferroviaire Ministère des Transports du Québec 700, boul. St-Cyrille est, 22e étage Québec (Québec) G1R 5H1				Étude ou recherche financée par (nom et adresse de l'organisme) Ministère des Transports du Québec 700, boul. St-Cyrille est Québec (Québec) G1R 5H1			
But de l'étude, recherche et renseignements supplémentaires To gauge the importance of liquid bulk in Québec's port activities. To evaluate the scope of liquid bulk traffic according to a modal breakdown. To identify the main movements of liquid bulk commodities on the St. Lawrence and the maritime installations needed for this traffic.							
Résumé du rapport Liquid bulk traffic on the St. Lawrence accounts for 17% of all Québec's maritime activity. It is characterized by the preponderance of petroleum (94%), chemicals (5%) and edible (1%). During the period studied (1984-1988), the Port of Québec emerged as the foremost terminal for liquid bulk petroleum products and chemicals on the St. Lawrence. Liquid bulk storage capacity totals seven million cubic metres in 1100 tanks along the St. Lawrence. Traffic forecasts and opportunities show a growth in the demand for petroleum products of about 2% a year. An increase in bulk liquid chemical traffic is anticipated, notably on the Beauport flats and at Grande-Anse, in the Saguenay. Most of the caustic soda used in Québec comes from abroad. Local supplies from Bécancour could be envisaged.							
Nbre de pages 158	Nbre de photos	Nbre de figures 43 graphs 6 maps	Nbre de tableaux 64	Nbre de références bibliographiques	Langue du document <input type="checkbox"/> Français <input checked="" type="checkbox"/> Anglais	Autre (spécifier)	
Mots-clés Maritime traffic; St. Lawrence River and Seaway; liquid bulk; ports; petroleum, chemical and edible traffic; flow; modal breakdown; port infrastructures; oil companies; commodities.				Autorisation de diffusion <input checked="" type="checkbox"/> Diffusion autorisée <input type="checkbox"/> Diffusion interdite			
				Signature du directeur général <i>Léon H. H. H.</i>		Date 9, 1 0, 8 28	

Foreword

Because of its mandate to favour the economic development of the St. Lawrence, the St-Lawrence Economie Development Council (SODES) is particularly interested in liquid bulk traffic on the River. This is a very important economic activity, which is controlled, for the most part, by Québec interests and which is facing great challenges for the future.

The Liquid Bulk Committee of SODES is studying the question of economic development and the environment. It prepared a draft plan of action and the frame of reference for a detailed study of the situation, this work being an essential step in achieving the objectives of the Committee.

With this in view, the Committee requested and obtained the assistance of the Direction du transport maritime, aérien et ferroviaire of the ministère des Transports du Québec in conducting a study of the liquid bulk commodity traffic on the St. Lawrence.

FRAME OF REFERENCE AND RESPONSIBILITIES:

MINISTÈRE DES TRANSPORTS DU QUÉBEC (MTQ) AND SODES

SODES

Comité de vrac liquide

Liquid bulk traffic on the St. Lawrence

I. INVENTORY

A. Shipping by volume, origin and destination (MTQ)

- * Import/export shippers
- * Volume and origin/destination
 - Petroleum products
 - Chemicals
 - Edible
- * Entry and exit ports, by region
 - St. Lawrence
 - Great Lakes
 - Maritimes (including Hibernia)

* Traffic at St. Lawrence ports, by commodity

B. Industries (SODES)

- * Users
- * Manufacturers

C. St. Lawrence port installations (MTQ)

* Limitations

- Draft
- Climate
- Other limitations

* Storage, by port

- Storage facilities
- Unballasting facilities
- Intermodal facilities
- Future expansion

D. Carriers (SODES)

* International carriers

- Types of vessels
- Frequency of service
- Commodities handled

* Domestic carriers

- Types of vessels
- Frequency of service
- Commodities handled

E. Maritime shipping agencies (SODES)

F. Brokers (SODES)

G. Governments (SODES)

- Federal
- Provincial
- Municipal

II. Analysis and evaluation of the situation, by category

A. Industries (SODES)

- * Import
- * Export

B. Mode of transport (MTQ)

- * Maritime
- * Land (rail, truck)
- * Pipeline

C. Port installations (MTQ)

Statistical sources

The statistical data on ports in Québec come from several agencies of the federal government: the St. Lawrence Seaway Authority, the Canadian Coast Guard, Laurentian Region, the ports of Ports Canada in Québec, whether local or divisional, the headquarters of Ports Canada in Ottawa and Statistics Canada. Bécancour is under provincial jurisdiction and Valleyfield is under municipal jurisdiction. Lastly, there is the private port of Port-Cartier.

Since Statistics Canada publishes port traffic data several years late and the present mandate required that liquid bulk traffic on the St. Lawrence from 1984 to 1988 be studied, port traffic data issued by the Canadian Coast Guard, Laurentian Region, which usually publishes port traffic figures in the year following transit on the various wharfs, was used.

Ports Canada statistical data for the ports under its jurisdiction in Québec, that is, the ports of Montréal, Québec, Trois-Rivières, Chicoutimi/La Baie des Ha! Ha! and Sept-Îles, were also used, as were local statistics for each of these ports and data from Ports Canada headquarters in Ottawa.

Statistics for port traffic at Bécancour and Valleyfield were gathered at the source, as were those for the private port of Port-Cartier. However, in the latter case, some special data concerning liquid bulk traffic could not be obtained for certain years.

With regard to the origin and destination of liquid bulk movements through Québec ports, a special compilation of Statistics Canada was used to illustrate the origin of the incoming commodities and the destination of the outgoing commodities for 1988.

The figures for traffic on the two sections of the St. Lawrence Seaway--Montréal - Lake Ontario and the Welland Canal--are based on annual statistics published by the St. Lawrence Seaway Authority.

The statistics in tables 18 to 23 inclusively are from the Canadian Coast Guard. They include all petroleum product traffic. The statistics furnished by Ports Canada for the ports of Montréal, Québec, Trois-Rivières, Sept-îles and Chicoutimi/Baie des Ha! Ha! (Table 25 ff.) only include petroleum traffic in the form of crude oil, gasoline and fuel oil. There are therefore differences between these figures and those of the Canadian Coast Guard.

Lastly, this study does not consider traffic at Nouveau-Québec ports or inland ports off the River or the Gulf of St. Lawrence.

Acknowledgments

At the completion of this research, we wish to express our gratitude to the people who contributed to it.

We thank Mr. Jacques Girard, engineer and Director of the Direction du transport maritime, aérien et ferroviaire of the ministère des Transports du Québec, for his confidence in us in entrusting us with responsibility for and coordination of this study.

We also had the support of the members of the Liquid Bulk Committee of the St-Lawrence Economie Development Council (SODES) and its President, Captain Georges S.R. Iskandar, President of Enerchem Transport Inc.

We would like to thank Mr. Serge Léveillé, who worked on the project on contract. His coordination of statistical research and his assistance in researching and drafting this report were greatly appreciated.

We were also fortunate to have the collaboration of Messrs. Jean-Pierre Boily, Norman Brittle and Rémy Tremblay, students, who gathered and compiled the statistical data in the summer of 1989.

Ms. Alexandra Halcini, engineer with the Service du transport ferroviaire, and Ms. Suzanne Pilote and Ms. Diane Deslauriers, of the Direction du transport maritime, aérien et ferroviaire, took great care in preparing the graphs and maps, and typed the report. Their fine work and devotion were highly appreciated.

We also want to express our gratitude to those in charge of the main ports on the St. Lawrence and the Saguenay, to the people at Ports Canada, Ports and Harbours, the Canadian Coast Guard, Laurentian Region, the authorities of the ports of Bécancour, Port-Cartier and Valleyfield, as well as those in charge of the Ultramar

refinery in Saint-Romuald and the Petro-Canada and Shell Canada refineries in Montréal for their warm welcome when we visited their offices and for their gracious collaboration in the realization of this research.

Lastly, we thank all those who, in one way or another, assisted us in carrying out this project.

Réjean Leclerc

Project Manager

Direction du transport maritime, aérien et ferroviaire

LIQUID BULK TRANSPORTATION ON THE ST. LAWRENCE RIVER

Table of Contents

	<u>Page</u>
Foreword	vii
Frame of reference and responsibilities	ix
Statistical sources	xiii
Acknowledgments	xv
Table of contents	xvii
List of tables	xxi
List of graphs	xxix
List of maps	xxxv
Summary	xxxvii
Introduction	1
 I - MARITIME TRAFFIC AND THE IMPORTANCE OF LIQUID BULK TRAFFIC	 3
 WORLDWIDE	 3
 IN CANADA	 5
. Transport Canada	5
. Ports Canada	7
. Ports on the Atlantic seaboard	11
. Ports on the Pacific seaboard	12
 CONCLUSION	 16
 II - LIQUID BULK TRAFFIC IN QUÉBEC	 19
 BY ROAD	 19
BY RAIL	23
BY PIPELINE	26

	<u>Page</u>
. Portland-Montréal Pipeline	31
. Sarnia-Montréal Interprovincial Pipe Line	36
. Trans-Northern Pipeline	41
BY THE ST. LAWRENCE	49
CONCLUSION	51
III - LIQUID BULK TRAFFIC ON THE ST. LAWRENCE RIVER, 1984 TO 1988	53
- TRAFFIC IN PETROLEUM PRODUCTS	53
- PORTS HANDLING PETROLEUM PRODUCTS	64
. The Port of Montréal	64
. The Port of Québec	68
. The Port of Sept-Îles	73
. The Port of Rimouski	75
. The Port of Chicoutimi	75
. The Port of Baie des Ha! Ha!	78
. The Port of Trois-Rivières	78
. The Port of Baie-Comeau	81
. The Port of Port-Cartier	82
. The Port of Gaspé (Sandy Beach)	82
. The Port of New-Richmond	83
. The Port of Mont-Louis	83
. The Port of Chandler	84
. The Port of Paspébiac	84
. The Port of Blanc-Sablon	85
. The Port of Havre-Saint-Pierre	85
. The Port of Matane	86
. Port of Cap à l'Aigle	86

	<u>Page</u>
. The small ports of the Basse-Côte-Nord	87
. The ports of Ports Canada	88
CONCLUSION	93
IV - BULK LIQUID CHEMICAL TRAFFIC ON THE ST. LAWRENCE	101
. The Port of Québec	101
. The Port of Baie des Ha! Ha!	107
. The Port of Gaspé (Sandy Beach)	108
. The Port of Montréal	108
. The Port of Valleyfield	109
. The Port of Trois-Rivières	110
. The Port of Bécancour	111
. The Port of Baie-Comeau	112
. The Port of Port-Cartier	112
CONCLUSION	113
V - MARITIME TRAFFIC IN BULK LIQUID EDIBLE ON THE ST. LAWRENCE	115
. The Port of Montréal	115
. The Port of Trois-Rivières	120
. The Port of Valleyfield	121
CONCLUSION	121
VI - LIQUID BULK TRAFFIC THROUGH THE ST. LAWRENCE SEAWAY, 1984 TO 1988	123
The Montréal - Lake Ontario section	123
. Downbound liquid bulk traffic	127
. Upbound liquid bulk traffic	127

	<u>Page</u>
The Welland Canal section	128
. Downbound liquid bulk traffic	129
. Upbound liquid bulk traffic	132
CONCLUSION	133
VII - ABOVE-GROUND LIQUID BULK STORAGE CAPACITY	135
PETROLEUM PRODUCTS	135
. Ultramar	135
. Petro-Canada	139
. Esso	139
. Irving	140
. Shell	140
. Hydro-Québec	140
. Olco	141
. Sunoco	141
. Texaco	142
CHEMICALS AND EDIBLE	142
VIII - ST. LAWRENCE PORT INFRASTRUCTURES	145
IX - TRAFFIC FORECASTS AND OPPORTUNITIES	149
X - GENERAL CONCLUSION	155
XI - BIBLIOGRAPHY	157

LIQUID BULK TRANSPORTATION ON THE ST. LAWRENCE RIVER

List of tables

<u>Table</u>		<u>Page</u>
1	World seaborne trade of main bulk commodities, 1977 to 1987	3
2	Canadian maritime traffic in petroleum products, 1984 to 1987	6
3	Traffic at ports in the Ports Canada system, 1980 to 1988	8
4	Bulk commodity traffic at the Port of Halifax, 1980 to 1988	13
5	Bulk commodity traffic at the Port of Saint John (N.B.), 1980 to 1988	13
6	Bulk commodity traffic at the Port of Vancouver, 1980 to 1988	17
7	Bulk commodity traffic at the Port of Prince Rupert, 1980 to 1988	17
8	Total shipments by road, originating in Québec, 1984 to 1987	20
9	Traffic in liquid bulk shipped by truck, originating in Québec, 1985	22
10	CN and CP rail traffic in dry and liquid bulk, 1984 to 1988	23

List of tables (cont'd)

<u>Table</u>		<u>Page</u>
11	Shipments by pipeline to Québec, 1981 to 1988	29
12	Transport of crude oil by the Portland-Montréal Pipeline (PML): flow from Portland to Montréal, 1985 to 1988	34
13	Interprovincial Pipe Line (IPLL): flow from Sarnia to Montréal, 1985 to 1988	40
14	Trans-Northern Pipeline, 1984 to 1988	44
15	Use of pipelines, 1985 to 1988	46
16	Flow of petroleum products by pipeline, Québec, 1984 to 1988	48
17	Maritime traffic and liquid bulk traffic on the St. Lawrence, 1984 to 1988	50
18	Traffic in petroleum products at St. Lawrence ports, 1984	55
19	Traffic in petroleum products at St. Lawrence ports, 1985	56
20	Traffic in petroleum products at St. Lawrence ports, 1986	57
21	Traffic in petroleum products at St. Lawrence ports, 1987	58

List of tables (cont'd)

<u>Table</u>		<u>Page</u>
22	Traffic in petroleum products at St. Lawrence ports, 1988	59
23	Traffic in petroleum products at the main St. Lawrence ports, 1984 to 1988	61
24	Traffic in petroleum products at the 10 main ports in Québec, 1984 to 1988	62
25	Bulk commodity traffic at the Port of Montréal, 1980 to 1988	66
26	Bulk commodity traffic at the Port of Québec, 1980 to 1988	70
27	Bulk commodity traffic at the Port of Sept-Îles, 1980 to 1988	74
28	Bulk commodity traffic at the Port of Chicoutimi, 1980 to 1988	76
29	Bulk commodity traffic at the Port of Baie des Ha! Ha!, 1980 to 1988	79
30	Bulk commodity traffic at the Port of Trois-Rivières, 1980 to 1988	80
31	Commodity traffic at the ports of Ports Canada in Québec, 1980 to 1988	89

List of tables (cont'd)

<u>Table</u>		<u>Page</u>
32	Petroleum product traffic at the ports of Ports Canada in Québec, 1980 to 1988	91
33	Petroleum product traffic at the ports of the Montréal-Québec City region, 1984 to 1988	94
34	Petroleum product traffic at the ports of the Côte-Nord region, 1984 to 1988	95
35	Petroleum product traffic at the ports of the Saguenay-Charlevoix region, 1984 to 1988	96
36	Petroleum product traffic at the ports of the Bas-Saint-Laurent/Gaspésie region, 1984 to 1988	97
37	Petroleum product traffic at the ports of the Baie des Chaleurs region, 1984 to 1988	98
38	Petroleum product traffic at the ports of the Basse-Côte-Nord region, 1984 to 1988	99
39	Bulk liquid chemical traffic at the main ports of the St. Lawrence, 1984 to 1988	102
40	Bulk liquid chemical traffic at St. Lawrence ports in 1984	102

List of tables (cont'd)

<u>Table</u>		<u>Page</u>
41	Bulk liquid chemical traffic at St. Lawrence ports in 1985	103
42	Bulk liquid chemical traffic at St. Lawrence ports in 1986	103
43	Bulk liquid chemical traffic at St. Lawrence ports in 1987	104
44	Bulk liquid chemical traffic at St. Lawrence ports in 1988	104
45	Total traffic in bulk liquids and and bulk liquid foods at St. Lawrence ports, 1984 to 1988	116
46	Traffic in bulk liquid edible at St. Lawrence ports, 1984 to 1988	117
47	Traffic in bulk liquid edible at the Port of Montréal, 1984 to 1988	118
48	Traffic in bulk liquid edible at the Port of Trois-Rivières, 1984 to 1988	122
49	Traffic in bulk liquid edible at the Port of Valleyfield, 1984 to 1988	122
50	Liquid bulk traffic on the Montréal - Lake Ontario section of the St. Lawrence Seaway, 1984 to 1988	125

List of tables (cont'd)

<u>Table</u>		<u>Page</u>
51	Downbound liquid bulk traffic on the Montréal - Lake Ontario section, 1984 to 1988	125
52	Upbound liquid bulk traffic on the Montréal - Lake Ontario section, 1984 to 1988	126
53	Upbound and downbound liquid bulk traffic on the Montréal - Lake Ontario section, 1984 to 1988	126
54	Liquid bulk traffic on the Welland Canal section of the St. Lawrence Seaway, 1984 to 1988	130
55	Downbound liquid bulk traffic on the Welland Canal section, 1984 to 1988	130
56	Upbound liquid bulk traffic on the Welland Canal section, 1984 to 1988	131
57	Downbound and upbound liquid bulk traffic on the Welland Canal section, 1984 to 1988	131
58	Above-ground storage capacity for petroleum products on the St. Lawrence	136
59	Above-ground storage capacity for chemicals on the St. Lawrence	143
60	Above-ground storage capacity for edible on the St. Lawrence	143

List of tables (cont'd)

<u>Table</u>		<u>Page</u>
61	Port accessibility for liquid bulk in Québec	146
62	Forecasts - 2000: Canadian maritime traffic - petroleum products	149
63	Canada Ports Corporation: 1992 liquid bulk forecasts	150
64	St. Lawrence Seaway: Forecast 2000	151

LIQUID BULK TRANSPORTATION ON THE ST. LAWRENCE RIVER

List of graphs

<u>Graph</u>		<u>Page</u>
1	World maritime traffic in main bulk commodities, 1977 to 1987 (millions of tonnes)	4
2	World maritime traffic in main bulk commodities, 1977 to 1987 (billions of tonne-miles)	4
3	Canadian and Ports Canada maritime traffic, 1980 to 1988	9
4	Commodity traffic at the Port of Halifax, 1980 to 1988	14
5	Commodity traffic at the Port of Saint John (N.B.), 1980 to 1988	14
6	Commodity traffic at the Port of Vancouver, 1980 to 1988	18
7	Commodity traffic at the Port of Prince Rupert, 1980 to 1988	18
8	CN and CP rail traffic in commodities and liquid bulk in Québec, 1984 to 1988 (tonnes)	25

List of graphs (cont'd)

<u>Graph</u>		<u>Page</u>
9	CN and CP rail traffic in commodities and liquid bulk in Québec, 1984 to 1988 (cars)	25
10	Shipments by pipeline to Québec, 1981 to 1988	30
11	Portland and Interprovincial pipelines: flow toward Montréal, 1985 to 1988	35
12	Interprovincial Pipe Line (IPLL): flow from Sarnia and Montréal, 1976 to 1988	39
13	Trans-Northern Pipeline, 1978 to 1988	45
14	Use of pipelines, 1985 to 1988	47
15	Transport by pipeline of petroleum products, Québec, 1984 to 1988	48
16	Maritime traffic and liquid bulk traffic on the St. Lawrence, 1984 to 1988	52
17	Modal breakdown of the transport of liquid bulk commodities in Québec, 1988	52
18	Traffic in petroleum products at the ports of Montréal and Québec, 1984 to 1988	62

List of graphs (cont'd)

<u>Graph</u>		<u>Page</u>
19	Traffic in petroleum products (50 000-500 000 tonnes) at St. Lawrence ports, 1984 to 1988	63
20	Breakdown of traffic in petroleum products (50 000-500 000 tonnes) at St. Lawrence ports, 1984 to 1988	63
21	Commodity traffic at the Port of Montréal, 1980 to 1988	66
22	Commodity traffic at the Port of Québec, 1980 to 1988	70
23	Commodity traffic at the Port of Sept-Îles, 1980 to 1988	74
24	Commodity traffic at the Port of Chicoutimi, 1980 to 1988	76
25	Commodity traffic at the Port of Baie des Ha! Ha!, 1980 to 1988	79
26	Commodity traffic at the Port of Trois-Rivières, 1980 to 1988	80
27	Commodity traffic in the Ports Canada system in Québec, 1980 to 1988	92

xxx.

List of graphs (cont'd)

<u>Graph</u>		<u>Page</u>
28	Traffic in petroleum products in the Ports Canada system in Canada and Québec, 1980 to 1988	92
29	Traffic in petroleum products at ports in the Montréal-Québec City region, 1984 to 1988	94
30	Traffic in petroleum products at ports in the Côte-Nord region, 1984 to 1988	95
31	Traffic in petroleum products at ports in the Saguenay-Charlevoix region, 1984 to 1988	96
32	Traffic in petroleum products at ports in the Bas-Saint-Laurent - Gaspésie region, 1984 to 1988	97
33	Traffic in petroleum products at ports in the Baie des Chaleurs region, 1984 to 1988	98
34	Traffic in petroleum products at ports in the Basse-Côte-Nord region, 1984 to 1988	99
35	Traffic in bulk liquid chemicals at St. Lawrence ports, 1984 to 1988	105
36	Relative proportion (%) of traffic in bulk liquid chemicals at St. Lawrence ports, 1984 to 1988	105

List of graphs (cont'd)

<u>Graph</u>		<u>Page</u>
37	Bulk liquid chemical traffic at St. Lawrence ports, 1984 to 1988	106
38	Relative proportion (%) of traffic in bulk liquid chemicals at St. Lawrence ports, 1984 to 1988	106
39	Breakdown of traffic in bulk liquid edible products at St-Lawrence ports, 1984 to 1988	117
40	Traffic in bulk liquid edible products at the Port of Montréal, 1984 to 1988	119
41	Breakdown of bulk liquid edible products at the Port of Montréal, 1984 to 1988	119
42	Breakdown of storage capacity for petroleum, chemical and edible liquid bulk products on the St. Lawrence, 1989	138
43	Breakdown of the number of tanks for petroleum, chemical and edible products on the St. Lawrence, 1989	138

BULK LIQUID TRANSPORTATION ON THE ST. LAWRENCE RIVER

List of maps

<u>Map</u>		<u>Page</u>
1	Pipelines serving greater Montréal	27
2	Shipments and use of natural gas, Canada, 1987	28
3	Portland-Montréal Pipeline	32
4	Interprovincial Pipe Line	38
5	Trans-Northern Pipeline	42
6	Petroleum product transit ports in Québec	54

Summary

Liquid bulk transport is a very important economic activity in Québec, totalling an estimated 50 million tonnes shipped by various means.

For the reference period, i.e. from 1984 to 1988, shipments via the St. Lawrence far exceeded others, with 44% of the modal breakdown in the liquid bulk category and 17% of all Québec maritime activity.

A total of 94% of liquid bulk shipments on the St. Lawrence consisted of petroleum products, 5% were bulk liquid chemicals and 1%, bulk liquid edible.

In contrast to the main ports on the Atlantic seaboard of Canada, where bulk shipments are overwhelmingly liquid, and the ports on the Pacific seaboard, where bulk shipments still consist mainly of dry commodities, there is a balance between liquid and dry bulk traffic in the two main Québec ports, Montréal and Québec.

During the period studied, the Port of Québec emerged as the primary terminal for bulk liquid commodities on the St. Lawrence in terms of petroleum products as well as chemicals. In contrast to the Saint-Romuald refinery, Montréal refineries were supplied by pipeline, depriving the Port of Montréal every year of major maritime shipments of hydrocarbons, which totalled about 10.9 million tonnes in 1988.

In the St. Lawrence Seaway from 1984 to 1988, liquid bulk accounted for 3% to 6% of total traffic in transit on both the Montréal - Lake Ontario section and the Welland Canal section. Petroleum products vied for first place and were, for the most part, dominated by bulk liquid chemicals beginning in 1985 on the two sections of the St. Lawrence Seaway.

From 1980 to 1988, traffic at all the ports of the Ports Canada system grew from 163 to 187 million tonnes, while traffic at Ports Canada ports in Québec dropped from 78.7 million tonnes to 70 million tonnes, the relative importance of the ports declining from 48.3% to 37.5% nationally during this period. The drop in maritime transport was particularly apparent for dry bulk commodities, the shipment of which decreased from 56 to 44 million tonnes and their relative importance fell from 56% to 37.8% from 1980 to 1988. Maritime shipments of liquid bulk stabilized at around 17 million tonnes in that period and their relative importance remained steady at 40%, after rising to 44% to 46% from 1982 to 1984 at the Québec ports under Ports Canada jurisdiction.

Above-ground liquid bulk storage facilities along the St. Lawrence consisted of 1100 tanks with a total capacity of more than 7 million cubic metres. There was surplus capacity in the wake of the rationalization measures adopted by oil companies after the energy crisis. Use of the storage capacity mirrors the breakdown of the main types of traffic: petroleum products 94%, chemicals 5% and edible 1%.

Liquid bulk port facilities offered accommodation for varied drafts to respond adequately to the needs of the clientele. In regard to the navigation season, St. Lawrence ports have been accessible throughout the year for the past 30 years between Sept-Îles and Montréal, with the exception of the Pointe à l'Islet site in the Saguenay. In the Seaway and the Basse-Côte-Nord region, the navigation season is limited to about nine months of the year for liquid bulk traffic.

Traffic forecasts and opportunities show growth in the demand for petroleum products of approximately 2% a year. Although traffic in bulk liquid chemicals fell enormously on the St. Lawrence in the reference period, an increase in these activities is anticipated, notably on the Beauport flats and at Grande-Anse, in the Saguenay,

where additional capacity for this type of commodity is planned. Furthermore, since most of the caustic soda used in Québec comes from abroad, various possibilities for local supply, Bécancour for example, should be examined.

Lastly, maritime bulk edible traffic could develop through a shift from road to river transport for the supply of certain commodities.

LIQUID BULK TRANSPORTATION ON THE ST. LAWRENCE RIVER

INTRODUCTION

This study deals with maritime traffic and the importance of liquid bulk, and compares the various means of transporting liquid bulk in Québec. The evolution and breakdown of liquid bulk traffic at St. Lawrence ports from 1984 to 1988, represented by the main commodity categories of petroleum products, chemicals and edible, are then discussed.

The St. Lawrence Seaway is still the site of major seasonal traffic although its total activities have declined since the beginning of the decade. Nonetheless, the evolution and importance of bulk liquid commodities shipped through the two sections of the St. Lawrence Seaway, the Montréal - Lake Ontario section and the Welland Canal section, will be analysed.

Subsequently, the above-ground storage capacity for petroleum products, chemicals and edible along the St. Lawrence will be examined before discussing the main technical characteristics of port facilities for the transit of liquid bulk commodities through St. Lawrence ports.

Lastly, liquid bulk traffic forecasts and the opportunities that may be developed in the future on the St. Lawrence will be discussed.

I - MARITIME TRAFFIC AND THE IMPORTANCE OF LIQUID BULK TRAFFIC

WORLDWIDE

World maritime trade in the five main dry bulk commodities, measured in tonnage, grew at an average annual rate of 3.1% during the decade from 1977 to 1987, totalling 875 million tonnes in 1987 (Table 1, Graph 1). However, this growth was unequally distributed over the period, with a spectacular increase of 14% in 1979 and a marked drop of 6% in 1982. Similarly, this trade expressed in tonne-miles grew during the same period at a rate of 4.3% a year.

TABLE 1

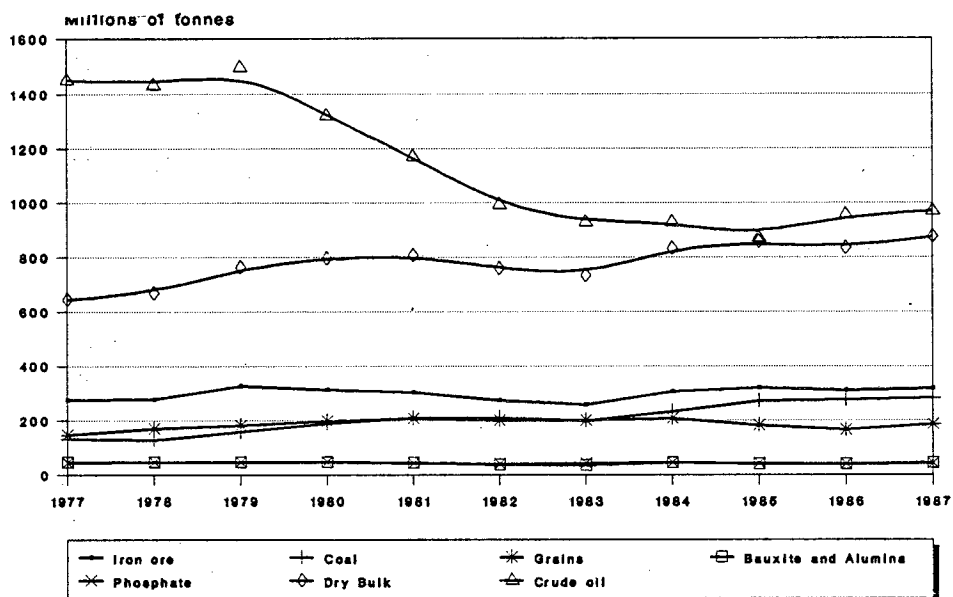
WORLD SEABORNE TRADE OF MAIN BULK COMMODITIES,
1977 TO 1987

YEAR	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
<u>Millions of tonnes</u>											
Iron ore	276	278	327	314	303	273	257	306	321	311	319
Coal	132	127	159	188	210	208	197	232	272	276	283
Grain	147	169	182	198	206	200	199	207	181	165	186
Bauxite and alumina	46	46	46	48	45	38	36	44	40	41	45
Phosphate	44	47	48	48	42	40	43	44	43	41	42
Main dry bulk	645	667	762	796	806	759	732	833	857	834	875
Crude oil	1 451	1 432	1 497	1 320	1 170	993	930	930	871	958	970
<u>Billions of tonnes-miles</u>											
Iron ore	1 386	1 384	1 599	1 613	1 508	1 443	1 320	1 631	1 675	1 671	1 728
Coal	643	604	786	952	1 120	1 094	1 057	1 270	1 479	1 586	1 653
Grain	801	945	1 026	1 087	1 131	1 120	1 135	1 157	1 004	914	1 061
Bauxite and alumina	167	162	169	188	172	153	145	172	166	167	180
Phosphate	160	168	177	171	139	142	159	162	156	155	165
Main dry bulk	3 157	3 263	3 757	4 011	4 070	3 952	3 816	4 392	4 480	4 493	4 787
Crude oil	10 408	9 561	9 452	8 219	7 193	5 212	4 478	4 508	4 007	4 640	4 671

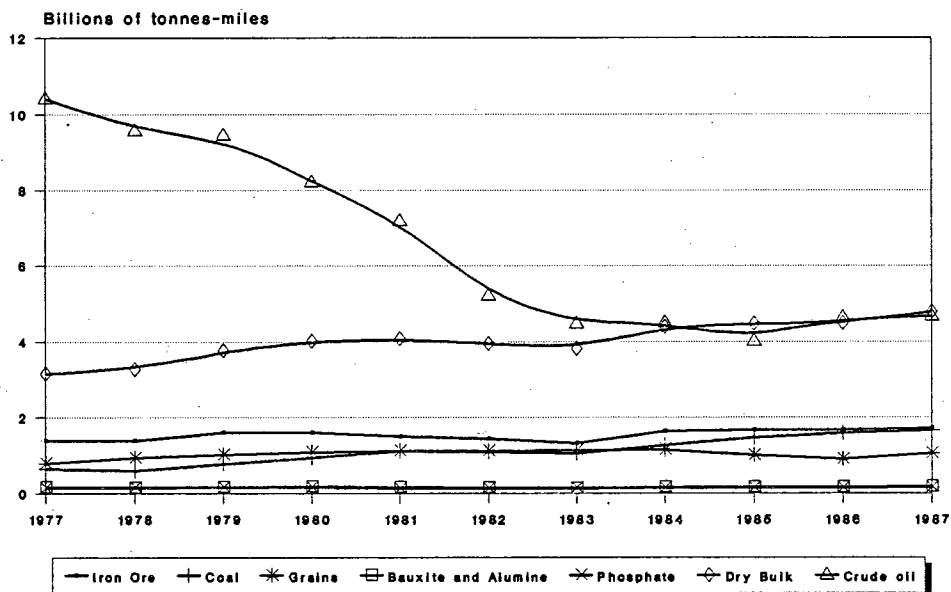
Note: Oil products and dry bulk commodities other than the five specified are excluded

Source: Fearnleys "World Bulk Trades 1987", Oslo, Norway, November 1988

GRAPH 1
WORLD MARITIME TRAFFIC IN MAIN
BULK COMMODITIES, 1977 TO 1987



GRAPH 2
WORLD MARITIME TRAFFIC IN MAIN
BULK COMMODITIES, 1977 to 1987



Source: Fearnleys' World Bulk Trades 1987"

At the beginning of the 1977-1987 period, traffic in crude oil, the main bulk liquid commodity, was more than double the traffic in the five main dry bulk commodities, but 10 years later, crude oil traffic exceeded traffic in the other commodities by scarcely 100 million tonnes, and its importance in terms of tonne-miles had dropped by half, from 10 408 billion tonne-miles to 4671 billion tonne-miles. The average annual decline in crude oil traffic during this period was 3.9% in terms of tonnage and 7.7% in terms of tonne-miles, representing a reduction of 33% in tonnage and 55% in tonne-miles during the decade.

Major bulk traffic fluctuated considerably during this period. The volume of dry bulk commodities remained the same in 1976 and 1977. However, during the period from 1977 to 1981, there was an average increase of 6% annually. From 1981 to 1983, there was an average decline of 5%, followed by an increase of 14% in 1984, an increase of 3% in 1985, a drop of 3% in 1986 and rise of 5% in 1987.

Crude oil traffic increased by an average of 2% a year from 1976 to 1979, then dropped sharply by 9% a year from 1979 to 1985. The decline was reversed in 1986 when an increase of 10% was recorded, followed by modest growth of 1% in 1987.

IN CANADA

. Transport Canada

Most of the maritime movements of petroleum products in Canada consist of crude oil, fuel oil, gasoline and

miscellaneous products. In 1987, these four categories accounted for 12% of total maritime traffic in Canada.¹

Crude oil was the main commodity in terms of maritime traffic in petroleum products, accounting for 45% of such traffic, i.e. 16.1 million tonnes of a total of 35.9 million tonnes in 1987. Also in 1987, fuel oil accounted for 38% of the petroleum flow, and gasoline for 16.7% of the total. Lastly, lubricants, liquified natural gas and other petroleum products made up only 0.3% of Canadian maritime petroleum traffic.

TABLE 2
CANADIAN MARITIME TRAFFIC IN PETROLEUM PRODUCTS,
1984 TO 1987
(Millions of tonnes)

	TOTAL	COASTAL TRADE	EXPORTS	IMPORTS
1984	28.7	13.2	3.2	12.3
1985	28.6	10.1	5.1	13.4
1986	31.3	9.1	5.6	16.6
1987	35.9	9.8	6.0	20.1

Source : Transport Canada

¹ Transport Canada, Marine Trends and Forecasts 1988-2000, Vol. II, detailed commodity forecasts, Marine and Surface Statistics and Forecasts Branch, Economic Analysis Directorate, April 1989, Report No. TP 8170E, p. 18.

Ports Canada

The Canada Ports Corporation was created in February 1983, succeeding the National Harbours Board, which dated from 1936. The Ports Canada system consists of 15 port facilities that are among the largest in Canada, seven of which have the special status of local port corporations, with greater autonomy in port management. The eight other ports in the system are divisional ports, under the responsibility of the head office of the crown corporation.

In 1988, the entire Ports Canada system achieved the historic high of 187 million tonnes (Table 3, Graph 3). After reaching a first record in 1980, traffic in the system dropped temporarily in 1982 and 1983, a decline probably linked to the decrease in traffic recorded at the Port of Sept-Îles. But the following year, encouraging signs of recovery in traffic at the ports of the Ports Canada system were noted. They were mainly the result of the development of traffic at the Port of Vancouver and the opening of the Port of Prince Rupert. However, there was probably some connection between the coming into force of the Western Grain Transportation Act and the gradual shift in Canadian port activity toward the ports on the Pacific coast.

Over the decade, total traffic in the Ports Canada system represented 45% to 50% of port activity throughout the country. In terms of volume, bulk traffic has dominated in the system of representative ports, which have received 87% to 88% of the total traffic in transit through the ports of the Ports Canada system.

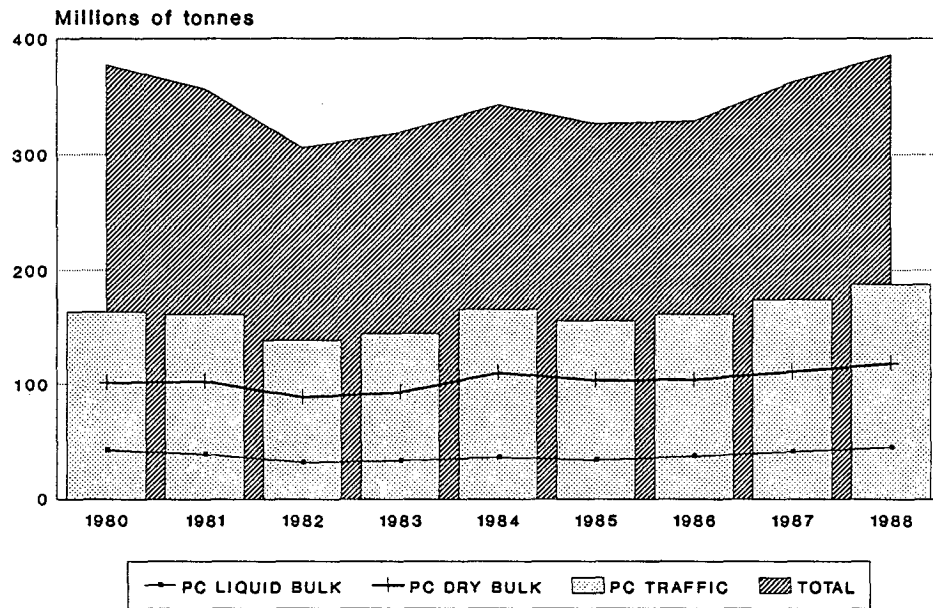
TABLE 3

TRAFFIC AT PORTS IN THE PORTS CANADA SYSTEM, 1980 TO 1988

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988
TOTAL CANADIAN TRAFFIC (millions of tonnes)	377,3	356,2	305,8	319,0	342,8	326,6	328,6	362,2	385,7
PORTS CANADA TRAFFIC (PC) (millions of tonnes)	163,0	160,5	137,7	143,9	164,8	155,2	160,9	174,0	186,8
PORTS CANADA/TOTAL CANADA (%)	43%	45%	45%	45%	48,1%	47,5%	49,0%	48,0%	48,4%
PORTS CANADA BULK TRAFFIC (millions of tonnes)	142,9	141,2	120,2	126,4	146,1	136,7	140,9	151,6	162,4
PC BULK/TOTAL PC TRAFFIC (%)	88%	88%	87%	88%	89%	88%	88%	87%	87%
PORTS CANADA DRY BULK (millions of tonnes)	100,8	102,2	88,4	92,9	109,8	103,0	103,6	110,6	117,5
Main commodities									
- coal	15,2	18,8	17,8	16,3	25,5	27,7	26,8	25,4	32,0
- grain	29,1	27,0	30,6	31,8	29,9	22,8	23,4	31,7	26,0
- iron ore	28,3	30,3	17,6	20,8	24,2	24,2	23,8	22,4	24,6
DRY BULK/TOTAL PC TRAFFIC (%)	70,6%	72,4%	73,6%	73,5%	75,1%	75,3%	73,5%	73,0%	72,4%
PC LIQUID BULK TRAFFIC	42,1	38,9	31,8	33,5	36,4	33,8	37,3	41,0	44,9
PC LIQUID BULK/TOTAL PC BULK (%)	29,4%	27,6%	26,4%	26,5%	24,9%	24,7%	26,5%	27,0%	27,6%
CRUDE OIL	16,6	12,6	10,7	13,4	13,7	12,6	14,7	16,4	18,1
GASOLINE	6,3	6,4	5,0	5,2	5,6	5,7	6,5	6,8	7,4
FUEL OIL	17,2	17,0	13,3	11,6	13,9	12,0	12,7	13,5	15,0
TOTAL PETROLEUM PRODUCTS (PP)	40,1	36,0	29,0	30,2	33,1	30,3	33,9	36,7	40,5
PP/LIQUID BULK (%)	95,3%	92,5%	91,1%	90,0%	91,0%	89,7%	90,9%	89,5%	90,2%

SOURCE: PORTS CANADA, 1988 PORTS CANADA STATISTICS Ottawa 1989, p.1

GRAPH 3
CANADIAN AND PORTS CANADA MARITIME
TRAFFIC, 1980 TO 1988



Bulk traffic is divided into two very distinct categories. The first is dry bulk, the principal heavy commodities of which are grain, iron ore, other metal ores, coal, sulphur and potassium. This category of commodity dominated bulk traffic. The Ports Canada system recorded volumes of 100 to 117 million tonnes, or 70% to 75% of the bulk maritime activity at these ports. Ninety percent of the other category, liquid bulk commodities, consisted of petroleum products, that is, crude oil, fuel oil and gasoline. The traffic in these products varied in Canada over the 10-year period from 32 million tonnes to 45 million tonnes (1988), and liquid bulk shipping accounted for 25% to 30% of bulk activity recorded in the Canadian port system as a whole.

Liquid bulk shipments were substantial, particularly liquid bulk petroleum products consisting of crude oil, gasoline and fuel oil, the volume of which totalled 40.5 million tonnes in 1988, compared with 32 million tonnes for coal, 26 million tonnes for grain and 24.6 million tonnes for iron ore in the ports of the Ports Canada system (Table 3).

Among these petroleum products, crude oil and fuel oil head the list with averages for the decade of about 42% and 40% respectively of bulk liquid commodities. Maritime traffic in gasoline was of lesser importance; it accounted for barely half the levels of the preceding two commodities, or 18% of the total for liquid bulk (Table 3).

However, bulk shipping at ports in the Ports Canada system was not distributed uniformly, as indicated in the following sections in which traffic at the main ports of the Ports Canada system on the Atlantic and Pacific coasts is discussed.

Ports on the Atlantic seaboard

The Port of Halifax achieved a record of 16.2 million tonnes in 1988, 75% or 12.1 million tonnes of which consisted of bulk commodities (Table 4). Among them, liquid bulk was way out in front, accounting for approximately 70% of bulk shipping activity, or 8.6 million tonnes. This traffic consisted almost exclusively of hydrocarbons produced by the Esso and Texaco refineries (Point Tupper), which import 4.7 million tonnes of crude oil and distribute part of their production (fuel oil and gasoline) by ship.

In 1988, the Port of Saint John (N.B.) was the site of activity approaching 15 million tonnes (14.9 million tonnes). Bulk shipping accounted for 93% of total traffic (Table 5). This percentage increased after 1985 in the wake of the shift in container traffic to the rival port in Nova Scotia. Port activity at Saint John (N.B.) was still largely dominated by liquid bulk commodities. Their volume was approximately 11.6 million tonnes, 5.6 million tonnes of which consisted of crude oil imports for the Irving Oil refinery. Shipments of refined products (mainly fuel oil, then gasoline) were the other main liquid bulk activities at New Brunswick's principal port. Having reached a summit in 1980, traffic in petroleum products dropped from 1982 to 1985 before recovering in 1986 and subsequently sustaining its recovery.

Although Halifax was a victim of the oil crisis in Canada in the early 1980s (the closing of the Gulf Oil terminal at Point Tupper) and although operations at the Saint John (N.B.) refinery were reduced, the Port of Saint John was able to survive this difficult period. The offshore facilities of Irving Oil (Canaport) were among the first to be built in deep water. This resumption of petroleum activities compelled those responsible for the refinery to instal a second offshore

station, which was to confirm Saint John's major role in the liquid bulk sector, mainly for petroleum products in New Brunswick.

Lastly, it should be noted, to complete the profile of port activity at the main ports on the Atlantic coast of Canada, that traffic at the Port of St. John's (Nfld.) stabilized over the 10-year period at around one million tonnes a year.

It was divided almost equally between bulk commodities (469 000 tonnes) and miscellaneous commodities (476 000 tonnes) in 1988. Liquid bulk largely dominated bulk shipments with 80% of the total (380 000 tonnes). No crude oil was included in liquid maritime traffic at St. John's (Nfld.), which was dominated by fuel oil (251 000 tonnes) and gasoline (129 000 tonnes). These commodities met the energy, industrial and transportation needs of the island. However, their volume dropped by almost half in the 10-year period.

Here is a profile of port traffic at the two facilities in the Ports Canada system on the Pacific coast, showing the extent of traffic in bulk liquid commodities.

Ports on the Pacific seaboard

Vancouver is still the main port in Canada from the point of view of tonnage. In 1988, it achieved a record of 71.3 million tonnes (Table 6). Bulk commodities represented 86% (55.2 million tonnes) of total traffic; 90% were dry bulk commodities (49 million tonnes). Note the dominance of coal (23.5 million tonnes) at Roberts Bank and grain traffic (12.5 million tonnes). Bulk liquid commodities accounted for 10% of port activity in bulk commodities (6.3 million tonnes). They were, in decreasing order of importance, fuel oil, gasoline and crude oil. There was a constant increase over the 10-year period in all petroleum traffic at the Port of Vancouver. It

TABLE 4

BULK COMMODITY TRAFFIC AT THE PORT OF HALIFAX, 1980 TO 1988

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988
HALIFAX									
TOTAL (thousands of tonnes)	13 594	13 278	11 199	12 493	14 285	14 023	14 107	15 791	16 236
BULK COMMODITIES (BC)	11 057	10 935	9 299	10 521	11 727	11 565	11 280	12 358	12 126
TOTAL BC (%)	81%	82%	83%	84%	82%	82%	80%	78%	75%
LIQUID BULK (LB)	8 255	7 847	6 495	7 283	8 459	8 027	7 821	8 656	8 357
LB/BC (%)	75%	72%	70%	69%	72%	69%	69%	70%	69%
DRY BULK (DB)	2 802	3 088	2 803	3 238	3 267	3 538	3 459	3 702	3 769
DB/BC (%)	25%	28%	30%	31%	28%	31%	31%	30%	31%
TOTAL PETROLEUM PRODUCTS (PP)	8 193	7 809	6 453	7 111	8 318	7 860	7 750	8 547	8 284
PP/LB (%)	99%	100%	99%	98%	98%	98%	99%	99%	99%
CRUDE OIL	4 514	4 211	3 432	3 921	4 181	4 385	4 241	4 737	4 750
GASOLINE	881	929	749	740	911	861	853	944	976
FUEL OIL	2 798	2 669	2 272	2 450	3 226	2 614	2 656	2 866	2 558

SOURCES: PORTS CANADA AND HALIFAX PORT CORPORATION

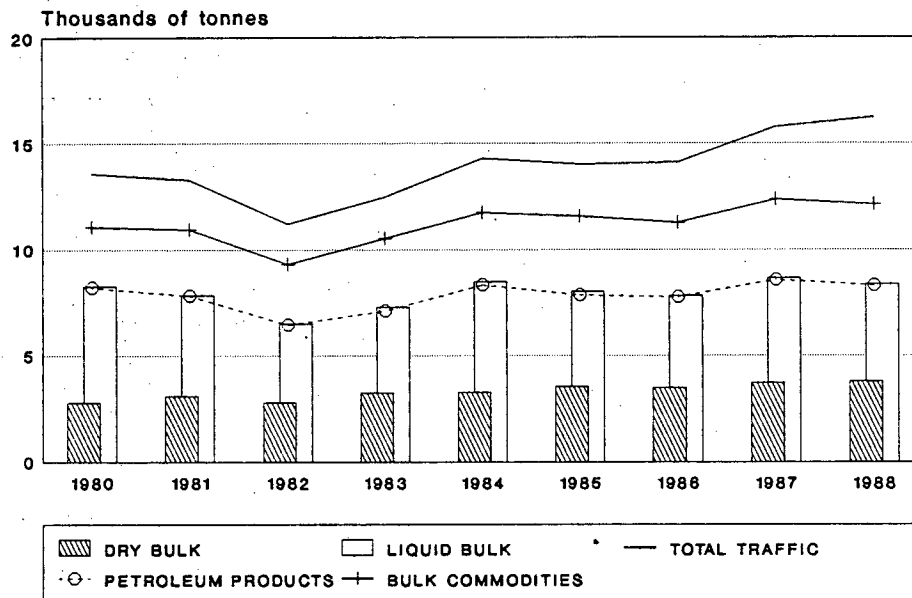
TABLE 5

BULK COMMODITY TRAFFIC AT THE PORT OF SAINT JOHN (N.B.), 1980 TO 1988

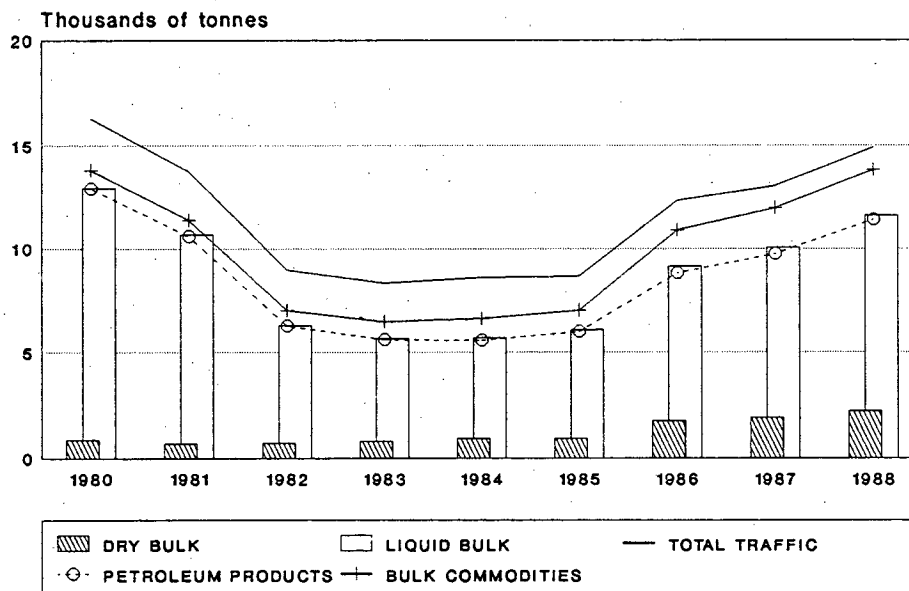
YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988
SAINT JOHN (N.B.)									
TOTAL (thousands of tonnes)	16 282	13 740	8 973	8 347	8 609	8 662	12 335	13 043	14 904
BULK COMMODITIES (BC)	13 797	11 380	7 010	6 482	6 620	7 004	10 895	11 981	13 825
TOTAL BC (%)	85%	83%	78%	78%	77%	81%	88%	92%	93%
LIQUID BULK (LB)	12 943	10 684	6 294	5 670	5 699	6 082	9 145	10 040	11 602
LB/BC (%)	94%	94%	90%	87%	86%	87%	84%	84%	84%
DRY BULK (DB)	854	696	716	812	920	921	1 750	1 921	2 225
DB/BC (%)	6%	6%	10%	13%	14%	13%	16%	16%	16%
TOTAL PETROLEUM PRODUCTS (PP)	12 903	10 602	6 274	5 605	5 576	5 998	8 827	9 735	11 401
PP/LB (%)	100%	99%	100%	99%	98%	99%	97%	97%	98%
CRUDE OIL	7 770	5 168	2 789	3 049	2 568	3 069	4 824	5 530	5 637
GASOLINE	1 319	1 438	902	847	942	975	1 439	1 443	2 072
FUEL OIL	3 814	3 996	2 583	1 709	2 066	1 954	2 564	2 762	3 692

SOURCES: PORTS CANADA AND SAINT JOHN PORT CORPORATION

GRAPH 4
COMMODITY TRAFFIC AT THE PORT OF
HALIFAX, 1980 TO 1988



GRAPH 5
COMMODITY TRAFFIC AT THE PORT OF
SAINT JOHN (N.B), 1980 TO 1988



rose from 1.6 million tonnes to 1.9 million tonnes, in the case of fuel oil; from 0.8 million tonnes to 1.2 million tonnes, in the case of gasoline; and from 400 000 tonnes to 1 million tonnes, in the case of crude oil.

Like Vancouver, Prince Rupert (Table 7) experienced explosive growth beginning in 1984. Traffic more than doubled from 1983 to 1984 (3.1 million tonnes to 8.1 million tonnes) and quadrupled from 1983 to 1988 (3.1 million tonnes to 12.4 million tonnes). This is attributable to, among other things, the development of dry bulk traffic, which, with the opening of facilities on Ridley Island, expanded traffic from 2.4 million tonnes in 1983 to 12 million tonnes in 1987. Traffic declined to 10.9 million tonnes in 1988.

The rapid rise in traffic at Prince Rupert was due to two types of dry bulk: coal, which only became part of port traffic in 1984 and shipments of which totalled 6.7 million tonnes in 1988, and grains, which varied from 1 million tonnes to 1.5 million tonnes until 1985, then shot up to 4.7 million tonnes in 1987. Grain traffic dropped to 3.5 million tonnes in 1988.

Bulk commodity traffic at Prince Rupert accounted for 90% of the port activity in 1988; bulk liquid commodities accounted for less than 2%. Half this meagre traffic consisted of fuel oil, which declined in importance by 50% after 1981.

CONCLUSION

The analysis of maritime traffic at the main ports of the Ports Canada system on the Atlantic and Pacific coasts highlights the clear dominance of bulk commodity traffic in total activities of these ports. It accounted for some 80% of activity in Halifax, more than 90% in Saint John (N.B.), 86% in Vancouver and 90% in Prince Rupert.

At Atlantic coast ports, liquid bulk commodities dominated port and bulk shipments with, for example, 84% of port activity at Saint John (N.B.), 70% at Halifax and 80% at St. John's (Nfld.). At Pacific coast ports, dry bulk commodities dominated overwhelmingly with 90% of port and bulk traffic at Vancouver and 98% at Prince Rupert. Liquid bulk commodities accounted for only 10% of traffic at Vancouver and less than 2% at Prince Rupert.

TABLE 6

BULK COMMODITY TRAFFIC AT THE PORT OF VANCOUVER, 1980 TO 1988

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988
VANCOUVER									
TOTAL	49 204	49 495	49 080	51 648	59 297	56 103	57 593	63 957	71 316
BULK COMMODITIES (BC)	41 122	42 122	42 076	44 868	52 644	49 556	50 123	55 188	61 668
TOTAL BC (%)	84%	85%	86%	87%	89%	88%	87%	86%	86%
LIQUID BULK (lb)	3 524	3 658	3 900	4 970	4 657	5 085	5 173	6 144	6 342
LB/BC (%)	9%	9%	9%	11%	9%	10%	10%	11%	10%
DRY BULK (DB)	37 598	38 464	38 176	39 898	47 987	44 471	44 950	49 044	55 276
DB/BC (%)	91%	91%	91%	89%	91%	90%	90%	89%	90%
TOTAL PETROLEUM PRODUCTS (PP)	2 875	2 247	2 301	2 990	2 784	3 276	3 507	4 154	4 143
PP/LB (%)	82%	61%	59%	60%	60%	64%	68%	68%	65%
CRUDE OIL	401	-	-	513	61	196	440	646	1 025
GASOLINE	817	809	793	1 017	979	1 356	1 424	1 466	1 207
FUEL OIL	1 657	1 438	1 508	1 460	1 744	1 724	1 643	2 042	1 911

SOURCES : PORTS CANADA AND VANCOUVER PORT CORPORATION

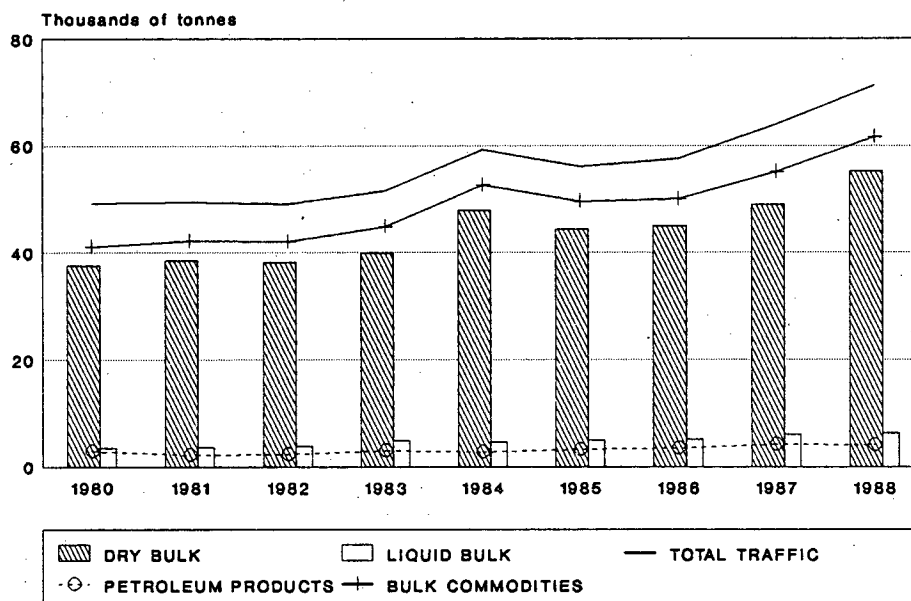
TABLE 7

BULK COMMODITY TRAFFIC AT THE PORT OF PRINCE RUPERT, 1980 TO 1988

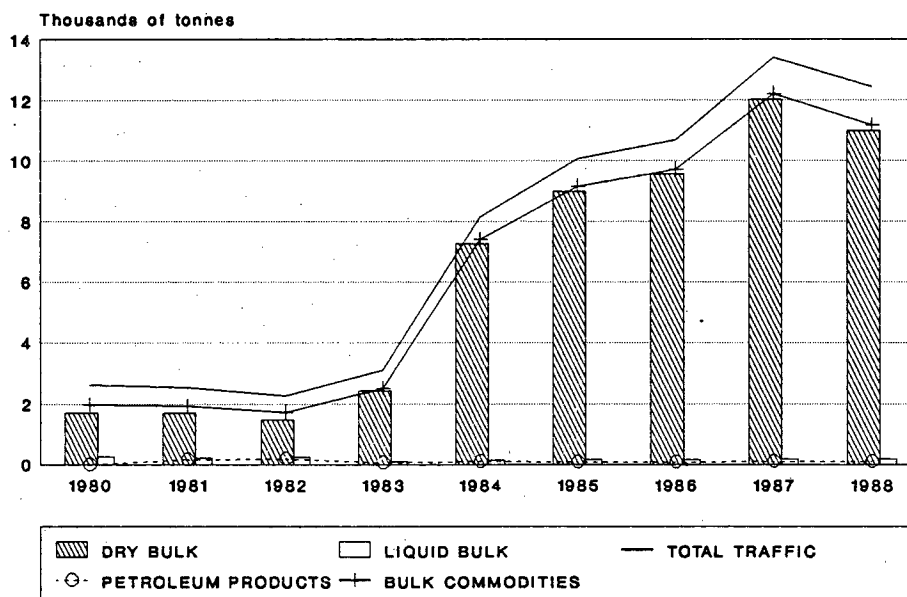
YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988
PRINCE-RUPERT									
TOTAL	2 621	2 534	2 257	3 107	8 134	10 065	10 680	13 405	12 442
BULK COMMODITIES (BC)	1 968	1 936	1 731	2 521	7 410	9 146	9 719	12 208	11 184
TOTAL BC (%)	75%	76%	77%	81%	91%	91%	91%	91%	90%
LIQUID BULK (lb)	265	225	246	92	148	155	154	178	187
LB/BC (%)	13%	12%	14%	4%	2%	2%	2%	1%	2%
DRY BULK (DB)	1 703	1 711	1 484	2 429	7 262	8 991	9 565	12 030	10 987
DB/BC (%)	87%	88%	86%	96%	98%	98%	98%	99%	98%
TOTAL PETROLEUM PRODUCTS (PP)	0	162	173	54	90	71	80	97	88
PP/LB (%)	-	-	-	-	-	-	-	-	-
CRUDE OIL	-	-	-	-	-	-	-	-	-
GASOLINE	-	162	173	54	90	71	80	97	88
FUEL OIL	-	-	-	-	-	-	-	-	-

SOURCES : PORTS CANADA AND PRINCE RUPERT PORT CORPORATION

GRAPH 6
COMMODITY TRAFFIC AT THE PORT OF
VANCOUVER, 1980 TO 1988



GRAPH 7
COMMODITY TRAFFIC AT THE PORT OF
PRINCE RUPERT, 1980 TO 1988



II - LIQUID BULK TRAFFIC IN QUÉBEC

BY ROAD

Goods are shipped by road in Québec by two main categories of carriers: those that transport goods on behalf of others and those that transport goods on their own behalf. In the first case, intercity transport companies that declared a sales figure above \$100 000 were taken into consideration. In the second, companies that had operating expenses above \$500 000 and that worked with firms in manufacturing, commerce, agriculture, forestry, fishing and trapping, mining and construction were considered.

Shipments of goods in Québec by road grew from 46.5 million tonnes to 57.3 million tonnes from 1984 to 1987. During this period, transport companies operating on behalf of others handled an average of 60% of the total traffic, whereas companies operating on their own behalf handled 40% (Table 8).

TABLE 8
TOTAL SHIPMENTS BY ROAD,
ORIGINATING IN QUÉBEC, 1984 to 1987
(in millions of tonnes)

	1984	1985	1986	1987
On behalf of others	29.1	33.4	33.2	35.9
%	63 %	56 %	60 %	63 %
On own behalf	17.4	26.0	21.7	21.4
%	37 %	44 %	40 %	37 %
Total	46.5	59.4	54.9	57.3

Source : Statistics Canada (53-222) and Mémento Statistique du transport au Québec.

To assess the proportion of liquid bulk shipped by road in Québec, 1985¹ was taken as the reference year. With regard to transport by truck on behalf of others, the establishments that handled intercity transport and declared a sales figure of \$350 000 or more were considered. Table 9 shows that these firms transported 29.1 million tonnes, including 4.7 million tonnes of liquid bulk or 16% of the total traffic of these firms. Petroleum products accounted for 2 million tonnes, or 43% of the liquid bulk transported in Québec by trucking firms working on behalf of others. Chemicals accounted for 1.5 million tonnes, or 32%, and dairy products, 1.2 million tonnes, or 25%.

¹ The last year for which statistics for this type of traffic are available for the whole of the industry.

The transport by road in Québec of liquid bulk by firms on their own behalf was estimated on the basis of traffic per commodity for the whole of Canada. The proportion of liquid bulk Canada-wide was then applied to total trucking, originating in Québec, by firms working for themselves.

In 1985, throughout Canada, 20.1 million tonnes of liquid bulk were shipped by road out of a total of 78 million tonnes, i.e. 25.8% of total traffic. Petroleum and natural gas products accounted for 15.5 million tonnes, i.e. 77% of liquid bulk shipped by road in Canada, while dairy products accounted for 3.9 million tonnes or 20% and chemicals for 0.7 million tonnes or 3% of the total in 1985. By applying the Canadian proportions to Québec, i.e. 25.8% of the total traffic in liquid bulk commodities, we arrived at 25.8% of 26 million tonnes (total traffic by firms on their own behalf in 1985), i.e. 6.7 million tonnes.

TABLE 9

TRAFFIC IN LIQUID BULK SHIPPED BY TRUCK,
ORIGINATING IN QUÉBEC, 1985
(in millions of tonnes)

A. Trucking on behalf of others¹

- Petroleum products and coal	1.7	
- Chemicals	1.5	
- Dairy products	1.2	
- Coal, crude oil	0.3	
<u>Subtotal</u> - liquid bulk	4.7	16%
<u>Total</u> - all commodities	29.1	100%

B. Trucking on own behalf
In CanadaIn Québec

- Petroleum and coal products	11.5		
- Dairy products	3.9		
- Gasoline	2.2		
- Refined gas	1.8		
- Other chemical specialties	0.4		
- Chemical elements	0.3		
<u>Subtotal</u> - liquid bulk	20.1	25.8%	6.7 (25.8%)
<u>Total</u> - all commodities	78.0	100%	26.0 (100%) ²

C. Total traffic (on behalf of others and on own behalf)

- Liquid bulk	11.4 = 4.7	6.7
- All commodities	55.1 = 29.1	26.0

Source: Statistics Canada, Trucking in Canada and Enquête sur le transport de marchandises pour compte d'autrui, compilation of the Direction du transport routier des marchandises, ministère des Transports du Québec, Québec City

¹ Intercity shipping by firms that declared a sales figure of \$350 000 or more.

² Estimate.

It should be noted that the total commodity traffic by truck has been underestimated, particularly in the case of trucking on the firms' own behalf, given the limited scope of the surveys conducted.

Lastly, in 1985, 55.1 million tonnes out of a total of 59.4 million tonnes (tables 8 and 9) of goods were transported by truck in Québec, 11.4 million tonnes or 20% of which apparently consisted of liquid bulk.

BY RAIL

About 90% of the entire railway system in Québec is in the hands of Canadian National and Canadian Pacific, and the tonnage transported by these two main companies is approximately 60% of total railway tonnage in Québec. Table 10 shows the volume of liquid bulk transported by rail in Québec by these two companies combined.

TABLE 10

CN AND CP RAIL TRAFFIC IN DRY AND LIQUID BULK, 1984 TO 1988

YEAR	TOTAL TRAFFIC		INCOMING		OUTGOING		LIQUID BULK TRAFFIC		INCOMING		OUTGOING		LBT/TT	
	T (000)	C (000)	T (000)	C (000)	T (000)	C (000)	T (000)	C	T (000)	C	T (000)	C	T %	C %
1984	39 778	1 079	19 562	527	20 216	551	5 209	79 156	2 673	41 196	2 542	37 952	13,1%	7,3%
1985	38 150	1 071	18 415	528	19 735	543	5 099	76 882	2 574	39 609	2 525	37 273	13,4%	7,2%
1986	39 060	1 074	19 276	531	20 584	543	4 724	70 345	2 553	38 033	2 162	32 312	12,1%	6,5%
1987	39 338	1 069	19 431	532	19 907	536	4 527	66 643	2 324	34 668	2 203	31 967	11,5%	6,2%
1988	39 128	1 063	19 089	522	20 039	540	4 803	70 432	2 538	37 556	2 264	32 876	12,3%	6,6%

Legend : T=Tonnes, C=Cars, TT = total traffic, LBT = liquid bulk traffic

Sources: Canadian National and Canadian Pacific

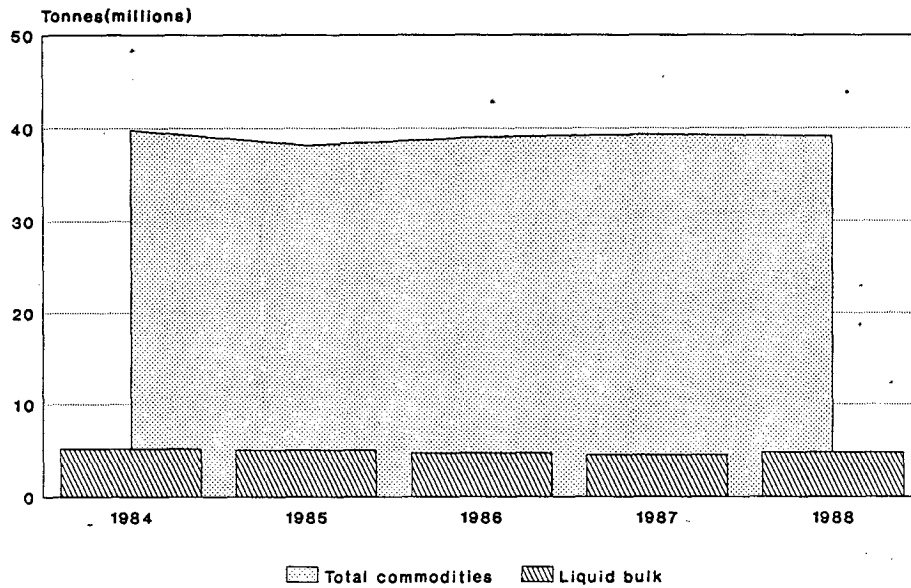
From 1984 to 1988, the total rail traffic considered¹ stabilized below the level of 40 million tonnes, with railway car traffic slightly higher, at a million units. This traffic was divided almost equally between commodities coming into and those going out of Québec in tonnage as well as in number of cars.

Rail traffic in liquid bulk consisted mainly of chemical acids, liquified petroleum gas, fertilizers, sulphuric acid, liquid sulphur, fuel oil, gasoline and vegetable oils. Tonnage for these commodities in the CN and CP system in Québec gradually dropped between 1984 and 1988 from 5 209 000 tonnes to 4 803 000 tonnes. These tonnages represent proportions varying from 11.5% to 13.3% during the five-year period. Like the volume, the number of cars used to transport commodities declined, from 79 156 in 1984 to 66 643 units in 1987, before rising to 70 432 units in 1988. During this period, tank car traffic accounted for 7.3% to 6.2% of the total traffic in Québec involving the cars of these two main railway companies.

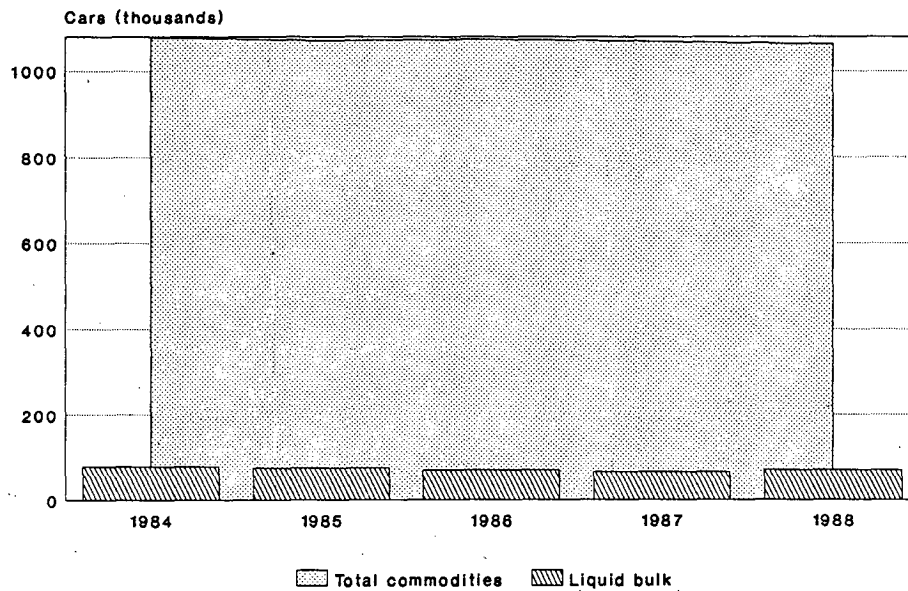
Lastly, the rail activities of Canadian National dominated in terms of total rail traffic (tonnage and cars) and in terms of the transport by rail of liquid bulk (tonnage and cars).

¹ Including only CN and CP data.

GRAPH 8
CN AND CP RAIL TRAFFIC IN COMMODITIES
AND LIQUID BULK IN QUÉBEC, 1984 TO 1988



GRAPH 9
CN AND CP RAIL TRAFFIC IN COMMODITIES
AND LIQUID BULK IN QUÉBEC, 1984 TO 1988



BY PIPELINE¹

The pipeline system in operation in Québec handles a significant proportion of the traffic in certain commodities such as liquid fuels and natural gas.

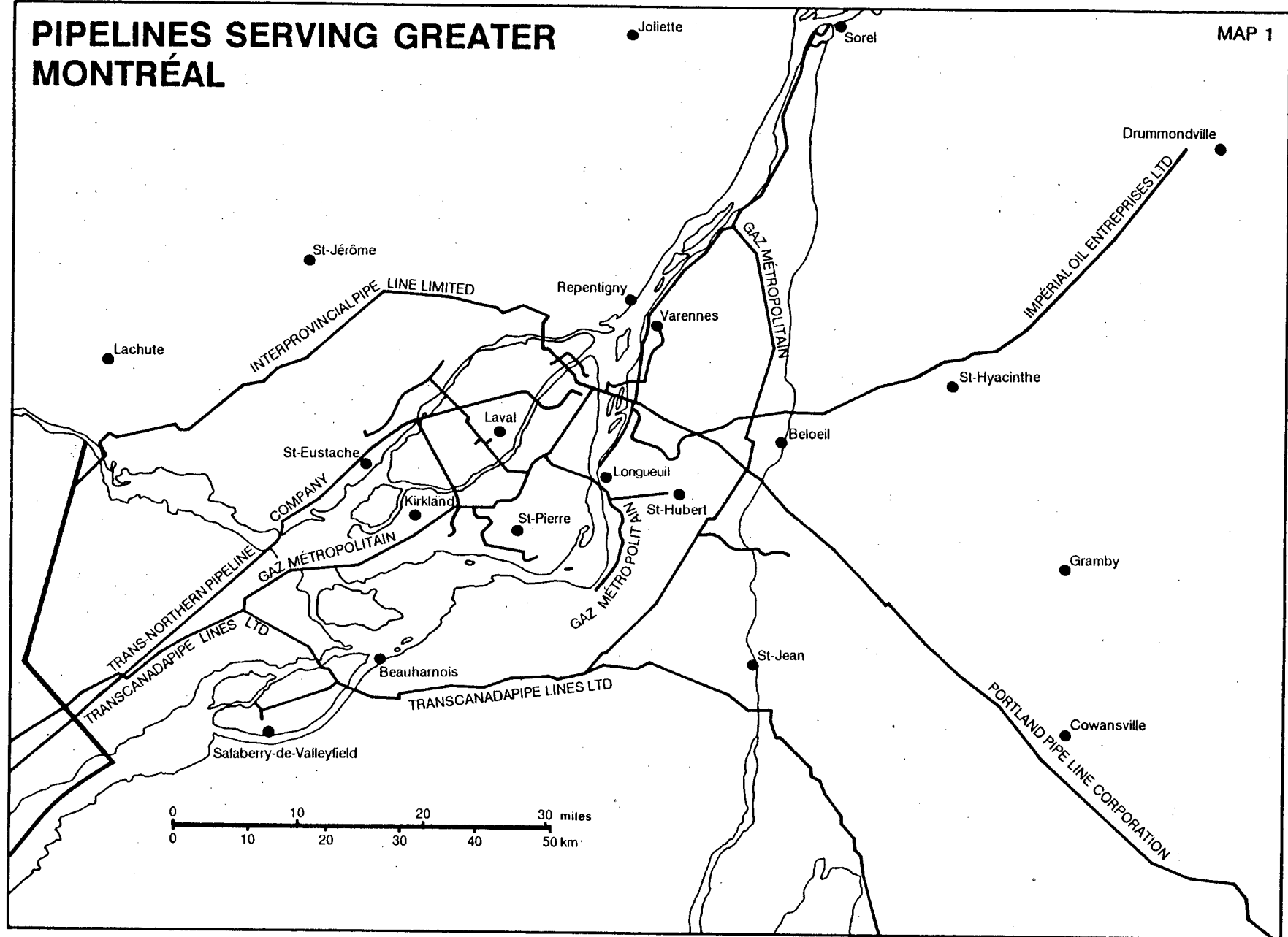
The oil pipelines that came on line in Québec in 1988 cover nearly 600 km. The main ones have the following characteristics: those with a diameter of 227 to 277 mm cover 127 km, those with a diameter of 430 to 480 mm and 532 to 658 mm cover 114 km and those with a diameter greater than 760 mm cover 110 km.

Liquified petroleum gas (LPG) such as propane and butane is now transported by rail and by road (tank trucks) from Sarnia to Montréal for the needs of the Petromont petrochemical processing plant. A major pipeline project could materialize: the construction of a new pipeline reserved solely for the transport of up to 24 000 barrels a day of LPG from Sarnia to Montréal (Soligaz).

¹ Natural gas was excluded from the study since it is not considered a liquid, in contrast to liquified petroleum gas such as propane and butane, which are transported in liquid form.

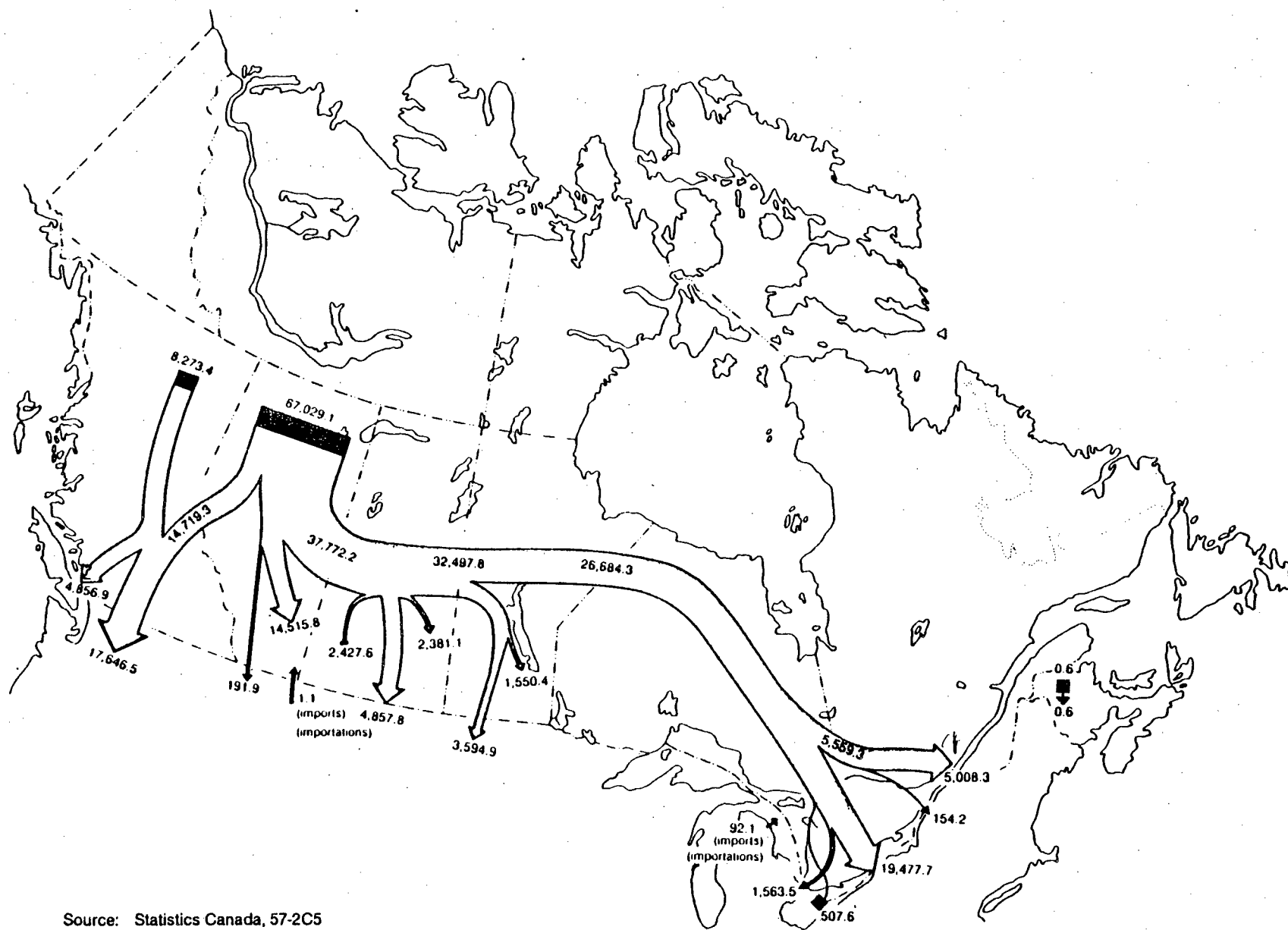
PIPELINES SERVING GREATER MONTRÉAL

MAP 1



SHIPMENTS AND USE OF NATURAL GAS, CANADA, 1987

MAP 2



Source: Statistics Canada, 57-2C5

The transport of crude oil, condensate and pentanes plus dominates the petroleum products pipeline system in Québec. However, the volume of this category of product declined by more than 50% between 1981 and 1988, from 23 744 000 cubic metres to 10 847 000 cubic metres (Table 11). There was a considerable reduction in traffic in terms of shipments from other provinces, the level of which in 1988 was 52% of that in 1981, and in international imports, the level of which in 1988 was two-thirds less than in 1981. In 1981, 57% of shipments of crude oil coming into Québec by pipeline were from the other provinces and 43% were imports from abroad. In 1988, 65% of total shipments coming into Québec by pipeline consisted of crude oil from the other provinces, while international imports accounted for 35% of the total.

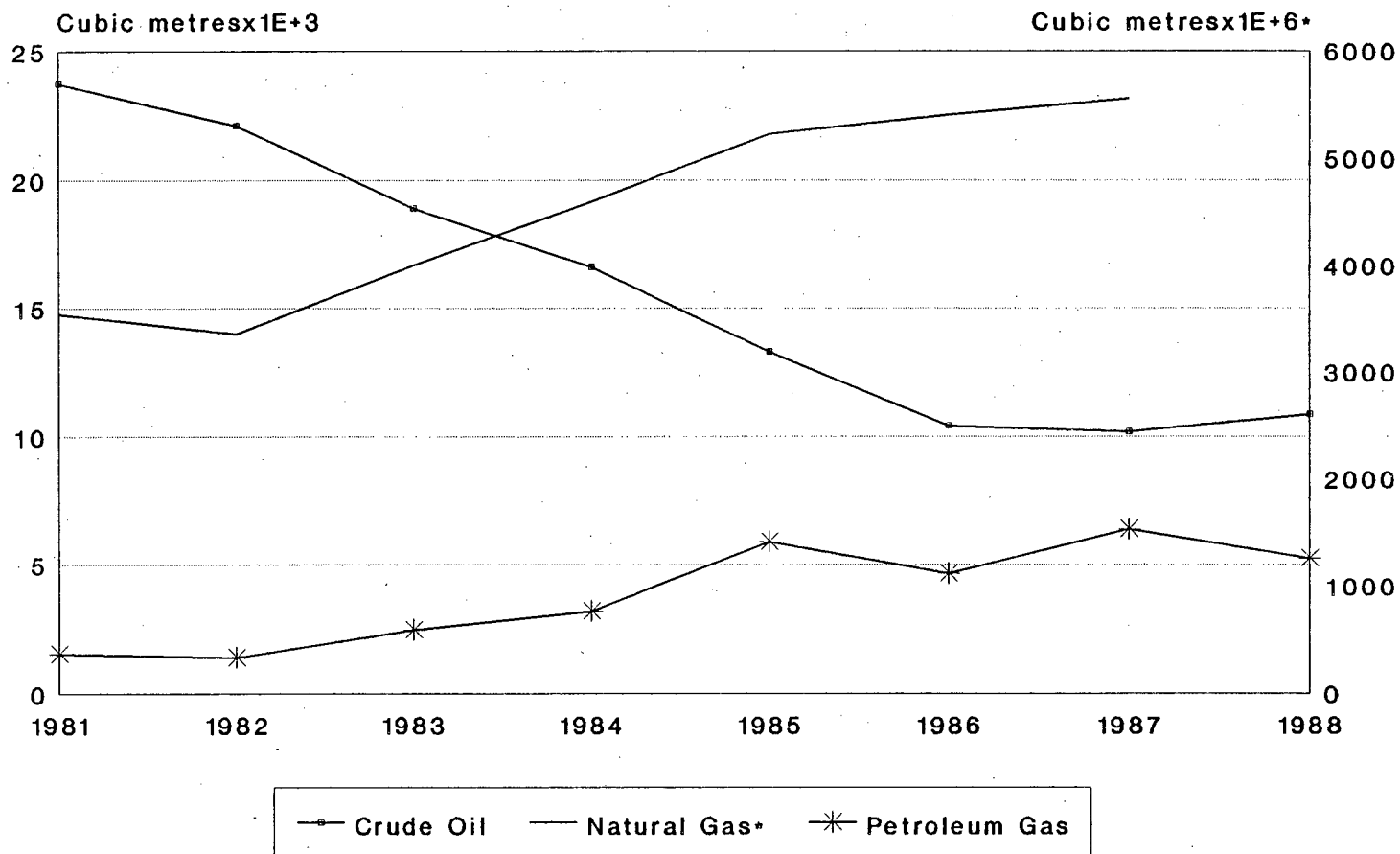
TABLE 11

SHIPMENTS BY PIPELINE TO QUÉBEC, 1981 TO 1988

YEARS	1981	1982	1983	1984	1985	1986	1987	1988
<u>Crude oil, condensate and pentanes plus</u> (in thousands of cubic metres)								
Shipments								
Other provinces	13 492	15 562	14 423	12 977	9 910	6 378	5 569	7 063
Imports	10 252	6 547	4 474	3 623	3 379	3 956	4 596	3 784
TOTAL	23 744	22 109	18 897	16 600	13 289	10 401	10 165	10 847
<u>Liquified petroleum gas and petroleum products</u> (in thousands of cubic metres)								
Refineries and storage installations								
other provinces	1 496	1 392	2 162	2 636	4 872	3 802	5 703	4 559
	40	-	296	553	1 010	847	685	675
Total	1 536	1 392	2 458	3 189	5 882	4 649	6 388	5 234

Source : Statistics Canada

GRAPH 10 SHIPMENTS BY PIPELINE TO QUÉBEC, 1981 TO 1988



The traffic in liquified petroleum gas and petroleum products grew more rapidly during the decade than traffic in other commodities. Incoming shipments of these products by pipeline rose from 1 536 000 cubic metres in 1981 to 6 381 000 cubic metres in 1987, an increase of 316%. A slight decline to 5 234 000 cubic metres was recorded in 1988.

This was mainly due to an increase in shipments of Canadian crude oil via the Interprovincial Pipe Line and a rise in inter-refinery exchanges of petroleum products in the wake of the closing of several refineries in Montréal.

To illustrate the scope of transport by pipeline, traffic via the Portland-Montréal Pipeline, the Interprovincial Pipe Line from Sarnia to Montréal and the Trans-Northern Pipeline, the flow of which is from Nanticoke to Montréal and from Montréal to Maitland, then on to Ottawa, will be examined. The first two pipelines are used only to transport crude oil, whereas the last one is used to transport petroleum products in both directions.

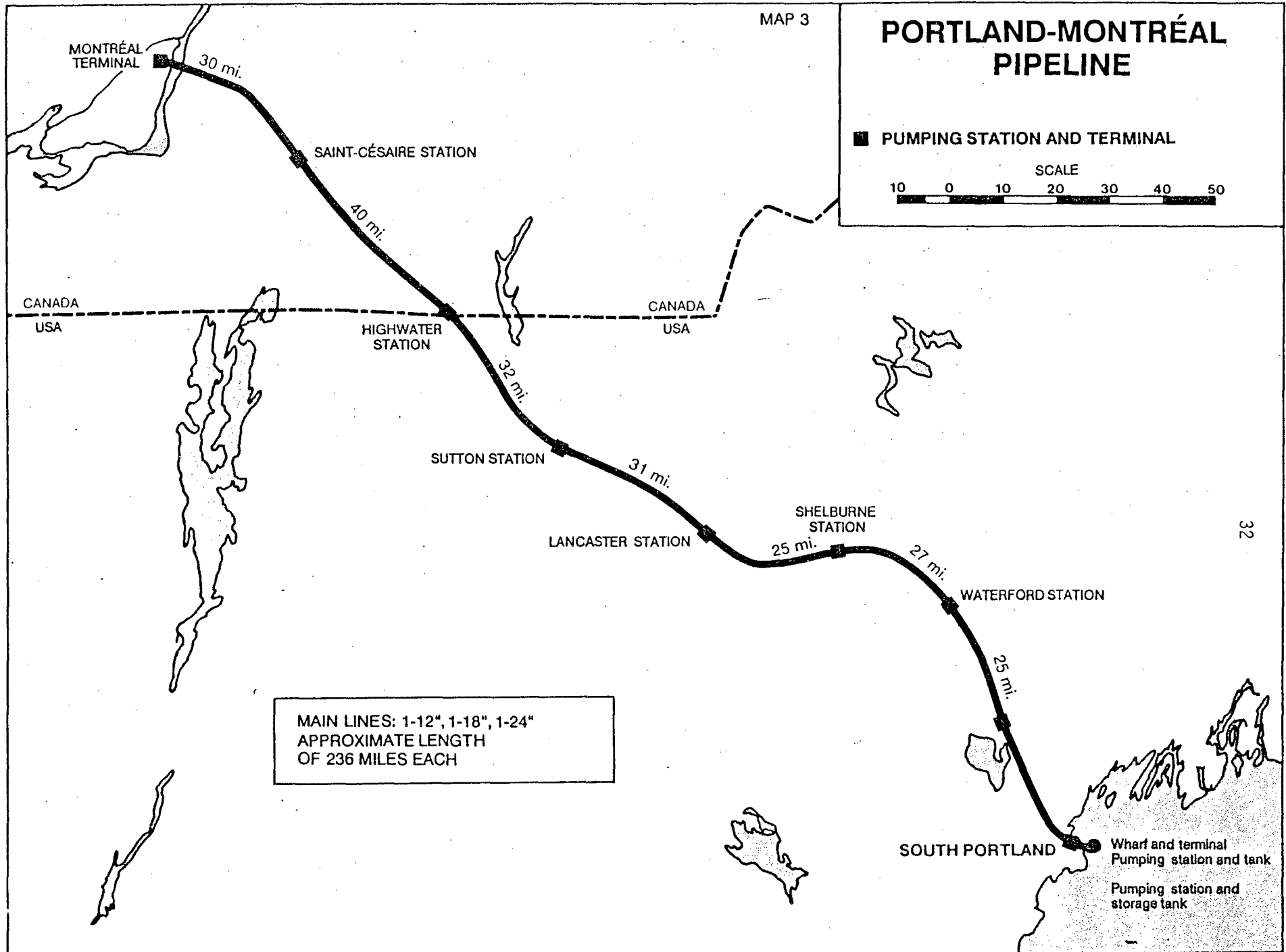
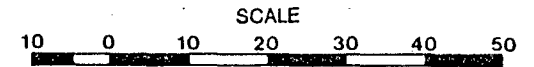
. Portland-Montréal Pipeline

The Portland-Montréal Pipeline is a system for transporting crude oil between South Portland (Maine) and Montréal-Est (Map 3). The system is owned by two companies, Portland Pipe Line Corporation (Portland, Maine) and Les Pipelines Montréal Limitée (Montréal). The Portland Pipe Line Corporation is a wholly-owned subsidiary of Les Pipelines Montréal Limitée, which is incorporated under a Canadian charter. This Canadian company is owned by the following oil companies: Imperial Oil Limited, Petro-Canada Inc., Shell Canada Limited and Texaco Canada Inc.

MAP 3

PORTLAND-MONTRÉAL PIPELINE

■ PUMPING STATION AND TERMINAL



Two pipelines are now in operation between Portland and Montréal: one has a diameter of 460 mm (18") and the other, 610 mm (24"). This system is a total of 378 km long. In the United States, it begins in South Portland and crosses Maine, New Hampshire and Vermont for 266 km. It enters Canada near Highwater, Québec, and extends over 112 km between the border and the refineries of Montréal-Est, which it supplies.

The elevation of the pipelines varies from 10 metres above sea level at South Portland to 650 metres above sea level in Vermont. It gradually descends to 33 metres above sea level in Montréal. The system is equipped with eight pumping stations to pump crude oil from one end to the other.

In South Portland, the system includes 23 tanks for the storage of crude oil, the capacity of which totals 3.8 million barrels.

Crude oil traffic through the pipeline system between Portland and Montréal varied from 58 400 to 66 800 barrels a day from 1985 to 1988, with highs of 72 800 and 80 000 barrels a day in 1986 and 1987 respectively (Table 12, Graph 11).

At the present time, the capacity of the 610-mm pipeline is 186 000 barrels a day; it was reduced to this level in 1986. Prior to that, it was 268 000 barrels a day. The capacity of the 610-mm pipeline can be increased to 290 000 barrels a day within a short period of time. The maximum capacity of the system is 392 000 barrels a day with the 610-mm pipeline alone. It totals 581 000 barrels a day if the capacity of the 460-mm pipeline is added.

Given the reduction in traffic since the beginning of the 1980s (Table 11), only the 610-mm pipeline is now used to

transport crude oil from Portland to Montréal, and traffic was about 65 000 barrels a day in 1988. Reductions in crude oil shipments and relatively stable forecasts for the medium term have resulted in the temporary conversion of the 460-mm pipeline of the Portland-Montréal system for the transport of natural gas until 1996. The Shell Canada oil tanker can use it to transport up to 25 million cubic feet a day of natural gas from Montréal to New England (Granite State Gas Transmission Inc.).

In 1988, crude oil traffic through the Portland-Montréal Pipeline totalled 24.5 million barrels from fifty 39 232-DWT and 120 340-DWT tankers, or between 249 155 and 630 447 barrels.¹ Most of these shipments of crude oil were from Europe, Mexico and South America.

TABLE 12
TRANSPORT OF CRUDE OIL BY
THE PORTLAND-MONTRÉAL PIPELINE (PML) :
FLOW FROM PORTLAND TO MONTRÉAL, 1985 TO 1988

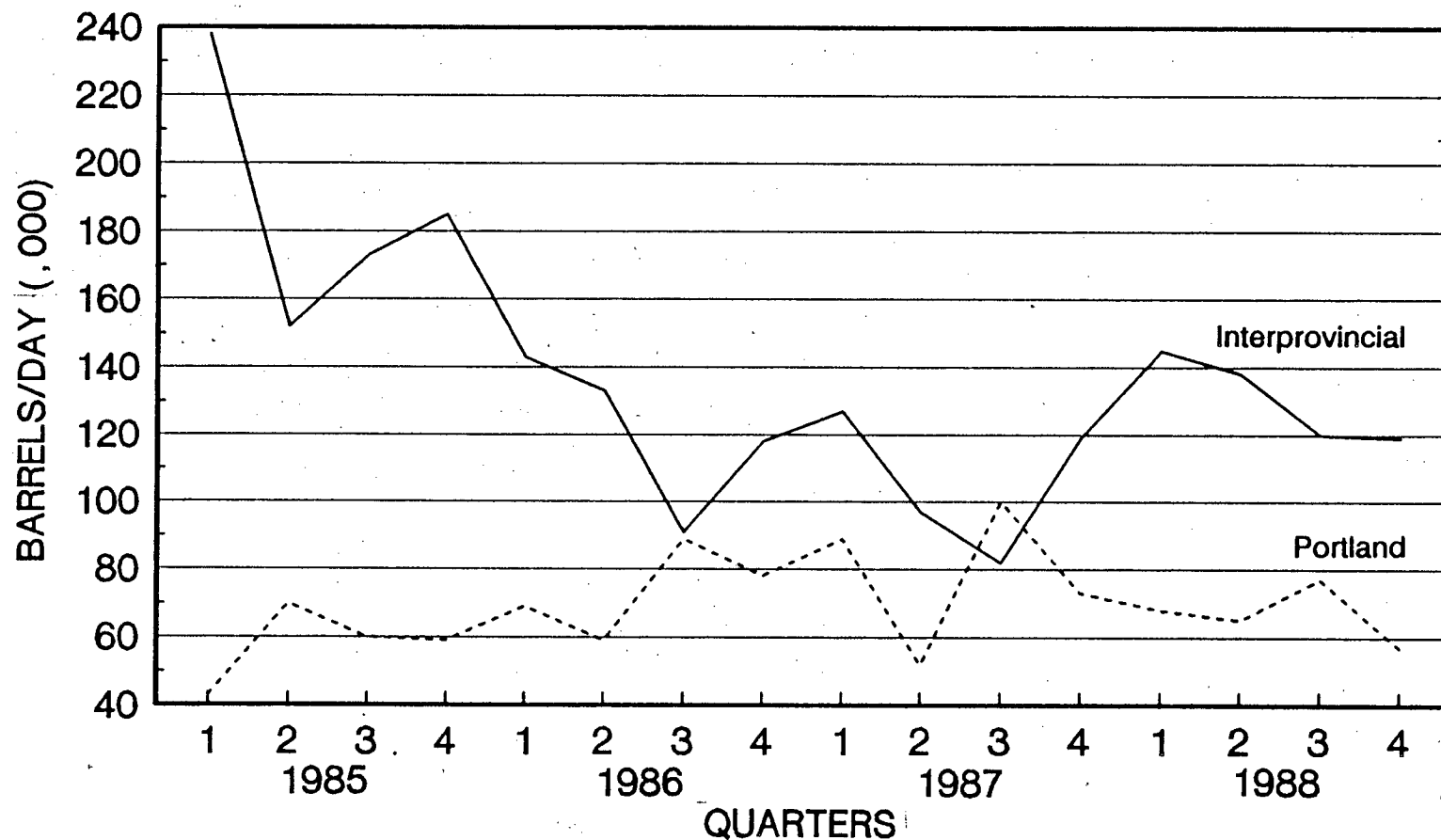
	1000 barrels/day	1000 m ³ /day	Tons per day	Tonnes per day
1985	58.4	9.3	7799.60	7924.76
1986	72.8	11.6	9728.53	9884.65
1987	80.0	12.7	10651.07	10821.98
1988	66.8	10.6	8889.87	9032.52

Note : 1 m³ = 6.29 barrels
 1 long ton ≈ 7.5 barrels (crude oil)
 1 long ton = 1.0160469088 tonnes

Source : Energy, Mines and Resources Canada and PML.

¹ Les Pipelines Montréal Limitée.

PORTLAND AND INTERPROVINCIAL PIPELINES: FLOW TOWARD MONTRÉAL, 1985 TO 1988



Source: Ministère de l'Énergie et des Ressources
du Québec, Direction du pétrole

Sarnia-Montréal Interprovincial Pipe Line

Before the 1973 energy crisis, Montréal was the main refining centre in Canada and one of the largest in the world. At that time, in order to protect Ontario and Western Canada from foreign oil imports, an economic border called the Borden Line was created. The establishment of the Borden Line in February 1961 was justified solely by the need to increase oil production in Western Canada to a level deemed desirable by the federal government of the time.

To achieve this objective, the federal government prevented Venezuelan oil, which was cheaper, from entering Ontario and supported the development of refining capacity west of the Ottawa Valley.

The implementation of this policy imposed two constraints on the Montréal petrochemical industry:

- physically, oil from Western Canada was reserved for the Sarnia region;
- commercially, the substantial southern Ontario market was closed to Montréal products.

The impact of the abandonment of this policy during the embargo on the export of petroleum products by the Arab countries in 1973 was especially commercial. Petroleum products could again circulate freely in Canada for reasons of national security, but with the increase in crude oil imports, Montréal had already lost its advantage over the competition from Ontario.

This is the context in which the Sarnia-Montréal pipeline was laid in the wake of the oil crisis in 1973.

The Interprovincial system now consists of:

- three parallel pipelines between Edmonton and Superior in Wisconsin;
- two sections connecting Superior to Sarnia in Ontario, one via the Straits of Mackinac and the other via Chicago;

two pipelines between Sarnia and the Toronto region with branches toward Buffalo, New York, and Nanticoke, Ontario;

- a section for the transport of crude oil from Sarnia to Montréal, with a branch from the Petro-Canada refinery in Clarkson, Ontario.

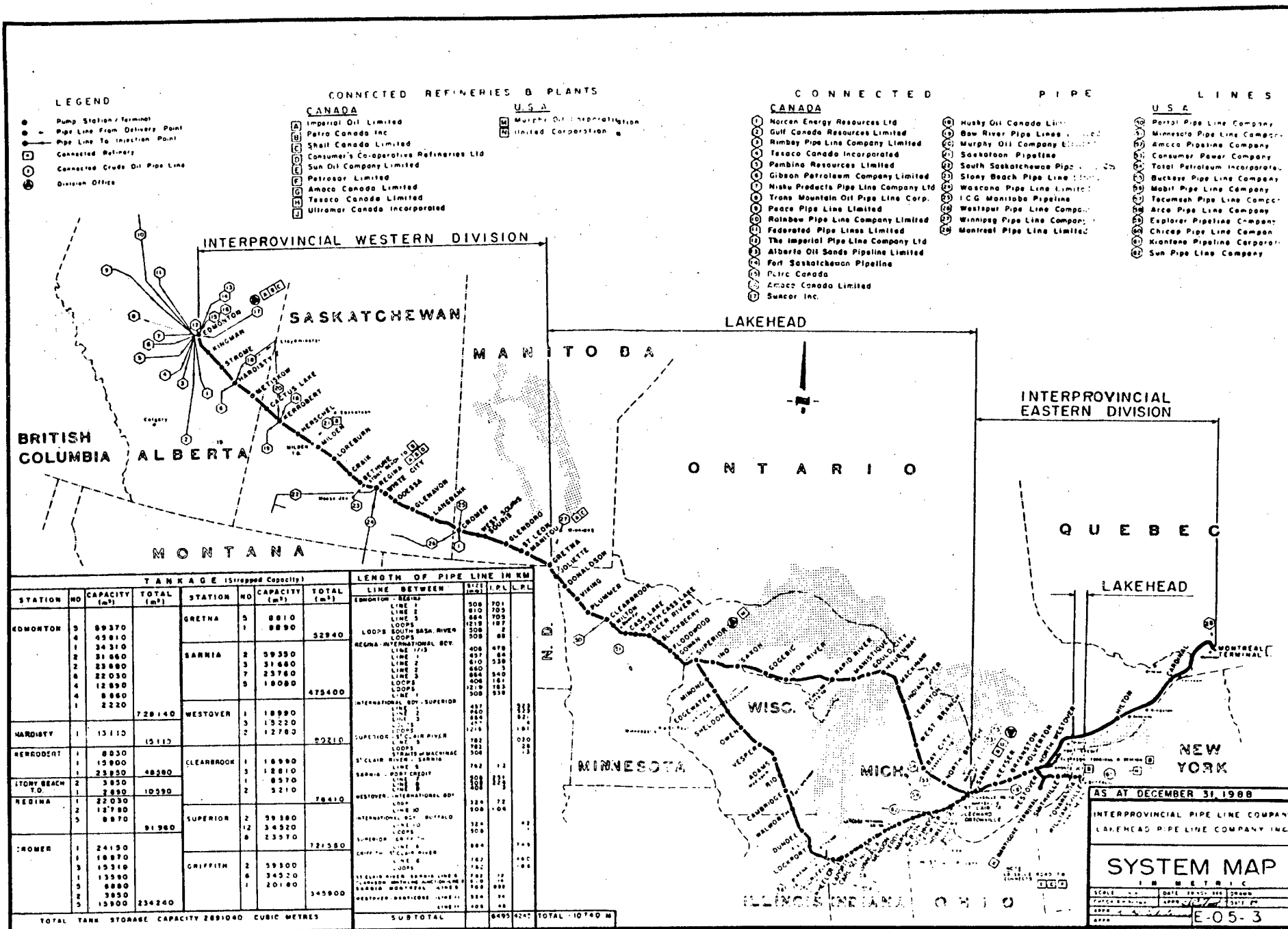
The Interprovincial system was laid in 1947 for the transport of crude oil between the Leduc oil field in Alberta, and Regina. The IPL was originally a wholly owned subsidiary of Imperial Oil Limited. In 1983, Hiram Walker Resources Limited, which became a subsidiary of Gulf Canada in 1986, acquired a 34% interest. Imperial Oil now holds a 22% interest.

The Sarnia-Montréal section came into service in June 1976. It covers 832 km and is 762 mm (30") in diameter (Map 4). It carries crude oil from Edmonton to Montréal.

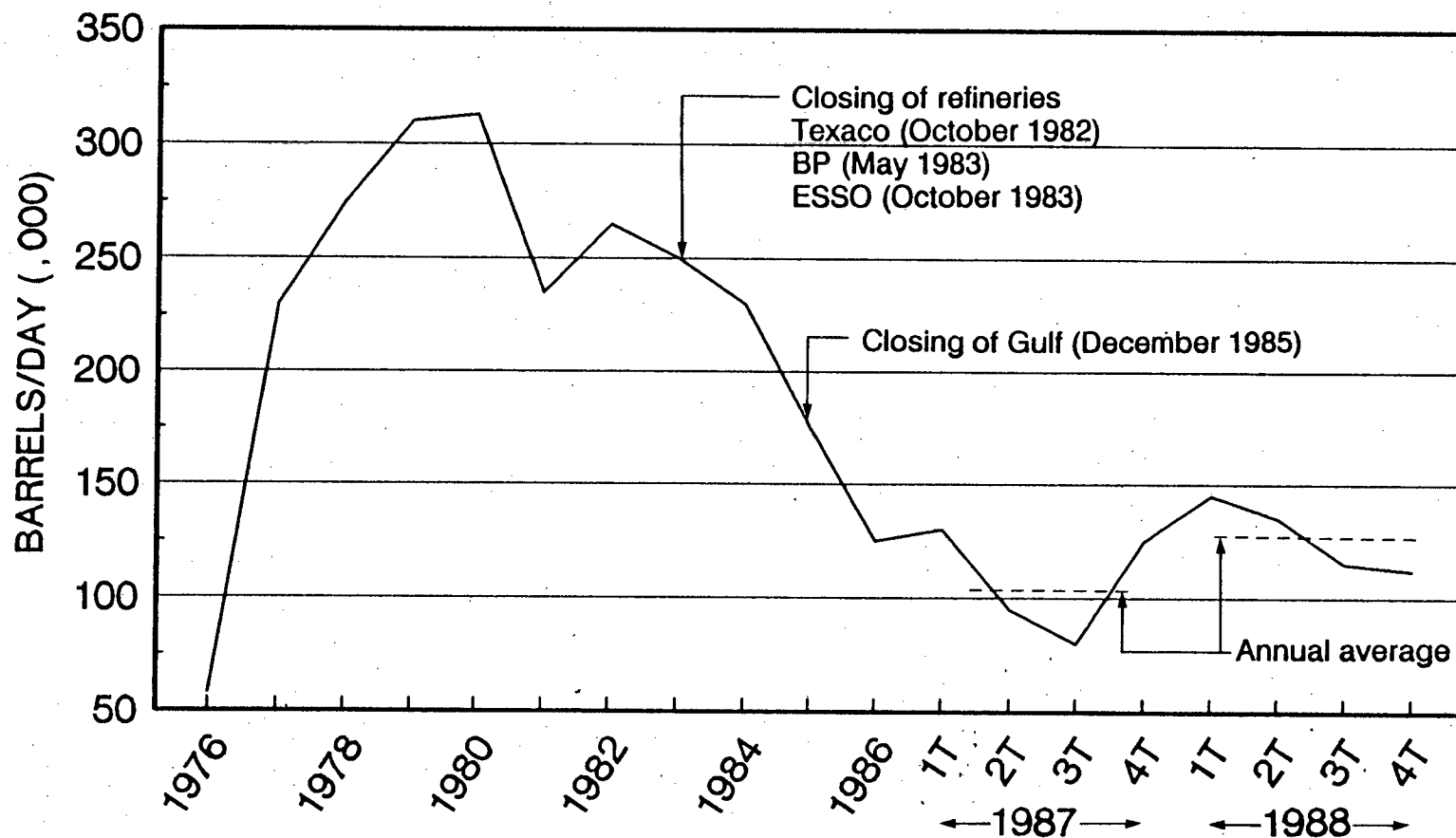
Traffic, which skyrocketed in 1976 and 1977, topped 300 000 barrels a day between 1979 and 1980. Subsequently, it declined almost constantly, except in 1982, and fell to a level below 100 000 barrels a day in the second and third quarters of 1987 (Graph 12).

INTERPROVINCIAL PIPE LINE

MAP 4



INTERPROVINCIAL PIPE LINE (IPLL): FLOW FROM SARNIA TO MONTRÉAL, 1976 TO 1988



Source: Ministère de l'Énergie et des Ressources
du Québec, Direction du pétrole

This period during which the level of supplies was reduced was marked by the successive closures of the following Montréal refineries: Texaco in October 1982, British Petroleum in May 1983, Esso in October 1983 and Gulf in December 1985. From 1980 to 1985, four refineries out of six closed one after the other in Montréal, resulting in an approximately 40% reduction in Québec's refining capacity.

Fortunately, in 1988 the nose-dive since 1983 slowed and the supply levels of the refineries in Montréal that were still in operation (Shell and Petro-Canada) meant a resumption of the flow on the Sarnia-Montréal section, which totalled nearly 130 000 barrels a day (Table 13).

TABLE 13
INTERPROVINCIAL PIPE LINE (IPLL) :
FLOW FROM SARNIA TO MONTRÉAL, 1985 TO 1988

	1000 barrels/day	1000 m ³ /day	Tons per day	Tonnes per day
1980	285.0	45.3	3804.97	38659.70
1985	187.2	29.8	24992.27	25393.32
1986	121.3	19.3	16186.27	16446.01
1987	105.3	16.7	14005.73	14230.48
1988	129.4	20.6	17276.53	17553.77

Source : Energy, Mines and Resources Canada.

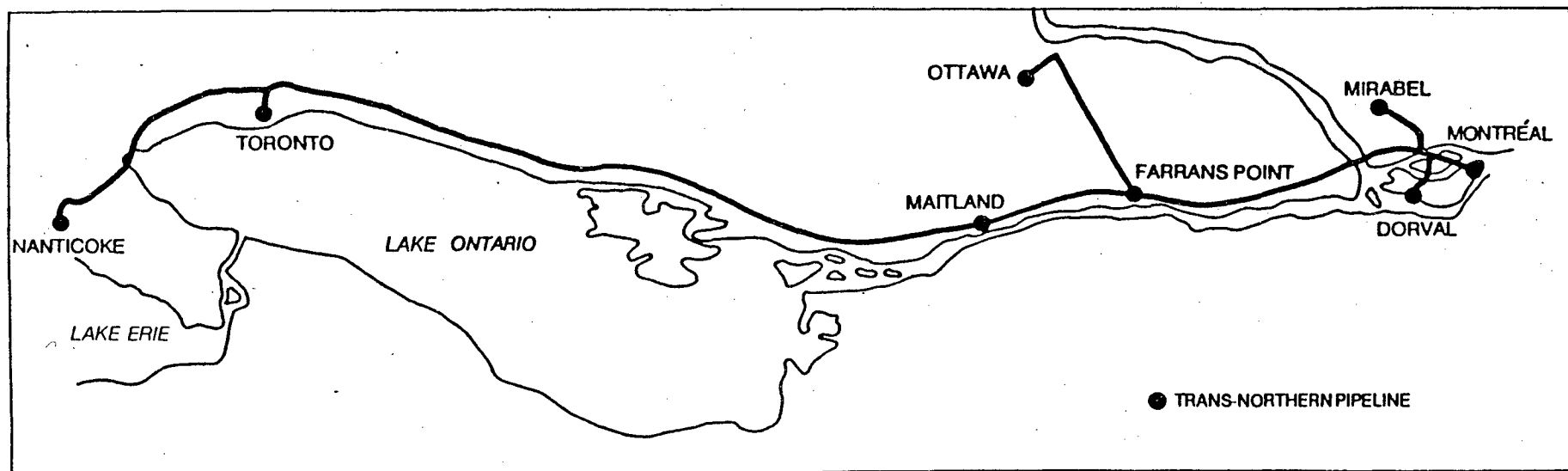
Trans-Northern Pipeline

The Trans-Northern Pipeline is owned by the Shell Canada, Petro-Canada and Imperial Oil of Canada petroleum companies, which set up the company Trans-Northern Pipeline Inc. The flow is in two directions. It connects Nanticoke, Ontario, located west of Toronto, to Montréal (Map 5). The capacity on the 273 mm (10") Trans-Northern line between Toronto and Montréal is 9500 m³ a day (60 000 barrels a day) from west to east up to Farrans Point and 10 000 m³ a day (63 000 barrels a day) from east to west.

Flow from Montréal goes no further than Maitland and Ottawa, in Ontario. These two cities are a little over 200 km west of Montréal. The Ontario cities served by both Montréal and Ontario are Cornwall, Ottawa, Prescott and Maitland. Of the three destinations in Québec (Montréal, Dorval and Mirabel), only Montréal is served by two lines from the city itself and from Ontario. Furthermore, Montréal supplies the Dorval and Mirabel airports and part of the Ottawa market. Petroleum products are also shipped to Ottawa and Montréal from Nanticoke.

The flow of petroleum products in the two directions began to differ in 1978, but parity of around 25 000 barrels a day was achieved in 1988. The flow westward was characterized by a curve descending from 45 000 barrels a day in 1978 to 25 000 barrels a day in 1981, then to 17.4 thousand barrels a day in 1986, after a slight recovery in 1985. It gradually returned to 25 000 barrels a day in 1988. On the other hand, the flow eastward followed an ascending curve: it was below 5000 barrels a day in 1978, rose to 29 000 barrels a day in 1984, and dropped in 1982 and again in 1985. It was around 20 000 barrels a day before increasing to 28 000 barrels a

TRANS-NORTHERN PIPELINE



day in 1986 and 1987. It reached the parity level of 25 000 barrels a day in 1988 (Table 14, Graph 13).

The reduction in the flow of oil transported by pipeline since the beginning of the 1980s meant a rate of use well below half the total capacity. From 1985 to 1988, barely one-third of the capacity of the Portland-Montréal Pipeline was used, with an average of 31%. Better use was made of the Interprovincial Pipe Line during this period, but even so, only 41.8% of its capacity was used. The rate of use of the Trans-Northern Pipeline was between the two others on average, i.e. 38.8% overall, but the eastbound flow was slightly heavier than the westbound, i.e. 40.3% compared with 36.2% respectively from 1985 to 1988 (Table 15, Graph 14).

The entire pipeline system bringing petroleum products to Montréal carried 35 829 tonnes a day in 1985; the figure dropped to 29 758 tonnes a day in 1988. These tonnages correspond to annual flows of 13.4 million tonnes in 1985 and 10.9 million tonnes in 1988, which would have reduced the volume of incoming petroleum at the Port of Montréal proportionately if Québec City had not been served by a pipeline to supply its refineries (Table 16, Graph 15).

In 1988:	- Portland-Montréal	3.3 million tonnes
	- Sarnia-Montréal	6.4 million tonnes
	- Nanticoke-Montréal	1.2 million tonnes

There are also four pipelines from the Port of Montréal to the petrochemical complex in Varennes. Formerly owned by Gulf Oil, the system was sold to Petromont.

TABLE 14
TRANS-NORTHERN PIPELINE, 1984 TO 1988

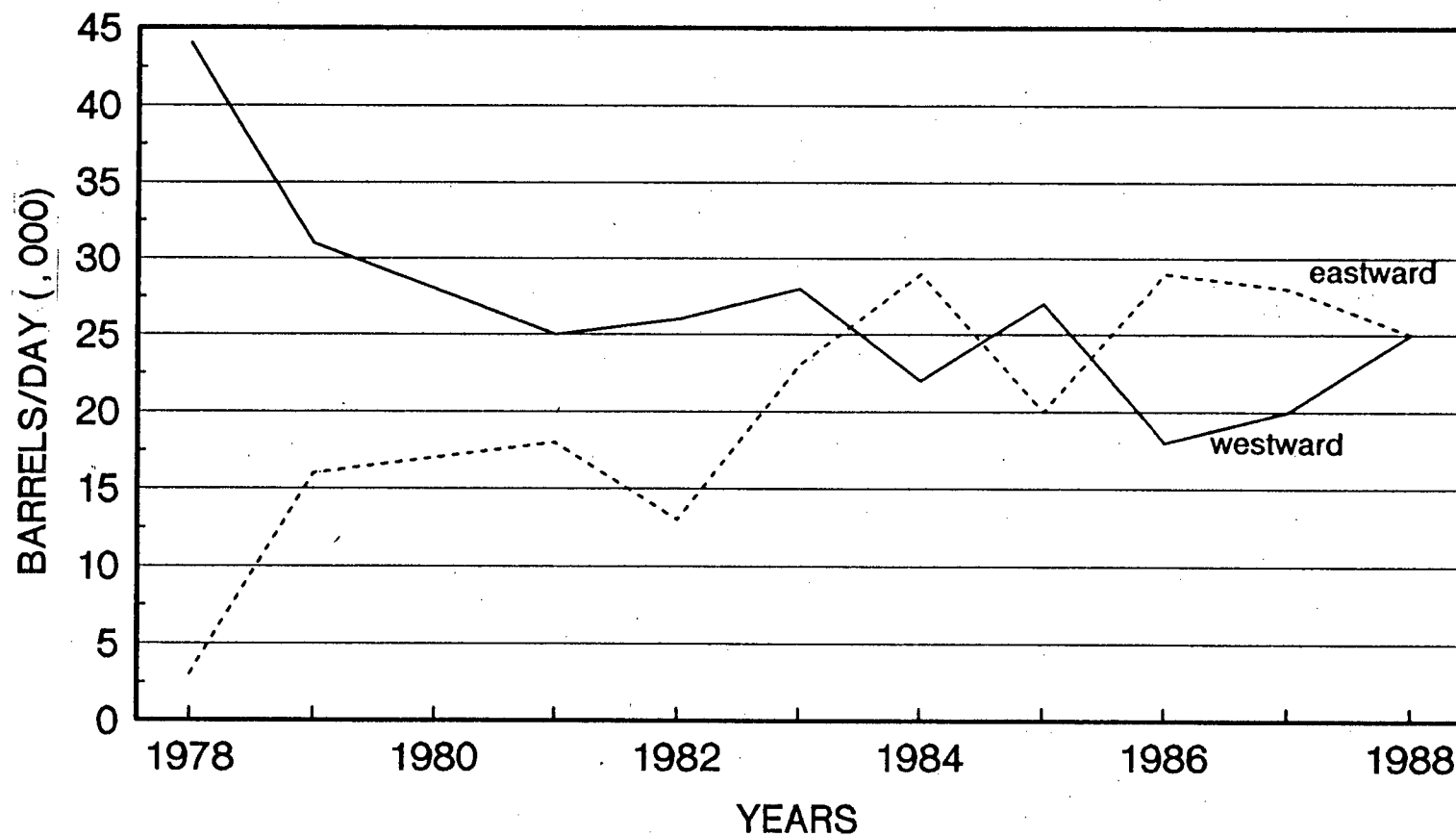
<u>FLOW FROM MONTRÉAL TO MAITLAND</u>				
	1000 barrels/day	1000 m ³ /day	Tons per day	Tonnes per day
1984	21.45	3.41	2681.11	2724.14
1985	27.80	4.42	3475.23	3530.99
1986	17.42	2.77	2177.91	2212.86
1987	20.31	3.23	2539.59	2580.34
1988	25.73	4.09	3215.76	3267.37

<u>FLOW FROM NANTICOKE TO MONTRÉAL</u>				
	1000 barrels/day	1000 m ³ /day	Tons per day	Tonnes per day
1984	28.97	4.60	3616.75	3674.79
1985	19.77	3.14	2468.83	2508.44
1986	28.57	4.54	3569.58	3626.86
1987	28.37	4.51	3545.99	3602.89
1988	24.97	3.97	3121.41	3171.50

Source : Energy, Mines and Resources Canada

TRANS-NORTHERN PIPELINE

1978 TO 1988



Source: Ministère de l'Énergie et des Ressources
du Québec, Direction du pétrole

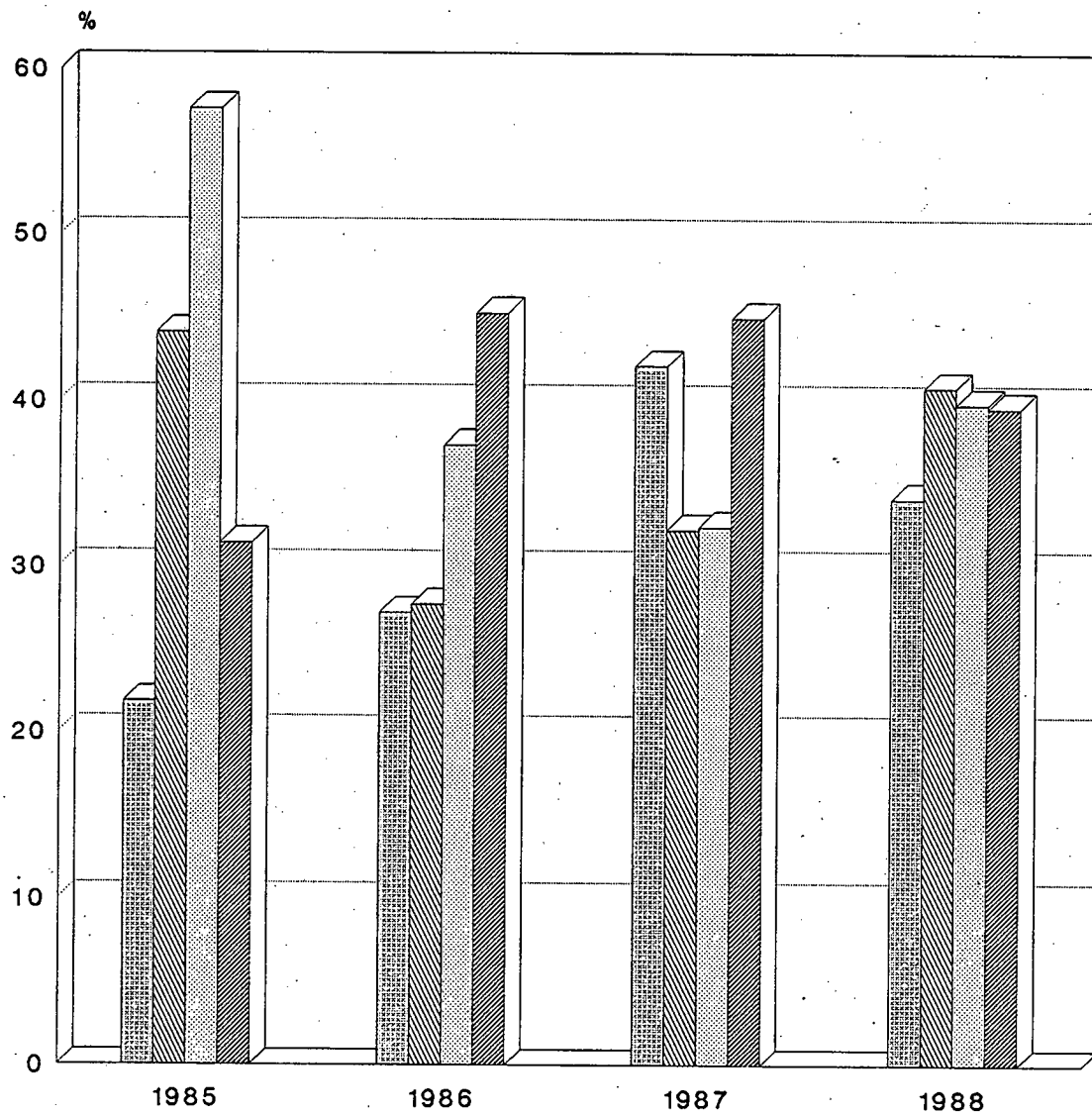
TABLE 15
USE OF PIPELINES, 1985 TO 1988

	PML ¹ %	Trans-Northern (westward) %	Trans-Northern (eastward) %	IPLL %
1985	21.8	44.1	31.4	57.6
1986	27.2	27.7	45.3	37.3
1987 ¹	42.1	32.2	45.0	32.4
1988	34.1	40.88	39.6	39.8
Average	31.3	36.2	40.3	41.8

Source : Ministère de l'Énergie et des Ressources du Québec,
Direction du pétrole.

¹ In october 1986, the capacity of this pipeline was reduced
from 43 000 to 30 000 m³/day.

GRAPH 14
USE OF PIPELINE, 1985 TO 1988



PML

IPLL

Trans-Northern(ww)

Trans-Northern(ew)

Source: Ministère de l'Énergie et des
Ressources du Québec

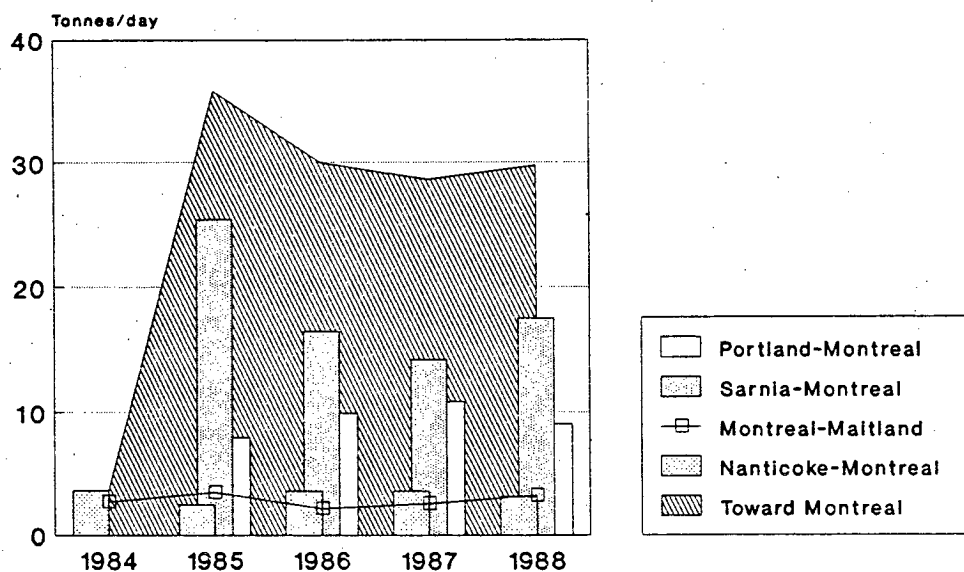
TABLE 16

FLOW OF PETROLEUM PRODUCTS BY PIPELINE, QUÉBEC 1984 TO 1988
(Tonnes/day)

YEAR	PORTLAND/ MONTRÉAL	SARNIA/ MONTRÉAL	TRANS-NORTHERN		TOTAL	TOTAL TO MONTRÉAL	MILLIONS OF TONNES /YEAR
			MONTRÉAL/ MAITLAND	NANTICOKE/ MONTRÉAL			
1984	N.D	N.D	2 724	3 675	6 399	3 675	2,3
1985	7 925	25 393	3 531	2 508	39 358	35 829	13,4
1986	9 885	16 446	2 213	3 627	32 170	29 958	10,9
1987	10 822	14 231	2 580	3 603	31 236	28 656	10,5
1988	9 033	17 554	3 267	3 172	33 025	29 758	10,9

SOURCE : ENERGY, MINES AND RESOURCES CANADA

GRAPH 15
TRANSPORT BY PIPELINE OF PETROLEUM
PRODUCTS, QUÉBEC, 1984 TO 1988



The Soligaz project was in its last stage before start-up in the fall of 1989 when the federal government agreed to build a new gas pipeline between Sarnia and Montréal (\$150 million) to supply natural gas liquids (NGLs) to be processed in the Montréal region. The new pipeline is expected to supply the Montréal petrochemical industry from Western Canada by 1992.

BY THE ST. LAWRENCE¹

From 1984 to 1988, total Canadian maritime transport varied from 326.6 million tonnes to 362.2 million tonnes, while Québec maritime transport fluctuated from 103.7 million tonnes to 111.8 million tonnes during same period (Table 17). Maritime traffic in Québec accounted for about one-third of all Canada's maritime traffic, although this proportion decreased slightly but steadily from 1984 to 1988, its relative share declining from 32% to 29% during the five-year period.

The transport of liquid bulk through St. Lawrence ports varied from 14.7 million tonnes to 18.8 million tonnes from 1984 to 1988, representing 14.3% to 16.8% of Québec's total maritime traffic during that period.

Liquid bulk commodities in transit through St. Lawrence ports may be divided into three main categories: petroleum products, chemicals and edible.

¹

This study mainly deals with liquid bulk traffic on the St. Lawrence. However, a brief analysis of the traffic in bulk liquid commodities on the two sections of the St. Lawrence Seaway (Montréal - Lake Ontario and the Welland Canal) is provided in Chapter VI.

From 1984 to 1988, petroleum products overwhelmingly dominated this traffic with 94% of the liquid bulk commodities in transit through all Québec's ports (Table 17). Their volume varied from 13.7 million tonnes to 17.9 million tonnes during the reference period.

Chemicals accounted for nearly 5% of liquid bulk on the St. Lawrence with maritime traffic varying from 0.72 million tonnes to 0.84 million tonnes. Lastly, liquid bulk edible accounted for 1% of liquid bulk commodities and their traffic fluctuated between 130 000 tonnes to 180 000 tonnes from 1984 to 1988.

TABLE 17

MARITIME TRAFFIC AND LIQUID BULK TRAFFIC ON ST. LAWRENCE
1984 TO 1988 (millions of tonnes)

YEAR	CANADIAN MARITIME TRAFFIC	QUÉBEC MARITIME TRAFFIC	QMT/CMT	LIQUID BULK ON THE ST. LAWRENCE	LB/QMT	LB/CMT
	(CMT)	(QMT)	(%)	(LB)	(%)	(%)
1984	342,8	111,8	33%	17,97	16,1%	5,2%
1985	326,6	102,8	31%	14,71	14,3%	4,5%
1986	327,6	101,7	31%	15,28	15,0%	4,7%
1987	362,2	107,4	30%	16,51	15,4%	4,6%
1988	385,7	111,8	29%	18,81	16,8%	4,9%

LIQUID BULK ON THE ST. LAWRENCE						
YEAR	PETROLEUM PRODUCTS	PP/LB	CHEMICALS	C/LB	EDIBLE	E/LB
	(P.P.)	(%)	(C)	(%)	(P.A.)	(%)
1984	17,0	94,6%	0,84	4,7%	0,13	0,7%
1985	13,7	93,1%	0,84	5,7%	0,17	1,2%
1986	14,4	94,2%	0,72	4,7%	0,16	1,0%
1987	15,6	94,5%	0,73	4,4%	0,18	1,1%
1988	17,9	95,2%	0,76	4,0%	0,15	0,8%

SOURCES:- Canadian Coast Guard, and Ports of Bécancour, Montréal, Québec, Valleyfield

MINISTÈRE DES TRANSPORTS
CENTRE DE DOCUMENTATION
200, RUE DORCHESTER SUD, 7e
QUÉBEC, (QUÉBEC)
G1K 5Z1

CONCLUSION

Nearly 50 million tonnes of liquid bulk commodities were transported in Québec in 1988 by various means: 44% by water, 24% by road, 22% by pipeline and 10% by rail (Graph 17).

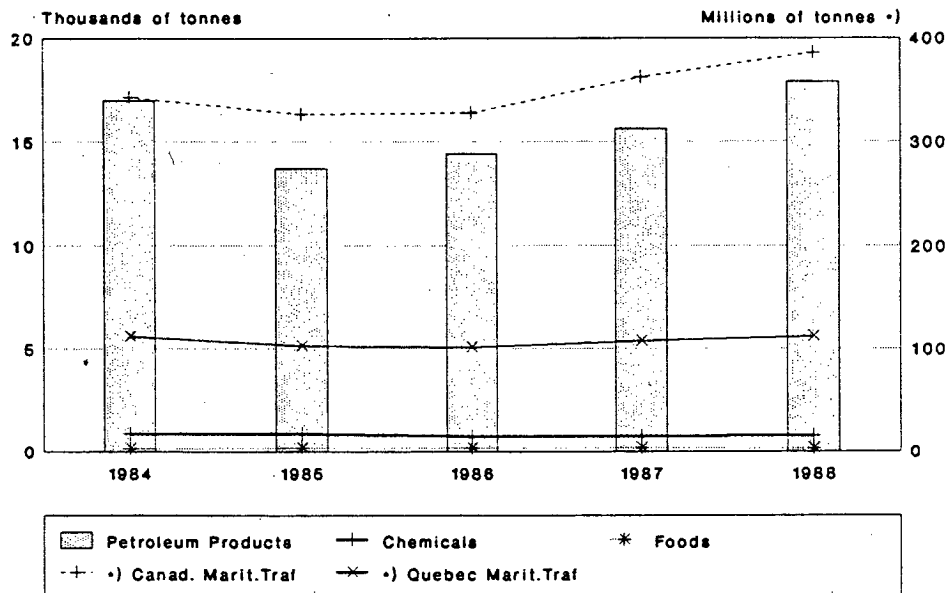
Transport by water was of major importance for this was the means used overwhelmingly to transport liquid bulk in Québec and its volume is almost equal to the volumes shipped by road and by pipeline combined.

	1988	
	<u>Millions of tonnes</u>	<u>%</u>
By water ¹	21.4	44
By road ²	11.4	24
By pipeline	10.9	22
By rail	4.8	10
	<hr/> 48.5	<hr/> 100%

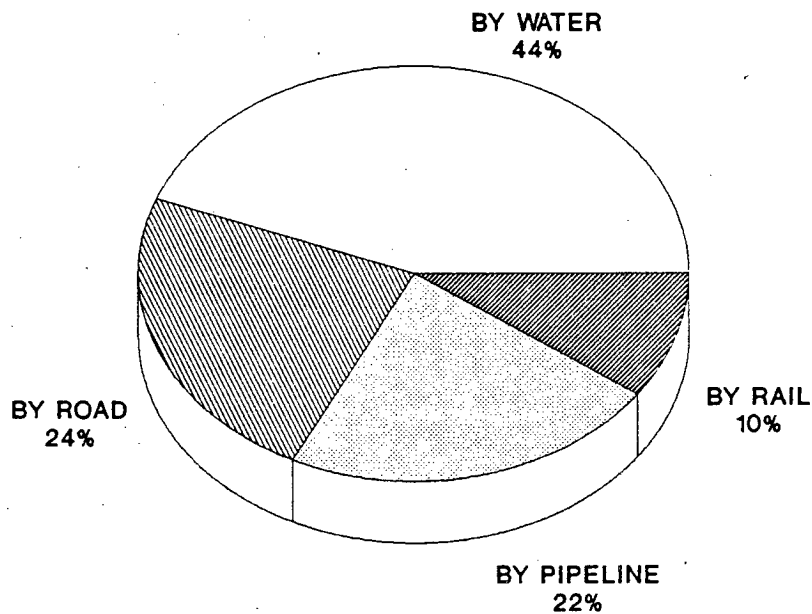
¹ St. Lawrence River and Seaway: M - LO section.

² 1985 data.

GRAPH 16
MARITIME TRAFFIC AND LIQUID BULK TRAFFIC
ON THE ST. LAWRENCE, 1984 TO 1988



GRAPH 17
MODAL BREAKDOWN OF THE TRANSPORT OF
LIQUID BULK COMMODITIES IN QUÉBEC, 1988



III - LIQUID BULK TRAFFIC ON THE ST. LAWRENCE RIVER, 1984 TO 1988

This chapter deals with the main liquid bulk commodities transported on the St. Lawrence and handled by ports in Québec from 1984 to 1988 inclusively.

Bulk petroleum products, chemicals and edible will be analysed successively in order of importance.

- TRAFFIC IN PETROLEUM PRODUCTS¹

Petroleum products are handled by some 30 Québec ports on the St. Lawrence, the Saguenay and the Baie-des-Chaleurs. From 1984 to 1988, these commodities accounted for all liquid bulk traffic in about 20 of the ports (tables 18 to 22).

However, six Québec ports--Montréal, Québec, Baie-Comeau, Baie des Ha! Ha!, Trois-Rivières and Gaspé (Sandy Beach)--handled liquid bulk other than petroleum products.

Some ports handled petroleum products only sporadically. This was particularly the case at Sorel in 1987 with 508 tonnes for the supply of a local plant, and at Rivière-du-Loup with 9893 tonnes in 1984, the last year in which petroleum products were supplied regionally by sea. Lastly, there was intermittent petroleum traffic in the small ports of the Basse-Côte-Nord.

¹ The statistics given in tables 18 to 23 inclusively are from the Canadian Coast Guard. They include all traffic involving petroleum products. The statistics provided by Ports Canada (Table 25 ff.) cover only crude oil, gasoline and fuel oil in the petroleum product category. The figures therefore differ from those of the Canadian Coast Guard.

MAP 6



TABLE 18

TRAFFIC IN PETROLEUM PRODUCTS AT ST. LAWRENCE PORTS, 1984
(tonnes)

TRAFFIC NAME OF PORT	TOTAL TRAFFIC (TT)	LIQUID BULK (LB)	LB/TT %	PETROLEUM PRODUCTS PP	PP/TT %	PP/LB %
SEPT-ÎLES	23 105 467	457 659	2,0%	457 659	2,0%	100,0%
MONTREAL	23 806 140	8 340 188	35,0%	8 128 801	34,1%	97,5%
PORT-CARTIER	21 801 053	142 325	0,7%	142 325	0,7%	100,0%
QUEBEC	17 724 000	6 921 000	39,0%	6 699 000	37,8%	96,8%
BAIE COMEAU	7 823 951	172 242	2,2%	151 299	1,9%	87,8%
SOREL	4 176 571	0	0,0%	0	0,0%	0,0%
BAIE DES HA!HA!	3 823 312	285 308	7,5%	285 308	7,5%	100,0%
TROIS-RIVIERES	3 197 079	235 683	7,4%	184 873	5,8%	78,4%
HAVRE ST-PIERRE	2 135 112	5 974	0,3%	5 974	0,3%	100,0%
MATANE	508 125	5 420	1,1%	5 420	1,1%	100,0%
CHICOUTIMI	414 573	315 196	76,0%	315 196	76,0%	100,0%
RIMOUSKI	396 218	363 465	91,7%	363 465	91,7%	100,0%
SANDY BEACH	162 530	158 835	97,7%	97 907	60,2%	61,6%
MONT-LOUIS	43 319	22 113	51,0%	22 113	51,0%	100,0%
CHANDLER	91 245	16 687	18,3%	16 687	18,3%	100,0%
NEW RICHMOND	50 622	50 622	100,0%	50 622	100,0%	100,0%
PORTNEUF	16 638	75	0,5%	75	0,5%	100,0%
PASPÉBIAC	14 732	14 732	100,0%	14 732	100,0%	100,0%
BLANC SABLON	15 537	7 488	48,2%	7 488	48,2%	100,0%
CAP A L'AIGLE	3 120	3 120	100,0%	3 120	100,0%	100,0%
ST-AUGUSTIN	4 281	2 266	52,9%	2 266	52,9%	100,0%
HARR HARBOUR	2 121	676	31,9%	676	31,9%	100,0%
JOHAN BEETZ	224	0	0,0%	0	0,0%	0,0%
TETE A LA BALEINE	851	112	13,2%	112	13,2%	100,0%
KÉGASKA	520	0	0,0%	0	0,0%	0,0%
LA TABATIERE	1 987	1 204	60,6%	1 204	60,6%	100,0%
LA ROMAINE	1 439	0	0,0%	0	0,0%	0,0%
RIVIERE-DU-LOUP	9 893	9 893	100,0%	9 893	100,0%	100,0%
TOTAL*	109 330 660	17 532 283	16,0%	16 966 215	15,5%	96,8%

Source : Canadian Coast Guard

*: Total traffic at the 28 ports that handled petroleum products.

TABLE 19

TRAFFIC IN PETROLEUM PRODUCTS AT ST.LAWRENCE PORTS, 1985
(tonnes)

TRAFFIC NAME OF PORT	TOTAL TRAFFIC (TT)	LIQUID BULK (LB)	LB/TT %	PETROLEUM PRODUCTS PP	PP/TT %	PP/LB %
SEPT-ILES	22 632 718	385 262	1,7%	385 262	1,7%	100,0%
MONTREAL	21 093 674	6 532 161	31,0%	6 255 109	29,7%	95,8%
PORT-CARTIER	21 690 994	N.D.	-	N.D.	-	-
QUEBEC	14 713 000	6 192 000	42,1%	6 019 000	40,9%	97,2%
BAIE COMEAU	6 309 126	180 469	2,9%	160 720	2,5%	89,1%
SOREL	4 719 829	0	0,0%	0	0,0%	0,0%
BAIE DES HA!HA!	3 282 887	116 118	3,5%	116 118	3,5%	100,0%
TROIS-RIVIERES	1 957 217	201 134	10,3%	146 360	7,5%	72,8%
HAVRE ST-PIERRE	2 586 579	6 343	0,2%	6 343	0,2%	100,0%
MATANE	462 144	5 514	1,2%	5 514	1,2%	100,0%
CHICOUTIMI	363 593	223 935	61,6%	223 935	61,6%	100,0%
RIMOUSKI	306 067	270 169	88,3%	270 169	88,3%	100,0%
SANDY BEACH	153 576	141 901	92,4%	43 774	28,5%	30,8%
MONT-LOUIS	103 859	6 742	6,5%	6 742	6,5%	100,0%
CHANDLER	61 218	7 466	12,2%	7 466	12,2%	100,0%
NEW RICHMOND	32 580	32 580	100,0%	32 580	100,0%	100,0%
PORTNEUF	26 255	0	0,0%	0	0,0%	0,0%
PASPÉBIAC	9 208	9 208	100,0%	9 208	100,0%	100,0%
BLANC SABLON	22 083	12 054	54,6%	12 054	54,6%	100,0%
CAP A L'AIGLE	0	0	0,0%	0	0,0%	0,0%
ST-AUGUSTIN	4 136	1 969	47,6%	1 969	47,6%	100,0%
HARR HARBOUR	1 944	543	27,9%	543	27,9%	100,0%
JOHAN BEETZ	401	91	22,7%	91	22,7%	100,0%
TETE A LA BALEINE	1 028	246	23,9%	246	23,9%	100,0%
KÉGASKA	545	0	0,0%	0	0,0%	0,0%
LA TABATIERE	N.D.	N.D.	-	N.D.	-	-
LA ROMAINE	N.D.	N.D.	-	N.D.	-	-
RIV-DU-LOUP	N.D.	N.D.	-	N.D.	-	-
TOTAL*	100 534 661	14 325 905	14,2%	13 703 203	13,6%	95,7%

Source : Canadian Coast Guard

*: Total traffic at the 28 ports that handled petroleum products.

TABLE 20

TRAFFIC IN PETROLEUM PRODUCTS AT ST.LAWRENCE PORTS, 1986
(tonnes)

TRAFFIC NAME OF PORT	TOTAL TRAFFIC (TT)	LIQUID BULK (LB)	LB/TT %	PETROLEUM PRODUCTS PP	PP/TT %	PP/LB %
SEPT-ILES	23 130 865	474 062	2,0%	474 062	2,0%	100,0%
MONTREAL	21 597 640	6 229 481	28,8%	5 996 487	27,8%	96,3%
PORT-CARTIER	19 848 377	N.D.	-	N.D.	-	-
QUEBEC	12 527 000	7 044 000	56,2%	6 891 000	55,0%	97,8%
BAIE COMEAU	7 414 288	146 665	2,0%	118 496	1,6%	80,8%
SOREL	6 129 789	0	0,0%	0	0,0%	0,0%
BAIE DES HA!HA!	3 430 680	101 430	3,0%	101 430	3,0%	100,0%
TROIS-RIVIERES	2 785 310	224 293	8,1%	178 826	6,4%	79,7%
HAVRE ST-PIERRE	2 763 841	1 384	0,1%	1 384	0,1%	100,0%
MATANE	521 375	1 885	0,4%	1 885	0,4%	100,0%
CHICOUTIMI	481 724	207 471	43,1%	207 471	43,1%	100,0%
RIMOUSKI	343 866	291 250	71,9%	291 250	84,7%	100,0%
SANDY BEACH	231 005	178 975	77,5%	45 971	19,9%	25,7%
MONT-LOUIS	130 722	24 250	18,6%	24 250	18,6%	100,0%
CHANDLER	56 404	13 350	23,7%	13 350	23,7%	100,0%
NEW RICHMOND	48 510	48 510	100,0%	48 510	100,0%	100,0%
PORTNEUF	23 984	211	0,9%	211	0,9%	100,0%
PASPÉBIAC	16 330	16 330	100,0%	16 330	100,0%	100,0%
BLANC SABLON	12 816	6 371	49,7%	6 371	49,7%	100,0%
CAP A L'AIGLE	4 676	4 676	100,0%	4 676	100,0%	100,0%
ST-AUGUSTIN	3 544	1 848	52,1%	1 848	52,1%	100,0%
HARR HARBOUR	2 149	780	36,3%	780	36,3%	100,0%
JOHAN BEETZ	2 081	0	0,0%	0	0,0%	0,0%
TETE A LA BALEINE	699	176	25,2%	176	25,2%	100,0%
KÉGASKA	514	5	1,0%	5	1,0%	100,0%
LA TABATIERE	N.D	N.D	-	0	-	-
LA ROMAINE	N.D	N.D	-	0	-	-
RIV-DU-LOUP	N.D	N.D	-	0	-	-
TOTAL*	101 508 189	15 017 403	14,8%	14 424 769	14,2%	96,1%

Source : Canadian Coast Guard

*: Total traffic at the 28 ports that handled petroleum products.

TABLE 21

TRAFFIC IN PETROLEUM PRODUCTS AT ST. LAWRENCE PORTS, 1987
(tonnes)

TRAFFIC NAME OF PORT	TOTAL TRAFFIC (TT)	LIQUID BULK (LB)	LB/TT %	PETROLEUM PRODUCTS PP	PP/TT %	PP/LB %
SEPT-ÎLES	19 343 339	375 413	1,9%	375 413	1,9%	100,0%
MONTREAL	21 866 747	6 634 016	30,3%	6 355 330	29,1%	95,8%
PORT-CARTIER	23 193 375	125 852	0,5%	125 852	0,5%	100,0%
QUEBEC	18 323 000	7 717 000	42,1%	7 604 000	41,5%	98,5%
BAIE COMEAU	5 510 283	152 716	2,8%	125 977	2,3%	82,5%
SOREL	5 867 850	508	0,009%	508	0,009%	100,0%
BAIE DES HA!HA!	3 286 904	113 369	3,4%	113 369	3,4%	100,0%
TROIS-RIVIERES	2 209 065	196 143	8,9%	120 060	5,4%	61,2%
HAVRE ST-PIERRE	2 551 359	581	0,0%	581	0,0%	100,0%
MATANE	581 029	2 938	0,5%	2 938	0,5%	100,0%
CHICOUTIMI	433 778	211 312	48,7%	211 312	48,7%	100,0%
RIMOUSKI	313 063	285 141	91,1%	285 141	91,1%	100,0%
SANDY BEACH	267 698	185 405	69,3%	54 135	20,2%	29,2%
MONT-LOUIS	147 065	40 847	27,8%	40 847	27,8%	100,0%
CHANDLER	65 321	15 294	23,4%	15 294	23,4%	100,0%
NEW RICHMOND	58 035	58 035	100,0%	58 035	100,0%	100,0%
PORTNEUF	22 425	46	0,2%	46	0,2%	100,0%
PASPÉBIAC	10 644	10 644	100,0%	10 644	100,0%	100,0%
BLANC SABLON	20 284	12 064	59,5%	12 064	59,5%	100,0%
CAP A L'AIGLE	4 091	4 091	100,0%	4 091	100,0%	100,0%
ST-AUGUSTIN	3 752	2 253	60,0%	2 253	60,0%	100,0%
HARR HARBOUR	1 482	578	39,0%	578	39,0%	100,0%
JOHAN BEETZ	521	219	42,0%	219	42,0%	100,0%
TETE A LA BALEINE	618	148	23,9%	148	23,9%	100,0%
KÉGASKA	N.D	N.D	-	N.D	-	-
LA TABATIERE	9 342	2 790	29,9%	2 790	29,9%	100,0%
LA ROMAINE	2 971	1 840	61,9%	1 840	61,9%	100,0%
RIV-DU-LOUP	N.D	N.D	-	N.D	-	-
TOTAL*	104 094 041	16 149 243	15,5%	15 523 465	14,9%	96,1%

Source : Canadian Coast Guard

*: Total traffic at the 28 ports that handled petroleum products.

TABLE 22

TRAFFIC IN PETROLEUM PRODUCTS AT ST.LAWRENCE PORTS, 1988
(tonnes)

TRAFFIC NAME OF PORT	TOTAL TRAFFIC (TT)	LIQUID BULK (LB)	LB/TT %	PETROLEUM PRODUCTS PP	PP/TT %	PP/LB %
SEPT-ÎLES	23 370 237	469 494	2,0%	469 494	2,0%	100,0%
MONTRÉAL	22 239 413	7 860 974	35,3%	7 615 906	34,2%	96,9%
PORT-CARTIER	22 600 145	148 411	0,7%	148 411	0,7%	100,0%
QUÉBEC	18 217 000	8 695 000	47,7%	8 519 000	46,8%	98,0%
BAIE COMEAU	6 928 022	143 214	2,1%	106 644	1,5%	74,5%
SOREL	5 265 105	0	0,0%	0	0,0%	0,0%
BAIE DES HA!HA!	3 848 945	351 274	9,1%	200 192	5,2%	57,0%
TROIS-RIVIERES	1 983 756	221 436	11,2%	160 357	8,1%	72,4%
HAVRE ST-PIERRE	2 699 638	4 443	0,2%	4 443	0,2%	100,0%
MATANE	567 714	17 337	3,1%	17 337	3,1%	100,0%
CHICOUTIMI	486 966	222 153	45,6%	222 153	45,6%	100,0%
RIMOUSKI	305 587	264 559	86,6%	264 559	86,6%	100,0%
SANDY BEACH	267 656	185 242	69,2%	55 843	20,9%	30,1%
MONT-LOUIS	125 415	36 000	28,7%	36 000	28,7%	100,0%
CHANDLER	81 178	29 683	36,6%	29 683	36,6%	100,0%
NEW RICHMOND	39 420	39 420	100,0%	39 420	100,0%	100,0%
PORTNEUF	781	0	0,0%	0	0,0%	0,0%
PASPÉBIAC	14 000	14 000	100,0%	14 000	100,0%	100,0%
BLANC SABLON	12 040	6 797	56,5%	6 797	56,5%	100,0%
CAP A L'AIGLE	3 088	3 088	100,0%	3 088	100,0%	100,0%
ST-AUGUSTIN	3 977	2 469	62,1%	2 469	62,1%	100,0%
HARR HARBOUR	2 398	1 171	48,8%	1 171	48,8%	100,0%
JOHAN BEETZ	993	250	25,2%	250	25,2%	100,0%
TETE A LA BALEINE	648	190	29,3%	190	29,3%	100,0%
KÉGASKA	752	6	0,8%	6	0,8%	100,0%
LA TABATIERE	7 334	4 360	59,4%	4 360	59,4%	100,0%
LA ROMAINE	258	0	0,0%	0	0,0%	0,0%
RIVIERE-DU-LOUP	N.D	N.D	-	N.D	-	-
TOTAL*	109 072 466	18 720 971	17,2%	17 921 773	16,4%	95,7%

Source : Canadian Coast Guard

*: Total traffic at the 28 ports that handled petroleum products

Petroleum product traffic through St. Lawrence ports was concentrated at two major ports, Montréal and Québec, which accounted for almost 90% of maritime traffic in petroleum products on the St. Lawrence (Table 23, Graph 18). Obviously, the fact that refineries are located near the port facilities is relevant to the polarization of the petroleum traffic at these two points.

Montréal was the St. Lawrence's foremost port for the handling of petroleum products in 1984 and 1985, with volumes of 8.1 million tonnes and 6.2 million tonnes respectively. The Port of Québec was close behind and actually supplanted Montréal, beginning in 1986, as the main port for the handling of petroleum products on the River, a position it preserved with volumes of from 6.8 million tonnes to 8.5 million tonnes (Table 23, Graph 18).

Seven other ports--Sept-Îles, Rimouski, Chicoutimi, Baie des Ha! Ha!, Trois-Rivières, Baie-Comeau and Port-Cartier--handled between 100 000 tonnes and 500 000 tonnes of petroleum products a year. Their combined volume accounted for about 10% of the total petroleum product tonnage on the St. Lawrence, the share of each varying from 1% to 2% of the total. Only Sept-Îles' share exceeded 2% of the total (Table 24 and graphs 19 and 20).

At five other ports, petroleum traffic was between 10 000 and 55 000 tonnes in 1988. These ports are located in Gaspésie and on the Baie des Chaleurs. They are, in order of importance, Gaspé (Sandy Beach), New-Richmond, Mont-Louis, Chandler and Paspébiac (Table 23). The remaining ports were characterized by minor traffic in petroleum products, below 10 000 tonnes a year. They accounted for only a tiny proportion of the maritime traffic in petroleum products recorded at St. Lawrence ports (Table 23).

A survey follows of the traffic in petroleum products from 1984 to 1988 at St. Lawrence ports in order of importance. The main origins and destinations of the traffic for the year 1988 are indicated.

TABLE 23

TRAFFIC IN PETROLEUM PRODUCTS AT THE MAIN ST.LAWRENCE PORTS, 1984 TO 1988
(tonnes)

YEAR	1984		1985		1986		1987		1988	
PETROLEUM PRO NAME OF PORT	PP	PP/T %	PP	PP/T %	PP	PP/T %	PP	PP/T %	PP	PP/T %
MONTRÉAL	8 128 801	47,9%	6 255 109	45,6%	5 996 487	41,6%	6 355 329	40,9%	7 615 906	42,5%
QUÉBEC	6 699 000	39,5%	6 019 000	43,9%	6 891 000	47,8%	7 604 000	49,0%	8 519 000	47,5%
TOTAL	14 827 801	87,4%	12 274 109	89,6%	12 887 487	89,3%	13 959 329	89,9%	16 134 906	90,0%
SEPT-ILES	457 659	2,7%	385 262	2,8%	474 062	3,3%	375 413	2,4%	469 494	2,6%
RIMOUSKI	363 465	2,1%	270 169	1,6%	291 250	1,7%	285 141	1,7%	264 559	1,6%
CHICOUTIMI	315 196	1,9%	223 935	1,6%	207 471	1,4%	211 312	1,4%	222 153	1,2%
BAIE DES HAIHAI	285 308	1,7%	116 118	0,8%	101 430	0,7%	113 369	0,7%	200 192	1,1%
TROIS-RIVIERES	184 873	1,1%	146 360	1,1%	178 826	1,2%	120 060	0,8%	160 357	0,9%
BAIE-COMEAU	151 299	0,9%	160 720	1,2%	118 496	0,8%	125 977	0,8%	106 644	0,6%
PORT-CARTIER	142 325	0,8%	N.D	0,0%	N.D	0,0%	125 852	0,8%	148 411	0,8%
TOTAL	1 900 125	11,2%	1 302 564	9,1%	1 371 535	9,2%	1 357 124	8,6%	1 571 810	8,9%
SANDY BEACH	97 907	0,6%	43 774	0,3%	45 971	0,3%	54 135	0,3%	55 843	0,3%
NEW RICHMOND	50 622	0,3%	32 580	0,2%	48 510	0,3%	58 035	0,4%	39 420	0,2%
MONT-LOUIS	22 113	0,1%	6 742	0,0%	24 250	0,2%	40 847	0,3%	36 000	0,2%
CHANDLER	16 687	0,1%	7 466	0,1%	13 350	0,1%	15 294	0,1%	29 683	0,2%
PASPEBIAC	14 732	0,1%	9 208	0,1%	16 330	0,1%	10 644	0,1%	14 000	0,1%
TOTAL	202 061	1,2%	99 770	0,7%	148 411	1,0%	178 955	1,2%	174 946	1,0%
RIV-DU-LOUP	9 893	0,1%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
BLANC-SABLON	7 488	0,04%	12 054	0,09%	6 371	0,04%	12 064	0,08%	6 797	0,04%
HAV.ST-PIERRE	5 974	0,04%	6 343	0,05%	1 384	0,01%	581	0,00%	4 443	0,02%
MATANE	5 420	0,03%	5 514	0,04%	1 885	0,01%	2 938	0,02%	17 337	0,10%
CAP A L'AIGLE	3 120	0,02%	0	0,00%	4 676	0,03%	4 091	0,03%	3 088	0,02%
ST-AUGUSTIN	2 266	0,01%	1 969	0,01%	1 848	0,01%	2 253	0,01%	2 469	0,01%
LA TABATIERE	1 204	0,01%	0	0,00%	0	0,00%	2 790	0,02%	4 360	0,02%
HARR HARBOUR	676	0,004%	543	0,004%	780	0,005%	578	0,004%	1 171	0,007%
TETE BALEINE	112	0,001%	246	0,002%	176	0,001%	148	0,001%	190	0,001%
PORTNEUF	75 *		0	0,0%	211	0,001%	46 *		0	0,0%
KÉGASKA	0	0,0%	0	0,0%	5 *		0	0,0%	6 *	
JOHAN BEETZ	0	0,0%	91 *		0	0,0%	219	0,001%	250	0,001%
LA ROMAINE	0	0,0%	0	0,0%	0	0,0%	1 840	0,012%	0	0,0%
SOREL	0	0,0%	0	0,0%	0	0,0%	508	0,003%	0	0,0%
TOTAL	36 228	0,2%	26 760	0,2%	17 336	0,1%	28 056	0,2%	40 111	0,2%
GENERAL TOTAL	16 966 215	100,0%	13 703 203	100,0%	14 424 769	100,0%	15 523 464	100,0%	17 921 773	100,0%
% *	100,0%		80,8%		85,0%		91,5%		105,6%	

Source: Canadian Coast Guard

% *: 1984=100%

*:Traffic too light to represent a significant percentage

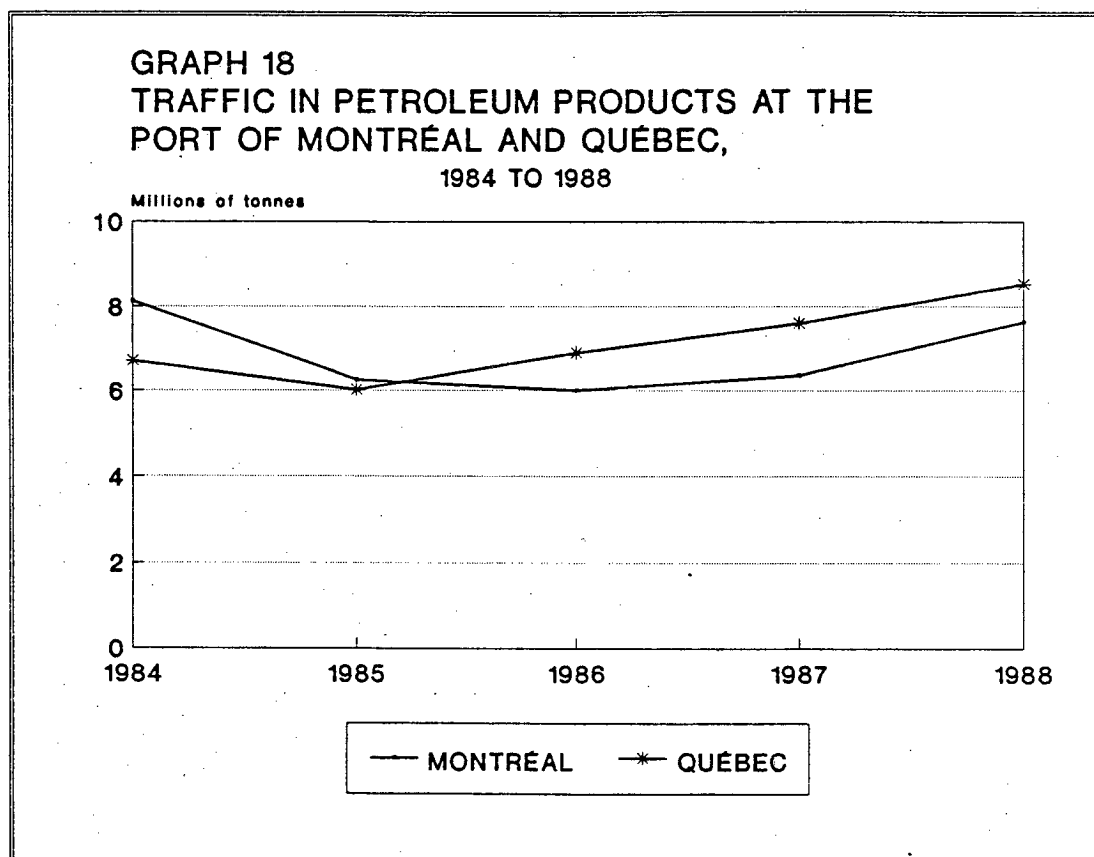
Note: The statistics in this table include all petroleum traffic recorded at St. Lawrence ports from 1984 to 1988, whereas the table illustrating the statistics for petroleum products in the ports of the Ports Canada system located in Québec, i.e. Montréal, Québec, Sept-Îles, Trois-Rivières, Chicoutimi/Baie des Ha! Ha!, include only crude oil, gasoline and fuel oil. There are therefore differences between those figures and the totals given here.

TABLE 24

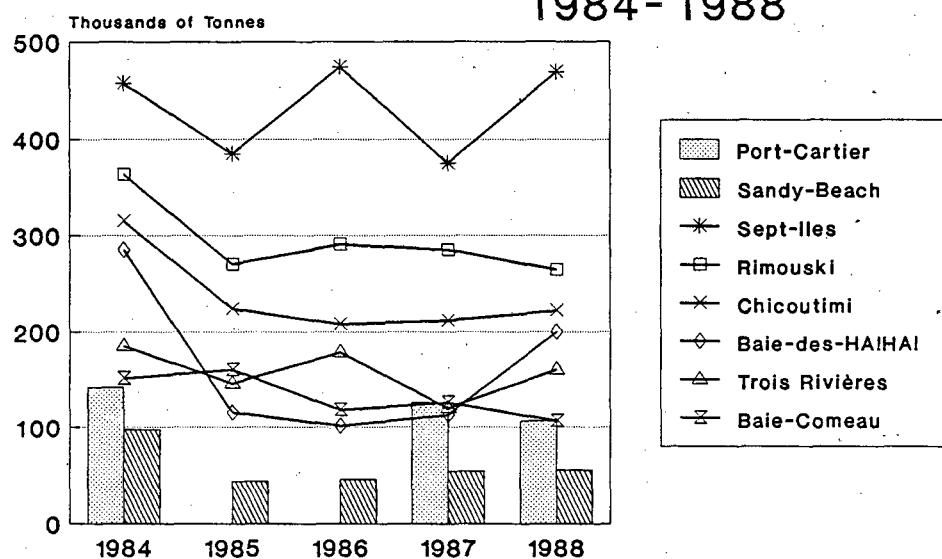
TRAFFIC IN PETROLEUM PRODUCTS AT THE 10 MAIN PORTS IN QUÉBEC, 1984 TO 1988
(tonnes)

YEAR	1984	%	1985	%	1986	%	1987	%	1988	%
MONTREAL	8 128 801	47,9%	6 255 209	45,6%	5 996 487	41,6%	6 355 330	40,9%	7 515 906	41,9%
QUEBEC	6 699 000	39,5%	6 019 000	43,9%	6 891 000	47,8%	7 604 000	49,0%	8 519 000	47,5%
SEPT-ILES	457 659	2,7%	385 262	2,8%	474 062	3,3%	375 413	2,4%	469 494	2,6%
RIMOUSKI	363 465	2,1%	270 169	2,0%	291 250	2,0%	285 141	1,8%	264 559	1,5%
CHICOUTIMI	315 196	1,9%	223 935	1,6%	207 471	1,4%	211 312	1,4%	222 153	1,2%
BAIE DES HAIHAI	285 308	1,7%	116 118	0,8%	101 430	0,7%	113 369	0,7%	200 192	1,1%
TROIS-RIVIERES	184 873	1,1%	146 360	1,1%	178 826	1,2%	120 060	0,8%	160 357	0,9%
BAIE-COMEAU	151 299	0,9%	160 720	1,2%	118 496	0,8%	125 977	0,8%	106 644	0,6%
PORT-CARTIER	142 325	0,8%	N.D.		N.D.		125 852	0,8%	148 411	0,8%
SANDY BEACH	97 907	0,6%	43 774	0,3%	45 971	0,3%	54 135	0,3%	55 843	0,3%
TOTAL FOR THE 10 PORT	16 825 833	99,2%	13 620 547	99,4%	14 304 993	99,2%	15 370 589	99,0%	17 662 559	98,6%
TOTAL PETROLEUM										
PRODUCT IN QUEBEC	16 966 215	100,0%	13 703 203	100,0%	14 424 769	100,0%	15 523 465	100,0%	17 921 773	100,0%

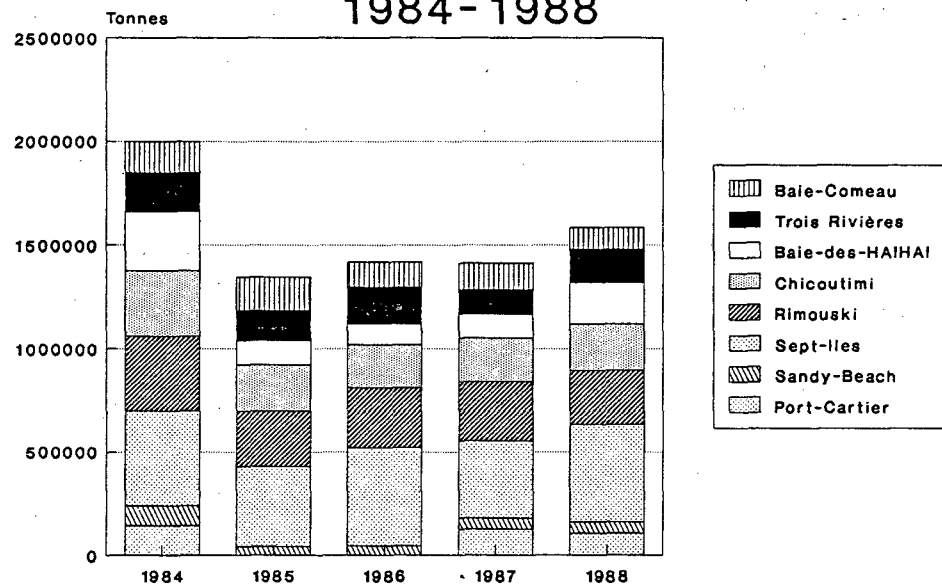
NOTE: The totals do not include 1985 and 1986 data for Port-Cartier, which is unavailable.



GRAPH 19
TRAFFIC IN PETROLEUM PRODUCTS
(50000-500000 T) AT ST.LAWRENCE PORTS
1984-1988



GRAPH 20
BREAKDOWN OF TRAF. IN PETROLEUM PRODUCTS
(50000-500000 T.) AT ST.LAWRENCE PORTS
1984-1988



- PORTS HANDLING PETROLEUM PRODUCTS

The Port of Montréal

The Port of Montréal enjoys an exceptional geographical location. Situated 1600 km from the Atlantic Ocean, it is the maritime terminus of open water navigation on the St. Lawrence. It also stands at the head of the St. Lawrence Seaway, which carries traffic from the shipping channel at the Jacques Cartier bridge to the Great Lakes, and the heartland of America.

Montréal is in addition one of the main oil refinery centres in Eastern Canada, although there were extensive upsets in this sector between 1982 and 1985, when the closing of four refineries reduced, in one fell swoop, its refining capacity by 40%. The refineries now in operation receive large shipments of crude oil, conveyed mainly by pipeline, from Western Canada by the Montréal-Sarnia Pipeline, and, in lesser quantities, by the Portland-Montréal Pipeline. Furthermore, shipment by pipeline deprives the Port of Montréal of extensive maritime deliveries of petroleum products.

The total traffic at the Port of Montréal reached a high of 24.9 million tonnes in 1980, which was almost equalled the following year. Since that time, the total annual traffic at the port has varied between 20 and 22 million tonnes, but 23.8 million tonnes were recorded in 1984.

The traffic in dry and liquid bulk, which represented 80% of the port's activity at the beginning of the decade, fell to 69% in 1987 and 1988, amounting to a loss of 5 million tonnes between 1980 and 1988. The traffic in dry bulk gradually fell to 7.4 million tonnes in 1988 after reaching 12.7 million tonnes in 1980. The cumulative drop in traffic in this category of commodities to relative stability with liquid bulk resulted in almost perfect balance

between dry and liquid bulk, i.e. 51% (7.8 million tonnes) against 49% (7.4 million tonnes). The balance of Montréal's port traffic is made up of various kinds of commodities, amounting to close to 7 million tonnes in 1988; 5.7 million tonnes of this mixed cargo were containerized (Table 25, Graph 21).

Oil products make up by far the largest part of the traffic in liquid bulk at the Port of Montréal, representing 85% of products in this category. However, their importance declined by 5% between 1980 and 1988, although the traffic in these products in 1988 settled at the same level as in 1980, i.e. 6.6 million tonnes.

Crude oil played a very small part in the maritime petroleum flow in 1988--0.15 million tonnes incoming and 1.5 million tonnes outgoing--most of which went to the United States, Québec and Nova Scotia. However, the level of the crude oil traffic in 1983 and 1984 was close to 3 million tonnes. This traffic dropped considerably between 1985 and 1987, before settling at 1.5 million tonnes in 1988. This can be explained by the implementation of a federal program of subsidies for Atlantic refineries for the use of crude oil from Alberta. Had it not been for this program of assistance, the decrease in the petroleum traffic at the Port of Montréal would have been much greater because of the closing of the refineries in Montréal. In 1988, imports of crude oil brought this traffic up to 1.5 million tonnes. Apart from this exceptional circumstance, the movements of petroleum products are essentially in refined products or petrochemical bases, the traffic in which declined following the oil crisis of the first half of the 1980s.

The movement of gasoline reached 1.6 million tonnes in 1988, 1.3 million incoming and 0.3 million outgoing. Half of the incoming shipments (0.6 million tonnes) were made up of gas deliveries from the Ultramar refinery in Québec City. The other half came mainly from Europe (the Netherlands and Italy), but from Venezuela and

TABLE 25

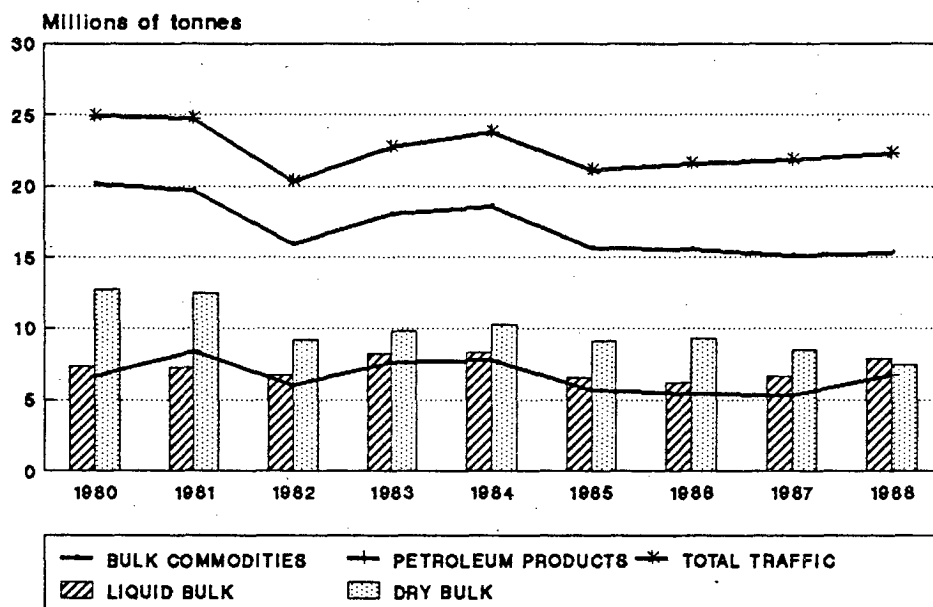
BULK COMMODITY TRAFFIC AT THE PORT OF MONTRÉAL, 1980 TO 1988

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988
MONTREAL									
TOTAL (thousands of tonnes)	24 898	24 795	20 333	22 737	23 806	21 094	21 597	21 867	22 239
BULK COMMODITIES (BC)	20 130	19 675	15 925	18 024	18 571	15 654	15 531	15 144	15 290
TOTAL BC (%)	80,8%	79,4%	78,3%	79,3%	78,0%	74,2%	71,9%	69,3%	68,8%
LIQUID BULK (LB)	7 385	7 216	6 752	8 237	8 340	6 532	6 229	6 634	7 861
LB/BC (%)	36,7%	36,7%	42,4%	45,7%	44,9%	41,7%	40,1%	43,8%	51,4%
DRY BULK (DB)	12 745	12 458	9 173	9 786	10 231	9 122	9 302	8 510	7 429
DB/BC (%)	63,3%	63,3%	57,6%	54,3%	55,1%	58,3%	59,9%	56,2%	48,6%
TOTAL PETROLEUM PRODUCTS (PP)	6 642	6 386	6 041	7 650	7 780	5 659	5 360	5 311	6 694
PP/LB (%)	89,9%	88,5%	89,5%	92,9%	93,3%	86,6%	86,0%	80,1%	85,2%
CRUDE OIL	502	175	1 315	2 866	2 911	1 644	1 109	554	1 542
GASOLINE	1 693	1 631	1 249	1 393	1 174	1 199	1 383	1 595	1 634
FUEL OIL	4 447	4 580	3 477	3 391	3 695	2 816	2 868	3 162	3 518

SOURCES: PORTS CANADA AND THE PORT OF MONTRÉAL

NOTE: See note to table 23

GRAPH 21
COMMODITY TRAFFIC AT THE PORT OF
MONTRÉAL, 1980 TO 1988



Brazil as well. Finally, there was some minor traffic from the Maritimes and Ontario.

The principal destination of gasoline leaving the Port of Montréal by ship was the Port of Québec (0.16 million tonnes), followed in order of importance by Ontario, the United States, the Maritime Provinces and the Northwest Territories.

Fuel oil remained the main oil product handled at the Port of Montréal, with 3.5 million tonnes in 1988, 2.5 million of it incoming and 1 million outgoing. Deliveries came mainly from Québec City (1 million tonnes), various countries of Europe (600 000 tonnes), South America and the Caribbean (350 000 tonnes), the United States (250 000 tonnes) and Ontario and the Maritimes.

Exports of fuel oil and gasoline were similar in volume, the largest portion going to Québec City (0.5 million tonnes), and the rest to Ontario, the Maritimes and the Northwest Territories.

Finally, petroleum products accounted for nearly 0.5 million tonnes, 0.2 million from Venezuela and 0.1 million from Ontario.

The Tracy power plant in the area of the Port of Montréal has a wharf accommodating a draft of 10.7 metres. This supplementary electricity production plant came on line in 1988, only because of the lack of water to supply Hydro-Québec's network of dams. The plant normally produces 300 to 400 megawatts when it is in operation. In 1988, a total of 93 000 tonnes of fuel oil was delivered by ships chartered by Esso, Shell, Ultramar and Petro-Canada. The fuel oil used at the Tracy power plant comes mainly from Montréal, Nanticoke, Venezuela, Peru, the Mediterranean and the North Sea.

The Shell refinery in Montréal has a production capacity comparable to that of Ultramar in Saint-Romuald, i.e. some 115 000 barrels per day. Crude oil comes mainly by pipeline (88%, 46% by the Inter-Provincial Pipe Line and 42% by the Portland pipeline), but also by ship (12%). The ships are chartered on the spot market and their cargoes come from all over the world. Truck and rail are used to ship 50 % of the refined products, while the proportion shipped by pipeline is 33% and by ship, 17%. Maritime transport represents 15% of all supply and distribution activities at this refinery.

The Petro-Canada refinery in east end Montréal now produces 84 000 barrels a day, which is 99% of its maximum capacity. In 1988 it received over 25 million barrels of crude oil, 70% via the Sarnia-Montréal pipeline, 25% via the Portland pipeline, close to 4% by ship and the rest by local pipelines. The main loading points for crude oil are the North Sea, Venezuela and Canada (Northwest Territories). Jahre Anders (Norway), Amoco Transport (Chicago) and Irving Oil (Kent Lines) bring crude oil to Montréal. In 1988 Petro-Canada shipped close to 30 million barrels of refined products, 38% of them by pipeline, 3.4% by rail, 9.9% by ship and 48.7% by road.

The Port of Québec

Port traffic at Québec City developed gradually. Total traffic was 3.9 million tonnes in 1960, rising to 6 million in 1965 and to 8 million in 1970. The opening of the refinery at Saint-Romuald pushed traffic up to 15.1 million tonnes in 1973. Between 1977 and 1984, traffic remained above 15 million tonnes, reaching over 17 million in 1980, 1982 and 1984, and 18 million in 1981, a performance repeated in 1987 and 1988. The very low figure of 12.3 million tonnes in 1986 can be explained by an unrelated phenomenon, a labour dispute which ended in a lock-out lasting from September 1986 to February 1987. With the return to normal activities, total traffic at the port rose to 18.2 million tonnes in 1988.

The traffic structure at the Port of Québec is strongly dominated by bulk commodities (Table 26, Graph 22), which accounted for 98% of port activities in 1988, a level which had been maintained since 1980, within a margin of 1% or 2%. As was the case in Montréal, bulk merchandise was fairly evenly divided between liquid products and dry products, i.e. 49% and 51% respectively. Bulk solids dropped slightly after 1980 to reach a level of 9.1 million tonnes in 1988. Bulk liquids, stable in the early 1980s, gradually increased after 1984 to reach 8.7 million tonnes in 1988.

Petroleum products constituted virtually the total of bulk liquids, 96% in 1988, with crude oil standing at 5 million tonnes, fuel oil at 2.3 million tonnes and gasoline at 1 million tonnes.

The traffic in oil products at the Port of Québec increased following the coming on line in 1971 of the refinery at Saint-Romuald on the south shore of the St. Lawrence, across from Anse au Foulon. Ultramar, formerly Golden Eagle, increased its refining capacity in 1983 by installing a cat cracker unit. This addition resulted in a doubling of the gasoline production capacity of the refinery, which originally concentrated on the production of fuel oil, the market in which has since dropped considerably.

Unlike the Montréal refineries that receive their crude oil via the Sarnia and Portland pipelines, the Ultramar refinery receives its crude supplies entirely by ship. It has a wharf on the river and vessels in the 150 000 DWT (deadweight tonnes) class, drawing 16.76 metres, can unload on the exterior side, while ships carrying refined products, with a draft of 10.7 metres, can reach the interior shipping station on the other side of the wharf. Six pipelines 3.6 km long connect the wharf to the storage area located on a higher level on the south shore. The production capacity of the Ultramar refinery is about 115 000 barrels a day or 42 million barrels a year.

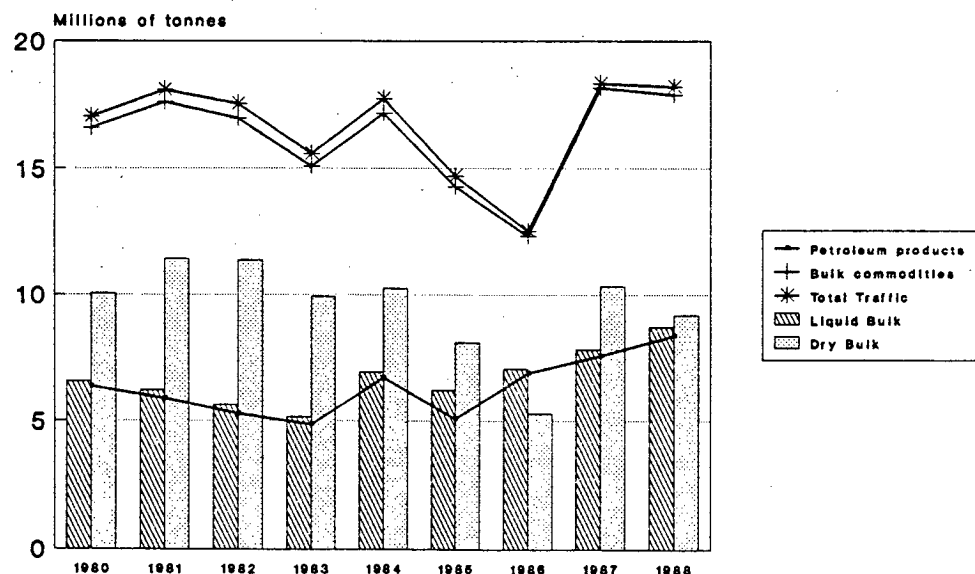
TABLE 26

BULK COMMODITY TRAFFIC AT THE PORT OF QUÉBEC, 1980 TO 1988

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988
QUEBEC									
TOTAL (thousands of tonnes)	17 027	18 075	17 526	15 571	17 723	14 713	12 527	18 320	18 216
BULK COMMODITIES (BC)	16 595	17 609	16 977	15 072	17 153	14 275	12 321	18 147	17 875
TOTAL BC (%)	97,5%	97,4%	96,9%	96,8%	96,8%	97,0%	98,4%	99,1%	98,1%
LIQUID BULK (LB)	6 542	6 201	5 625	5 152	6 922	6 191	7 044	7 816	8 695
LB/BC (%)	39,4%	35,2%	33,1%	34,2%	40,4%	43,4%	57,2%	43,1%	48,6%
DRY BULK (DB)	10 053	11 408	11 353	9 920	10 232	8 083	5 277	10 331	9 180
DB/BC (%)	60,6%	64,8%	66,9%	65,8%	59,7%	56,6%	42,8%	56,9%	51,4%
TOTAL PETROLEUM PRODUCTS (PP)	6 353	5 875	5 293	4 874	6 691	5 975	6 872	7 578	8 360
PP/LB (%)	97,1%	94,7%	94,1%	94,6%	96,7%	96,5%	97,6%	97,0%	96,1%
CRUDE OIL	3 438	3 008	2 852	2 859	3 752	3 262	4 056	4 845	5 053
GASOLINE	856	869	730	641	1 089	901	985	987	1 009
FUEL OIL	2 059	1 998	1 711	1 374	1 850	1 812	1 831	1 746	2 298

SOURCES: PORTS CANADA AND THE PORT OF QUEBEC

GRAPH 22
COMMODITY TRAFFIC AT THE PORT OF
QUÉBEC, 1980 TO 1988



There are two other locations where companies specialize in the transit of bulk liquids in the Port of Québec area.

First on the Beauport flats, where there is a terrace of 87 ha. with a 1060 metres docking facility, furnished with five wharves three of which are reserved for the transshipment of bulk liquids. The depth of the water at low tide varies from 11.2 metres to 15.3 metres. Here the Intertank company receives and stores bulk liquid petroleum, chemical and food products. Some oil companies also have storage tanks here for petroleum products, Petro-Canada and Olco in particular.

The other part of the Port of Québec where liquid bulk is handled is Anse au Foulon, situated on the north shore across from the Ultramar refinery at Saint-Romuald. Wharves 107 and 108 can accommodate a draft of 11.3 metres and are used to meet the marine requirements of oil companies. The third wharf, number 109, gives access to the ships of Irving Oil Inc. The depth available at this wharf is 12.8 metres.

Incoming crude oil shipments, which varied between 3 and 4 million tonnes between 1980 and 1986, reached 5 million tonnes in 1987 and even exceeded this figure in 1988. These movements in crude oil engendered significant increases in refined products. The traffic related to fuel oil, for example, remained below 2 million tonnes from 1981 to 1987 but increased to 2.3 million tonnes in 1988, while traffic related to gasoline rose slowly after 1982, with major setbacks in 1982 and especially in 1983, to reach a peak of 1 million tonnes in 1988, a peak reached once before, in 1984 (Table 26).

In 1988, 5 million tonnes of crude oil arrived at the Port of Québec, 85% of it from Great Britain (North Sea) and 7% from Venezuela; the remainder came from the Middle East, Africa and the

Canadian West. An Ultramar subsidiary, Agence des pétroliers océaniques, is the Saint-Romuald refinery's regular supplier of crude oil.

The Port of Québec ships some 1.5 million tonnes of fuel oil to the main ports of Québec, and receives supplies from the Irving refinery in Saint John, New Brunswick. Gasoline traffic is made up of domestic shipments to the main ports of Québec (0.9 million tonnes) and arrivals from Saint John (N.B.) and the Port of Montréal for the regional needs of the distributor Olco.

Fuel oil accounted for 60% of the grand total of national oil shipments from the Port of Québec in 1988, gasoline, 33%, and other petroleum products, 7%. When we analysed the geographic distribution of petroleum product shipments loaded at the Port of Québec in 1988, we found that 85% were destined for other Québec ports, 7% for New Brunswick, 3% for Ontario, 2% for Newfoundland, 2% for Nova Scotia and 1% for Prince Edward Island.

The Texaco company, which no longer uses its installations in Québec City, obtains some of its supplies from Ultramar at Saint-Romuald. The Shell marine station at Québec City is supplied by ship and occasionally by truck from its refinery in Montréal. For certain distillates, and when the demand for a product increases suddenly (ex. heating oil), Shell sometimes obtains provisions on the spot market. These products are then imported by ship. The main products stocked at the terminal in Québec City are jet fuel, different grades of unleaded gasoline and distillates.

Given the relative stability of petroleum products at the Port of Montréal, the increase in traffic in these products recorded in Québec City has made this port first on the St. Lawrence for the traffic in hydrocarbons since 1986.

Finally, the Ultramar refinery produced 1.5 million barrels of asphalt in 1988, two-thirds of which was sent by ship to Montréal and Ontario, and the other third by road to serve the greater Québec region and the eastern part of the province.

The Port of Sept-Îles

The total traffic at the Port of Sept-Îles, which was less than 30 million tonnes in 1980 and 1981, fell suddenly in 1982 to 18.9 million tonnes as a result of a difficult period for the North American steel industry. This total gradually rose, only to fall once more, in 1987, to below 20 million tonnes. In 1988 it climbed back, to reach 23.4 million tonnes (Table 27, Graph 23).

Stiff competition from the St. Lawrence ports, the Port of Québec for example, which receives ore from South America and Africa, is part of the reason for this situation.

Port traffic at Sept-Îles is essentially made up of bulk commodities. Dry bulk, consisting mainly of iron ore shipped from the port installations of Iron Ore of Canada and of Wabush Mines at Pointe-Noire, accounts for 98% of this traffic.

The traffic in liquid bulk at Sept-Îles is only 2% of the total for bulk commodities. This traffic consists mainly of fuel oil and gasoline. The maritime traffic in gasoline is stable at about 80 000 tonnes per year. The traffic in fuel oil, which exceeded 700 000 tonnes in 1980 and 1981, dropped by half beginning in 1982 and settled between 300 000 and 400 000 tonnes a year for subsequent years (Table 27).

Esso and Shell receive two-thirds and one-third respectively of the petroleum products arriving at the Port of Sept-Îles. These companies supply regional distributors Ultramar, Texaco and Irving. Gasoline comes mainly from Dartmouth/Halifax and from Montréal.

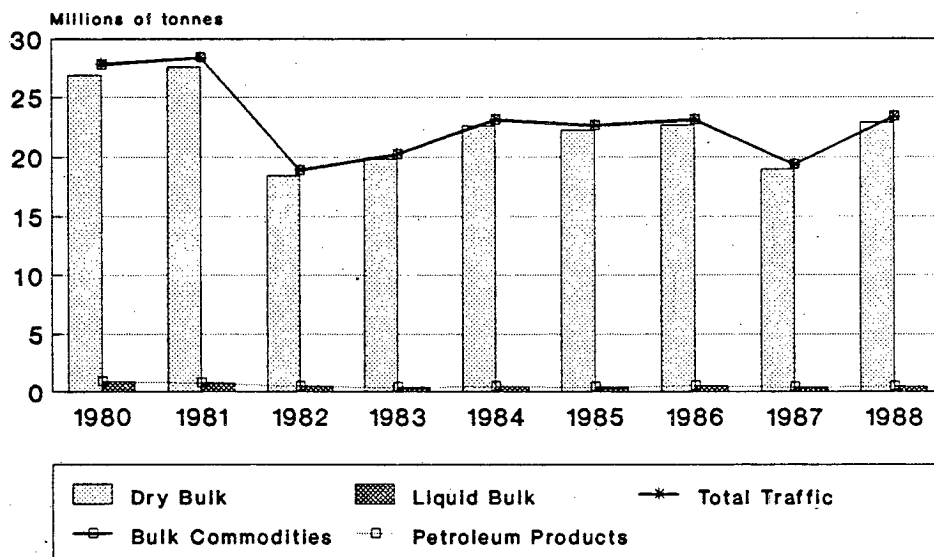
TABLE 27

BULK COMMODITY TRAFFIC AT THE PORT OF SEPT-ILES, 1980 TO 1988

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988
SEPT-ILES									
TOTAL (thousands of tonnes)	27 819	28 398	18 907	20 223	23 105	22 632	23 131	19 343	23 370
BULK COMMODITIES (BC)	27 753	28 349	18 870	20 196	23 079	22 615	23 103	19 318	23 354
TOTAL BC (%)	99,8%	99,8%	99,8%	99,9%	99,9%	99,9%	99,9%	99,9%	99,9%
LIQUID BULK (LB)	872	791	466	389	458	385	475	378	469
LB/BC (%)	3,1%	2,8%	2,5%	1,9%	2,0%	1,7%	2,1%	2,0%	2,0%
DRY BULK (DB)	26 881	27 558	18 404	19 808	22 621	22 230	22 629	18 939	22 885
DB/BC (%)	96,9%	97,2%	97,5%	98,1%	98,0%	98,3%	97,9%	98,0%	98,0%
TOTAL PETROLEUM PRODUCTS (PP)	862	784	464	389	457	385	475	375	469
PP/LB (%)	98,9%	99,1%	99,6%	100,0%	99,8%	100,0%	100,0%	99,2%	100,0%
CRUDE OIL	-	-	-	-	-	-	-	-	-
GASOLINE	79	78	42	55	61	67	80	72	80
FUEL OIL	783	706	422	334	396	318	395	303	389

SOURCES: PORTS CANADA AND THE PORT OF SEPT-ILES

GRAPH 23
COMMODITY TRAFFIC AT THE PORT
OF SEPT-ILES, 1980 TO 1988



Fuel oil is used mainly to supply mining companies located at Sept-Îles and Pointe-Noire, but also those in the hinterland. Most of it comes from Nanticoke in Ontario, and from Venezuela by ship.

The Port of Rimouski

This is a regional port serving the greater Bas-Saint-Laurent - Gaspésie region, primarily for the storage and distribution of petroleum products.

Six oil companies, Petro-Canada, Esso, Shell, Texaco, Irving and Ultramar, operate a marine depot at Rimouski.

Total traffic at the Port of Rimouski dropped from 400 000 tonnes to 300 000 tonnes between 1984 and 1988. This decrease is partly the result of the decline in the traffic in oil products, since they represent the total of liquid bulk handled at Rimouski and 86% of the total activity of the Port. The petroleum products traffic decreased from 364 000 tonnes to 265 000 tonnes during this short period, a drop of 100 000 tonnes. The petroleum products handled at Rimouski are made up essentially of domestic commodities coming, in order of importance, from Saint-Romuald, Saint John (N.B.), Montréal, Halifax and Sarnia (Table 23).

The Port of Chicoutimi

The total traffic passing through the Port of Chicoutimi between 1980 and 1985 is represented by a descending curve. Total activities at the port decreased by half, 750 000 tonnes to 364 000 tonnes, during this period. After 1986, the total volume of commodities at the Port of Chicoutimi stabilized at below the half million tonne mark (Table 28, Graph 24).

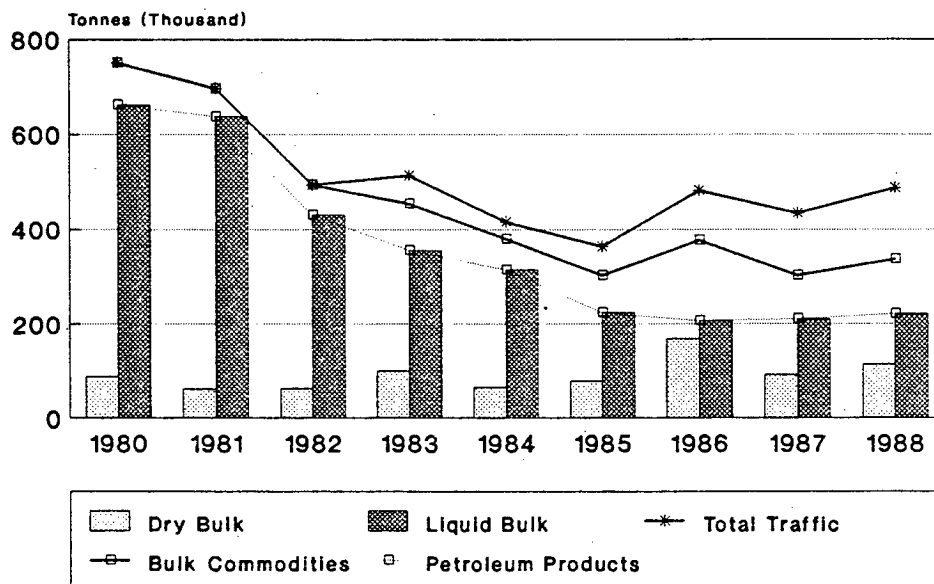
TABLE 28

BULK COMMODITY TRAFFIC AT THE PORT OF CHICOUTIMI, 1980 TO 1988

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988
CHICOUTIMI									
TOTAL (thousands of tonnes)	750	697	493	514	415	364	482	434	487
BULK COMMODITIES (BC)	750	697	493	454	380	303	377	303	337
TOTAL BC (%)	100%	100%	100%	88%	92%	83%	78%	70%	69%
LIQUID BULK (LB)	662	636	430	355	315	224	207	211	222
LB/BC (%)	88%	91%	87%	78%	83%	74%	55%	70%	66%
DRY BULK (DB)	88	61	63	100	65	79	169	92	115
DB/BC (%)	12%	9%	13%	22%	17%	26%	45%	30%	34%
TOTAL PETROLEUM PRODUCTS (PP)	662	636	430	355	315	224	207	211	222
PP/LB (%)	100%	100%	100%	100%	100%	100%	100%	100%	100%
CRUDE OIL	-	-	56	50	17	-	-	-	-
GASOLINE	323	308	235	183	163	125	111	126	131
FUEL OIL	339	328	139	122	135	99	96	85	91

SOURCES: PORTS CANADA AND PORT OF CHICOUTIMI

GRAPH 24
COMMODITY TRAFFIC AT THE PORT
OF CHICOUTIMI, 1980 TO 1988



However, the structure of the traffic began to diversify in 1983 when bulk commodities, which constituted total port activities between 1980 and 1982, became much less important, declining to only 69% of the total traffic by 1988.

Liquid bulk was made up mainly of petroleum products and constituted about 90% of the bulk commodities traffic from 1980 to 1982. Subsequently, bulk liquids declined to 66% of the traffic in bulk commodities by 1988. This loss was offset by increased traffic in dry bulk, mainly de-icing salts, coal to meet the needs of a ferrosilicon plant in the region, and various non-containerized commodities, notably lumber.

The opening of the Grande-Anse terminal in 1985 has had some bearing on the recent changes in the structure of the port traffic at Chicoutimi.

The liquid bulk handled by the Port of Chicoutimi is made up mainly of petroleum products, as shown by the maritime movements of gasoline and fuel oil. However, between 1980 and 1988, these two products decreased steadily in volume, fuel oil dropping from 323 000 tonnes to 131 000 tonnes and gasoline, from 339 000 tonnes to 91 000 tonnes.

All the oil supplies, in the amount of 225 000 tonnes, arriving by ship at the Port of Chicoutimi, come from the Ultramar refinery at Saint-Romuald and meet the energy, domestic and industrial needs of the Saguenay - Lac-Saint-Jean region, which amount to 400 000 tonnes per year. The remainder comes by tank truck. Ultramar, Petro-Canada and Texaco have storage tanks at Pointe à l'Islet (Table 58).

Some 6000 30-tonne tank trucks annually take Route 175 through the parc des Laurentides--an average of over 100 trips a week--carrying petroleum products.

The Port of Baie des Ha! Ha!

Total traffic at the Port of Baie des Ha! Ha! varied from 3 million to 4 million tonnes a year; it reached a peak of 4.7 million tonnes in 1980. Out of a total traffic of 3.85 million tonnes in 1988, 99% of the commodities handled were products in bulk. The figure for the period 1980 to 1987 was in the region of 90% (Table 29, Graph 25).

Dry bulk constituted the major part of the traffic through this port, accounting for 90% of all bulk commodities, while liquid bulk made up the remainder.

Petroleum products constituted 54% of the traffic in liquid bulk, i.e. 200 000 tonnes out of a total 370 000 tonnes. Crude oil accounted for 89 000 tonnes, fuel oil for 90 000 and gasoline for 21 000 in 1988. The traffic in fuel oil and crude oil dropped considerably between 1982 and 1987 before rallying slightly in 1988.

Oil products in transit at the Port of Baie des Ha! Ha! come, in order of importance, from Ontario, Montréal and Québec City and are stored in Shell and Alcan storage tanks (Table 58).

The Port of Trois-Rivières

Total traffic through the Port of Trois-Rivières varied between 2 million and 3 million tonnes from 1981 to 1988, after a high of 3.5 million tonnes in 1980. In 1988 total traffic was slightly below 2 million tonnes. The bulk commodities traffic from 1980 to 1988 was between 91% and 96% of the total port traffic, i.e. 1.854 million tonnes out of a total of 1.984 million tonnes in 1988 (Table 30, Graph 26).

TABLE 29

BULK COMMODITY TRAFFIC AT THE PORT OF BAIE DES HAI HAI, 1980 TO 1988

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988
BAIE DES HAIHAI									
TOTAL (thousands of tonnes)	4 712	4 098	3 878	3 726	3 823	3 283	3 431	3 287	3 849
BULK COMMODITIES (BC)	4 297	3 703	3 376	3 323	3 606	2 935	3 103	3 009	3 803
TOTAL BC (%)	91,2%	90,4%	87,1%	89,2%	94,3%	89,4%	90,4%	91,5%	98,8%
LIQUID BULK (LB)	379	435	742	354	432	240	223	259	370
LB/BC (%)	8,8%	11,7%	22,0%	10,7%	12,0%	8,2%	7,2%	8,6%	9,7%
DRY BULK (DB)	3 917	3 268	2 904	2 969	3 174	2 695	2 880	2 750	3 233
DB/BC (%)	91,2%	88,3%	86,0%	89,3%	88,0%	91,8%	92,8%	91,4%	85,0%
TOTAL PETROLEUM PRODUCTS (PP)	278	323	637	246	285	116	102	113	200
PP/LB (%)	73,4%	74,3%	85,8%	69,5%	66,0%	48,3%	45,7%	43,6%	54,1%
CRUDE OIL	-	-	270	144	179	38	10	38	89
GASOLINE	-	-	-	-	-	-	-	-	21
FUEL OIL	278	323	367	102	106	78	92	75	90

SOURCES: PORTS CANADA AND PORT OF BAIE DES HAIHAI

GRAPH 25
COMMODITY TRAFFIC AT THE PORT
OF BAIE DES HAI HAI, 1980 TO 1988

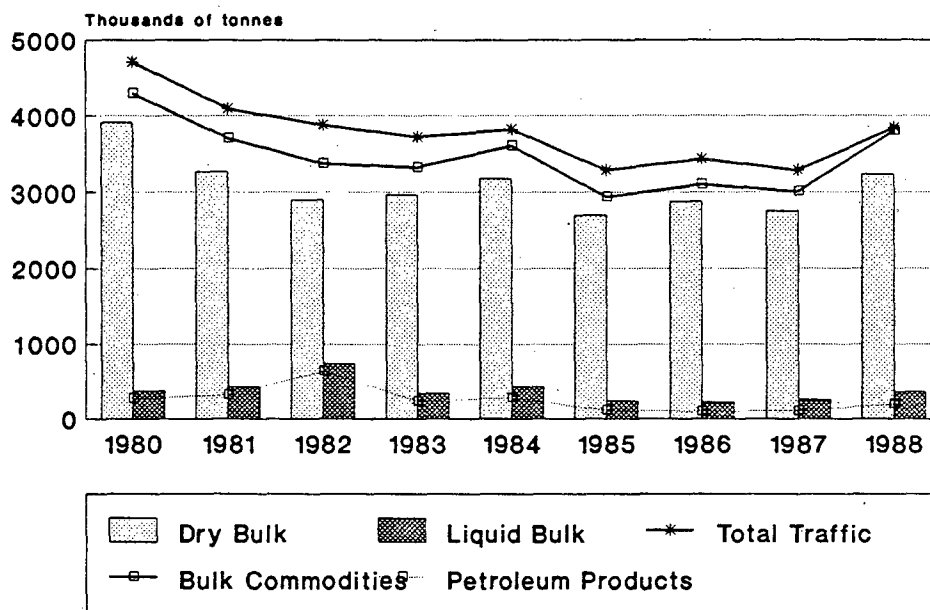


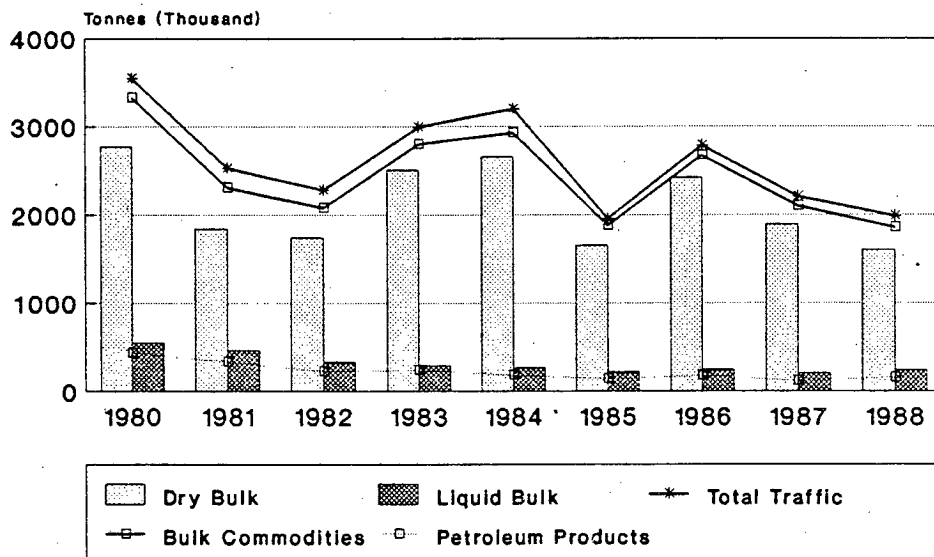
TABLE 30

BULK COMMODITY TRAFFIC AT THE PORT OF TROIS-RIVIERES, 1980 TO 1988

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988
TROIS-RIVIERES									
TOTAL (thousands of tonnes)	3 545	2 526	2 275	2 988	3 197	1 957	2 785	2 209	1 984
BULK COMMODITIES (BC)	3 327	2 310	2 077	2 800	2 924	1 876	2 671	2 102	1 854
BC/TOTAL (%)	94%	91%	91%	94%	91%	96%	96%	95%	93%
LIQUID BULK (LB)	555	466	335	294	271	222	253	211	248
LB/BC (%)	17%	20%	16%	11%	9%	12%	9%	10%	13%
DRY BULK (DB)	2 772	1 844	1 741	2 507	2 653	1 654	2 418	1 891	1 606
DB/BC (%)	83%	80%	84%	90%	91%	88%	91%	90%	87%
TOTAL PETROLEUM PRODUCTS (PP)	439	340	230	248	185	146	179	120	161
PP/LB (%)	79%	73%	69%	84%	68%	66%	71%	57%	65%
CRUDE OIL	-	-	-	-	-	-	-	-	-
GASOLINE	40	22	44	47	43	29	58	57	60
FUEL OIL	399	318	186	201	142	117	121	63	101

SOURCES: PORTS CANADA AND THE PORT OF TROIS-RIVIERES

GRAPH 26
COMMODITY TRAFFIC AT THE PORT
OF TROIS-RIVIÈRES, 1980 TO 1988



Liquid bulk, which represented 15% to 20% of bulk commodities from 1980 to 1982, subsequently settled at around 10%. Bulk solids, on the other hand, progressed during this period, accounting for 85% to 90% of traffic in bulk.

Petroleum products, mainly fuel oil but also gasoline, declined in volume as a proportion of bulk liquids. From the 75% to 80% they represented in 1980 and 1981, in 1987 and 1988 they constituted respectively 57% and 65% of the traffic. The gasoline traffic remained at 60 000 tonnes after 1986, while that of fuel oil decreased gradually from 400 000 tonnes in 1980 to 100 000 in 1988, even dropping to 63 000 in 1987.

Irving Oil Inc. has been the region's only supplier of petroleum products by sea since 1988; these supplies come from its refinery in Saint John (N.B.). Other oil companies use tank trucks from Montréal refineries (Shell and Petro-Canada) and from Saint-Romuald (Ultramar) to see to regional needs. The C.I.P. paper mill at Trois-Rivières receives its fuel oil by tanker from Montréal and Québec City.

The Port of Baie-Comeau

Baie-Comeau is a port used first for loading and unloading supplies for the companies in the region. It sees to regional supplies of the petroleum and other products stocked by Irving, Esso and Reynolds. Baie-Comeau is also a grain transshipment port.

Total traffic at the Port of Baie-Comeau varied from 7.8 million tonnes in 1984 to 7 million tonnes in 1988. The traffic in petroleum products, which represented 2% of the total traffic at the port and 75% of the liquid bulk traffic, decreased to 107 000 tonnes in 1988. Bulk liquids reached a peak of 90% of total port traffic in 1984 and 1985.

Oil products handled by the Port of Baie-Comeau come from Canada, mainly Québec City, Halifax, Saint John (N.B.), Montréal and Sarnia, and from abroad; shipments of fuel oil amounting to 50 000 tonnes arrived from Corpus Christi (Texas) and Detroit in 1988.

The Port of Port-Cartier

This private port was built between 1957 and 1960 at a cost of \$24 million. The mooring basin was dug out of the rock and five wharves offer a 15-metre depth at low tide. The main users of the port are the Compagnie Minière Québec Cartier, whose activities include the extraction, transport, and primary processing of iron ore, and Les Silos Port-Cartier, a subsidiary of the French grain group Louis Dreyfus. Papiers Cascades, which took over the plant of Rayonier Québec Inc., had to interrupt its activities when its paper contract in Europe was not renewed. The total traffic at the Port of Port-Cartier is slightly over 20 million tonnes a year.

The bulk liquids traffic at Port-Cartier, which was some 150 000 tonnes a year, represented barely 1% of the port traffic in 1988. It was mainly made up of petroleum products, which came from Canada and from abroad. Fuel oil and gasoline came from Québec City and from Bridgetown and Milford in 1988.

The Port of Gaspé (Sandy Beach)

Total traffic at the Port of Gaspé rose from 162 530 tonnes to 267 656 tonnes between 1984 and 1988. The liquid bulk traffic, which constituted the major portion (98%) of the port's traffic in 1984, decreased to 70% in 1988. Petroleum products, which represented 62% of the liquid bulk in 1984, accounted for only 30% of this traffic in 1988. The petroleum products traffic, which stood at 100 000 tonnes in 1984, decreased by half and stabilized at 50 000 tonnes beginning in 1985.

The Irving and Ultramar companies serve part of the Gaspé peninsula from their storage depots at the Port of Gaspé. The drop recorded in the petroleum products traffic at the port from 1985 on can be explained by the closing of Esso's marine depot in 1984, and by the abandonment of the reshipment of liquid fuels from Gaspé.

The petroleum products handled at Gaspé came only from locations in Canada, mainly, in order of importance, from Saint-Romuald, Saint John (N.B.), Halifax and St. John's (Nfld.).

The drop in this traffic at the port was, however, offset by the increase in shipments of sulphuric acid and in the incoming traffic in ore concentrates, a trend generated by Mines Gaspé of Murdochville.

The Port of New-Richmond

Total traffic at the Port of New-Richmond registered an average of 50 000 tonnes between 1984 and 1988. This traffic is entirely composed of liquid bulk, specifically of petroleum products to supply the Consolidated Bathurst plant and the energy needs of the region. Shipments originate mainly in Québec City and Halifax.

The Port of Mont-Louis

The Port of Mont-Louis supports the mining activities of Mines Gaspé located in Murdochville. Port traffic developed gradually between 1984 and 1988, increasing from 44 000 tonnes in 1984 to 157 000 in 1987, before dropping to 125 000 tonnes in 1988.

The significant increase in tonnage between 1985 and 1987 was the result of the transfer of the traffic in ore concentrates from the Gaspé wharf to that of Mont-Louis while marine installations were being restored in Gaspé. The traffic in bulk liquids was made up

exclusively of the bunker oils used by Mines Gaspé for its foundry operations. This traffic varied from 20 000 tonnes to 40 000 tonnes during this period, with a low of 6742 tonnes in 1985. The traffic in fuel oil came from three national sources, mostly from Montréal, followed by Québec City and then Sarnia.

The Port of Chandler

The Port of Chandler, like that of Mont-Louis, has a single user, Gaspesia Pulp and Paper Ltd. It uses the port for its fuel requirements and to ship rolls of newsprint.

Total traffic at this port varied between 90 000 tonnes and 60 000 tonnes in the 1984 to 1988 period, to return in 1988 to almost the same level as in 1984. Petroleum products make up all the liquid bulk traffic handled at this port, which stayed at about 15 000 tonnes from 1984 to 1987, before doubling to 30 000 in 1988.

The modest bunker oil traffic prior to 1988, in which year it increased, was the result of the Gaspesia company's participation in Hydro-Québec's energy program, which ended in 1987. This would explain the subsequent increase in this traffic to 30 000 tonnes, the same level as that recorded for this product in the early 1980s. The bunker oil traffic represented 20% of the total port traffic from 1984 to 1987 and 30% in 1988.

In 1988, the fuel oil unloaded at Chandler came from Montréal and Halifax and, internationally, from Baton Rouge.

The Port of Paspébiac

The maritime infrastructures at Paspébiac, which were at one time multi-functional, have since 1981 been used solely for receiving and storing petroleum products for regional needs. The Irving

company set up storage facilities there in 1972 for fuel oil and gasoline.

Traffic at the Port of Paspébiac varied from 9000 tonnes to 16 300 tonnes between 1984 and 1988, when it stabilized at 14 000 tonnes. The petroleum products unloaded at the port come only from the Maritimes, mainly Saint John (N.B.), St. John's (Nfld.) and Halifax.

The Port of Blanc-Sablon

Total traffic at the Port of Blanc-Sablon varied from 12 000 tonnes to 20 000 tonnes between 1984 and 1988. Half of this was made up of oil products, amounting to 6000 tonnes to 12 000 tonnes per year. These products are used to supply the Hydro-Québec power plant and regional requirements in heating oil, diesel oil and gasoline.

The petroleum products unloaded at the port come mainly from Halifax, but also from the Ultramar refinery at Saint-Romuald.

The Port of Havre-Saint-Pierre

Total activities at this port rose from 2.1 million tonnes to 2.7 million tonnes between 1984 and 1988. The bulk liquids traffic is only a tiny portion of the total port traffic, i.e. between 0.1% and 0.3%. Traffic in the region of 6000 tonnes was recorded in 1984 and 1985, but fell to 1384 tonnes in 1986 and to 581 tonnes in 1987. Finally, in 1988, it climbed again, to 4443 tonnes.

Most of the traffic here is made up of exports of ilmenite from the Fer et Titane company of Québec, which is shipped first to Sorel and then across the Atlantic, as well as to Japan and to the United States.

Some of the petroleum products coming into the Port of Havre-Saint-Pierre supply the Fer et Titane plant, the other part furnishing the energy requirements of the region between Rivière-au-Tonnerre and Natashquan. All of the petroleum traffic originates at the Saint-Romuald refinery.

The Port of Matane

Total traffic at the Port of Matane stabilized at some half million tonnes for the reference period, 1984 to 1988.

However, very low figures were recorded for bulk liquids between 1984 and 1987, i.e. some 2000 tonnes to 5500 tonnes, with a high point of 17 337 tonnes in 1988. Petroleum products arriving at the port are used to meet domestic regional requirements and those of the C.I.P. plant. The low figures recorded at Matane were due in part to the adoption of the Hydro-Québec energy program by C.I.P. and in part to the fact that regional petroleum product supplies come overland from the storage park located near the Port of Rimouski; this has been going on for some years.

Oil tankers using the port regularly come mainly from Montréal and Saint John (N.B.).

The Port of Cap à L'Aigle

This port is used by a single customer, the Irving company, which handles and stores annually, for local needs, between 3000 and 4000 tonnes of light oil from its refinery at Saint John (N.B.).

The small ports of the Basse-Côte-Nord

Apart from Blanc-Sablon, which is the eastern terminus of the Basse-Côte-Nord of Québec and which generates the largest movements of petroleum products in the region, there are seven other small ports that receive petroleum products to supply the domestic and energy needs of the local villages, and fuel for vehicles and fishing vessels. However, total traffic is very small, amounting to less than 5000 tonnes a year.

The petroleum products traffic at La Tabatière rose from 1200 tonnes to 4360 tonnes during the reference period. Some 60% of the total port traffic is generated by the presence of Hydro-Québec oil storage tanks.

The little Port of Saint-Augustin recorded an increase in its oil traffic from 1848 tonnes to 2461 tonnes between 1984 and 1988, representing 60% of the total port traffic. This traffic comes mainly from Halifax, followed by Québec City.

The oil products traffic at the Port of Harrington Harbour varied from 543 tonnes to 1171 tonnes during the period, representing 50% of total port activities.

At Tête-à-la-Baleine, the oil traffic varied from 112 to 246 tonnes a year, representing 30% of port activity.

Oil traffic at Baie Johan-Beetz rose from 100 tonnes to 250 tonnes, accounting for 25% of the port traffic.

Finally, at Kégaska, 5 tonnes of petroleum products were handled in 1986 and 6 tonnes in 1988.

The ports of Ports Canada

We observed a certain stability in the movement of liquid bulk in both the entire Ports Canada system in Canada and in a portion of the system in Québec. At the Canadian level, traffic settled between 40 million tonnes and 45 million tonnes after recording a drop to 31.7 million tonnes in 1982, while in Québec it stabilized at 17.8 million tonnes after experiencing a slight decrease in 1982 to 14.3 million tonnes. The crisis of 1982 was, however, less perceptible in the Ports Canada system in Québec. During this period the bulk liquids traffic reached 45% and stabilized around 40% at the beginning and at the end of the decade (Table 31, Graph 27).

Between 1980 and 1988, the Ports Canada system as a whole handled 163 million to 187 million tonnes, while the member ports of the network in Québec experienced a drop in traffic from 78.7 million tonnes to 70 million tonnes for the period, and the relative proportion decreased from 48.3% in 1980 to 37.52% in 1988 (Table 31).

The total bulk commodities traffic at all the ports of Ports Canada rose from 143 million to 162 million tonnes between 1980 and 1988, while local traffic in this category at the ports of Ports Canada located in Québec diminished from 72.8 million to 62.5 million tonnes. Again the relative proportion of bulk commodities traffic suffered a drop from 51% in 1980 to 38.5% in 1988 (Table 31).

Dry bulk increased in volume from 100 million to 117.5 million tonnes in all ports of the system in Canada, while in Québec the ports of Ports Canada experienced a decline of 12 million tonnes in the bulk solids traffic during the 1980 to 1988 reference

TABLE 31

COMMODITY TRAFFIC AT THE PORTS OF PORTS CANADA IN QUÉBEC, 1980 TO 1988

(thousands of tonnes)

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988
PORTS CANADA (PC)	162 993	160 492	137 694	143 885	164 778	155 156	160 939	173 987	186 822
PORTS CANADA IN QUEBEC	78 751	78 589	63 412	65 759	72 109	64 043	63 953	65 460	70 145
including									
MONTREAL	24 898	24 795	20 333	22 737	23 806	21 094	21 597	21 867	22 239
QUEBEC	17 027	18 075	17 526	15 571	17 763	14 713	12 527	18 320	18 216
SEPT-ILES	27 819	28 398	18 907	20 223	23 105	22 632	23 131	19 343	23 370
TROIS-RIVIERES	3 545	2 526	2 275	2 988	3 197	1 957	2 785	2 209	1 984
CHICOUTIMI	750	697	493	514	415	364	482	434	487
BAIE DES HAIHAI	4 712	4 098	3 878	3 726	3 823	3 283	3 431	3 287	3 849
PC IN QUEBEC/P.C.(%)	48,3%	49,0%	46,1%	45,7%	43,8%	41,3%	39,7%	37,6%	37,5%
BULK COMMODITIES (BC)	142 882	141 157	120 201	126 386	146 149	136 721	140 924	151 619	162 381
PC IN QUEBEC:	72 852	72 343	57 718	59 869	65 713	57 658	57 106	58 023	62 513
including									
MONTREAL	20 130	19 675	15 925	18 024	18 571	15 654	15 531	15 144	15 290
QUEBEC	16 595	17 609	16 977	15 072	17 153	14 275	12 321	18 147	17 875
SEPT-ILES	27 753	28 349	18 870	20 196	23 079	22 615	23 103	19 318	23 354
TROIS-RIVIERES	3 327	2 310	2 077	2 800	2 924	1 876	2 671	2 102	1 854
CHICOUTIMI	750	697	493	454	380	303	377	303	337
BAIE DES HAIHAI	4 297	3 703	3 376	3 323	3 606	2 935	3 103	3 009	3 803
BC-P.C IN QUEBEC/BC(%)	51,0%	51,3%	48,0%	47,4%	45,0%	42,2%	40,5%	38,3%	38,5%
LIQUID BULK (LB)	42 066	38 904	31 778	33 515	36 368	33 758	37 314	40 999	44 872
PC IN QUEBEC:	16 395	15 745	14 350	14 781	16 738	13 794	14 431	15 509	17 865
including									
MONTREAL	7 385	7 216	6 752	8 237	8 340	6 532	6 229	6 634	7 861
QUEBEC	6 542	6 201	5 625	5 152	6 922	6 191	7 044	7 816	8 695
SEPT-ILES	872	791	466	389	458	385	475	378	469
TROIS-RIVIERES	555	466	335	294	271	222	253	211	248
CHICOUTIMI	662	636	430	355	315	224	207	211	222
BAIE DES HAIHAI	379	435	742	354	432	240	223	259	370
LB-PC IN QUE./PC-LB (%)	39,0%	40,5%	45,2%	44,1%	46,0%	40,9%	38,7%	37,8%	39,8%
DRY BULK (db)	100 816	102 239	88 423	92 871	109 782	102 963	103 610	110 620	117 509
PC IN QUEBEC:	56 456	56 597	43 638	45 090	48 976	43 863	42 675	42 513	44 448
including									
MONTREAL	12 745	12 458	9 173	9 786	10 231	9 122	9 302	8 510	7 429
QUEBEC	10 053	11 408	11 353	9 920	10 232	8 083	5 277	10 331	9 180
SEPT-ILES	26 881	27 558	18 404	19 808	22 621	22 230	22 629	18 939	22 885
TROIS-RIVIERES	2 772	1 844	1 741	2 507	2 653	1 654	2 418	1 891	1 606
CHICOUTIMI	88	61	63	100	65	79	169	92	115
BAIE DES HAIHAI	3 917	3 268	2 904	2 969	3 174	2 695	2 880	2 750	3 233
DB-PC IN QUE./DB (%)	56,0%	55,4%	49,4%	48,6%	44,6%	42,6%	41,2%	38,4%	37,8%

SOURCE: PORTS CANADA

period, decreasing from 56.4 million tonnes to 44.4 million tonnes (Table 31). These losses occurred mainly in the iron ore and grains traffic.

As for the traffic in liquid bulk, we observed a certain stability of movement within the entire Ports Canada network in Canada and in Québec. In the former case, the traffic stabilized between 40 and 45 million tonnes after registering a drop to 31.7 million tonnes in 1982, while in Québec this particular traffic was 17.8 million tonnes after a slight drop to 14.3 million tonnes in 1982. However, the 1982 crisis was not so noticeable in the ports of Ports Canada in Québec. During this period the traffic in bulk liquids reached 45% of the total for the ports of Ports Canada, stabilizing around 40% at the beginning and end of the decade (Table 32).

With regard to petroleum products in transit at the ports of the Ports Canada network in Québec, between 1980 and 1988 maritime traffic in fuel oil decreased from 8.3 million tonnes to 6.4 million tonnes, crude oil rose from 3.9 million tonnes to 6.7 million tonnes and gasoline stabilized at 2.9 million tonnes.

During this period, crude oil increased from 24% to 37% of the traffic in petroleum products, gasoline fell from 48% to 40% of this traffic and fuel oil decreased from 48% to 43% at the ports of Ports Canada in Québec in relation to the total for the Canadian network (Table 32, Graph 28).

In 1988 a degree of balance was observed in the bulk traffic for both liquids and solids at the ports of Montréal (51% for liquids, 49% for solids) and Québec City (49% for liquids and 51% for solids), while at the others ports in the system on the Atlantic coast the bulk liquids traffic was dominant, i.e. 84% at Saint John

TABLE 32

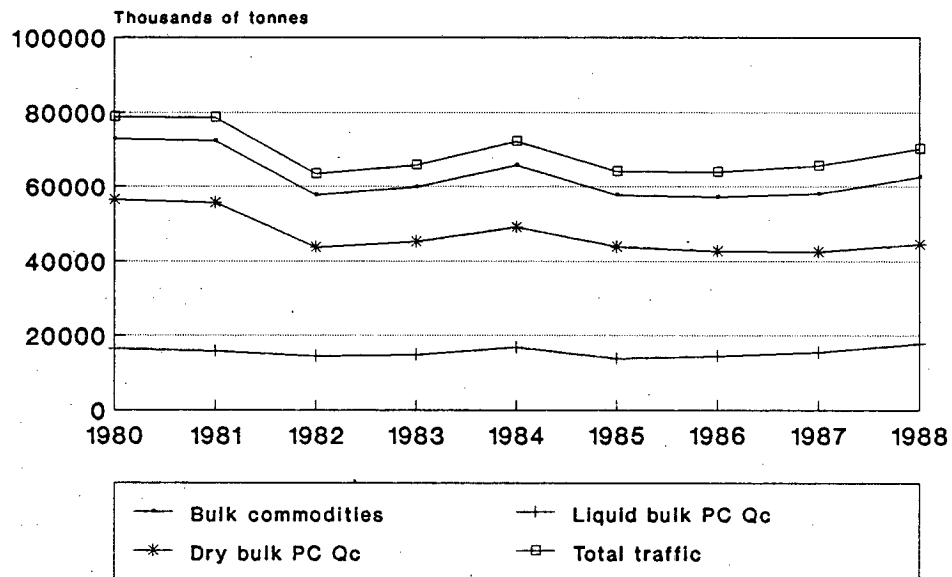
PETROLEUM PRODUCTS TRAFFIC AT THE PORTS OF PORTS CANADA IN QUÉBEC, 1980 TO 1988

(thousands of tonnes)

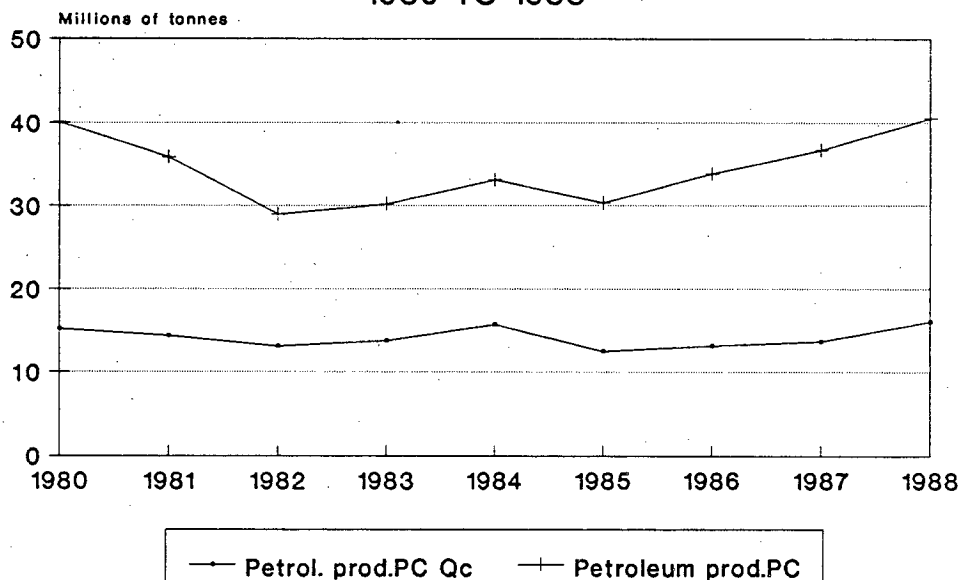
YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988
PETROLEUM PRODUCTS (PP)	40 076	35 870	28 951	30 151	33 087	30 284	33 844	36 704	40 482
PC IN QUEBEC:	15 236	14 344	13 095	13 762	15 713	12 505	13 194	13 708	16 105
including									
MONTREAL	6 642	6 386	6 041	7 650	7 780	5 659	5 360	5 311	6 694
QUEBEC	6 353	5 875	5 293	4 874	6 691	5 975	6 872	7 578	8 360
SEPT-ILES	862	784	464	389	457	385	474	375	469
TROIS-RIVIERES	439	340	230	248	185	146	179	120	160
CHICOUTIMI	662	636	430	355	315	224	207	211	222
BAIE DES HAIHAI	278	323	637	246	285	116	102	113	200
PP-PC IN QUE/PP(%)	38,0%	40,0%	45,2%	45,6%	47,5%	41,3%	39,0%	37,3%	39,8%
CRUDE OIL (CO)	16 625	12 562	10 714	13 402	13 669	12 593	14 680	16 350	18 096
PC IN QUEBEC:	3 940	3 183	4 493	5 919	6 859	4 944	5 175	5 437	6 684
including									
MONTREAL	502	175	1 315	2 866	2 911	1 644	1 109	554	1 542
QUEBEC	3 438	3 008	2 852	2 859	3 752	3 262	4 056	4 845	5 053
SEPT-ILES	-	-	-	-	-	-	-	-	-
TROIS-RIVIERES	-	-	-	-	-	-	-	-	-
CHICOUTIMI	-	-	56	50	17	-	-	-	-
BAIE DES HAIHAI	-	-	270	144	179	38	10	38	89
CO-PC IN QUE/CO(%)	23,7%	25,3%	41,9%	44,2%	50,2%	39,3%	35,3%	33,3%	36,9%
GASOLINE (G)	6 262	6 352	4 978	5 154	5 566	5 678	6 506	6 840	7 361
PC IN QUEBEC:	2 991	2 908	2 300	2 319	2 530	2 321	2 617	2 837	2 935
including									
MONTREAL	1 693	1 631	1 249	1 393	1 174	1 199	1 383	1 595	1 634
QUEBEC	856	869	730	641	1 089	901	985	987	1 009
SEPT-ILES	79	78	42	55	61	67	80	72	80
TROIS-RIVIERES	40	22	44	47	43	29	58	57	60
CHICOUTIMI	323	308	235	183	163	125	111	126	131
BAIE DES HAIHAI	-	-	-	-	-	-	-	-	21
G-PC IN QUE/G (%)	48%	46%	46%	45%	45%	41%	40%	41%	40%
FUEL OIL (FO)	17 189	16 956	13 259	11 595	13 852	12 013	12 658	13 514	15 025
PC IN QUEBEC:	8 305	8 253	6 302	5 524	6 324	5 240	5 403	5 434	6 487
including									
MONTREAL	4 447	4 580	3 477	3 391	3 695	2 816	2 868	3 162	3 518
QUEBEC	2 059	1 998	1 711	1 374	1 850	1 812	1 831	1 746	2 298
SEPT-ILES	783	706	422	334	396	318	395	303	389
TROIS-RIVIERES	399	318	186	201	142	117	121	63	101
CHICOUTIMI	339	328	139	122	135	99	96	85	91
BAIE DES HAIHAI	278	323	367	102	106	78	92	75	90
FO IN QUE/FO TOTAL (%)	48,3%	48,7%	47,5%	47,6%	45,7%	43,6%	42,7%	40,2%	43,2%

SOURCE: PORTS CANADA

GRAPH 27
COMMODITY TRAFFIC IN THE PORTS CANADA
SYSTEM IN QUÉBEC, 1980 TO 1988



GRAPH 28
TRAFFIC IN PETROLEUM PRODUCTS IN THE
PORTS CANADA SYSTEM IN CANADA AND QUEBEC
1980 TO 1988



(N.B.), 70% at Halifax and 80% at St. John's (Nfld.). On the West coast, the traffic in bulk liquids was minor, 10% at Vancouver and even less at Prince Rupert (2%) (see p. 16).

Given the traffic on Route 175 and the costs of transport by road, it might be wise to envisage a transfer of part of the petroleum products traffic carried by road to the maritime sector.

CONCLUSION

If we were to divide the ports on the St. Lawrence into large geographic regions, we would see that the ports in the Montréal-Québec City corridor had about 90% of the traffic in petroleum products in transit through the St. Lawrence ports between 1984 and 1988 (Table 33, Graph 29).

The ports of the Côte-Nord region generated some 4% of the St. Lawrence traffic in petroleum products (Table 34, Graph 30), while traffic at the ports of the Saguenay-Charlevoix region dropped from 3.6% to 2.3% from 1984 to 1988 (Table 35, Graph 31).

The ports of the Bas-Saint-Laurent region handled a petroleum products traffic that was only 2% to 3% of the total for the St. Lawrence ports between 1984 and 1988 (Table 36, Graph 32)

The ports of the Baie des Chaleurs handled only 0.5% of the St. Lawrence traffic in hydrocarbons, while those of the Basse-Côte-Nord, although there are more of them, generated only 0.9% of this traffic from 1984 to 1988 (tables 37 and 38, graphs 33 and 34).

For the reference period, the petroleum products traffic at the ports of Ports Canada in Québec was characterized by an increase in crude oil, stability in gasoline and a decrease in fuel oil.

TABLE 33

PETROLEUM PRODUCTS TRAFFIC AT THE PORTS OF THE MONTRÉAL-QUÉBEC CITY REGION, 1984 TO 1988
(tonnes)

YEAR	1984	% *	1985	% *	1986	% *	1987	% *	1988	% *
MONTRÉAL	8 128 801	47,9%	6 255 109	45,6%	5 996 487	41,6%	6 355 330	40,9%	7 615 906	42,5%
SOREL	0	0,0%	0	0,0%	0	0,0%	508	0,003%	0	0,0%
QUÉBEC	6 699 000	39,5%	6 019 000	43,9%	6 891 000	47,8%	7 604 000	49,0%	8 519 000	47,5%
TROIS-RIVIERES	184 873	1,1%	146 360	1,1%	178 826	1,2%	120 060	0,8%	160 357	0,9%
PORTNEUF	75 *		0	0,0%	211	0,001%	46 *		0	0,0%
TOTAL	15 012 749	88,5%	12 420 469	90,6%	13 066 524	90,6%	14 079 944	90,7%	16 295 263	90,9%
GENERAL TOTAL **	16 966 215	100,0%	13 703 203	100,0%	14 424 769	100,0%	15 523 465	100,0%	17 921 773	100,0%

Source: Canadian Coast Guard

%*: Proportion of general total.

*: Traffic too slight to represent a significant percentage.

**: Total traffic in petroleum products in transit at all St-Lawrence ports

GRAPH 29
TRAFFIC IN PETROLEUM PRODUCTS AT PORTS
IN THE MONTRÉAL-QUÉBEC CITY RÉGION,
1984 TO 1988

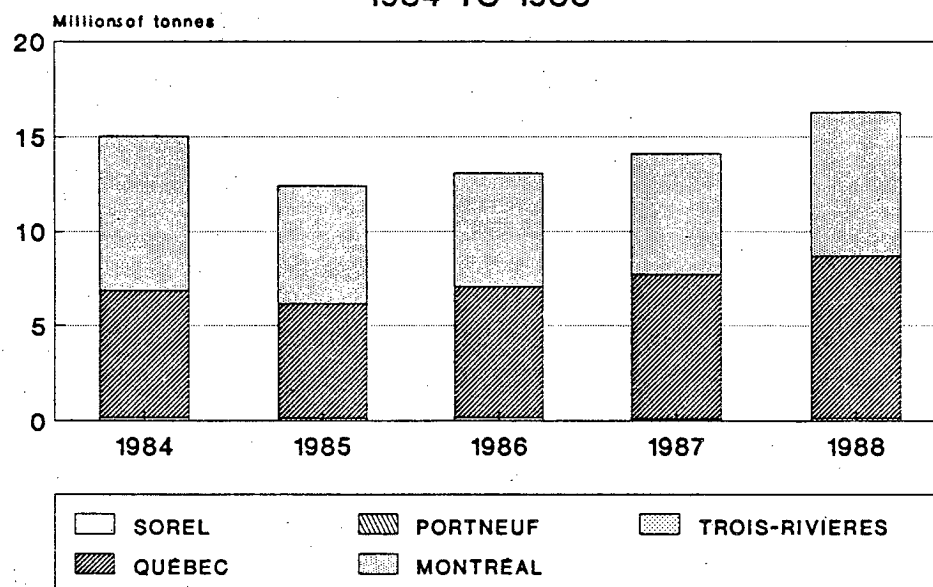


TABLE 34

PETROLEUM PRODUCT TRAFFIC AT THE PORTS OF THE COTE-NORD REGION, 1984 TO 1988

(tonnes)

YEAR	1984	%*	1985	%*	1986	%*	1987	%*	1988	%*
SEPT-ILES	457 659	2,7%	385 262	2,8%	474 062	3,3%	375 413	2,4%	469 494	2,6%
BAIE-COMEAU	151 299	0,9%	160 720	1,2%	118 496	0,8%	125 977	0,8%	106 644	0,6%
PORT-CARTIER	142 325	0,8%	N.D		N.D		125 852	0,8%	148 411	0,8%
HAVRE-ST-PIERRE	5 974	0,04%	6 343	0,05%	1 384	0,01%	581	0,00%	4 443	0,02%
TOTAL	757 257	4,5%	552 325	4,0%	593 942	4,1%	627 823	4,0%	728 992	4,1%
GENERAL TOTAL**	16 966 215	100,0%	13 703 203	100,0%	14 424 769	100,0%	15 523 465	100,0%	17 921 773	100,0%

Source: Canadian Coast Guard

GRAPH 30
TRAFFIC IN PETROLEUM PRODUCTS AT PORTS
IN THE CÔTE-NORD REGION, 1984 TO 1988

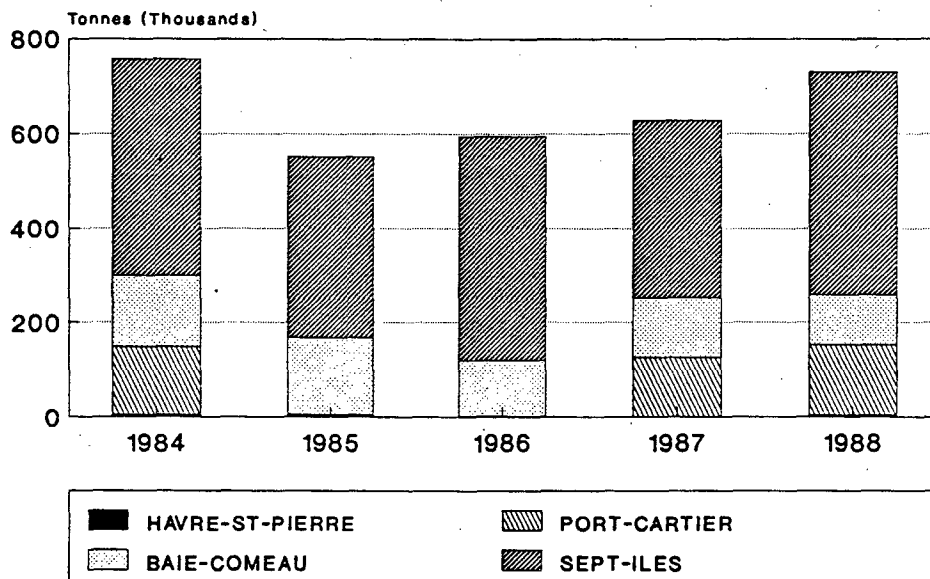


TABLE 35

PETROLEUM PRODUCT TRAFFIC AT THE PORTS OF THE SAGUENAY-CHARLEVOIX REGION, 1984 TO 1988

(tonnes)

YEAR	1984	% *	1985	% *	1986	% *	1987	% *	1988	% *
CHICOUTIMI	315 196	1,86%	223 935	1,63%	207 471	1,44%	211 312	1,36%	222 153	1,24%
BAIE DES HAIHAI	285 308	1,68%	116 118	0,85%	101 430	0,70%	113 369	0,73%	200 192	1,12%
CAP A L'AIGLE	3 120	0,02%	0	0,00%	4 676	0,03%	4 091	0,03%	3 088	0,02%
TOTAL	603 624	3,56%	340 053	2,48%	313 577	2,17%	328 772	2,12%	425 433	2,37%
GENERAL TOTAL **	16 966 215	100,0%	13 703 203	100,0%	14 424 769	100,0%	15 523 465	100,0%	17 921 773	100,0%

Source: Canadian Coast Guard

*: Proportion of general total.

**: Total traffic in petroleum products in transit at all St-Lawrence ports

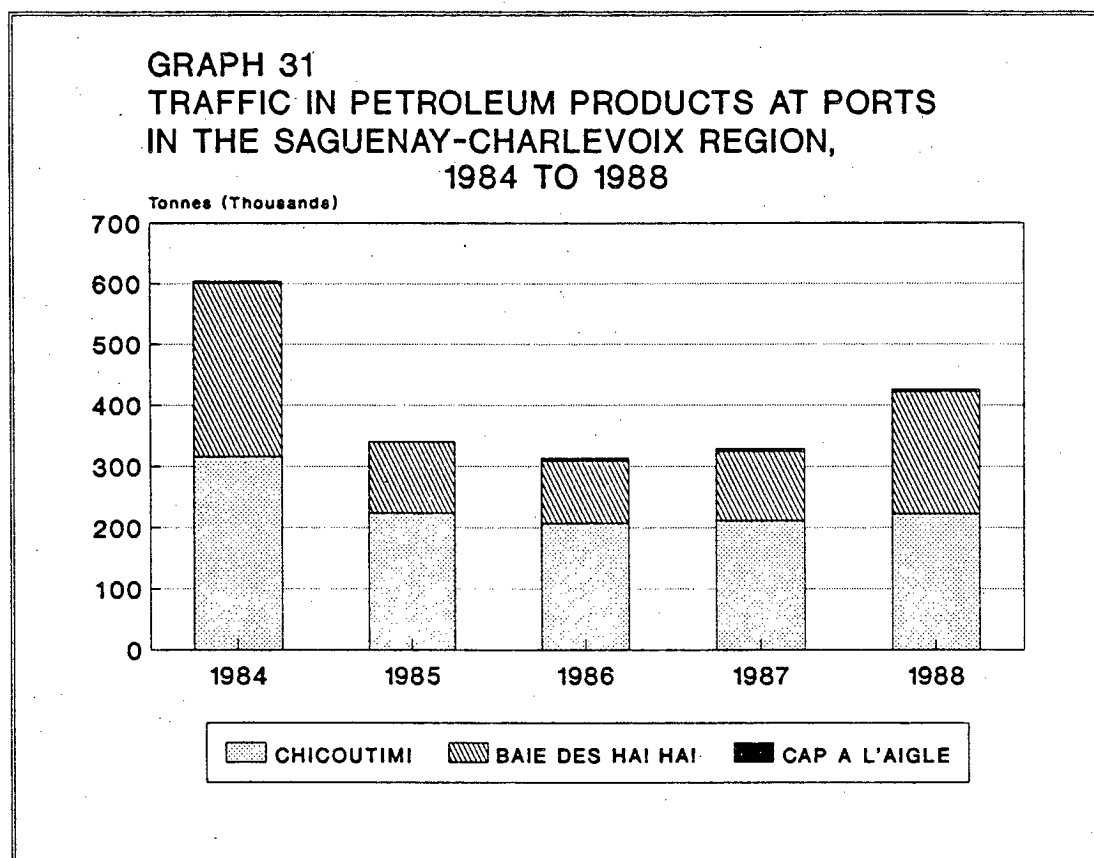


TABLEAU 36

PETROLEUM PRODUCT TRAFFIC AT THE PORTS OF THE BAS-ST-LAURENT/GASPÉSIE REGION, 1984 TO 1988
(tonnes)

YEAR	1984	% *	1985	% *	1986	% *	1987	% *	1988	% *
RIMOUSKI	363 465	2,14%	270 169	1,97%	291 250	2,02%	285 141	1,84%	264 559	1,48%
RIV-DU-LOUP	9 893	0,06%	0	0,00%	0	0,00%	0	0,00%	0	0,00%
MATANE	5 420	0,03%	5 514	0,04%	1 885	0,01%	2 938	0,02%	17 337	0,10%
MONT-LOUIS	22 113	0,13%	6 742	0,05%	24 250	0,17%	40 847	0,26%	36 000	0,20%
SANDY BEACH	97 907	0,58%	43 774	0,32%	45 971	0,32%	54 135	0,35%	55 843	0,31%
TOTAL	498 798	2,94%	326 199	2,38%	363 356	2,52%	383 061	2,47%	373 739	2,09%
GENERAL TOTAL **	16 966 215	100,0%	13 703 203	100,0%	14 424 769	100,0%	15 523 465	100,0%	17 921 773	100,0%

Source: Canadian Coast Guard

GRAPH 32
TRAFFIC IN PETROLEUM PRODUCTS AT PORTS
IN THE BAS-ST-LAURENT - GASPÉSIE REGION,
1984 TO 1988

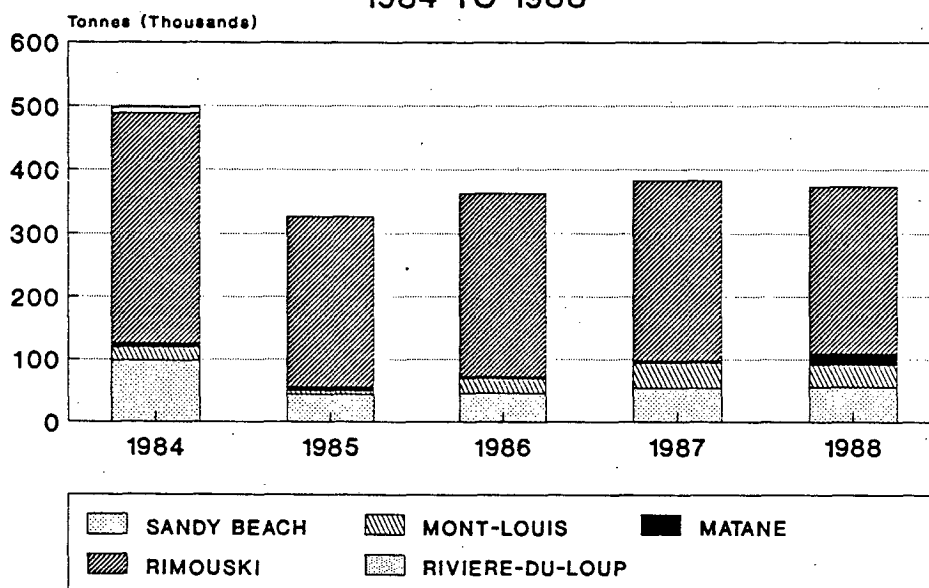


TABLE 37

PETROLEUM PRODUCT TRAFFIC AT THE PORTS OF THE BAIE DES CHALEURS REGION, 1984 TO 1988
(tonnes)

YEAR	1984	%*	1985	%*	1986	%*	1987	%*	1988	%*
CHANDLER	16 687	0,10%	7 466	0,05%	13 350	0,09%	15 294	0,10%	29 683	0,17%
PASPEBIAC	14 732	0,09%	9 208	0,07%	16 330	0,11%	10 644	0,07%	14 000	0,08%
NEW RICHMOND	50 622	0,30%	32 580	0,24%	48 510	0,34%	58 035	0,37%	39 420	0,22%
TOTAL	82 041	0,48%	49 254	0,36%	78 190	0,54%	83 973	0,54%	83 103	0,46%
GENERAL TOTAL**	16 966 215	100,0%	13 703 203	100,0%	14 424 769	100,0%	15 523 465	100,0%	17 921 773	100,0%

Source: Canadian Coast Guard

*: Proportion of general total.

** : Total traffic in petroleum products in transit at all St-Lawrence ports

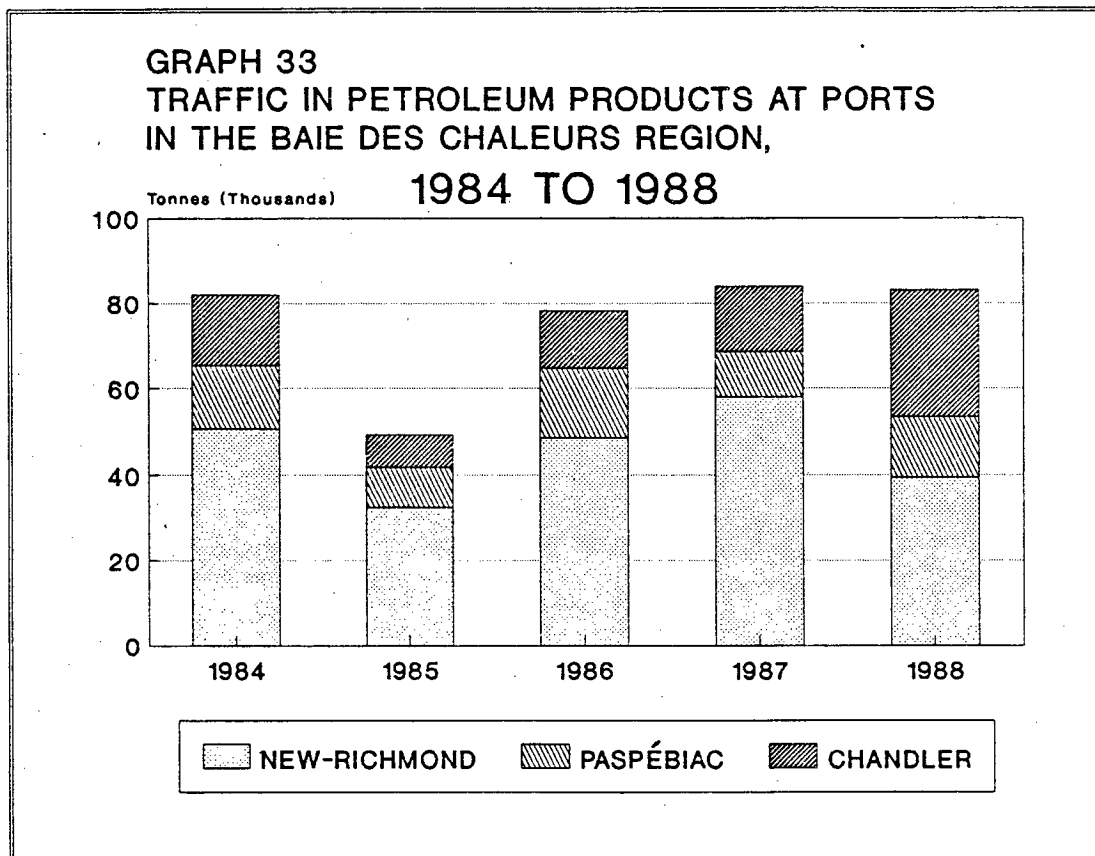


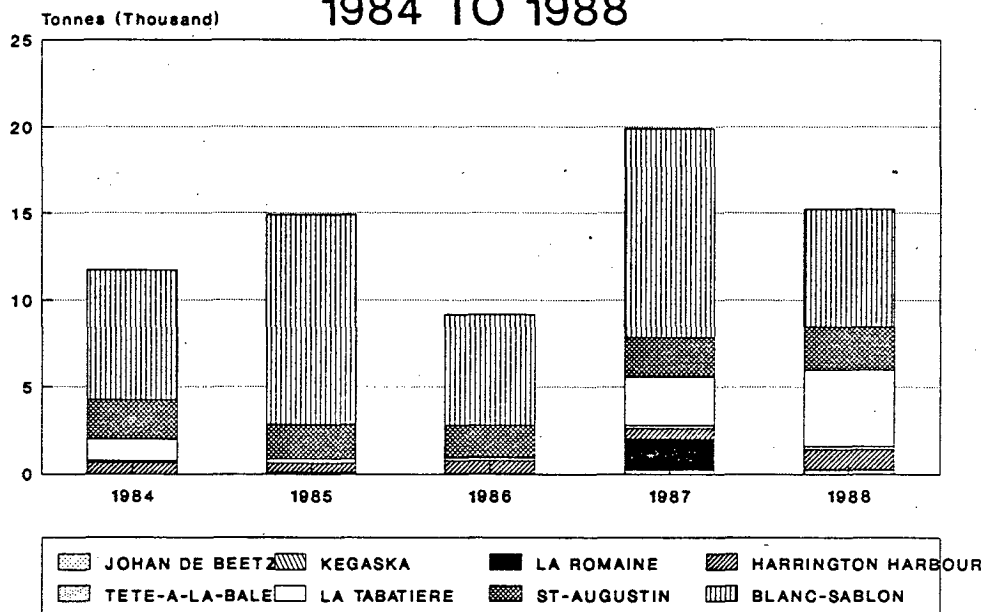
TABLE 38

PETROLEUM PRODUCT TRAFFIC AT THE PORTS OF THE BASSE-CÔTE-NORD REGION, 1984 TO 1988
(tonnes)

YEAR	1984	% *	1985	% *	1986	% *	1987	% *	1988	% *
JOHAN DE BEETZ	0	0,00%	91	0,00%	0	0,00%	219	0,001%	250	0,001%
KÉGASKA	0	0,00%	0	0,00%	5	*	0	0,00%	6	*
LA ROMAINE	0	0,00%	0	0,00%	0	0,00%	1 840	0,01%	0	0,00%
HARR HARBOUR	676	0,004%	543	0,004%	780	0,005%	578	0,004%	1 171	0,007%
TETE A LA BALEINE	112	0,001%	246	0,002%	176	0,001%	148	0,001%	190	0,001%
LA TABATIERE	1 204	0,01%	0	0,00%	0	0,00%	2 790	0,02%	4 360	0,024%
ST-AUGUSTIN	2 266	0,01%	1 969	0,01%	1 848	0,01%	2 253	0,01%	2 469	0,014%
BLANC-SABLON	7 488	0,04%	12 054	0,09%	6 371	0,04%	12 064	0,08%	6 797	0,038%
TOTAL	11 746	0,07%	14 903	0,11%	9 180	0,06%	19 892	0,13%	15 243	0,09%
GENERAL TOTAL **	16 966 215	100,0%	13 703 203	100,0%	14 424 769	100,0%	15 523 465	100,0%	17 921 773	100,0%

Source: Canadian Coast Guard

GRAPH 34
TRAFFIC IN PETROLEUM PRODUCTS AT PORTS
IN THE BASSE-CÔTE-NORD REGION,
1984 TO 1988



IV - BULK LIQUID CHEMICAL TRAFFIC ON THE ST. LAWRENCE

Bulk liquid chemicals are the second most important category of liquid bulk handled at St. Lawrence ports, after petroleum products, representing close to 5% of the total traffic in liquid bulk. But traffic at the nine ports where these products are in transit decreased from 842 000 tonnes to 764 000 tonnes between 1984 and 1988 (tables 39 to 44, graphs 35 to 38).

We shall now analyse the progress of the traffic in liquid chemicals at the main St. Lawrence ports.

The Port of Québec

In 1988, Québec was the most important port for liquid chemicals in bulk, handling 176 000 tonnes that year compared with 222 000 in 1984. The traffic in bulk liquid chemicals represented, in 1988, 1% of the total traffic of the port, 2% of the bulk liquids traffic and 23% of the total traffic in bulk liquid chemicals in transit at St. Lawrence ports (tables 39 and 44). The Intertank terminal at Québec City is used for storing (leasing) petroleum, edible and chemical products. Intertank has 30 storage tanks with a total capacity of over 81 000 cubic metres (511 000 barrels or 17.9 million imperial gallons). There are six pipelines, approximately 215 metres long and 6, 8 and 12 inches in diameter, for transport between berthed vessels and the tanks. Wharf 50, with a minimum depth of 11.2 metres, is used for offloading bulk liquids. There are as well private railways which can accommodate 16 oversized wagons at a time. The service road to these different shipment points is maintained mainly by the Provost, Lévis Transport and Trimax companies.

The principal users of the Intertank terminal at Québec are Dow Chemical, Polysar, Canadian Celanese, Reichol and Daishowa.

TABLE 39

BULK LIQUID CHEMICAL TRAFFIC AT THE MAIN PORTS OF THE ST.LAWRENCE, 1984 TO 1988
(tonnes)

PORT	1984	%*	1985	%*	1986	%*	1987	%*	1988	%*
VALLEYFIELD	231 172	27,4%	184 439	21,8%	61 358	8,5%	85 753	11,7%	62 019	8,1%
QUÉBEC	222 000	26,3%	173 000	20,4%	153 000	21,1%	113 000	15,4%	176 000	23,0%
BAIE DES HA!HA!	139 900	16,6%	121 300	14,3%	123 200	17,0%	145 700	19,8%	151 100	19,8%
MONTRÉAL	102 768	12,2%	126 871	15,0%	97 733	13,5%	111 782	15,2%	104 561	13,7%
SANDY BEACH	60 928	7,2%	98 127	11,6%	133 004	18,4%	131 270	17,8%	129 399	16,9%
TROIS-RIVIERES	50 810	6,0%	54 774	6,5%	45 467	6,3%	76 083	10,3%	61 079	8,0%
BAIE-COMEAU	20 943	2,5%	19 749	2,3%	28 169	3,9%	26 739	3,6%	36 570	4,8%
BECANCOUR	14 030	1,7%	68 275	8,1%	82 172	11,3%	45 515	6,2%	33 257	4,4%
PORT-CARTIER									10 000	1,3%
TOTAL	842 551	100,0%	846 535	100,0%	724 103	100,0%	735 842	100,0%	763 985	100,0%

LEGEND

%* = Proportion of total

TABLE 40

BULK LIQUID CHEMICAL TRAFFIC AT ST.LAWRENCE PORTS IN 1984
(tonnes)

TRAFFIC	TOTAL	LIQUID	LB/TT	CHEMICALS	C/TT	C/LB
PORT	TRAFFIC (TT)	BULK (LB)	%	(C)	%	%
QUÉBEC	17 724 000	6 921 000	39,0%	222 000	1,3%	3,2%
BAIE DES HA!HA!	3 823 312	285 308	7,5%	139 900	3,7%	49,0%
SANDY BEACH	162 530	158 835	97,7%	60 928	37,5%	38,4%
MONTRÉAL	23 806 140	8 340 188	35,0%	102 768	0,4%	1,2%
VALLEYFIELD	472 940	231 189	48,9%	231 172	48,9%	100,0%
TROIS-RIVIERES	3 107 079	235 683	7,6%	50 810	1,6%	21,6%
BAIE-COMEAU	7 823 951	172 242	2,2%	20 943	0,3%	12,2%
BECANCOUR	504 325	14 030	2,8%	14 030	2,8%	100,0%
PORT-CARTIER	21 801 053	142 325	0,7%			
TOTAL	79 225 330	16 500 800	20,8%	842 551	1,1%	5,1%

TABLE 41

BULK LIQUID CHEMICAL TRAFFIC AT ST. LAWRENCE PORTS IN 1985
(tonnes)

TRAFFIC PORT	TOTAL TRAFFIC (TT)	LIQUID BULK (LB)	LB/TT %	CHEMICALS (C)	C/TT %	C/LB %
QUÉBEC	14 713 000	6 192 000	42,1%	173 000	1,2%	2,8%
BAIE DES HA!HA!	3 282 887	116 118	3,5%	121 300	3,7%	104,5%
SANDY BEACH	153 576	141 901	92,4%	98 127	63,9%	69,2%
MONTREAL	21 093 674	6 532 161	31,0%	126 871	0,6%	1,9%
VALLEYFIELD	433 055	184 480	42,6%	184 439	42,6%	100,0%
TROIS-RIVIERES	1 957 217	201 134	10,3%	54 774	2,8%	27,2%
BAIE-COMEAU	6 309 126	180 469	2,9%	19 749	0,3%	10,9%
BECANCOUR	605 125	68 275	11,3%	68 275	11,3%	100,0%
PORT-CARTIER	21 690 994	0	0,0%	0	0,0%	0,0%
TOTAL	70 238 654	13 616 538	19,4%	846 535	1,2%	6,2%

TABLE 42

BULK LIQUID CHEMICAL TRAFFIC AT ST. LAWRENCE PORTS IN 1986
(tonnes)

TRAFFIC PORT	TOTAL TRAFFIC (TT)	LIQUID BULK (LB)	LB/TT %	CHEMICALS (C)	C/TT %	C/LB %
QUÉBEC	12 527 000	7 044 000	56,2%	153 000	1,2%	2,2%
BAIE DES HA!HA!	3 430 680	101 430	3,0%	123 200	3,6%	121,5%
SANDY BEACH	231 005	178 975	77,5%	133 004	57,6%	74,3%
MONTREAL	21 597 640	6 229 481	28,8%	97 733	0,5%	1,6%
VALLEYFIELD	321 608	61 358	19,1%	61 358	19,1%	100,0%
TROIS-RIVIERES	2 785 310	224 293	8,1%	45 467	1,6%	20,3%
BAIE-COMEAU	7 414 288	146 665	2,0%	28 169	0,4%	19,2%
BECANCOUR	1 055 980	82 172	7,8%	82 172	7,8%	100,0%
PORT-CARTIER	19 848 377	0	0,0%	0	0,0%	0,0%
TOTAL	69 211 888	14 068 374	20,3%	724 103	1,0%	5,1%

TABLE 43

BULK LIQUID CHEMICAL TRAFFIC AT ST. LAWRENCE PORTS IN 1987

(tonnes)

TRAFFIC PORT	TOTAL TRAFFIC (TT)	LIQUID BULK (LB)	LB/TT %	CHEMICALS (C)	C/TT %	C/LB %
QUÉBEC	18 323 000	7 717 000	42,1%	113 000	0,6%	1,5%
BAIE DES HA!HA!	3 286 904	113 369	3,4%	145 700	3,4%	128,5%
SANDY BEACH	267 698	185 605	69,3%	131 270	28,4%	70,7%
MONTREAL	21 866 747	6 634 016	30,3%	111 782	0,6%	1,7%
VALLEYFIELD	272 968	85 754	31,4%	85 753	31,4%	100,0%
TROIS-RIVIERES	2 209 065	196 143	8,9%	76 083	1,2%	38,8%
BAIE-COMEAU	5 510 283	152 716	2,8%	26 739	0,5%	17,5%
BECANCOUR	1 166 314	45 515	3,9%	45 515	3,9%	100,0%
PORT-CARTIER	23 193 375	126 852	0,5%		0,0%	0,0%
TOTAL	76 096 354	15 256 970	20,0%	735 842	1,0%	4,8%

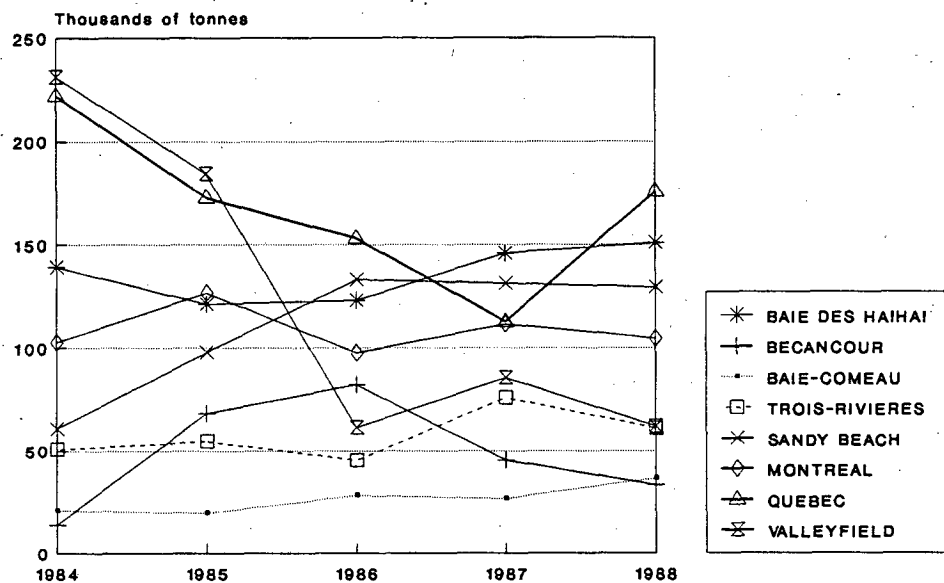
TABLE 44

BULK LIQUID CHEMICAL TRAFFIC AT ST. LAWRENCE PORTS IN 1988

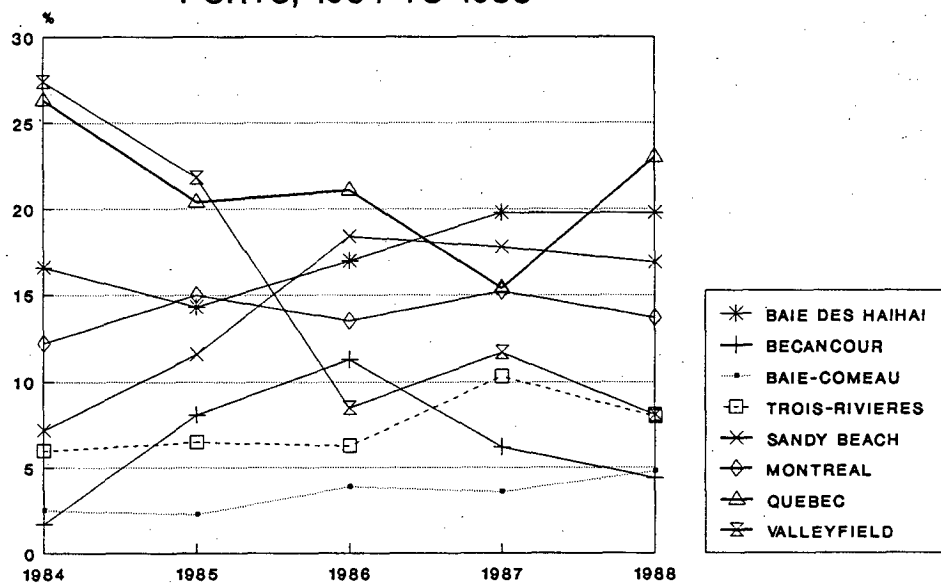
(tonnes)

TRAFFIC PORT	TOTAL TRAFFIC (TT)	LIQUID BULK (LB)	LB/TT %	CHEMICALS (C)	C/TT %	C/LB %
QUÉBEC	18 217 000	8 695 000	47,7%	176 000	0,97%	2,0%
BAIE DES HA!HA!	3 848 945	351 274	9,1%	151 100	3,93%	43,0%
SANDY BEACH	267 656	185 242	69,2%	129 399	48,35%	69,9%
MONTREAL	22 239 413	7 860 974	35,3%	104 561	0,47%	1,3%
VALLEYFIELD	305 773	62 091	20,3%	62 019	20,28%	99,9%
TROIS-RIVIERES	1 983 756	221 436	11,2%	61 079	3,08%	27,6%
BAIE-COMEAU	6 928 022	143 214	2,1%	36 570	0,53%	25,5%
BECANCOUR	1 127 133	33 257	3,0%	33 257	2,95%	100,0%
PORT-CARTIER	22 600 145	148 411	0,7%	10 000	0,04%	6,7%
TOTAL	77 517 843	17 700 899	22,8%	763 985	0,99%	4,3%

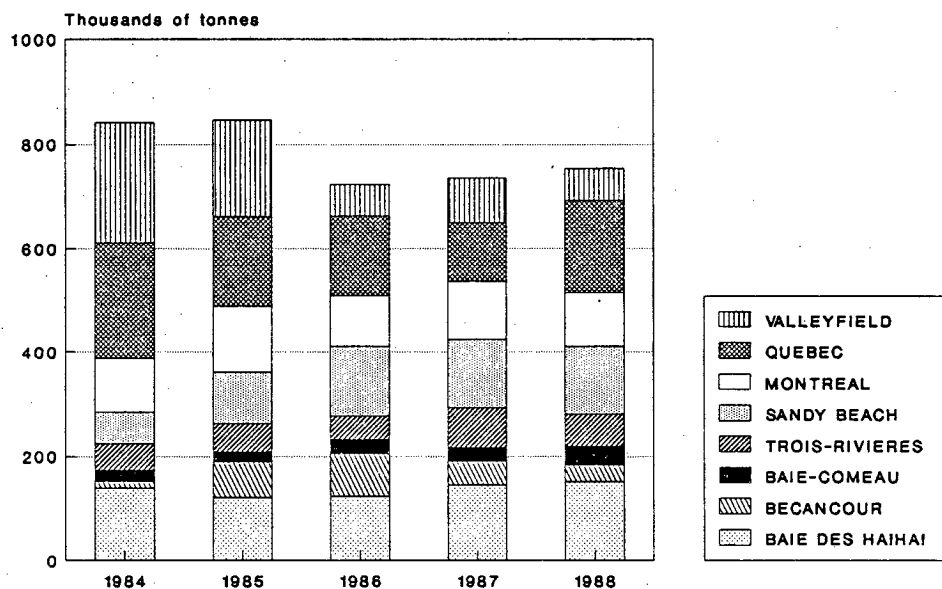
GRAPH 35
TRAFFIC IN BULK LIQUID CHEMICALS AT
ST. LAWRENCE PORTS, 1984 TO 1988



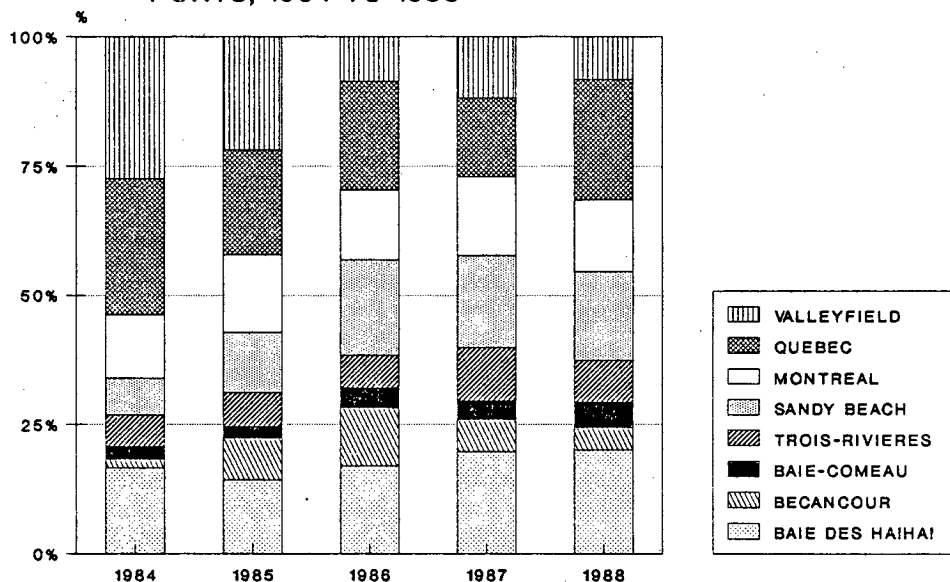
GRAPH 36
RELATIVE PROPORTION (%) OF TRAFFIC IN
BULK LIQUID CHEMICALS AT ST. LAWRENCE
PORTS, 1984 TO 1988



GRAPH 37
BULK LIQUID CHEMICAL TRAFFIC AT
ST. LAWRENCE PORTS, 1984 TO 1988



GRAPH 38
RELATIVE PROPORTION (%) OF TRAFFIC IN
BULK LIQUID CHEMICALS AT ST. LAWRENCE
PORTS, 1984 TO 1988



The main products, in order of importance, are caustic soda, monomeric styrene and vinyl acetate. Caustic soda comes principally from Sarnia in Ontario, and from Houston and Freeport in the United States from where it is sent by ship to Québec City. Almost all of the other bulk liquid chemicals originate in Europe and the United States and are shipped to Eastern Canada through the Port of Québec. Other shipments come from both Eastern and Western Canada and from the United States and are transhipped to Europe, North Africa and South America from the Port of Québec.

The Port of Baie des Ha! Ha!

The traffic in bulk liquid chemicals increased from 121 000 tonnes to 151 000 tonnes between 1984 and 1988 at the Port of Baie des Ha! Ha! With its 1988 volume, representing 3.9% of the port's total traffic, this Saguenay port became second in importance in Québec for handling this type of cargo. The volume was equivalent to 43% of the bulk liquids handled at this port and to 19.8% of the total traffic in bulk liquid chemicals passing through St. Lawrence ports (tables 39 and 44). All incoming shipments of caustic soda come from abroad, notably from the American states bordering the Gulf of Mexico. Some 37% of the total area of the port at Port-Alfred is taken up by tanks for the storage of bulk liquids (bunker oil and caustic soda). Two of the seven tanks at Port-Alfred are used for caustic soda; they have a total capacity of 72 500 tonnes. The Powell wharf, which is used for unloading bulk liquids, is connected to the caustic soda tanks by a pipeline 12 inches in diameter. Stolt-Nielsen is Port Alfred's main supplier of caustic soda.

The main user of the bulk liquid installations (for caustic soda) is the Société d'électrolyse et de chimie Alcan.

The Port of Gaspé (Sandy Beach)

The traffic in bulk liquid chemicals rose considerably during the 1984-1988 reference period at this port. In 1984, 61 000 tonnes of liquid chemicals were handled at the port. This traffic doubled beginning in 1986 and reached 130 000 tonnes in 1988, an appreciable increase of 112%. Sandy Beach was second or third, depending on the year, in order of importance for bulk liquid chemicals in Québec during the reference period (Table 39, Graph 35).

In 1988 this traffic represented 48.3% of the total port traffic, 70% of the port's bulk liquids traffic and 17% of all liquid chemicals handled at St. Lawrence ports (tables 39 and 40).

The main liquid chemical handled at Sandy Beach is sulphuric acid, which is produced at Murdochville by Gaspé Copper Mines Ltd. (Mines Gaspé). The raw material, copper ore, comes mainly from Portugal and to a lesser extent from Chili and Peru. Almost all the sulphuric acid loaded at Sandy Beach is exported to the United States (Baltimore, New London and Newport).

The Port of Montréal

At the Port of Montréal, the total of incoming and outgoing liquid chemicals, at both national and international levels, was fairly stable during the reference period. Only in 1985 did this total increase substantially, only to fall once again, to an annual average of 100 000 tonnes (Graph 35). In 1988 the traffic in bulk liquid chemicals at the Port of Montréal was 0.5% of the total port traffic, 1.3% of the bulk liquids traffic of the port and 13.7% of the traffic in liquid chemicals at St. Lawrence ports (tables 39 and 40). Furthermore, in 1988, 48% of imports of liquid chemicals came from Rotterdam, and the rest from England, Italy, Spain and

the southern United States. Domestic imports came entirely from Amherstburg in Ontario.

Exports abroad amounted to close to 20 000 tonnes and most went to Rotterdam. Other shipments went to New Jersey and Michigan in the United States and to England.

Most shipments of liquid chemicals were carried by tramp by the maritime transport company, Stolt-Nielsen. The Montank terminal is used principally for storing bulk liquid chemicals. It has 56 tanks with a capacity of 33 000 cubic metres to store such products as solvents, caustic soda, phenols and glycols.

The Port of Valleyfield

The total traffic in bulk liquid chemicals gradually decreased over the five years from 1984 to 1988, as did the total traffic at the port, from 231 200 tonnes in 1984 to 62 000 in 1988 (Table 39, Graph 35). In 1988 this traffic accounted for 20% of the port's total traffic, 99.9% of the port's bulk liquids traffic and 8.1% of the liquid chemicals traffic on the St. Lawrence (tables 39 and 44).

The main bulk liquid chemicals handled at the Port of Valleyfield are sulphuric acid, sodium hydroxide, caustic soda and miscellaneous chemicals. Sulphuric acid constitutes a large part of the bulk liquid tonnage passing through the port; this product comes from a plant near the port, Zinc Électrolytique du Canada Ltée, which ships almost all its products abroad, notably to the United States (North Carolina, Maryland, Connecticut and the Gulf of Mexico). However, in 1984 there were more exports to Central America, South America, the Netherlands and New Brunswick, but that traffic gradually disappeared during the reference period and the trend was once more towards the United States in 1987 and 1988. The

traffic in sulphuric acid fell from 180 000 tonnes in 1984 to less than 50 000 tonnes in 1988.

If we look at the table illustrating the traffic in bulk liquid chemicals, we find that caustic soda comes principally from England and West Germany via the Port of Rotterdam. In 1985, 7000 tonnes of caustic soda were imported from the Gulf of Mexico to supply Zinc Électrolytique du Canada Ltée. The category of miscellaneous chemicals consisted of a multitude of other bulk liquid chemicals, which went to Valleytank Inc. There is a strong trade in sodium hydroxide, which comes, like many other chemicals, from Western Europe. There is a constant traffic in products in this category originating in the Netherlands, England and the Gulf of Mexico. Finally, there is sporadic minor traffic from other European countries, i.e. West Germany, France, Belgium and Spain.

Valleytank, a subsidiary of the Odfield group, has storage facilities at the port. There are 26 tanks with a total capacity of 22 280 cubic metres (136 000 barrels), with 6-inch pipelines connecting the tanks with the wharf. There are two other, 4-inch pipelines to connect vessels to tank trucks. The main carriers using the port installations for liquid chemicals are Stolt-Nielsen (sea transport), CN and Conrail (rail transport) and Provost (road transport). Caustic soda is delivered to customers in Montréal and Toronto by rail and road.

The Port of Trois-Rivières

The total traffic in caustic soda at the Port of Trois-Rivières was stable during the reference period, for an annual average volume of 57 600 tonnes. The traffic in liquid chemicals at this port was 3% of the total port traffic in 1988, 28% of the port's bulk liquids traffic and 8% of the liquid chemicals traffic at the ports of the St. Lawrence (tables 39 and 40). During the period, only

incoming shipments of caustic soda were noted, those from abroad being slightly greater in volume than those from Canada. The latter come by tanker mainly from the Great Lakes and Sarnia. The caustic soda from abroad comes primarily from the southern United States and from Freeport in Texas. In both cases it is used to supply the paper mills in the Trois-Rivières area. Somavrac Inc. stores caustic soda for Dow Chemical.

In addition, 40 000 tonnes of liquid clay were handled at the port in 1988. This product comes mainly from Georgia and is used in the manufacture of paper, to bleach it and make it more uniform.

Finally, 35 000 tonnes of liquid fertilizer from Europe via Rotterdam were handled at the port in 1987 and 1988.

The Port of Bécancour

The CIL company operates a plant in the Industrial Park and the Port of Bécancour; its four storage tanks have a capacity of about 16 000 tonnes. It produces some 250 000 tonnes of caustic soda a year, which amounts to 95% of its production capacity.

The total traffic in caustic soda at the port increased slowly beginning in 1984 (14 000 tonnes) and reached a peak of 82 000 tonnes in 1986. It subsequently fell to a little over 33 000 tonnes in 1988 (Table 39, Graph 35).

The liquid chemicals traffic at the Port of Bécancour represented, in 1988, 3% of the total port traffic, 100% of the port's bulk liquids traffic and 4.4% of the traffic in liquid chemicals on the St. Lawrence (tables 39 and 44). The transport of caustic soda from the plant to the wharf is carried out by tank truck. Transport by ship is used essentially for exports to the eastern United States (Norfolk, Southfolk). These exports amount to some 10% of total

production. About 60% of total production is carried by rail and the remainder, 30%, by truck. Caustic soda shipments to the main customers in the United States and Canada (Newfoundland, Nova Scotia) are made by Provost (road), CN (rail) and Stolt (sea).

There are plans to build a wharf to be used exclusively for bulk liquids at the Port of Bécancour. The wharf would be connected by pipeline to the plants. Port authorities have told us, however, that if the project is to materialize the demand must be sufficient.

The Port of Baie-Comeau

Caustic soda constitutes the major portion of the bulk liquid chemicals traffic at this port. Growth between 1984 and 1988 was slow, the traffic increasing from 21 000 tonnes to 36 600 tonnes (Table 39); in 1988 caustic soda accounted for 0.5% of the total port traffic, 25% of the bulk liquids traffic at the port and 5% of the traffic in this category at all St. Lawrence ports. This product, which is produced by Dow Chemical at Freeport, Texas, and shipped to the Port of Baie-Comeau by sea, is the only one coming into the port. It is used by the Compagnie de papier Québec et Ontario.

The Port of Port-Cartier

In 1988, 10 000 tonnes of bulk liquid chemicals, consisting of caustic soda for use in the manufacture of paper at the Cascades plant, were handled at this port. This product comes from Freeport in Texas. The Cascades plant is temporarily closed, following the loss of a large European contract.

CONCLUSION

At the ports of Baie des Ha! Ha!, Trois-Rivières and Montréal, the traffic in bulk liquid chemicals improved slightly during the reference period. The Port of Québec experienced a drop in traffic of some 49% (Graph 38) between 1984 and 1987, but in 1988 there was a substantial increase in traffic of close to 56%. Québec is the only port where there was a significant improvement in the bulk liquid chemicals traffic between 1987 and 1988 (Graph 36); this traffic at all the other ports either remained more or less stable or declined.

The Port of Valleyfield experienced a sharp drop in its traffic, amounting to a loss of 73% (Graph 38) or 169 000 tonnes during the reference period. In 1984 Valleyfield, with 231 000 tonnes, had acquired 27.4% of this particular traffic on the St. Lawrence. It was in the front rank of ports handling bulk liquid chemicals. By 1988, this percentage had dropped to 8.1% (Table 39), with only 62 000 tonnes. It seems that competition from the ports of Québec and Montréal, which were able to offer more advantageous rates because of the longer navigation season and greater storage capacity, was one of the factors that contributed to this decrease in traffic.

The Port of Sandy Beach recorded a 112% increase in its sulphuric acid traffic during the period, but the tonnage handled since 1986 is more or less stable, and may even be slightly lower. In 1984 the traffic in liquid chemicals was 7.2% of the total, and since 1986 it has been in the region of 17% (graphs 36 and 38).

V - MARITIME TRAFFIC IN BULK LIQUID EDIBLE ON THE ST. LAWRENCE

Bulk liquid edible accounted for 1% of all liquid bulk handled at St. Lawrence ports from 1984 to 1988. Port traffic in this category of commodities ranged from 130 000 tonnes to 182 000 during the period (tables 45 and 46, Graph 39). Three ports are involved, Montréal primarily, followed by Trois-Rivières and then Valleyfield.

The Port of Montréal

The Port of Montréal is the main transit and storage centre for bulk liquid edible on the St. Lawrence. This traffic varied between 109 000 tonnes and 167 000 tonnes during the reference period. Montréal had between 82% and 93% of the traffic in bulk liquid edible handled by St. Lawrence ports. This traffic consists of five commodity categories: molasses, tallow, alcoholic beverages, oils, fats and waxes, and fruit juices (Table 47, graphs 40 and 41).

The molasses traffic ranged from 36 334 tonnes in 1984 to 62 631 tonnes in 1988 with a peak of 86 634 tonnes in 1985 (Table 47), the greatest fluctuation during the reference period. Incoming traffic was almost exclusively from the Caribbean--Belize, Cuba, the Dominican Republic, Barbados--and from Florida¹. Between 1986 and 1988 there was a modest movement in this traffic towards Hamilton and Toronto.

The tallow traffic amounted to some 40 000 tonnes (Table 47). In the reference period it ranged from 37 941 tonnes to 42 668 tonnes. Exports go to Naples, Rotterdam, Lisbon, Barcelona, Algeria, Casablanca, Alexandria, Dakar and Mauritania.

¹ From 1986 to 1988, we register a light traffic of this product at national level from Montréal to Hamilton and Toronto.

TABLE 45

TOTAL TRAFFIC IN LIQUID BULK AND BULK LIQUID EDIBLE AT ST.LAWRENCE PORTS
1984 TO 1988 (tonnes)

TRAFFIC	TOTAL TRAFFIC (TT)	LIQUID BULK (LB)	LB/TT	EDIBLE (E)	E/TT	E/LB
YEAR 1984						
PORT						
MONTREAL	23 806 140	8 340 188	35,0%	108 619	0,5%	1,3%
TROIS-RIVIERES	3 107 079	235 683	7,6%	21 000	0,7%	8,9%
VALLEYFIELD	472 940	231 189	48,9%	16	0,0%	0,0%
TOTAL	110 362 777	17 788 340	16,1%	128 635	0,1%	0,7%
YEAR 1985						
PORT						
MONTREAL	21 093 674	6 532 161	31,0%	150 182	0,7%	2,3%
TROIS-RIVIERES	1 957 217	201 134	10,3%	21 000	1,1%	10,4%
VALLEYFIELD	433 055	184 480	42,6%	41	0,0%	0,0%
TOTAL	101 748 700	14 588 626	14,3%	171 223	0,2%	1,2%
YEAR 1986						
PORT						
MONTREAL	21 597 640	6 229 481	28,8%	135 259	0,6%	2,2%
TROIS-RIVIERES	2 785 310	224 293	8,1%	29 000	1,0%	12,9%
VALLEYFIELD	321 608	61 358	19,1%	0	0,0%	0,0%
TOTAL	103 239 480	15 171 766	14,7%	164 259	0,2%	1,1%
YEAR 1987						
PORT						
MONTREAL	21 866 747	6 634 016	30,3%	166 904	0,8%	2,5%
TROIS-RIVIERES	2 209 065	196 143	8,9%	15 000	0,7%	7,6%
VALLEYFIELD	272 968	86 754	31,8%	0	0,0%	0,0%
TOTAL	105 674 658	16 292 363	15,4%	181 904	0,2%	1,1%
YEAR 1988						
PORT						
MONTREAL	22 239 413	7 860 974	35,3%	140 508	0,6%	1,8%
TROIS-RIVIERES	1 983 756	221 436	11,2%	10 000	0,5%	4,5%
VALLEYFIELD	305 773	264 559	86,5%	72	0,0%	0,0%
TOTAL	110 657 406	18 776 574	17,0%	150 580	0,1%	0,8%

TABLE 46

TRAFFIC IN BULK LIQUID EDIBLE AT ST. LAWRENCE PORTS, 1984 TO 1988
(tonnes)

YEAR	1984	%*	1985	%*	1986	%*	1987	%*	1988	%*
PORT										
MONTREAL	108 619	84%	150 182	88%	135 259	82%	166 904	92%	140 508	93%
TROIS-RIVIERES	21 000	16%	21 000	12%	29 000	18%	15 000	8%	10 000	7%
VALLEYFIELD	16	0,01%	41	0,02%	0	0,0%	0	0,0%	72	0,05%
TOTAL	129 635	100%	171 223	100%	164 259	100%	181 904	100%	150 580	100%

* : Proportion of total

GRAPH 39
BREAKDOWN OF TRAFFIC IN BULK LIQUID
EDIBLE PRODUCTS AT ST. LAWRENCE PORTS,
1984 TO 1988

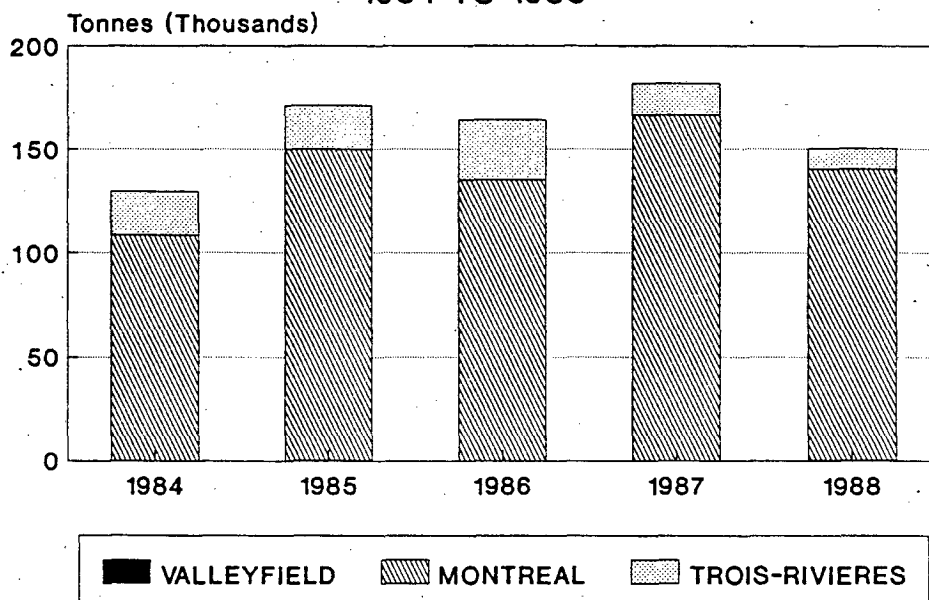


TABLE 47

TRAFFIC IN BULK LIQUID EDIBLE AT THE PORT OF MONTRÉAL, 1984 TO 1988
(tons)

YEAR	1984	1985	1986	1987	1988
MOLASSES					
TOTAL	36 334	69 211	50 044	86 634	62 631
INCOMING	36 334	69 211	48 076	86 634	58 171
INTERNATIONAL	36 334	69 211	48 076	80 913	58 171
INCOMING	36 334	69 211	48 076	80 913	58 171

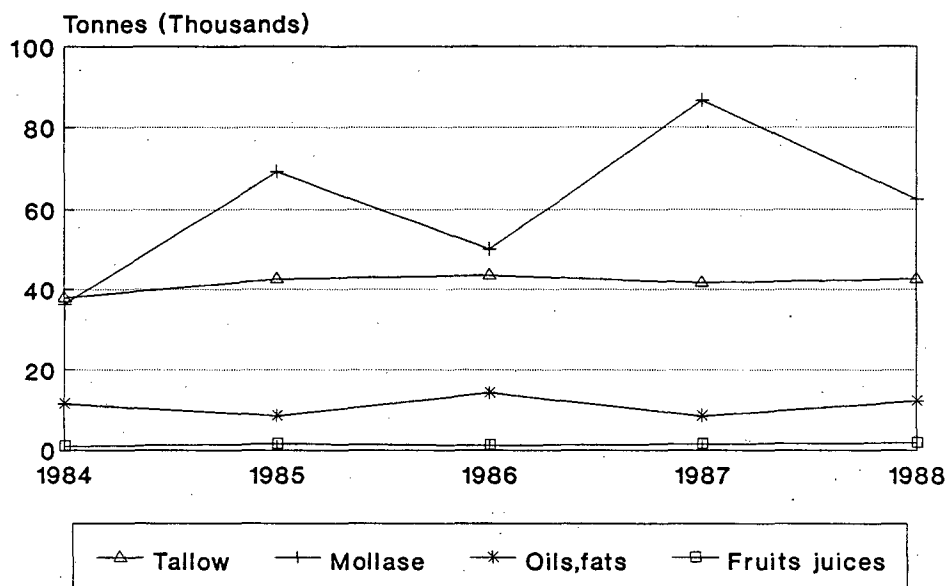
TALLOW					
TOTAL	37 941	42 636	43 678	41 685	42 668
OUTGOING	37 941	42 636	43 678	41 685	42 668
INTERNATIONAL	37 941	42 636	43 678	41 685	42 668
OUTGOING	37 941	42 636	43 678	41 685	42 668

ALCOHOLIC BEVERAGES:					
TOTAL	21 985	28 097	25 929	28 497	21 113
INCOMING	21 985	28 097	25 929	28 497	21 113
INTERNATIONAL	21 985	28 097	25 929	28 497	21 113
INCOMING	21 985	28 097	25 929	28 497	21 113

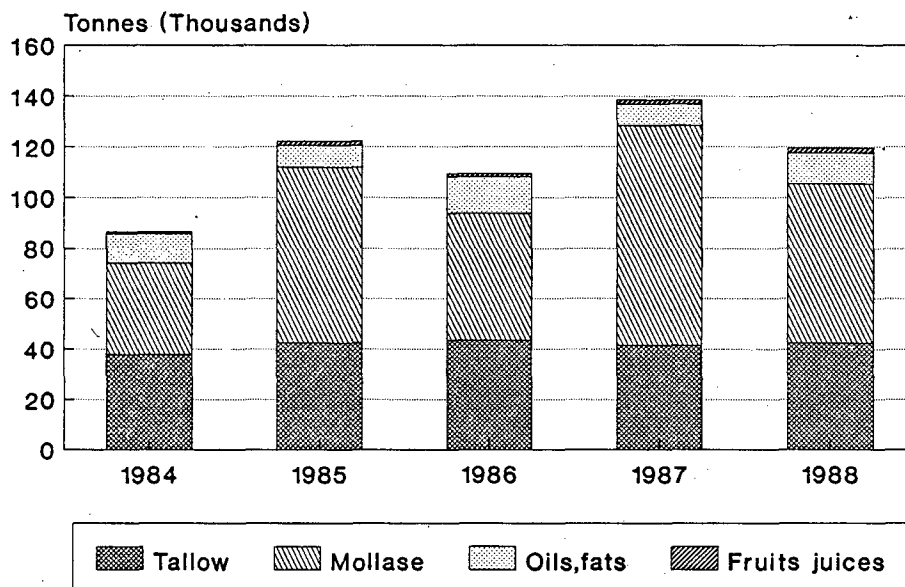
OILS, FATS, WAXES					
TOTAL	11 422	8 589	14 270	8 494	12 221
INCOMING	10 768	5 763	0	6 242	6 970
OUTGOING	654	2 826	5 797	2 252	5 251
INTERNATIONAL	11 422	8 589	14 270	8 494	12 221
INCOMING	10 768	5 763	8 473	6 242	6 970
OUTGOING	654	2 826	5 797	2 252	5 251

FRUIT JUICES:					
TOTAL	937	1 649	1 338	1 594	1 875
INCOMING	937	1 649	1 338	1 594	1 875
INTERNATIONAL	937	1 649	1 338	1 594	1 875
INCOMING	937	1 649	1 338	1 594	1 875

GRAPH 40
TRAFFIC IN BULK LIQUID EDIBLE PRODUCTS
AT THE PORT OF MONTRÉAL, 1984 TO 1988



GRAPH 41
BREAKDOWN OF BULK LIQUID EDIBLE PRODUCTS
AT THE PORT OF MONTRÉAL, 1984 TO 1988



The traffic in alcoholic beverages is third in order of importance among bulk liquid commodities at the Port of Montréal. It fluctuated between 21 000 tonnes and 28 500 during the reference period (Table 47).

These movements of commodities (alcoholic beverages) constitute the main portion of imports from abroad. The products come primarily from France (Bordeaux and Marseilles in equal proportions), from Spain (Valencia) and Italy (Genoa). A small amount comes from Guyana (Georgetown).

The traffic in oils, fats and waxes ranged from 8494 tonnes to 14 270 tonnes during the period (Table 47). They were mainly imports from Rotterdam. Outgoing shipments, which increased slightly between 1984 and 1988, went mostly to Rotterdam, Korea, the Philippines, Malaysia and Spain.

The traffic in fruit juices, the final category of bulk liquid edible handled at the Port of Montréal, doubled during the reference period, rising from 937 tonnes to 1875 tonnes (Table 47). These products are mainly from abroad--Genoa and Valencia.

There are many companies in Montréal that use and stock bulk liquid edible--Canada West Indies, Les Produits Alimentaires Grandma, Lallemand Inc., Canada Packers, Les Moulins Maple Leaf and the Société des Alcools du Québec. These companies have 204 storage tanks for the various products with a total capacity of 87 937 cubic metres (Table 60).

The Port of Trois-Rivières

Molasses is the only bulk liquid edible handled by the Port of Trois-Rivières. It is used by the mills in the region which mix it with feed for cattle. Between 1984 and 1988, traffic varied from

21 000 tonnes to 10 000 tonnes, with a high point of 29 000 tonnes in 1986 (Table 48). Its proportion of the total traffic in bulk liquid edible at St. Lawrence ports varied from 7% to 18% (Table 46).

Traffic varies greatly for this market is very competitive. Molasses comes from the Caribbean, mainly Jamaica, Trinidad, Tobago and Grenada, and from Florida.

Servitank has two tanks with a capacity of 16 200 cubic metres for storing molasses.

The Port of Valleyfield

There is little traffic in bulk liquid edible at the Port of Valleyfield. In 1984 it amounted to 16 tonnes and in 1985, 41 tonnes. In 1986 and 1987 there was no traffic at all, and in 1988, 72 tonnes (Table 49).

In 1985, pickles, sauces and salad dressings in bulk were shipped from Valleyfield to South Africa. In 1988, traffic of 72 tonnes was recorded at the port, from Jamaica, consisting mainly of non-fermented and concentrated syrups and fruit juices.

CONCLUSION

The traffic in bulk liquid edible at St. Lawrence ports is small and mainly concentrated at Montréal. There is, however, a certain potential for development in this type of traffic, even though it is more or less stable at the moment.

TABLE 48

TRAFFIC IN BULK LIQUID EDIBLE AT THE PORT OF TROIS-RIVIERES, 1984 TO 1988
(tonnes)

PRODUCTS: MOLASSES	1984	1985	1986	1987	1988
TOTAL	21 000	21 000	29 000	15 000	10 000
INCOMING	21 000	21 000	29 000	15 000	10 000
OUTCOMING	0	0	0	0	0
NATIONAL	0	0	0	0	0
INCOMING	0	0	0	0	0
OUTCOMING	0	0	0	0	0
INTERNATIONAL	21 000	21 000	29 000	15 000	10 000
INCOMING	21 000	21 000	29 000	15 000	10 000
OUTCOMING	0	0	0	0	0

TABLE 49

TRAFFIC IN BULK LIQUID EDIBLE AT THE PORT OF VALLEYFIELD, 1984 TO 1988
(tonnes)

FOODS	1984	1985	1986	1987	1988
TOTAL	16	41	0	0	72
INCOMING	0	0	0	0	72
OUTCOMING	16	41	0	0	0
NATIONAL	0	0	0	0	0
INCOMING	0	0	0	0	0
OUTCOMING	0	0	0	0	0
INTERNATIONAL	16	41	0	0	72
INCOMING	0	0	0	0	72
OUTCOMING	16	41	0	0	0

VI - LIQUID BULK TRAFFIC THROUGH THE ST. LAWRENCE SEAWAY,
1984 TO 1988

The St. Lawrence Seaway is the longest inland waterway in the world. It carries traffic every bit as impressive as that consisting of ocean-going vessels. Navigation on this part of the system, upbound from Montréal, is seasonal (early April to December 20), while downbound it is year-round, including the Port of Montréal.

The Seaway as such has two sections, Montréal - Lake Ontario and the Welland Canal. The first section between Montréal and Lake Ontario covers a distance of 300 km. Seven locks lift vessels up 75 metres. Five of these are on Canadian territory (four of them in Québec) and two on American territory.

The Welland Canal allows ships to clear the Niagara escarpment, a height of some 100 metres, by means of eight locks all of which are on Canadian territory, over a distance of 42 km. Vessels 220 metres long, 23 metres wide with a draft of up to 8.3 metres, which are specially designed to go through the locks and which can carry close to 30 000 tonnes of goods, regularly use this waterway.

The Montréal - Lake Ontario section

In 1988, total traffic in the Montréal - Lake Ontario section amounted to 40 557 669 tonnes, compared with 43 536 317 tonnes in the Welland Canal section.

There has recently been a change in the relative proportions of the main commodities transported by Canadian carriers on the Seaway. Formerly downbound grains and upbound iron ore dominated the traffic, but since 1984, coal has been the main commodity carried

by Canadian vessels on the Seaway. We are now witnessing a decline in grain traffic and stagnation in iron ore traffic to the benefit of coal.

Liquid bulk moving through the Seaway varied in volume from 2 million tonnes to 2.67 million tonnes between 1984 and 1988 in the Montréal - Lake Ontario section, representing from 4.7% to 6.6% of the total traffic in this section.

Bulk liquid chemicals and petroleum products dominated the maritime bulk liquid traffic, with, respectively, 1.35 million tonnes and 1.29 million tonnes in 1988 (Table 50).

Bulk liquid edible transported in this section constituted a negligible proportion of the traffic, decreasing constantly throughout the 1984-1988 reference period. The total dropped from 70 000 tonnes to less than 20 000 tonnes. The proportion in relation to liquid bulk generally decreased from 3% to less than 1% in 1988.

In the Montréal - Lake Ontario section, total downbound traffic from 1984 to 1988 was greater than total traffic upbound. However, this difference tended to decrease considerably during the period (tables 51 and 52).

The total downbound traffic in bulk liquids dropped from 1.5 million tonnes in 1984 to 1.2 million tonnes in 1988 and their proportions decreased from 70% to 47% in relation to the upbound traffic in this category. During this period, the upbound movement of bulk liquids in this section practically doubled, rising from 0.7 million tonnes to 1.4 million tonnes, and its importance in relation to downbound traffic increased from 30% to 54% (Table 53).

TABLE 50

LIQUID BULK TRAFFIC ON THE MONTRÉAL-LAKE ONTARIO SECTION OF THE
ST.LAWRENCE SEAWAY, 1984 TO 1988 (TONNES)

YEAR	TOTAL TRAFFIC (TT)	LIQUID BULK (LB)	LB/TT (%)	PETROLEUM PRODUCTS (PP)	PP/LB (%)	CHEMICALS (C)	C/LB (%)	EDIBLE (E)	E/LB (%)
1984	47 505 456	2 243 737	4,72%	1 134 549	50,57%	1 044 620	46,56%	64 568	2,88%
1985	37 321 698	2 003 658	5,37%	796 332	39,74%	1 133 848	56,59%	73 478	3,67%
1986	37 581 808	2 268 848	6,04%	989 498	43,61%	1 236 067	54,48%	43 283	1,91%
1987	39 968 615	2 039 463	5,10%	889 794	43,63%	1 110 904	54,47%	38 765	1,90%
1988	40 557 669	2 672 305	6,59%	1 297 728	48,56%	1 357 921	50,81%	16 656	0,62%

Source: ST.LAWRENCE Seaway, 1984-1988 Traffic Report

TABLE 51

DOWNBOUND LIQUID BULK TRAFFIC ON THE MONTREAL LAKE ONTARIO
SECTION, 1984 TO 1988 (TONNES)

YEAR	TOTAL DOWN-BOUND TRAFFIC (TT)	DOWN-BOUND LIQUID BULK (LB)	LB/TT (%)	PETROLEUM PRODUCTS (PP)	PP/LB (%)	CHEMICALS (C)	C/LB (%)	EDIBLE (E)	E/LB (%)
1984	28 868 773	1 550 565	5,37%	880 959	56,82%	619 083	39,93%	50 523	3,26%
1985	22 496 389	1 391 375	6,18%	651 133	46,80%	683 262	49,11%	56 980	4,10%
1986	22 935 623	1 249 846	5,45%	591 383	47,32%	620 388	49,64%	38 075	3,05%
1987	23 158 151	938 469	4,05%	412 955	44,00%	490 990	52,32%	34 524	3,68%
1988	21 903 409	1 250 805	5,71%	605 841	48,44%	632 293	50,55%	12 671	1,01%

Source: ST.LAWRENCE Seaway, 1984-1988 Traffic Report

TABLE 52

UPBOUND LIQUID BULK TRAFFIC ON THE MONTREAL - LAKE ONTARIO SECTION, 1984 TO 1988
(tonnes)

YEAR	TOTAL UP-BOUND TRAFFIC	UP-BOUND LIQUID BULK	LB/TT	PETROLEUM PRODUCTS	PP/LB	CHEMICALS	C/LB	EDIBLE	E/LB
	(TT)	(LB)	(%)	(PP)	(%)	(C)	(%)	(E)	(%)
1984	18 636 683	693 172	3,72%	253 590	36,58%	425 537	61,39%	14 045	2,03%
1985	14 825 309	612 283	4,13%	145 199	23,71%	450 586	73,59%	16 498	2,69%
1986	14 646 185	1 019 002	6,96%	398 115	39,07%	615 679	60,42%	5 208	0,51%
1987	16 810 464	1 100 994	6,55%	476 839	43,31%	619 914	56,30%	4 241	0,39%
1988	18 654 260	1 421 500	7,62%	691 887	48,67%	725 628	51,05%	3 985	0,28%

Source: ST.LAWRENCE Seaway, 1984-1988 Traffic Report

TABLE 53

UPBOUND AND DOWNBOUND LIQUID BULK TRAFFIC ON THE MONTREAL -
LAKE ONTARIO SECTION, 1984 TO 1988
(tonnes)

YEAR	TOTAL LIQUID BULK	DOWNBOUND LIQUID BULK	DLB/ TLB	UPBOUND LIQUID BULK	ULB/ TLB
	(TLB)	(DLB)	(%)	(ULB)	(%)
1984	2 243 737	1 550 565	69,11%	693 172	30,89%
1985	2 003 658	1 391 375	69,44%	612 283	30,56%
1986	2 268 848	1 249 846	55,09%	1 019 002	44,91%
1987	2 039 463	938 469	46,02%	1 100 994	53,98%
1988	2 672 305	1 250 805	46,81%	1 421 500	53,19%

Source: ST.LAWRENCE Seaway, 1984-1988 Traffic Report

Downbound liquid bulk traffic

Downbound traffic in liquid bulk, although it dropped from 1.5 million tonnes to 1.25 million tonnes from 1984 to 1988, increased from 4% to 6% of the total downbound traffic.

Traffic in this direction was dominated at the beginning of the period by petroleum products (0.8 million tonnes), but this traffic decreased to 0.41 million tonnes in 1987, only to increase once again in 1988, to 0.6 million tonnes. The proportion of this category of traffic went down to 44% from 57% between 1984 and 1987, before stabilizing in 1988 at 48%. Bulk liquid chemicals were second in importance in the downriver direction, in the Montréal - Lake Ontario section, representing 40% of the liquid bulk traffic in 1984, with 0.62 million tonnes. Beginning in 1985, the volume of chemicals remained above 0.6 million tonnes, except for 1987 when it dropped to 0.49 million tonnes. The proportion of downbound traffic in bulk liquid chemicals in the section was about 40% in 1984, occupying first place in this product category until the end of the period and remaining just under or just over 50% in relative importance.

The downbound traffic in bulk liquid edible was modest and continued to decline during the reference period. From 50 000 tonnes in 1985, it dropped constantly until it reached 12 671 in 1988, which represented only 1% of total bulk liquid traffic in this direction. This traffic varied between 3% and 4% of total bulk liquids in the other years of the reference period (Table 51).

Upbound liquid bulk traffic

The upbound traffic in liquid bulk in the Montréal - Lake Ontario section of the Seaway practically doubled between 1984 and 1988, rising from 0.69 million tonnes to 1.4 million tonnes. Its relative

importance in total traffic increased from 3.7% to 7.6%. Most of the traffic in liquid bulk in this direction consisted of bulk liquid chemicals, which rose steadily from 425 537 tonnes to 725 628 tonnes between 1984 and 1988. At the beginning of the period they accounted for over 60% of liquid bulk, even reaching 73% in 1985, only to drop again, to 56% in 1987 and to 51% in 1988. This was attributable to the gradual recovery in oil products, particularly after 1986, when the volume was close to 400 000 tonnes that year, 476 839 tonnes in 1987 and 691 887 tonnes in 1988. The first years of this period were marked by a relatively low traffic in petroleum products--253 590 tonnes in 1984 and a low point of 145 199 tonnes in 1985.

Petroleum products remained below 40% of the upbound bulk liquid traffic on the Montréal - Lake Ontario section between 1984 and 1986, hitting a trough of 23% in 1985, and rising again to 43% in 1987 and 48% in 1988.

The proportion of bulk liquid edible moving in this direction in the same Seaway section remained minimal, dropping from 15 000 tonnes in 1984 and 1985 to less than 4 000 tonnes in 1988, accounting for 2% to 3% in 1984 and 1985, and for the infinitesimal proportion of less than 0.5% of total liquid products thereafter.

The Welland Canal section

In 1988, total traffic on the Welland Canal section of the St. Lawrence Seaway amounted to 43 536 317 tonnes.

Liquid bulk carried on this section of the Seaway varied between 1.8 million tonnes and 2.1 million tonnes, or from 3.6% to 5.2% of the total traffic moving through the locks of the Welland Canal. Petroleum products, which dominated the liquid bulk traffic in 1984, gave way to bulk chemicals from 1985 on. They headed the list

until 1988 with traffic slightly more than 1 million tonnes, except in 1987 when the volume was 955 404 tonnes. The proportions of 52% to 55% of total bulk liquid products moving through the Welland Canal between 1985 and 1988 are indicative of the volume of liquid chemicals. In 1984, they accounted for 42% of the total compared with 55% for petroleum products, which reached a peak of 1 million tonnes that year alone. Subsequently, this traffic varied from 0.83 million tonnes and 0.95 million tonnes, accounting for 43% and 45% of total liquid bulk.

The volume of bulk liquid edible carried on the Welland Canal between 1984 and 1988 was small and diminished constantly beginning in 1985, dropping from 60 000 tonnes to only 11 832 in 1988. Their share of total liquid bulk never rose above 2% between 1986 and 1988, and even fell to 0.5% in 1988. The peak of this short period came in 1985 with 60 645 tonnes or 3.06% of the traffic in liquid bulk on the Welland Canal (Table 54).

Downbound liquid bulk traffic

Between 1984 and 1988, total downbound traffic remained greater--almost three times more--than upbound traffic (tables 55 and 56).

The downbound traffic in liquid bulk between 1984 and 1988 in the Welland Canal section remained at about 1.4 million tonnes, with a drop to 1.1 million tonnes in 1987, which corresponded to between 3.5% and 4.7% of the total traffic.

Liquid bulk traffic downbound varied from 1.1 million tonnes to 1.4 million tonnes in volume between 1984 and 1988, the proportion dropping from 72% to 67%, with a thin period in 1987 when it was 61%. Upbound movement, although the proportion was only about a third in 1984 and 1985, amounting to some half million tonnes, rose to almost 700 000 tonnes between 1986 and 1988 (Table 57).

TABLE 54

LIQUID BULK TRAFFIC ON THE WELLAND CANAL SECTION OF THE ST. LAWRENCE SEAWAY, 1984 TO 1988
(tonnes)

YEAR	TOTAL TRAFFIC (TT)	LIQUID BULK (LB)	LB/TT (%)	PETROLEUM PRODUCTS (PP)	PP/LB (%)	CHEMICALS (C)	C/LB (%)	EDIBLE (E)	E/LB (%)
1984	53 916 858	1 955 664	3,63%	1 080 601	55,25%	823 096	42,09%	51 967	2,66%
1985	41 851 760	1 981 109	4,73%	888 471	44,85%	1 031 993	52,09%	60 645	3,06%
1986	41 612 770	2 154 629	5,18%	925 853	42,97%	1 190 369	55,25%	38 407	1,78%
1987	42 724 755	1 820 143	4,26%	830 581	45,63%	955 404	52,49%	34 158	1,88%
1988	43 536 317	2 087 662	4,80%	955 841	45,79%	1 119 989	53,65%	11 832	0,57%

Source: St. Lawrence Seaway, 1984-1988 Traffic Report

TABLE 55

DOWNBOUND LIQUID BULK TRAFFIC ON THE WELLAND CANAL SECTION, 1984 TO 1988
(tonnes)

YEAR	TOTAL DOWNBOUND TRAFFIC (TT)	DOWNBOUND LIQUID BULK (LB)	LB/TT (%)	PETROLEUM PRODUCTS (PP)	PP/LB (%)	CHEMICALS (C)	C/LB (%)	EDIBLE (E)	E/LB (%)
1984	39 837 065	1 407 145	3,53%	776 009	55,15%	582 583	41,40%	48 553	3,45%
1985	30 964 259	1 460 317	4,72%	628 556	43,04%	775 365	53,10%	56 496	3,87%
1986	31 388 740	1 473 466	4,69%	647 260	43,93%	788 188	53,49%	38 018	2,58%
1987	31 294 712	1 117 927	3,57%	439 858	39,35%	644 160	57,62%	33 909	3,03%
1988	31 172 325	1 398 415	4,49%	624 719	44,67%	762 123	54,50%	11 573	0,83%

Source: St. Lawrence Seaway, 1984-1988 Traffic Report

TABLE 56

UPBOUND LIQUID BULK TRAFFIC ON THE WELLAND CANAL SECTION, 1984 TO 1988
(Tonnes)

YEAR	TOTAL UPBOUND TRAFFIC (TT)	UPBOUND LIQUID BULK (LB)	LB/TT (%)	PETROLEUM PRODUCTS (PP)	PP/LB (%)	CHEMICALS (C)	C/LB (%)	EDIBLE (E)	E/LB (%)
1984	14 079 793	548 529	3,90%	304 592	55,53%	240 523	43,85%	3 414	0,62%
1985	10 887 501	520 792	4,78%	259 915	49,91%	256 728	49,30%	4 149	0,80%
1986	10 224 030	681 163	6,66%	278 593	40,90%	402 181	59,04%	389	0,06%
1987	11 430 043	702 216	6,14%	390 723	55,64%	311 244	44,32%	249	0,04%
1988	12 363 992	688 977	5,57%	330 852	48,02%	357 866	51,94%	259	0,04%

Source: ST.LAWRENCE Seaway, 1984-1988 Traffic Report

TABLE 57

DOWNBOUND AND UPBOUND LIQUID BULK TRAFFIC ON THE WELLAND CANAL SECTION, 1984 TO 1988
(Tonnes)

YEAR	TOTAL LIQUID BULK (TLB)	DOWNBOUND LIQUID BULK (DLB)	DLB/ TLB (%)	UPBOND LIQUID BULK (ULB)	ULB/ TLB (%)
1984	1 955 664	1 407 145	71,95%	548 529	28,05%
1985	1 981 109	1 460 317	73,71%	520 792	26,29%
1986	2 154 629	1 473 466	68,39%	681 163	31,61%
1987	1 820 143	1 117 927	61,42%	702 216	38,58%
1988	2 087 662	1 398 415	66,98%	688 977	33,00%

Source: ST.LAWRENCE Seaway, 1984-1988 Traffic Report

Liquid bulk traffic downstream at the beginning of the reference period was dominated by petroleum products (0.77 million tonnes), which subsequently reached a level of 600 000 tonnes and a low of 439 858 tonnes in 1987. The importance of this category of liquid bulk went from 55% in 1984 to 43% and 44% subsequently, with a proportion of 39% in 1987.

Bulk liquid chemicals moving downstream were second in importance in 1984, but in 1985 moved into first place and remained there until the end of the period. This traffic amounted to between 700 000 tonnes and 800 000 tonnes annually, except in 1987 when the volume was 644 160 tonnes, representing 53% to 57% of the total liquid bulk throughout the period. Downbound liquid edible in bulk in the Welland Canal section did not figure very largely in total liquid bulk, coming to a volume of some 50 000 tonnes in 1984 and 1985 and gradually declining to 11 573 tonnes in 1988. The proportion fell from 3% to less than 1% between 1984 and 1988 (Table 55).

Upbound liquid bulk traffic

Upstream traffic in liquid bulk in the Welland Canal section increased from 0.54 million tonnes to 0.68 million tonnes between 1984 and 1988. In this section of the Seaway it varied from 3.9% to 6.6% of total liquid bulk traffic.

Here too petroleum products and chemicals constituted the bulk of this particular traffic. Liquid bulk edible, which varied between a few thousand tonnes and a few hundred tonnes from beginning to end of the reference period, represented less than 1% of total bulk liquids upbound on the Welland Canal section.

Petroleum products were dominant in 1984, 1985 and 1987 with a volume varying between 250 000 tonnes and 400 000 tonnes, or proportions of 50% to 55% of total bulk liquids upbound. Liquid chemicals were in first place in 1986 and 1988, with a volume of 350 000 tonnes to 400 000 tonnes or 52% to 59% of total liquid bulk.

In the other years of this reference period, this traffic oscillated between 240 000 tonnes and 310 000 tonnes or 43% and 49% of the total traffic in liquid bulk in this direction on the Welland Canal section.

CONCLUSION

During the reference period, maritime traffic in both sections of the St. Lawrence Seaway was characterized by traffic in commodities and liquid bulk that was greater downbound than upbound. Only in the Montréal - Lake Ontario section in 1988 was the movement of liquid bulk greater upbound than downbound.

Total traffic and traffic in bulk liquid products were less in the Seaway than on the St. Lawrence. While liquid bulk represented some 16% of the total traffic on the River (Table 17), this category of commodity was equivalent to only a little more than an average of 5% of the total traffic for the Montréal - Lake Ontario section and a little more than 4% of the total traffic on the Welland Canal section.

Although oil products largely dominated the traffic in liquid bulk on the St. Lawrence (94%), beginning in 1985 chemicals took the lead on both sections of the Seaway.

As for liquid bulk edible, they represented a negligible proportion of traffic on both the St. Lawrence and the Seaway.

VII - ABOVE-GROUND LIQUID BULK STORAGE CAPACITY

Total storage capacity for petroleum products, chemicals and edible on the St. Lawrence comes to over 7 million cubic metres contained in some 1100 tanks. Most of the storage space, 93.7%, is for petroleum products. Chemicals follow with 4.8% and then edible with 1.5% (graphs 42 and 43).

Petroleum products

If Table 58 is examined it can be seen that the total capacity for petroleum products is 6.6 million cubic metres in over 770 storage tanks. The company with the greatest storage capacity on the St. Lawrence is Shell Oil, with over 2 million cubic metres. Petro-Canada has the most storage tanks, numbering 204. Shell, Ultramar and Petro-Canada have 67% of the storage capacity on the St. Lawrence, mainly owing to the refineries in Montréal and Québec City.

Ultramar

On the site of its refinery at Saint-Romuald, Ultramar has 51 tanks with a total capacity of 1 166 137 cubic metres, 75% of which is used for storing crude oil, gasoline, diesel oil and heating oil. The rest of the space serves to store catalytic cracking products, #6 fuel oil, asphalt, propane, butane and intermediate products. Ultramar has 13 marine stations along the St. Lawrence which obtain their supplies from this main site. These stations have 82 storage tanks totalling 481 661 cubic metres. Montréal is the second most important storage terminal, after Québec City, with a capacity of 309 197 cubic metres to ensure the distribution of Ultramar products in greater Montréal. Ultramar also has purchase and sale contracts with other oil companies in Québec, with Petro-Canada for the Québec and Chicoutimi regions, for example.

TABLE 58

ABOVE-GROUND STORAGE CAPACITY FOR PETROLEUM PRODUCTS ON THE ST. LAWRENCE
(cubic metres)

COMPAGNY	PORT REGION	NUMBER OF TANKS	CAPACITY (m3)	MAIN PRODUCTS STORED
ESSO	BAIE-COMEAU	10	62 600	Gasoline-distillates-fuel oil
	RIMOUSKI	7	44 200	Gasoline-distillates
	SEPT-ILES	7	31 800	Gasoline-distillates
	MONTREAL-EST	41	395 900	Gasoline-distillates-fuel oil
	TOTAL	65	534 500	
IRVING	BAIE-COMEAU	4	63 663	Gasoline-diesel oil
	CAP-A-L'AIGLE	6	10 343	Gasoline-diesel oil
	FORESTVILLE	6	13 618	Gasoline-diesel oil
	GASPE	5	48 762	Gasoline-diesel oil-heating oil
	CAP-AUX-MEULES	31	7 136	Gasoline-diesel oil-heating oil
	MATANE	7	36 314	Gasoline-diesel oil
	MONTREAL	2	54 200	Heating oil
	PASPEBIAC	5	14 860	Gasoline-diesel oil
	RIMOUSKI	6	30 476	Gasoline-diesel oil
	SILLERY	10	122 443	Gasoline-diesel oil
	TROIS-RIVIERES	6	74 584	Gasoline-diesel oil-heating oil
	GRANDE ENTREE	7	1 445	Gasoline-heating oil
	TOTAL	95	477 844	
HYDRO-QUEBEC	TRACY	7	230 524	Fuel oil
OLCO	QUEBEC CITY	8	132 591	Gasoline-heavy oil-heating oil
	MONTREAL	28	221 879	Gasoline-heavy oil-heating oil
	TOTAL	36	354 470	
PETRO-CANADA	QUEBEC CITY	7	42 687	Heating oil-diesel oil-gasoline
	CHICOUTIMI	6	41 335	Gasoline-heating oil
	RIMOUSKI	6	22 000	Gasoline-heating oil
	MONTREAL *	185	635 000	All petroleum products
	TOTAL	204	741 022	
SHELL	LA BAIE	6	144 284	Distillates-heating oil-fuel
	RIMOUSKI	5	20 910	Gasoline-distillates
	SEPT-ILES	14	30 901	Gasoline-asphalt-distillates-oil-fuel
	QUEBEC CITY	20	105 789	Jet fuel-gasoline-distillates-solvents
	MONTREAL *	147	1 750 000	All petroleum products
	TOTAL	192	2 051 884	
MINES				
QUEBEC CARTIER	PORT CARTIER	8	54 350	Gasoline-diesel-fuel

* The compagny owns and operates a refinery there.

Sources: Above listed companies

TABLE 58 (cont'd)

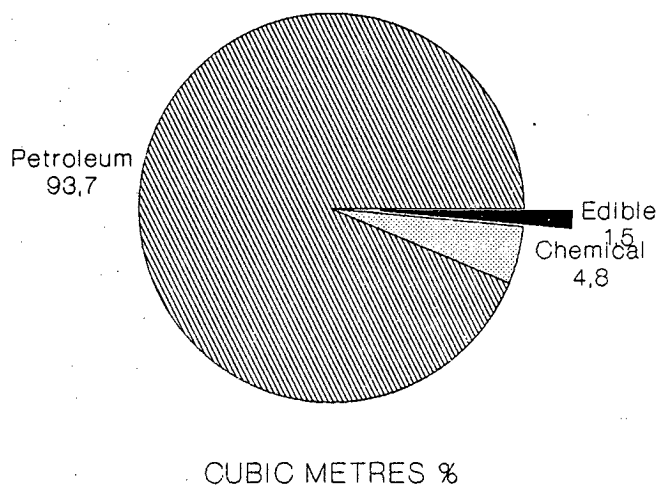
ABOVE-GROUND STORAGE CAPACITY FOR PETROLEUM PRODUCTS ON THE ST. LAWRENCE
(cubic metres)

COMPAGNY	PORT REGION	NUMBER OF TANKS	CAPACITY (m3)	MAIN PRODUCTS STORED STOCKES
ULTRAMAR	MONTREAL	19	309 197	Gasoline-heating oil-diesel- asphalt-calcium
	JOHAN BEETZ	2	595	Gasoline-diesel oil
	BLANC SABLON	2	3 270	Gasoline-diesel oil
	HARRINGTON HARBOUR	4	1 054	Gasoline-diesel oil
	HAVRE-ST-PIERRE	5	4 067	Gasoline-diesel oil
	LA ROMAINE	3	840	Gasoline-diesel oil
	LA TABATIERE	4	1 562	Gasoline-diesel oil
	NATASHQUAN	5	1 504	Gasoline-diesel oil
	PORT CARTIER	8	63 643	Gasoline-diesel oil-heating oil-fuel oil
	ST-AUGUSTIN	10	741	Gasoline-diesel oil
	TETE-A-LA-BALEINE	4	228	Gasoline-diesel oil
	CHICOUTIMI	12	84 360	Gasoline-diesel oil-heating oil
	GASPÉ	4	10 600	Gasoline-heating oil
	QUEBEC CITY*	51	1 166 137	All petroleum products
	TOTAL	133	1 647 798	
REYNOLDS	BAIE-COMEAU	1	190 779	Fuel oil
NORCO CALEX	MONTREAL	8	158 982	Gasoline-fuel oil
SUNOCO	MONTREAL	9	96 979	Gasoline-diesel oil
TEXACO	RIMOUSKI	8	25 400	Gasoline-distillates
	BAIE-COMEAU	7	9 794	Gasoline-distillates
	CHICOUTIMI	4	24 252	Distillates
	TOTAL	19	59 446	
GENERAL TOTAL		777	6 598 578	

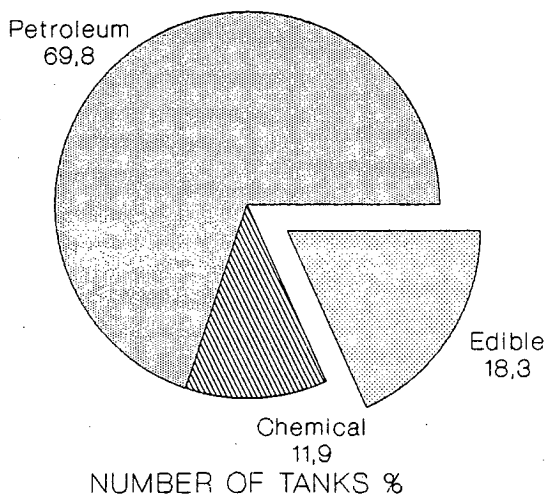
* The compagny owns and operates a refinery there.

Sources: Above listed companies

GRAPH 42
BREAKDOWN OF STORAGE CAPACITY FOR
PETROLEUM, CHEMICAL AND EDIBLE LIQUID
BULK PRODUCTS, ON THE ST. LAWRENCE, 1989



GRAPH 43
BREAKDOWN OF NUMBER OF TANKS FOR
PETROLEUM, CHEMICAL AND EDIBLE PRODUCTS
ON THE ST. LAWRENCE, 1989



Petro-Canada

In addition to its refinery in Montréal, which offers a storage capacity of 635 000 cubic metres for crude oil and refined products in 185 tanks, Petro-Canada has three other terminals on the St. Lawrence, the first at Québec City (on the Beauport flats) with a total storage capacity of 42 687 cubic metres; there is one 13 593-cubic-metre tank for heating oil, two for diesel oil with a total capacity of 6359 cubic metres and four for gasoline of a total capacity of 24 165 cubic metres. The second terminal, in Chicoutimi, has storage capacity of 41 335 cubic metres for oil products. These two terminals used to receive their supplies by ship, but they are no longer in operation. Petro-Canada in Québec City obtains its supplies directly from the Ultramar refinery, while in Chicoutimi, tank trucks get their supplies from Ultramar's marine terminal. Only the depot in Rimouski with its six tanks remains in operation. These tanks have a total capacity of 22 000 cubic metres and store various grades of unleaded gasoline and heating oil. The supplies come by ship from Montréal and Québec City and are used to supply retailers in the Gaspé peninsula. In this region, the Baie des Chaleurs is served by rail and Gaspé by road.

Esso

Esso has facilities in four St. Lawrence ports: 10 tanks in Baie-Comeau, seven in Rimouski, seven in Sept-Îles and 41 in east end Montréal, totalling 534 500 cubic metres of storage space. The main products stored are gasoline, fuel oil, distillates, thinners and aviation fuel.

Irving

Irving Oil, with head offices in Saint John, N.B., has 95 oil storage tanks in Québec. Close to a third of these are located in Cap-aux-Meules in the Îles-de-la-Madeleine, and the others are to be found at fairly regular intervals along the St. Lawrence. Irving has a total storage capacity of 477 844 cubic metres, placing it in the third rank among companies. The principal commodities stocked are gasoline, diesel oil and heating oil; they come from the Irving refinery in Saint John. The company also has its own fleet of tankers serving its 12 marine depots in Québec.

Shell

The east end Montréal refinery has 12 storage tanks for crude oil with a capacity of nearly 450 000 cubic metres. The circulation rate for crude oil is a little under 30 times a year. Finished products are contained in 135 tanks with a total capacity of 1 300 000 cubic metres. This infrastructure supplies four marine stations on the St. Lawrence, among others. They are La Baie, Rimouski, Sept-Îles and Québec City, which offer a total storage capacity of 301 794 cubic metres divided among 45 tanks. After Montréal, Québec City and La Baie are the company's two largest storage stations with respective capacities of 105 789 cubic metres and 144 284 cubic metres.

Hydro-Québec

The Tracy power plant has seven tanks of 230 524 cubic metres in capacity. The fuel oil stocked is used to supply the plant, which began to produce electricity in 1988.

Olco

Olco is a distributor which operates two marine terminals on the St. Lawrence in Québec. In Québec City it has eight storage tanks with a capacity of 132 591 cubic metres, and in Montréal there are 28 storage tanks, some in east end Montréal with a capacity of 146 521 cubic metres and the rest at wharf 94 in the Port of Montréal with a capacity of 75 358 cubic metres, for a total storage capacity of 221 879 cubic metres. Olco distributes gasoline and diesel oil to 140 Olco retailers, and to independents under contract with the company. Olco also sells over \$359 million annually in heating oil, marine fuel and petroleum products wholesale through its three subsidiaries, Striker Industries, Scotcan Marine and Alco Atlantic.

The Olco group obtains its supplies mainly from Esso, with which it has a contract, but also on the spot market. The plant in Québec City is supplied almost exclusively by ship and occasionally from Ultramar at Saint-Romuald by truck.

Sunoco

The Sunoco company has only one maritime terminal on the St. Lawrence, in Montréal, with a storage capacity of 96 979 cubic metres. There are nine tanks, two of which hold 3974 cubic metres and seven, 12 718 cubic metres. The principal products stored are diesel oil and gasoline. Supplies come mainly by pipeline under purchase and exchange agreements with other refineries. Only the gasoline called "Gold" comes, by ship, from Sunoco's refinery in Sarnia. Increasingly, the use of pipelines is causing transport by ship to drop. Since last September, the Kemtec company has had a tank sub-leasing contract with Sunoco.

Texaco

Texaco has three marine depots on the St. Lawrence, at Rimouski, Baie-Comeau and Chicoutimi, with a total storage capacity of 59 446 cubic metres. There are 19 tanks stocking gasoline and distillates, except at Chicoutimi, where there are only distillates. These depots are supplied by ship from the refineries at Nanticoke in Ontario and from Dartmouth in Nova Scotia. There are eight tanks in Rimouski that hold 25 400 cubic metres, seven in Baie-Comeau with a capacity of 9794 cubic metres and four in Chicoutimi with a total capacity of 24 252 cubic metres. The merger with or purchase of Texaco by Esso, although it has been approved, has not yet taken place. The Texaco name will probably disappear from Québec within a year.

Chemicals and edible

Total chemicals and edible stored amount to some 440 000 cubic metres. The nine firms storing chemicals on the St. Lawrence offer a total of 335 869 cubic metres of space in 133 tanks. The main products stocked are caustic soda and sulphuric acid.

There are 204 edible tanks with a total capacity of 104 137 cubic metres. The main products stored are molasses, various oils, tallow, and wines and spirits (tables 59 and 60).

TABLE 59

ABOVE-GROUND STORAGE CAPACITY FOR CHEMICALS ON THE ST. LAWRENCE
(cubic metres)

COMPAGNY	PORT	NUMBER OF TANKS	CAPACITY (m.3)	MAIN PRODUCTS STORED
INTERTANK	QUEBEC CITY	30	81 000	Caustic soda, vinyl acetate monomeric styrene
ALCAN	BAIE DE HAIHAI	2	72 500	Caustic soda
MINES GASPÉ	SANDY BEACH	2	22 675	Sulphuric acid
VALLEYTANK	VALLEYFIELD	26	21 620	Variuos chemicals
CIL	BECANCOUR	4	2 540	Caustic soda
MONTANK	MONTREAL	56	33 000	Caustic soda, solvents, alcohols phenols
CIE DE PAPIER QUEBEC & ONTARIO	BAIE-COMEAU	1	11 767	Caustic soda
CASCADES	PORT-CARTIER	1	4 517	Caustic soda
SERVITANK	TROIS-RIVIERES	11	86 250	Caustic soda, liquid chemical, fertilizers, calcium chloride, clay
TOTAL		133	335 869	

Source : Above listed compagnies

TABLE 60

ABOVE-GROUND STORAGE CAPACITY FOR EDIBLE ON THE ST. LAWRENCE
(cubic metres)

COMPAGNY	PORT	NUMBER OF TANKS	CAPACITY (m.3)	MAIN PRODUCTS STORED
SERVITANK	TROIS-RIVIERES	2	16 200	Molasses
CANADA WEST INDIES	MONTREAL	6	53 184	Molasses
PRODUITS ALIMENTAIRES GRANDMA	MONTREAL	3	13 550	Molasses
LALLEMAND INC.	MONTREAL	5	2 725	Molasses
CANADA PACKERS INC.	MONTREAL	5	3 000	Palme oil Coconut oil
LES MOULINS MAPLE LEAF	VILLE STE-CATHERINE	6	3 000	Tallow
SOCIETE DES ALCOOLS	MONTREAL	177 *	12 478	Wines, spirits
TOTAL		204	104 137	

*: Stainless steel vats are used for storing wines and spirits

Source : Above listed compagnies

VIII - ST. LAWRENCE PORT INFRASTRUCTURES

The ports on the St. Lawrence and its tributaries are not equally accessible (Table 53). For example, the Port of Valleyfield accommodates a draft of 8.23 metres, which is the same as the depth of the Seaway. At the ports of Montréal and Québec, it varies from 7.6 metres to 10.7 metres, depending on the position of the berthage for liquid bulk.

On the north shore, between Québec City and Sept-Îles, the depth varies from 5.2 metres to 16.7 metres, while in the Gaspé peninsula it goes from 4 metres to 10 metres. In the ports of the Basse-Côte-Nord, i.e. from Havre-Saint-Pierre to Blanc-Sablon, accessibility is more limited, the depth varying from 4.5 metres to 7.5 metres.

In several ports there are different depths within the same installation. This is true of Baie-Comeau, Blanc-Sablon, Matane, Montréal, Port-Cartier, Québec, Sandy Beach, Sept-Îles and Trois-Rivières (Table 61).

The St. Lawrence ports are generally accessible 12 months of the year between Sept-Îles and Montréal, except for Pointe à l'Islet, at the Port of Chicoutimi on the Saguenay. On the Basse-Côte-Nord and the Seaway, the navigation season is about nine months.

TABLE 61

PORT ACCESSIBILITY FOR LIQUID BULK IN QUÉBEC

<u>PORT</u>	<u>NAME OF WHARF</u>	<u>BERTHAGE</u>	<u>DEPTH</u>	<u>NAVIGATION SEASON</u> (accessibility)
Valleyfield		South side	8.23 m	Seasonal
Montréal	Ultramar	Wharf 105, 106	9.45 m	12 months
		95	10.67 m	
		96, 97	9.14 m	
	Texaco	Wharf 98	10.67 m	
		99 half	10.67 m	
		half	9.14 m	
		100	9.14 m	
	Petro-Canada	Wharf 109, 110E	10.67 m	
	Norco	Wharf 76, 77	10.67 m	
	Montank	Wharf 57 west side	9.75 m	
		east side	9.14 m	
	Irving-Domestic	Wharf 62	10.67 m	
	Imperial	Wharf 101, 102E	10.67 m	
	Grandma Food Prod.	Wharf 32, 40	9.14 m	
	Domtar	Wharf 62	9.75 m	
	Canada West Indies	Wharf 58	9.75 m	
	Shell Canada	Wharf 103S	10.67 m	
Tracy	Quai Hydro-Québec	Main wharf	10.67 m	146
Trois-Rivières	Quai privé Ports Canada	Main wharf	7.6 m	
		Section 11	10.7 m	
		19	10 m	
		20	10.7 m	
Bécancour		B.1	10.7 m	

TABLE 61 (cont'd)

PORT ACCESSIBILITY FOR LIQUID BULK IN QUÉBEC




<u>PORT</u>	<u>NAME OF WHARF</u>	<u>BERTHAGE</u>	<u>DEPTH</u>	<u>NAVIGATION SEASON</u> (Accessibility)
Portneuf	Quai fédéral	Section 1	10.7 m	
Québec	Société du port de Québec	Wharf 50	11.9 m	
		52	12.2 m	
		53	15.3 m	
		107, 108	11.3 m	
	Pétroles Irving Inc.	Wharf 109	12.8 m	
	Ultramar	Wharf 86	10.6 m	
		87	16.7 m	
Cap-à-l'Aigle	Quai fédéral (Irving)	Main side	5.2 m	
Chicoutimi	Pointe à l'Islet	Main side	9 m	
Baie des Ha! Ha!	Quai Powell	Stations 3 and 4	11.9 m	Seasonal 12 months
Rimouski	Quai fédéral (Ultramar, Irving, Petro-Canada, Shell, Imperial Oil)	Sections 1, 2, 3, 4 and 5	7.3 m	
Baie-Comeau	Quai fédéral	Sections 1 and 2	9 m	
	(Esso)	Section 3	8.2 m	
	Compagnie de Papier Québec et Ontario	Private wharf	7.1 m	
	Irving, Shell, Texaco	Reynolds' private Wharf	10 m	
	Cargill	Private wharf	10 m	
Matane	Quai fédéral (Irving)	Sections 1 (main), 2 3	10 m 5 m 4 m	
New-Richmond	Quai fédéral (Consolidated Bathurst)	Section 1	N.D.	N.A.

TABLE 61 (cont'd)

PORT ACCESSIBILITY FOR LIQUID BULK IN QUÉBEC

<u>PORT</u>	<u>NAME OF WHARF</u>	<u>BERTHAGE</u>	<u>DEPTH</u>	<u>NAVIGATION SEASON</u> (accessibility)
Mont-Louis	Quai fédéral (Noranda Mines Ltd.)	Section 1	9.5 m	
Port-Cartier	Québec	Wharf 1, 2, 3, 4	15.2 m	
	Cartier	Private pier	16 m	
	Cascades			
Paspébiac	Quai fédéral	Main side	6 m	
Sept-Iles	Quai des pétroliers Wabush Mines	Main wharf	12 m	
			12.5 m	
Chandler	Quai fédéral	Section 1	9.75 m	
Sandy Beach (Gaspé)	Quai fédéral Noranda Irving , Ultramar)	Section 1 2	10 m	
			8 m	
Havre-St-Pierre	Quai fédéral	Section 1	7.5 m	Seasonal
Johan Beetz	Quai fédéral (Ultramar)	Main side	5.4 m	Seasonal
Kégaska	Quai fédéral	Main side	4.5 m	Seasonal
La Romaine	Quai fédéral	Main side	5 m	Seasonal
Harrington Harbour	Quai fédéral (Ultramar)	West side	6.7 m	Seasonal
Tête-Baleine	Quai fédéral (Ultramar)	Section 1	4.7 m	Seasonal
La Tabatière	Quai fédéral	Main side	5 m	Seasonal
St-Augustin	Quai fédéral (Ultramar)	Section 1	6 m	Seasonal
Blanc-Sablon	Quai fédéral (Ultramar)	Section 1 (north)	6 m	Seasonal
		Section 2 (south)	7 m	

IX - TRAFFIC FORECASTS AND OPPORTUNITIES

Forecasts

- Transport Canada

Canadian production of crude oil will continue to increase until 1990; after that the reserves in existing installations will begin to decline. A drop in exports and an increase in imports are therefore to be expected.

One of the factors supporting this forecast is the reopening of the Come By Chance refinery in Newfoundland. It will be necessary to import 2.8 million tonnes of crude oil per year until 1994 to meet the needs of this refinery.

It is also expected that the Hibernia deposits will begin producing crude oil in 1994 and should reach, as early as the first year, an output of 2 million cubic metres. Crude oil extracted from Hibernia will be shipped by sea to Come By Chance. Beginning in the year

TABLE 62
FORECASTS - 2000
CANADIAN MARITIME TRAFFIC - PETROLEUM PRODUCTS
(millions of tonnes)

	TOTAL	COASTAL TRAFFIC	EXPORTS	IMPORTS
1987	35.9	9.8	6.0	20.1
1990	44.3	9.6	9.8	24.9
1994	44.4	11.5	9.8	23.1
2000	43.8	19.4	9.0	15.4

Source : Transport Canada

2000, surplus volumes will probably be sent to refineries in the Atlantic Provinces. Production of crude oil in the Arctic should begin between 1995 and 2000 and reach 4.6 million cubic metres, 3.8 million tonnes of which will go to Québec to replace existing shipments to the Ultramar refinery.

Maritime traffic will come to about 44 million tonnes in the 1990s. This period will be relatively stable in exports while imports will fall by 7.7 million tonnes between 1994 and 2000. On the other hand, inland maritime traffic will increase by almost 69%.

This increase will be mainly due to the anticipated exploitation of oil deposits in the Arctic between 1995 and 2000.

TABLE 63

**CANADA PORTS CORPORATION
1992 LIQUID BULK FORECASTS
(thousands of tonnes)**

	1990	1991	1992
Port of Québec Corporation	7750	7770	7760
Montréal Port Corporation	5640	5670	5700

Source : Ports Canada - 1988-1992 Corporate Plan Summaries

The Canada Ports Corporation anticipates, in its Corporate Plan Summaries for 1988-1992, relative stability in the traffic in liquid bulk for its two most important Québec oil ports.

Acres Consulting Services Limited forecasts the traffic in petroleum products on the Seaway in the following table.

TABLE 64

St. LAWRENCE SEAWAY : FORECAST 2000

	Montréal-Lake Ontario		Welland Canal		Common traffic	
	upbound	downbound	upbound	downbound	upbound	downbound
	(in thousands of tonnes)					
1990	1500	670	490	790	1740	1070
1995	1500	670	490	790	1740	1070
2000	1500	670	490	790	1740	1070

Source : Acres Consulting Services Limited. Data Resources Inc., 1982.

We deduce from these forecasts that the 1990s will bring stability and zero growth in the traffic in petroleum products on the St. Lawrence Seaway.

- Canadian Coast Guard, Laurentian Region

All Canadian Coast Guard ports should experience sustained growth until 1992. However, traffic in some of the main commodities now handled, including petroleum products, will not increase much.

Petroleum products	<u>1992</u>	<u>1997</u>	<u>2002</u>
(thousands of tonnes)	453	503	536

Source: Master Plan Study of the Public Ports - 1989, Canadian Coast Guard

These estimates are based on the capacity of existing port infrastructures and improvement projects already set up for the short term.

Port and industrial facilities

Ultramar - Saint-Romuald

Investments of the order of \$200 million could be made by Ultramar between now and the middle of the decade. Some of the objectives will be to increase refining capacity to 130 000 barrels per day, to introduce a technology to raise fuel octane values, and to develop expertise to reduce the sulphur content of oil products.

In the meantime, work on, in particular, the automation of certain steps in the production process, environmental protection and cleanup and water purification will necessitate spending \$25 million between now and the end of 1990. Work aimed at increasing refining capacity from 103 000 to 120 000 barrels a day will soon be completed.

Also, meetings with the directors of Ultramar and other refineries indicate that the expected increase in the demand for petroleum products will be about 2% per year in the 1990s.

Traffic opportunities

The following market opportunities will be interesting to watch in the near future with a view to diversifying and maximizing the operations of maritime carriers.

- The coming on line of the Hibernia oilfields off the coast of Newfoundland will probably result in a change in sources of supplies of crude oil for Québec refineries, which now receive supplies from the North Sea oilfields.

- Given the increasing demand for natural gas to meet the energy needs of industrial and commercial consumers, the start up of the Arctic pilot project (which was shelved) will be closely watched. Natural gas production in the northwestern part of Melville Island (Drake Point) will require the setting up of a regasification terminal to the south which would be located at Gros-Cacouna, that is, at Melford Point (N.S.). This development will require the construction of two methane tankers of the ice-breaker type able to carry 140 000 cubic metres of LNG each.
- The Soligaz project will generate supplies carried by methane tankers in addition to the basic flow by pipeline from Western Canada.

Bulk liquid chemicals should increase substantially worldwide, which could have a favourable effect on certain St. Lawrence ports, particularly that of Québec, where Intertank has just acquired unused Petro-Canada tanks on the Beauport flats, and in Chicoutimi (Grande-Anse), where a terminal for bulk liquid chemicals is planned. Supplies of caustic soda for paper mills from Bécancour rather than from abroad is another possibility.

Most bulk liquid edible are transported by tank trucks. A dynamic marketing approach to certain customers, especially fruit juice producers, could result in a changeover to modal transport for certain commodities, which might prove profitable for users and could be introduced on the St. Lawrence.

X - GENERAL CONCLUSION

Between 1980 and 1988, traffic at all the ports in the Ports Canada system increased from 163 million tonnes to 187 million tonnes, while that at Ports Canada ports in Québec dropped from 78.7 million tonnes to 70 million tonnes, the proportion moving from 48.3% to 37.5% at the national level during this period. The decline in shipping traffic was particularly evident in dry bulk commodities, where activities decreased from 56 million tonnes to 44 million tonnes between 1980 and 1988, or from 56% to 37.8%. Maritime traffic in liquid bulk during this period settled at about 17 million tonnes, or 40% in relative importance, after reaching 44% to 46% between 1982 and 1984 in the Québec ports of the Ports Canada system.

Maritime liquid bulk traffic, like Québec maritime transport generally, was relative stable at about 18 million tonnes during the reference period. This sector was largely dominated by oil products, which represented 94% of all liquid bulk traffic on the St. Lawrence. Montréal and Québec City are the two major centres of activity, with three refineries producing a total of more than 314 000 barrels a day. People in the field predict an increase in demand for petroleum products of about 2% a year. Purchase and exchange agreements enable the oil companies to save on transport costs; Québec City and Chicoutimi with Petro-Canada and Ultramar are a good example of this.

The transport of bulk liquid chemicals decreased during the reference period. It seems that the use of chemicals in the various manufacturing processes is directly related to production rates of manufacturing concerns and others. These companies are very sensitive to fluctuations in the Canadian dollar. The best examples are paper mills and the traffic in caustic soda. The port most affected by this decline is Valleyfield, with a drop of 73% in its

liquid chemical traffic. Since most of the caustic soda used in Québec comes from abroad, the various possibilities of obtaining supplies locally, from Bécancour for example, should be explored.

Québec's maritime traffic in bulk liquid edible is negligible. Montréal handles most of these products.

It is estimated that there are, on the St. Lawrence, over 1100 tanks storing liquid bulk, with more than 7 million cubic metres in capacity. The two most important centres are, of course, Québec City and Montréal, where most Québécois live and where activity in the oil sector is considerable. It should be noted that a large number of these tanks are unused or abandoned, evidence of greater activity in the past.

Access by water and port infrastructures seem adequate, perhaps even underused. Québec possesses a good network and access to it is possible throughout the year, except for Valleyfield, Chicoutimi and the Basse-Côte-Nord.

Cooperation among producers, users and carriers would be useful in examining possibilities for expanding certain liquid bulk markets. At the same time, such an exercise could help minimize the transport costs associated with the supply and distribution traffic in petroleum products, chemicals and edible.

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