

ENQUIRY AND PUBLIC HEARING REPORT

**Sainte-Marguerite-3
Hydroelectric
Development Project**

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All documents and briefs submitted during the term of the enquiry and public hearing may be consulted at the Bureau d'audiences publiques sur l'environnement. Videocassettes of the public hearing and texts of all interventions are also available.

The panel thanks all individuals, groups and agencies who contributed to its work, as well as the personnel of the Bureau d'audiences publiques sur l'environnement, who provided the professional, technical and administrative support needed to complete this report.

This document is an English translation of the report of the Bureau d'audiences publiques sur l'environnement on the Sainte-Marguerite-3 hydroelectric development project.

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Quebec, June 9, 1993

Mr. Pierre Paradis
Minister of the Environment
3900 rue de Marly, 6th floor
Sainte-Foy, Quebec
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Mr. Minister,

I am pleased to submit to you the report of the enquiry and public hearing carried out by the Bureau d'audiences publiques sur l'environnement on Hydro-Québec's Sainte-Marguerite-3 hydroelectric development project on the North Shore.

The project was studied by a panel consisting of Messrs. Pierre Béland, Michel Germain, Robert Leconte and Ms. Muriel Boulanger, as panel members. It was chaired by Mr. André Delisle.

In accordance with the agreement that you signed with your federal government counterpart to avoid duplication, the public review of the project was carried out jointly in that it followed the Quebec process while meeting the requirements of both the Quebec and the federal processes.

The report puts forward a cautious consensus option in view of the risks involved in diverting the Carheil and aux Pékans tributaries of the Moisie River.

Yours sincerely,

BERTRAND TÉTREAU
Chairman





Quebec, June 4, 1993

Mr. Bertrand Tétreault, Chairman
Bureau d'audiences publiques
sur l'environnement
625 rue Saint-Amable, 2nd floor
Quebec, Quebec
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Mr. Chairman,

I am pleased to submit to you the report on the enquiry and public hearing carried out by the panel established to examine the Sainte-Marguerite-3 hydroelectric development project on the North Shore.

In its report the panel concludes on the one hand that the project should be envisaged only if the need for energy can be demonstrated by an independent evaluation, and on the other, that hydroelectric development on the Sainte-Marguerite River without the diversion of the Moisie River tributaries could be acceptable socially and prove to be less of an environmental risk.

I wish to thank the members of the panel for their sustained effort and their competence: Ms. Muriel Boulanger, Messrs. Pierre Béland, Michel Germain and Robert Leconte, as well as the team consisting of Ms. Mary-Andrée Jobin, assistant to the chairman, Ms. Sylvie Desjardins, Ms. Jocelyne Beaudet and Mr. Jacques Talbot, analysts, Ms. Thérèse Daigle and Mr. Serge Labrecque, information officers, Ms. Martine Tousignant, panel secretary and Ms. France Carter, secretariat officer.

Yours sincerely,

ANDRÉ DELISLE, Eng.
Chairman of the panel



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List of Acronyms

AGRM	Association des gestionnaires de la rivière Moisie
APRM	Association de protection de la rivière Moisie Inc.
APTI	Association provinciale des trappeurs indépendants
ASF	Atlantic Salmon Federation
BAPE	Bureau d'audiences publiques sur l'environnement
CAFSAC	Canadian Atlantic Fisheries Scientific Advising Committee
CAM	Conseil des Atikamekw et des Montagnais
CCQ	Commission de la construction du Québec
CH-4	Barrage Carheil-4
CSN	Conseil central des syndicats nationaux de Sept-Îles
DFO	Department of Fisheries and Oceans Canada
DOE	Department of Environment Canada
DOT	Department of Transport Canada
EARP	Environmental Assessment Review Process
EMR	Energy, Mines and Resources Canada
ENJEU	Environnement Jeunesse
FEARO	Federal Environmental Assessment Review Office
ForCan	Department of Forestry Canada
FQCC	Fédération québécoise du canot-camping inc.
FQF	Fédération québécoise de la faune
FQSA	Fédération québécoise pour le saumon atlantique
FREM	Fonds régional d'exploration minière de la Côte-Nord
FTQ	Fédération des travailleurs et travailleuses du Québec
GAPN	Groupe d'appui aux premières nations
IFIM	Instream Flow Incremental Methodology
IREQ	Institut de recherche en électricité du Québec

IRP	Integrated Resource Planning
MAMQ	Ministère des Affaires municipales du Québec Quebec Department of Municipal Affairs
MAPAQ	Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec Quebec Department of Agriculture, Fisheries and Food
MENVIQ	Ministère de l'Environnement du Québec Quebec Department of Environment
MER	Ministère de l'Énergie et des Ressources du Québec Quebec Department of Energy and Resources
MEQ	Ministère de l'Éducation du Québec Quebec Department of Education
MFO	Ministre des Forêts du Québec Quebec Department of Forest
MICT	Ministère de l'Industrie, du Commerce et de la Technologie Quebec Department of Industry, Commerce and Technology
MLCP	Ministère du Loisir, de la Chasse et de la Pêche Quebec Department of Recreation, Fish and Game
MSSQ	Ministère de la Santé et des Services sociaux du Québec Quebec Department of Health and Social Services
MTQ	Ministère des Transports du Québec Quebec Department of Transport
QNSLR	Quebec North Shore Labrador Railway
QWF	Quebec Wildlife Federation
RCM	Regional County Municipality
SDI	Société de développement industriel
SM-1	Sainte-Marguerite-1
SM-2	Sainte-Marguerite-2
SM-3	Sainte-Marguerite-3
SOCAM	Société de communication Atikamekw Montagnais
UQAM	Université du Québec à Montréal
WHO	World Health Organisation
ZEC	Zone d'exploitation contrôlée / Controlled Exploitation Area

List of Abbreviations

cm	centimetre
m	metre
km	kilometre (1 thousand metres)
km ²	square kilometre
m ³ /s	cubic metre per second
kV	kilovolt (1 thousand volts)
MW	megawatt (1 million watts)
kWh	kilowatthour (1 thousand watthours)
GWh	gigawatthour (1 million de kilowatthours)
TWh	terawatthour (1 billion kilowatthours)
¢/kWh	cent par kilowatthour
M\$	million dollars

Chapter 1

From the Project Notice to the Public Hearing

Steps Prior to the Hearing

In June 1987, pursuant to the provisions of the *Environment Quality Act* (R.S.Q., c. Q-2), Hydro-Québec filed a project notice to inform the Quebec Minister of the Environment of its intention to develop the hydroelectric potential of the Sainte-Marguerite River on the North Shore. The project notice specified that, according to the *1987-1989 Development Plan*, the generating station is to be brought on line in 1998.

The proponent proposed a generating station with an installed capacity of 822 megawatts (MW). The project notice also described how a partial diversion of the flow of the Carheil and aux Pékans rivers would be used to increase the level of energy production beyond what would be possible with the Sainte-Marguerite River alone.

The project is subject to the environmental impact assessment and review process under sections 31.1 ff. of the *Environment Quality Act* and consequently, the Quebec Minister of the Environment issued guidelines to Hydro-Québec on July 20, 1988 for the preparation of an Environmental Impact Statement.

The guidelines explained to the proponent the nature and scope of the Environmental Impact Statement to be prepared. The guidelines stated that the content of the Environmental Impact Statement would have to comply with section III of the *Regulation on the Assessment and Review of Environmental Impacts* (R.R.Q., 1981, c. Q-2, r. 9) and that the work would have to be carried out scientifically.

In July 1991, Hydro-Québec submitted a preliminary phase 2 report to serve as the Environmental Impact Statement. The report consists of twelve parts broken down into eight volumes, seven appendices and a summary. The Quebec Department of the Environment/Ministère de l'Environnement du Québec (MENVIQ) prepared two reports analysing the conformity of the reports dated February 17 and July 10, 1992. Additional documents were prepared by the proponent in April and July 1992, and MENVIQ issued the notice of conformity of the Environmental Impact Statement on August 14, 1992.

On October 9, 1992, Hydro-Québec requested approval of the location plan for its structures to comply with the prescriptions of the *Navigable Waters Protection Act* (R.S.C., c. N-22). Finally, on November 2, 1992, Hydro-Québec released an update on the hydrological data for the Sainte-Marguerite River to bring its Environmental Impact Statement up-to-date.

On August 26, the Quebec Minister of the Environment, Mr. Pierre Paradis, requested the Bureau d'audiences publiques sur l'environnement (BAPE) to make the Environmental Impact Statement public for an information period of 45 days, as prescribed in the regulation. The period was from September 29 to November 13, 1992.

To make it easier to consult the reports in the locations concerned, BAPE opened four local centres in addition to its permanent centres in Quebec and Montreal, and copies of the Environmental Impact Statement, the summary and other companion documents (Appendix 1) were placed there. These centres were located at the Sept-Îles municipal library, the Montagnais Council office in Uashat, the Le Manuscrit library in Port-Cartier and the Fermont municipal library. Representatives of BAPE visited these centres to guide interested parties in consulting the impact study and to explain the procedure to them.

The same set of documents was also placed at the Laval University undergraduate library in Quebec City and at the Central Library of the University of Quebec in Montreal for consultation outside of normal office hours.

Twenty requests for public hearings were forwarded to the Minister of the Environment during the information period (Appendix 2).

The Terms of Reference and the Panel

On December 10, 1992, the Minister of the Environment directed the BAPE to enquire into and to hold a public hearing on the Sainte-Marguerite-3 hydroelectric development project on the North Shore pursuant to sections 6.3 and 31.3 of the *Environment Quality Act*. In his letter, the Minister mentioned that the terms of reference included reviewing the environmental and directly related social impacts of the project as they relate to areas of federal jurisdiction (Appendix 3). The panel's term began on January 18, 1993.

The president of the BAPE, Mr. Bertrand Tétreault, established a panel and mandated it to review the project. He appointed as chair of the panel Mr. André Delisle, Eng., vice-president of BAPE. Other members of the panel included Mr. Michel Germain, an additional member of BAPE, a geomorphologist with experience in hydrology, Ms. Muriel Boulanger, an economist who spent much of her career with the National Energy Board, Mr. Pierre Béland, a biologist and director of the St. Lawrence National Institute of Ecotoxicology, and Mr. Robert Leconte, a professor of civil and environmental engineering at the École de technologie supérieure. The latter's appointment was submitted to the President of BAPE by federal authorities, in compliance with the agreement signed by the federal and provincial Ministers of the Environment (filed document B4).

This agreement was signed to ensure that the public review would meet the requirements of the Quebec and federal processes. It provides:

- that the public review be done under the Quebec procedure;
- that the Quebec Minister of the Environment forward the BAPE report to his federal counterpart and to the federal Minister of Transport;
- that the federal government translate the report.

Lastly, the Federal Environmental Assessment Review Office (FEARO), allocated \$175,000 under the participants funding program to provide assistance to groups and individuals wishing to become involved in the public review process.

Other individuals who supported the commission in its work were Ms. Mary-Andrée Jobin, assistant to the chairman of the panel, Ms. Sylvie Desjardins, Ms. Jocelyne Beaudet and Mr. Jacques Talbot, analysts, Ms. Thérèse Daigle and Mr. Serge Labrecque in communications, Ms. Martine Tousignant, panel secretary, and Ms. France Carter in the secretariat.

The First Part of the Public Hearing

Under the Quebec procedure, a public hearing is held in two parts. The hearings under the first part began in Sept-Îles on the evening of February 2, 1993, and continued on February 3, 4 and 5 in the afternoon and evening, as well as on the evening of February 8 and the afternoon and evening of February 9, 10, 11 and 12. Following the submission of the requests for a public hearing sent to the Minister of the Environment by applicants, the proponent described his project. The Hydro-Québec team then responded to the questions asked by the panel and the participants. This team was led by Mr. Patrick Arnaud, engineer, official spokesman for the proponent at the hearing. He was assisted by Ms. Geneviève Corfa, a biologist in the Vice-présidence Environnement and by Mr. Michel Gaudette, project engineer in Vice-présidence équipements de production, and by Mr. Michel Lacharité, engineer, Vice-présidence planification des équipements.

At the invitation of the panel, resource persons from various provincial and federal departments and agencies attended the first part of the public hearing in order to provide additional information in response to questions from citizens and from the panel (Appendix 4).

The 16 sessions of the first part of the hearing made it possible for 63 individuals or representatives of groups to present approximately 100 interventions to the panel. Half of the interventions were raised at seven thematic meetings. Two meetings were on Atlantic salmon, and the others were on hydraulic data and navigability, on aboriginal issues, on socioeconomic impacts, on health and mercury, and on project need.

Attendance was estimated at approximately 1,700. To make access to the public hearing as broad as possible, the panel decided to have it carried on cable television on the North Shore and in a number of areas of Quebec. The panel's meetings were thus broadcast by satellite relay to a number of cable operators, and were thus available on television to a large number of participants. The meetings, which lasted a total of 61.5 hours, reached over 900,000 homes in the North Shore, Gaspé, Fermont, Quebec City, Montreal, Hull and the Saguenay. The meetings of the panel were transmitted in the Montagnais language on the Société de communication Atikamekw-Montagnais (SOCAM) radio network. The public hearing was thus transmitted to the communities of Betsiamites, La Romaine, Des Escoumins, Mingan, Natashquan, Mashteuiatsh, Matimekossh, Maliotenam, Pakua Shipu, Obedjiwan, Manawan and Weymontachie in Quebec, and in Shacashit and Davis Inlet in Labrador.

Remote participants could submit their questions about the project in French, Montagnais or English on three toll-free long-distance lines. One hundred and sixty-three persons participated in the public hearing by telephone. The calls came from Fermont, the North Shore, Montreal, Quebec City, the Saguenay–Lac-Saint-Jean area, Gaspé, the Outaouais and Central Quebec.

Out of a total of just over 410 questions to the proponent and to the invited departments and agencies, over 240 were asked by on-site participants and approximately 130 telephone questions from outside participants were asked by the panel. Lastly, 40 questions were sent in writing to the proponent, and to the agencies and departments following the first part of the hearing. Of the telephone participants, 86% were Aboriginal citizens, citizens of the region, or citizens from outside the region. On the other hand, only 5% of participants at the hearing itself were there as citizens, with the remaining 95% acting as official representatives of groups or agencies.

Written questions, and responses to them, were filed in the reference centres, along with the documents submitted by the proponent, the departments and the public (Appendix 1), as well as the full transcripts of the public sessions.

In addition, all the technical documents used by Hydro-Québec for its impact study were filed in the Quebec City and Montreal offices of the BAPE, and in the Sept-Îles municipal library (Appendix 5).

The Second Part of the Public Hearing

A period of thirty days between the first and second parts of the hearing allowed citizens the time to prepare their briefs. The second part of the public hearing was devoted to the presentation of opinions about the project; it began in Sept-Îles on the evening of March 15, 1993. The public sessions of the second part of the hearing were held on March 16, 17 and 18, at a rate of three sessions per day. The panel continued its work in Quebec City from the evening of March 25 to the afternoon of March 29.

The panel received 152 briefs and heard 4 oral presentations (Appendix 6). The briefs and the transcripts of the sessions were also filed in the reference centres. Approximately 710 people attended the second part of the public hearing in Sept-Îles and Quebec City.

The sessions held in Sept-Îles were broadcast live in Sept-Îles. Elsewhere in the province, the second part of the hearing was recorded and broadcast later for a period of 66.5 hours in Montreal, Quebec City, Victoriaville, the North Shore, Fermont, Havre-Saint-Pierre and La Romaine. It was also broadcast live in the Montagnais language on the SOCAM radio network. Approximately 980,000 persons had access to the sessions of the second part of the hearing, either on television or radio.

Panel Experts

The panel called on three specialists to help it with its work: Mr. Joseph Doucet, an economist specializing in energy issues as well as a professor at Laval University and a researcher with the Groupe de recherche en économie de l'énergie et des ressources naturelles, Mr. Jules Dufour, a geographer specializing in natural and human ecology in a northern environment, a professor at the Chicoutimi campus of the University of Quebec and Mr. Geoffrey Power, a biologist specializing in Atlantic salmon, and a professor and researcher at the University of Waterloo in Ontario.

A paper prepared by Mr. Power, entitled *An analysis of the methods used to estimate the effects of flow reduction in the Moisie River on juvenile Atlantic salmon habitat*, was released by the panel on April 29, 1993. The panel received four annotated reports, which were filed in the reference centres.

Chapter 2

The Project and Its Impacts

This chapter provides a brief description of the Sainte-Marguerite-3 (SM-3) hydroelectric development project as described by Hydro-Québec in phase 2 of its preliminary report (referred to hereafter as the Environmental Impact Statement), in the two companion reports and in the update of the hydrological data for the Sainte-Marguerite River, as well as in the documents made available during the panel's term.

In the *1993 Development Plan* proposal submitted to the Parliamentary Committee on Labour and the Economy, Hydro-Québec forecasted an average annual growth rate in electricity sales in Quebec of 2.2% from 1992 to 2010 in its energy conservation programs. According to their scenario, the quantity of electrical energy sold would rise from 133 to 198 TWh during this period.

To meet demand, Hydro-Québec estimates that it would require new hydroelectric generating stations to meet the energy shortfall expected by the year 2001. Various projects are envisaged to meet needs that go well beyond this time span, including the Sainte-Marguerite River project, which is considered environmentally acceptable by Hydro-Québec, as well as one of the most cost-efficient projects, with a rate of return of 3.8 cents (in 1992 dollars) per kilowatt-hour (3.8¢/kWh). It also appears to be the project that has advanced furthest in the environmental assessment process and in obtaining approval from government authorities.

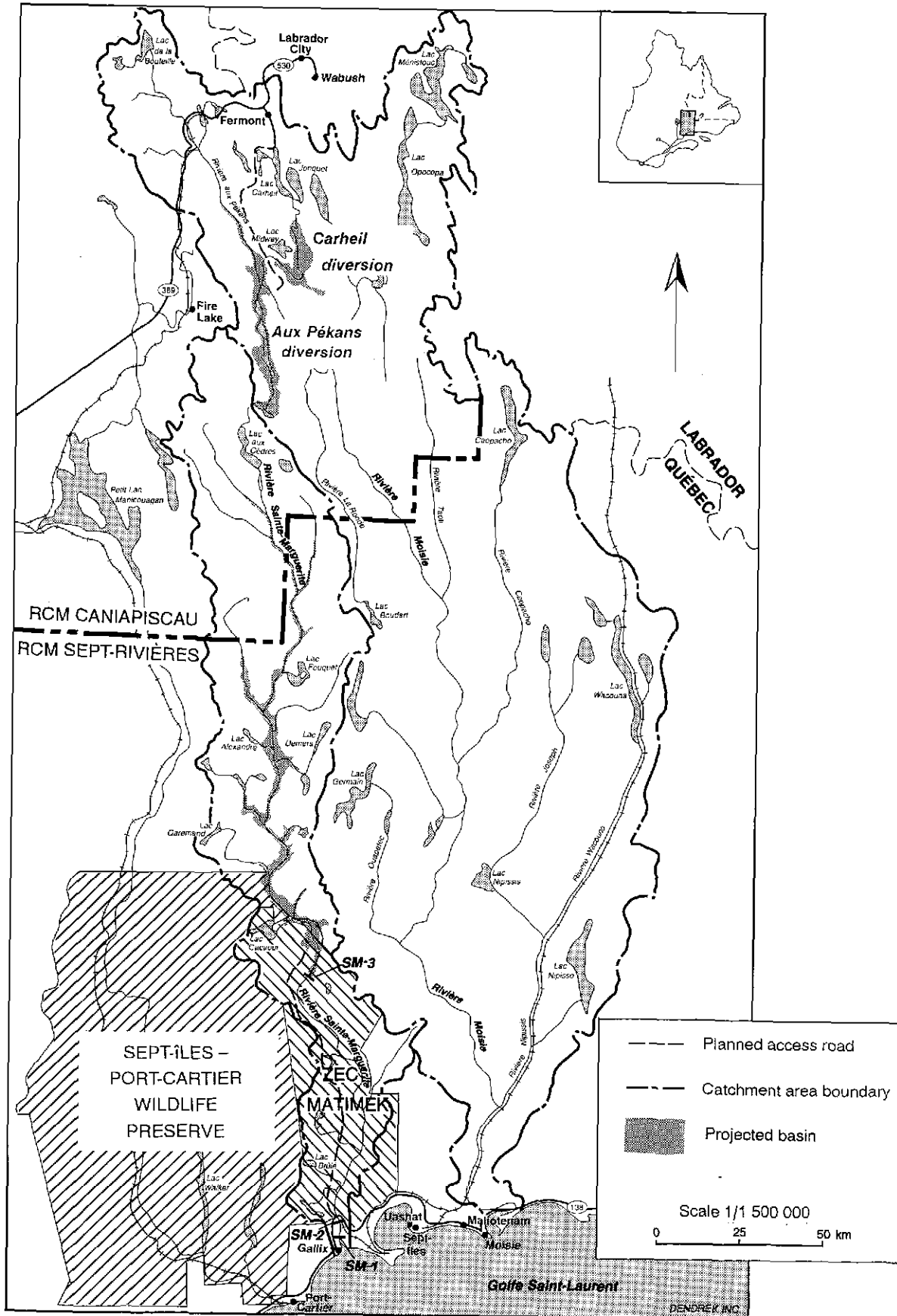
The Proposed Project

Hydro-Québec is proposing to build a hydroelectric generating station on the Sainte-Marguerite River, some 700 km northeast of Montreal on the North Shore, near Port-Cartier and Sept-Îles. The planned station, called SM-3, would have an installed capacity of 882 MW and an available peak capacity of 819 MW.

Two other generating stations along the river are privately owned, Sainte-Marguerite-2 (SM-2) with a capacity of 18 MW, located 10 km from the mouth of the river, and Sainte-Marguerite-1 (SM-1), currently under repair, which would have an installed capacity of 8 MW (Figure 1).

The hydroelectric potential of the Sainte-Marguerite River was identified in the early 70s. For Hydro-Québec, there are five stages in implementing a project: preliminary study, preliminary project phase 1, preliminary project phase 2 (Environmental Impact Statement), applying for and obtaining of government authorizations and, lastly, project completion. Table 1 gives a summary of these steps.

Figure 1 Location of SM-3 hydroelectric development project



Source: Adapted from Environmental Impact Statement, Part II, plate I.

Table 1 SM-3 project stages

Stage	Completion date	Purpose
Inventory of hydroelectric potential of Quebec rivers	1970-1980	Summary studies to identify sites for potential development, their costs and their hydroelectric potential
Preliminary study of Sainte-Marguerite River	1982-1985	Studies of possible development options and selection of preferred sites based on cost and environmental considerations
Preliminary project phase I	1986-1988	After obtaining a government order, project design as well as the technical and environmental studies begin Notice of project sent to Minister of the Environment (1987) and Minister's directive issued in 1988 Option selected
Preliminary project phase II (Environmental Impact Statement)	1989-1993	Studies continue and selected option optimized Costs calculated Studies submitted to Minister of the Environment Public review of project
Government decision concerning project	to come	Conditional or full authorization of project, or refusal Required permits to be obtained
Project implementation	—	Detailed engineering Tenders Construction

Source: Adapted from Environmental Impact Statement, Part 2, p. 1 to 4.

Option Selected by Proponent

Hydro-Québec studied in detail three hydroelectric development options along the Sainte-Marguerite River:

- creation of the Sainte-Marguerite-3 reservoir using water only from the Sainte-Marguerite basin;
- creation of the SM-3 reservoir with diversion of part of the Moisie River basin by the Carheil and aux Pékans tributaries;

- creation of the SM-3 reservoir with diversion of part of the Moisie River basin by the Carheil and aux Pékans tributaries but with regulated flows.

The proponent selected the last of these options, the estimated annual production of which is 4.4 TWh. The estimated cost of this option is \$1.261 billion (1992\$), to which \$296 million must be added to link energy production from the generating station to the Quebec power transmission system.

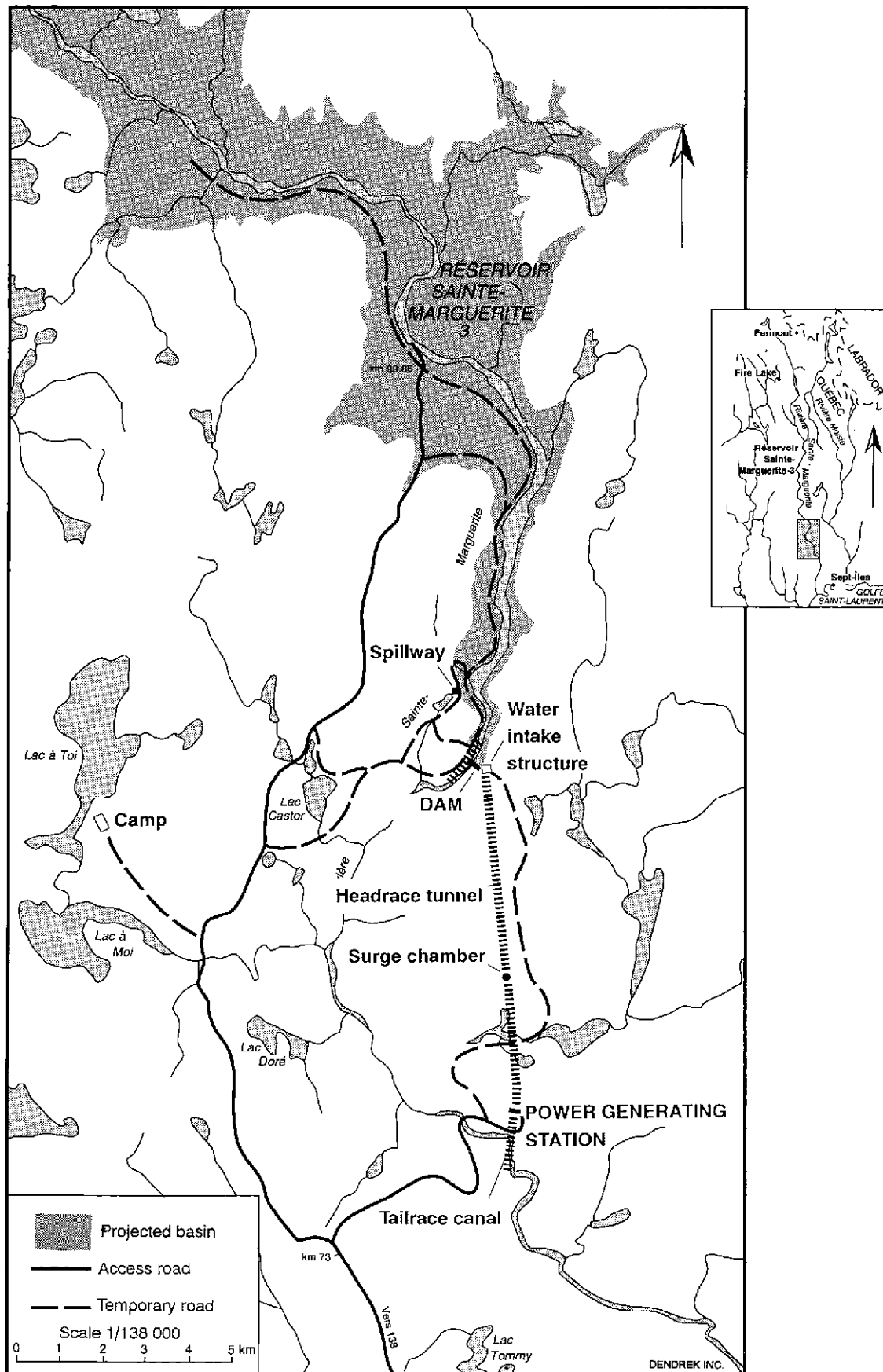
Technical Description of Project

Development of the SM-3 site would involve the following main structures:

- a primary rock-fill dam, roughly 150 m high, 90 km from the mouth of the Sainte-Marguerite River, to create a 315 km² reservoir;
- a water intake structure near the dam to supply an 8 km underground headrace tunnel;
- an underground station equipped with two generating sets, each with a capacity of 441 MW;
- a spillway northwest of the primary dam;
- a tailrace tunnel outlet preceded by a surge chamber and a 1.5 km canal excavated in the river bed (Figure 2).

The construction of these structures would require a work camp designed to accommodate a maximum of 1,000 workers. The camp is to be located 8.4 km to the west of the dam near Lake À Toi. The camp would be supplied with electricity by a temporary 69 kV transmission line from the Arnaud station. Wastewater would be treated at a biological disk treatment plant. Temporary supply areas and locations for crushing aggregates, manufacturing concrete and on-site services would be located in the vicinity of the dam close to highways.

Figure 2 General layout of SM-3 site



Source: Adapted from Environmental Impact Statement, Part 9, Figure 2 and Part II, plate 3

The SM-3 site structures would be linked to highway 138 by a permanent access road on the western side of the Sainte-Marguerite River beginning at a point located halfway between Port-Cartier and Sept-Îles.

The annual average rise and fall or variation in water level at the SM-3 reservoir would be 6.4 m. When in operation, the SM-3 reservoir water level would gradually begin to drop in November and reach its minimum level in April, and then rise rapidly until June, at which time it would reach its peak for the summer. The SM-3 development would, however, control the flows and keep the SM-2 reservoir, which currently rises and falls by approximately 11 m, at a constant level. Forests in the areas to be covered by the SM-3 reservoir would be cleared before priming.

Several structures would be required to build the Carheil and aux Pékans reservoirs. In the Carheil River catchment area, Hydro-Québec would build a 20 m earth dam (CH-4), thus creating a 51-km² reservoir, a dyke and a weir into the aux Pékans reservoir (Figure 3).

In the aux Pékans catchment area, the proponent would build a 43 m rock-fill dam, creating a 108-km² reservoir, seven dykes, a regulating structure (P-2) designed to control the flow of the Moisie River, a weir and diversion channel into the Sainte-Marguerite basin.

The main Carheil and aux Pékans diversion dams and the regulating structure at aux Pékans would be linked to Fermont by a permanent access road approximately 60 km long. A work camp to accommodate between 200 and 300 workers would be located close to CH-4. The temporary work areas would be set up nearby. A permanent 34.5 kV transmission line from the Normand station would provide the necessary power. Only a small area of the two reservoirs would be cleared.

Hydro-Québec has prepared a summary project completion schedule (Table 2).

Source: Adapted from Environmental Impact Statement, summary, Figure 10, and Part II, plate 4

Table 2 Project completion schedule

Stage	Date
Tenders conditional on project authorization (preparatory and road work)	May 1993
Obtain Government of Quebec orders and authorization certificates from the Quebec Department of the Environment for development implementation	July 1993
Construction of access road at the SM-3 reservoir	October 1993 to September 1995
Deforesting of SM-3 reservoir (recovery of merchantable timber)	July 1994 to August 1997
Construction of temporary diversion and dam at the SM-3 site	October 1993 to October 1998
Construction of access road and diversion structures at the Carheil and aux Pékans sites	November 1994 to May 1997
Priming of Carheil and aux Pékans reservoirs	November 1996 to August 1997
Closing of temporary diversion at SM-3 site	August 1997
Priming of SM-3 reservoir	August 1997 to March 2002
Construction of SM-3 plant and related works	January 1996 to October 2000
Generating sets brought on line	June and October 2001
Source: Adapted from filed document A6.	

Immediate Surroundings

The area affected by the project extends from the town of Fermont to the north to the Gulf of St. Lawrence to the south and includes the drainage basins of two major rivers, the Sainte-Marguerite River and the Moisie River, or more precisely two of its tributaries, the Carheil and aux Pékans rivers. Hydro-Québec has mapped out a study area divided into three major ecosystems, each of which was treated separately in the Environmental Impact Statement. It consists of 1) the ecosystem of the northern plateau, which covers the area that includes the drainage basins of the Carheil and aux Pékans rivers; 2) the continental basin that includes the drainage basin of the Sainte-Marguerite River as far as the SM-1 site, 7.5 km from its mouth; 3) the ecosystem of the estuary and the coastal zone, which covers the area downstream from SM-1 in the river mouth area. The Moisie River was treated separately, primarily from the standpoint of salmon and salmon fishing.

The Sainte-Marguerite River Basin

The Sainte-Marguerite River flows into the St. Lawrence roughly 15 km west of Sept-Îles. The river begins to the north of Lake aux Cèdres and flows some 300 km before reaching its estuary, where its waters mix with those of the Gulf of St. Lawrence.

The river is deeply embedded in the rocky embankment of the Laurentian Shield. It drains a catchment area of 6,200 km² and provides an average annual flow at the mouth of 156 m³/s. The thalweg consists primarily of glaciofluvial deposits, which makes its banks highly susceptible to erosion.

From the chemical and physical standpoints, the water quality of the Sainte-Marguerite River is good. However, like all North Shore rivers in the Canadian Shield, the Sainte-Marguerite is sensitive to acidification. The northern sucker is the dominant fish species in the Sainte-Marguerite River and in the SM-2 reservoir. The Grand Portage rapids area, located 79 km from the river mouth, also offers solid potential for speckled trout and fishing.

The coniferous forests that are dominant in the continental basin shelter a rapidly expanding moose population, as in most of the North Shore. The winter habitats of these cervidae are concentrated in the valleys of the Sainte-Marguerite River and its main tributaries.

The estuary of the Sainte-Marguerite River possesses the characteristics of a spit estuary, which is to say that across much of its mouth is a strip of sand whose shape is continually changed by storm waves, while the river channel is affected by the tides. Seventeen species of fish have been found in the estuary, several of which could spawn there, for example rainbow smelt, northern sucker, monkfish, northern pike, speckled trout, gaspereau, whitefish and tommy-cod.

Birds observed include sea ducks, which breed mainly in the coastal marine area rather than in the estuary. Mink whales also feed frequently in the area.

The Moisie River Basin

The Moisie River, which is located further east than the Sainte-Marguerite River, has its source close to lakes Ménistouc and Opocopa. It flows southward over a distance of more than 400 km and into the Gulf of St. Lawrence roughly 20 km to the east of Sept-Îles.

The area of the Moisie River drainage basin is 19,190 km² and the total drop from the source to the mouth is 533 m. Its main tributaries are the Nipissis, Caopacho, aux Pékans and Ouapetec rivers. The mean annual runoff of the Moisie River is 464 m³/s at the mouth. The high flow velocity makes this watercourse look like a long rapid.

The drainage basin of the Moisie River is covered by glacial deposits. The river bed, which is hemmed in by these deposits and at a few locations reaches bedrock, consists primarily of coarse deposits. The principal erosion zones are located in the estuary area. Severe bends that change in direction to the northwest and northeast give the river a sawtooth shape that shows clearly in its middle and lower sections. Along the Laurentian plateau, the river is at some locations hemmed as deep as 300 m into the gneiss.

The permanence and consistency of the bedrock gives the waters in the area a low biological productivity and a low acid neutralizing capacity. However, the waters of the Carheil River are somewhat more conductive, alkaline and acid than those of the aux Pékans and Moisie rivers.

The northern plateau is a rolling plain covered with many lakes and a few hills. The Carheil and aux Pékans rivers drain the area and reach the Moisie River 262 km upstream from its mouth. The water quality in the rivers is generally good in terms of physical and chemical properties, although the aux Pékans River has in the past received ferrous water discharge in the effluent of the Mont Wright mine.

The northern sucker is the dominant fish species in the rivers and lakes of the northern plateau. Lake Gras has whitefish and lake trout, which are highly sought after by natives. Other wildlife resources hunted in the area include small game and cervidae. Small herds of caribou and moose share the open coniferous forest habitats and plains that cover the area.

The Moisie and aux Pékans rivers flow through a northern environment dominated by black spruce until they join. A few peat bogs also occur along the way. The Moisie estuary is a spit estuary. It extends over a length of 10.25 km with an average width of approximately 1 km; the estuary bed is almost entirely sand.

A secondary road gives access to the first 15 km of the river. A railway line towards Schefferville runs along the Nipissis River, a tributary of the Moisie.

Human Considerations

The towns of Port-Cartier and Sept-Îles and the municipalities of Moisie and Gallix are located along the Gulf of St. Lawrence in the Regional County Municipality (RCM) of Sept-Rivières. Close to 90% of inhabitants live in Sept-Îles and Port-Cartier. The Uashat and Maliotenam Montagnais reserves are also in the territory of the RCM. With a land area of 30,000 km², the territory of the RCM consists of 99% public lands. Some private properties are located along the banks of the estuary of the Sainte-Marguerite River at Gallix and in the Clarke community, and along the banks of the Moisie River in Moisie. The area in question is currently included in an overall land claim

made by the Quebec Montagnais, represented by the Conseil des Atikamekw et des Montagnais (CAM), of which the Uashat and Maliotenam Montagnais are members.

The development plan for the Sept-Rivières RCM, and the development plans and by-laws for the municipalities on the rivers (Port-Cartier, Gallix, Sept-Îles, Moisie) as well as the memorandum of agreement between the Department of Recreation, Fish and Game/Ministère du Loisir, de la Chasse et de la Pêche (MLCP) and the Department of Energy and Resources/Ministère de l'Énergie et des Ressources du Québec (MER) concerning macrozoning on the North Shore provide the legal foundations for land development in the area and for the organization of human activities there.

The labour force works in the primary sector (17%), the secondary sector (20%), and in government and government-related services (30%). The remaining third of the jobs is provided by the tertiary sector (transportation, communications, insurance, financial services, business services). The primary sector consists primarily of mining and forestry operations, whereas the secondary sector consists of resource processing firms, construction and other forms of business.

The commercial forest land is located south of the 52nd parallel. Rights to most of the forest land were allocated up until 1991 to the Cascades company of Port-Cartier. Lastly, wildlife harvesting activities, which consist of hunting, fishing and trapping, along with resorts, occupy most of the land users.

The drainage basin for the Carheil and aux Pékans rivers, which are tributaries of the Moisie River, is located in the Caniapiscau RCM. Fermont, located near Lake Daviault and linked to Baie-Comeau by highway 389, which is 587 km long, is the only Quebec town in this area. The Newfoundland towns of Wabush and Labrador City are located in the vicinity. Mining operations are the main activity in the area, and the main source of employment at the moment at Fermont is the Mont Wright iron mine. The community in this isolated single-industry town is rather homogeneous in terms of the strong feeling of belonging and drive that led to the development of a variety of services, facilities and social clubs.

Project Impacts

According to the proponent, the hydroelectric development of SM-3 would have various kinds of repercussions on several biological, physical and human components of the environment. In its Environmental Impact Statement, Hydro-Québec describes the effects of its project on the drainage basins for the Sainte-Marguerite, Carheil, aux Pékans and Moisie rivers, and on salmon in the Moisie.

To reduce the impacts, the proponent suggests the mitigation measures contained in the Hydro-Québec environment code, as well as specific measures to deal with the effects of the project on the environment under review. One of these specific measures is a regulated flow management system for the salmon of the Moisie River.

Despite such measures, the proponent concluded that for the ecosystems being studied:

[...] it was determined that no repercussions were mitigated enough to change their significance. This is because several of the planned works are already subject to the Hydro-Québec environment code and mitigated at their source. Another reason why the effects of certain mitigation measures proposed are not reflected in the residual impacts grid is because corrective measures apply only to a portion of the element disturbed.

(Environmental Impact Statement, Part 6, p. 13)

A hydroelectric development project as large as that for the Sainte-Marguerite River involves permanent changes to the environment that cannot be mitigated: these are the residual impacts of the project.

An impact is described by Hydro-Québec as having a positive or negative effect on the environment. When there is evidence of an impact, but it is impossible to determine whether it is positive or negative, Hydro-Québec describes it as an indeterminate impact. The significance of an impact may be rated low, medium or high depending on the intensity, extent and duration of the disturbance, as well as on the value set for this element of the environment.

The sources and significance of residual impacts on elements of the environment are identified for the construction and operation periods for the structures. This information is broken down into physical, biological and human environments.

Tables 3, 4 and 5 present an overview of the residual impacts identified by the proponent, following the application of mitigating measures.

Table 3 Sources and residual impacts on the physical environment

Elements of the environment	Sources	Impacts
Climatic environment	SM-3 reservoir	Local changes in climatic environmental variables; late heating and cooling of the reservoir in the spring and fall; increase in wind speed in the north-south axis. Indeterminate medium
Hydraulic and hydrological	Priming of Carheil, aux Pékans and SM-3 reservoirs	Complete modification of the characteristics of the Carheil, aux Pékans and Sainte-Marguerite rivers. For 2 or 3 years, increase in spring flooding upstream on the Sainte-Marguerite River (upstream flow from Lake aux Cèdres greater by a factor of 10.5; at the northern extremity of the SM-3 reservoir, flow is greater by a factor of 4.2). Indeterminate high
	Priming of SM-3 reservoir	Drainage of a 30 to 40 km section of the Sainte-Marguerite River downstream from the dam. Indeterminate high
	Carheil and aux Pékans dams, hydraulic management of P-2	Virtually complete drainage of 30 km except during regulated flow discharge towards Moisie; drainage of 15 km of the Carheil River. Indeterminate high
	Carheil and aux Pékans reservoirs	Transformation of existing river ecosystem into a lake ecosystem. Indeterminate high

Table 3 (continued)

Elements of the environment	Sources	Impacts
Hydraulic and hydrological (continued)	Diversion of Carheil and aux Pékans	Significant modifications to the flow conditions. Indeterminate medium
	SM-3 reservoir	Disruption of river flow conditions. Indeterminate high
	SM-3 conveyance and outlet structures	Drainage of a 15-km section downstream from the dam. Indeterminate medium
	Spillway	Change in flow pattern of the discharge valley. Indeterminate medium
	SM-3 hydraulic management	Increase by a factor of 3 to 8 of the winter flows and 30% increase in summer flows at the site of the SM-3 generating station. Ten to 30% increase in flows in the summer and 240% to 345% in the winter at SM-2. Indeterminate medium
Ice and heat balance	Priming of SM-3 reservoir	Increase of ice cover surface area: 149 km ² , 210 km ² and 271 km ² for each of the first three years. Indeterminate medium
	SM-3 reservoir	Transformation into a deep lake system. Downstream from the dam, water temperature colder in summer, warmer in autumn and winter, with the creation of a 15-km stretch of ice-free water. Indeterminate high
	SM-3 hydraulic management	Change in water temperature downstream from SM-2, channel free of ice from SM-2 dam to the spit. Indeterminate medium
	Carheil and aux Pékans reservoirs	Transformation into a lake system. Indeterminate medium
	Carheil and aux Pékans reservoirs	Slight modification of ice conditions. Indeterminate medium

Table 3 (continued)

Elements of the environment	Sources	Impacts
Morphosedimentology	Deforestation of SM-3 reservoir	Increased sediment suspension load in the clearing areas to the head of the SM-2 reservoir. Indeterminate medium
	Priming of SM-3 reservoir	Increased vulnerability to bank erosion. Indeterminate medium
	Aux Pékans diversion	Significant erosion upstream from Lake aux Cèdres: 60,000 to 100,000 m ³ of sand. Strike-slip motion and turbidity upstream from the SM-3 reservoir during spring flooding. Indeterminate high
	SM-3 hydraulic management	Stabilization of SM-2 reservoir levels. Reduction in bank erosion. Indeterminate medium
Salt intrusion	Priming of SM-3 reservoir	Saltwater upwelling in the estuary following reduction in flows. Indeterminate medium
	SM-3 hydraulic management	Decrease in salt intrusion following increase in flows. Indeterminate medium
Water quality	Diversion and Carheil and aux Pékans reservoirs	Modification in water quality following decomposition of submerged organic matter: marked deficiency of dissolved oxygen (5 years). Indeterminate medium
	Priming of SM-3 reservoir	Alteration in aesthetic qualities at the Clarke water inlet. Indeterminate medium
Source: Adapted from Environmental Impact Statement, Part 6, pp. 13 to 18.		

Table 4 Sources and residual impacts on the biological environment

Elements of the environment	Sources	Impacts
Primary production	SM-3 hydraulic management	Increased total nutrients in the coastal maritime zone owing to increased flows. Positive medium
Fish populations	Priming of reservoirs	Decreased yield in terms of number of fish following dilution in a greater volume of water; modifications to spawning sites; increased primary and secondary production; loss of habitats for northern pike downstream from SM-3; risk of increased mortality for freshwater fish species in the estuary following decreased flows. Negative medium
	Carheil and aux Pékans dams hydraulic management of P-2	Disturbance of fish community structure and loss of habitats following drainage of rivers. Negative medium
	SM-3 conveyance and outlet structures	Loss of habitats for speckled trout because of drainage over a 15-km section downstream from the dam. Negative medium
	Carheil, aux Pékans and SM-3 reservoirs	Increase in biomass for fish populations and yields: situation beneficial to northern pike and whitefish if reproduction not disturbed by tidal range. Positive medium
		Marked reduction in lake trout and speckled trout. Negative medium
		Accumulation of methylmercury in fish over a 20 to 30-year period. Negative medium
	Aux Pékans diversion	Deterioration of aquatic habitat through sedimentation in the portion upstream from Lake aux Cèdres. Negative medium
	SM-3 hydraulic management	Improvement of fall spawning season following stabilization of SM-2 reservoir. Positive medium
		Disturbance of young stages in the life of freshwater species in the estuary following increased winter flows and a rise in the water temperature. Negative medium

Table 4 (continued)

Elements of the environment	Sources	Impacts
Forest vegetation	SM-3 reservoir	Loss of vast areas of open and dense coniferous forests (approximately 280 km ²). Negative medium
Terrestrial wildlife	Priming of reservoirs	Animals forced to move and increased mortality. Negative medium
	SM-3 reservoir	Definite loss of land habitats for moose. Negative high
	Carheil and aux Pékans reservoirs	Definite loss of land habitats. Negative medium
	Aux Pékans diversion	Loss of quality land and river habitats over a stretch of 35 km. Negative medium
Source: Adapted from Environmental Impact Statement, Part 6, pp. 18 to 20.		

Table 5 Sources and residual impacts on the human environment

Elements of the environment	Sources	Impacts
Companies	Labour, materials, equipment, services and transportation, site facilities, construction of structures	Contracts to North Shore companies (\$140 to 330 million); increase in consumption costs; strengthening of regional firms; creation of firms. Positive medium
Employment	Labour	Creation of roughly 100 jobs per year while work under way. Positive medium
	Materials, equipment, services and transportation, site facilities, construction of structures	Regional workers on sites (average yearly 480-550, or 60 % of total personnel); employment in regional firms (100 to 250 per year). Positive high
Transportation and communications	Access roads	Access to inaccessible areas. Different impact depending on community: non-natives, positive medium and positive high ; natives: negative medium
Recreation, tourism and resorts	SM-3 reservoir	Extension of recreation, tourism and resorts northwards. Positive medium
	Access road (SM-3 reservoir and power generating station)	Extension of recreation, tourism and resorts northwards. Positive high
Heritage areas	Construction of structures (SM-3)	Disturbance of Grand Portage site. Negative high
	Priming of reservoirs	Disappearance of sites with archaeological potential. Indeterminate
Landscape	SM-3 reservoir	Narrow valley with a vigorous watercourse transformed into a broad valley; modification of visual aspect of the host environment. Negative medium

Table 5 (continued)

Elements of the environment	Sources	Impacts
Landscape (continued)	Dams, dykes and power plant (SM-3) spillways, access road, Carheil and aux Pékans dams	Permanent loss of natural landscape. Negative medium
	SM-3 conveyance and outlet structures	Drainage of the most important sequence of chutes and rapids along the Sainte-Marguerite River. Negative high
Logging and mining	Access roads	Improved access to mining and forestry resources in the medium and long term. Positive high (northern plateau), positive medium (continental basin)
Wildlife resource development	Labour	Hunting by workers on construction sites. Negative medium
	Access roads	Increased hunting, fishing and trapping Non-natives: positive high and positive medium ; Natives: negative high and negative medium
	Construction of structures	Disturbance of wildlife and of the use of the land by the Montagnais. Negative high (continental basin) and negative medium (northern plateau) Disturbance of Montagnais activities near SM-2. Negative medium
	Deforesting SM-3 reservoir	Loss of many wildlife habitats. Negative medium
	Priming of SM-3, Carheil and aux Pékans reservoirs	Significant decline or total disappearance of sports and subsistence species. Negative high
	SM-3 conveyance and outlet structures	Permanent loss of a section of the river (approximately 15 km) for speckled trout reproduction. Negative high

Table 5 (continued)

Elements of the environment	Sources	Impacts
Wildlife resource development (continued)	SM-3 hydraulic management (and tidal range)	Displacement of mammals living close to the banks of the Sainte-Marguerite River caused by absence of river ecotone development. Negative high
Operation of SM-1 and SM-2	Priming of reservoirs	Decline in production at SM-2 and SM-1 following reduced flows. Negative medium
	SM-3 hydraulic management	Increased potential of SM-1 and SM-2 sites. Positive high
Source: Adapted from Environmental Impact Statement, Part 6, pp. 20 to 23.		

The proponent concluded that the residual impacts on salmon in the Moisie River would be minimal:

The use of controlled flows for salmon and for fishing would make it possible to eliminate most of the expected repercussions on salmon and the salmon habitat, and on sport fishing in the Moisie. Nevertheless, the diversion of the aux Pékans and Carheil rivers would lead to a number of temporary or permanent changes in the environment which it would be impossible to correct.
(Environmental Impact Statement, Part 7, p. 125)

The impacts on the physical, biological and human components are described in Tables 6, 7 and 8.

Table 6 Impacts on physical components of the Moisie River

Physical components	Impacts
Hydrology	Decline in flow during spring flooding (13 % to 40 % depending on location) Decline in mean annual runoff (8 % to 27 % depending on location)
Water quality	Negligible change because of controlled flow Very slight increase in mercury concentrations in juvenile salmon - negligible increase for adult salmon
Water temperature	Summer change of approximately 0.5 °C
Sedimentology	Possible accumulation of fine particles owing to 30 % to 40 % decline in spring flooding
Ice conditions	Icing up three to seven days earlier downstream to upstream Breakup later by one or two days
Hydrodynamics of the estuary	Slight penetration of saltwater wedge and tide
Source: Adapted from Environmental Impact Statement, Part 7, pp. 21 to 42	

**Table 7 Impacts on biological components of salmon
in the Moisie River**

Biological components	Impacts
Breeding habitats	Control of hydrological conditions and probable maintenance of breeding functions
Spawning and egg incubation habitats	Risk of alteration in porosity of substrates over the long term
Upstream migration (run)	Slight acceleration Absence of extreme low summer water level would encourage more regular migration and more uniform distribution of population
Downstream descent by young salmon	Restricted impact on descent, which occurs during spring flooding
Descent by spent salmon	Minimal slowdown possible owing to reduced flooding
Genetic characteristics	Minimum risk of impact on genetics
Source: Adapted from Environmental Impact Statement, Part 7, pp. 42 to 78	

Table 8 Impacts on human components of the Moisie River

Human components	Impacts
Sport fishing	Time spent by salmon in the estuary shortened by a few days
Aboriginal fishermen	Average drop in estuary water level of 10 to 15 cm
River management	Modifications to river management
River integrity	Addition of an artificial dimension constitutes a relatively visible alteration in the integrity of the Moisie River basin
Source: Adapted from Environmental Impact Statement, Part 7, pp. 79 to 101	

To offset the residual impacts on the Moisie River, even the slight impacts, the proponent proposes a series of specific development measures designed to improve environmental conditions for the salmon resource and for salmon fishing.

These measures could include the opening of new areas, the recovery and rehabilitation of spent salmon, the use of the Katchapahun fish-pass as a management tool for the upper portion of the river, the buy back of commercial salmon fishing permits, an inventory and the creation of salmon pools, and improvement of access to these pools.

Environmental Monitoring

For the three ecosystems studied, and for salmon in the Moisie River, Hydro-Québec has proposed work and environmental monitoring measures. If the project is accepted by the government, Hydro-Québec will develop a detailed monitoring program.

The main objectives of the environmental monitoring program that are currently envisaged are as follows:

- verification of the formation of spray conducive to the creation of frost on the road bridge downstream from the SM-2 station;
- verification of the effect of the increased flow in the Lake aux Cèdres area;
- verification of the effect of the reduced flow downstream from the SM-3 dam during the priming of the reservoir (43-km portion);
- assessment of the effect on ice cover by modifications to the flow downstream from the SM-3 and SM-2 stations, and downstream from the P-2 flow control structure;
- validation of forecasts in connection with changes to the shorelines (vulnerability to erosion), of the diversion and the section upstream from the Sainte-Marguerite River as well as the section downstream from the P-2 dam;
- validation of forecasts in connection with changes in water quality in the various areas affected during priming and operation;
- validation of anticipated changes in fish populations and mercury concentrations;
- evaluation of the extent of floating bogs on the reservoirs and the future development of riparian ecotones;
- determination of the population density of caribou, moose, beaver and small wildlife;
- evaluation of the impact of flow variations on the estuary and on ice cover downstream from SM-2;
- evaluation of changes to the spit at the mouth of the Sainte-Marguerite River;

- evaluation of the impact of flow variations on primary production and on fish populations in the estuary and in the marine coastal zone;
- evaluation of the impact of increasing accessibility to the territory, deforesting and priming on harvesting levels (fishing, hunting and trapping);
- a study on use of the territory;
- validation of impacts on employment, firms and demography;
- evaluation of the social impacts generated by construction and operation, particularly on the residents of Fermont and on the Montagnais.

The monitoring program for salmon in the Moisie River would focus on evaluating the size of adult salmon populations, juvenile salmon populations, phenotype and genotype of salmon populations, spawning grounds, the various physical components of the Moisie River, and the establishment and funding of an organization to manage the regulated flows on the Moisie River.

Chapter 3

Citizens' Concerns

Throughout the various phases of its public review, the SM-3 hydroelectric development project elicited many reactions from citizens. This chapter summarizes the concerns raised, and discusses how they have changed, from the information and consultation period of the fall of 1992 to the end of the term for the BAPE inquiry and public hearing.

Reasons for Applications

The concerns expressed by citizens at the information meetings organized by the BAPE related to the rationale for the project from the energy standpoint, to regional socioeconomic benefits and to changes in the current use of land by the Montagnais. The validity of the Hydro-Québec studies on salmon and fishing in the Moisie River, and the continuance of fishing for speckled trout and lake trout in the Sainte-Marguerite River are also concerns. Mercury-contamination of fish, health risks and procedures for safe consumption of fish were also raised. A number of other subjects were also referred to, such as the partial deforestation of the Carheil and aux Pékans reservoirs, and changes to the canoe camping routes on the Moisie and Sainte-Marguerite rivers.

The reasons given for the 20 hearing applications sent to the Minister of the Environment generally express, with more or less detail, the concerns expressed during the information and public consultation period. The applications can be grouped by category, including the project assessment procedure, Moisie River salmon, energy issues, impacts on the human environment, impact assessment method and general project impacts (Table 9).

Table 9 Summary of hearing applications

Applicants	Reasons for hearing					
	Assessment procedure	Moisie River and salmon	Impacts on the human environment		Impact assessment method	General impacts and other subjects
			Aboriginal	Non-Aboriginal		
"Conseil des Atikamekw et des Montagnais"			•			
Pro SM-3 Group						- Study the scope, quality and extent of the impact study
"Conseil central des syndicats nationaux de Sept-Îles"		•	•	•		- Impacts on health (mercury and water quality)
"Les Amis de la Moisie" Coalition		•				- Inadequate mitigation measures
"Association de protection de la rivière Moisie"		•				
Innu Takuaikan Uashat mak Mani-Uteman			•		•	
Citizens of Fermont	•			•	•	- Decrease in diversity of fish species and mercury
"Mouvement Au Courant"	•				•	
Atlantic Salmon Federation		•				
"Fédération québécoise pour le saumon atlantique"		•				

Table 9 Summary of hearing applications (continued)

Applicants	Reasons for hearing						
	Assessment procedure	Mosisie River and salmon	Energy and rationale	Impacts on the human environment		Impact assessment method	General impacts and other subjects
				Aboriginal	Non-Aboriginal		
"Les Ami-e-s de la Terre de Québec"	●	●	●			●	<ul style="list-style-type: none">- Impacts on Sainte-Marguerite River- Social, economic and environmental impacts
"Corporation de protection de l'environnement de Sept-Îles"					●		<ul style="list-style-type: none">- Improvement of project and maintenance of quality of life for future generations
"ENvironnement JEUnesse"	●		●				<ul style="list-style-type: none">- Environmental and economic impacts
Moisie-Nipississ outfitter		●					
"Regroupement pour la protection de l' Ashuapmushuan"	●	●	●		●		
"Les Amis de la vallée du Saint-Laurent"	●	●	●	●	●		<ul style="list-style-type: none">- Environmental, social and economic costs
"Association des gestionnaires de la rivière Moisie inc."	●						<ul style="list-style-type: none">- Submission of a brief
Canadian Wildlife Federation		●					<ul style="list-style-type: none">- Economic and social issues
"Conseil régional de l'environnement de la région de Québec"	●		●		●		<ul style="list-style-type: none">- Impact on natural environment and wildlife resources
James Bay Committee	●		●				<ul style="list-style-type: none">- General impacts of project

Project Assessment Procedure

Many requests were formulated concerning the project assessment procedure in the public hearing applications and in letters sent to the provincial and federal Ministers of the Environment, as well as to the president of the BAPE. These came up throughout the public hearing.

The initial requests concern the nature of the project assessment procedure:

What the Conseil des Atikamekw et des Montagnais is asking for is an improved procedure, like the one applied to the Grande-Baleine project, which makes possible an environmental assessment that is as complete and objective as possible.

(Letter from Mr. René Simon, president of the CAM, to the Minister of the Environment, November 19, 1992, pp. 1 and 2)

A similar request was made by the "Conseil régional de l'environnement de la région de Québec" and by the James Bay Committee. The "Mouvement Au Courant" also sent the federal Minister of the Environment a request to set in motion the environmental assessment and review process at the federal level.

The opportunity for all of the people of Quebec to be involved in the assessment of the project was also requested:

We therefore request that this project be assessed from a provincial perspective and that all citizens, wherever they may live, be able to benefit from the same opportunities to participate in the public hearings as citizens living in the immediate vicinity of the North Shore. The "Mouvement Au Courant" specifically asks that the BAPE also hold hearings in Montreal.

(Application by the "Mouvement Au Courant", October 30, 1992, p. 3)

Similar requests were also made by various agencies for the public hearing to sit in Uashat, Maliotenam and Matimekosk, as well as in Fermont, Montreal and Quebec City.

Several of the applications, in particular those from national environmental groups or from groups working in regions other than the North Shore, asked for financial assistance for the participants:

We also request financial assistance to help us with our research, analysis and compilation work in order to be able to prepare a brief for the hearing. The financial assistance will, of course, have to be adequate to enable us to cover travel and accommodation expenses during our participation in the question periods and at the hearing itself.

(Application by the Regroupement pour la protection de l'Ashuapmushuan, November 10, 1992, p.1)

Several groups also asked that the time period normally allotted for the public review be extended:

Firstly, we consider the four-month period during which the BAPE is required, after receiving terms of reference from the Minister, to set in motion and organize the assessment process, to hold the two stages of the public hearings, and to produce a final report, is simply too short, particularly for a project of this magnitude.

(Application by the "Mouvement Au Courant", October 30, 1992, p. 2)

Lastly, in a letter sent to the Minister of the Environment on December 9, 1992, the Regroupement pour la protection de l'Ashuapmushuan asked that the public review for the SM-3 project be extended until the government had made its decision concerning the proposed Hydro-Québec 1993 Development Plan.

Impacts and Rationale

The other concerns raised in the public hearing applications have to do with the various impacts of the project and its rationale from the energy standpoint.

The impacts of the project on the Moisie River and on Atlantic salmon were cited by several groups or agencies as the reason for their application. The application by the "Les Amis de la Moisie" coalition summarizes these concerns well:

We therefore request that you hold public hearings for the following reasons:

- the impact study by Hydro-Québec shows very negative effects for salmon in the Moisie River and for its users;*
- the digital hydrodynamic model was not validated;*
- the proposed mitigating measures do not give due regard to all the factors that can affect salmon in the Moisie River and its users;*
- the proposed project would cause irreparable deterioration to the river.*

In concluding, Mr. Minister, I would like to remind you that the Moisie River is one of the best salmon rivers in the world which it is imperative to preserve fully intact.

(Application by the "Les Amis de la Moisie" coalition, October 16, 1992, pp. 1 and 2)

Others argued on the basis of the energy issue and the rationale for the project. Subjects raised by the applications included the cost of the project and its financial repercussions, indirect costs or externalities, Quebec's energy needs, electricity exports, energy efficiency programs and other energy production matters.

The impacts of the project on the human environment are also mentioned, both by the Aboriginal communities affected and by the people living in the Sept-Îles or Fermont regions. The Montagnais representatives referred to the impacts of the project on territorial claims currently under negotiation with the federal and provincial governments, the development of the Uashat-Maliotenam community, the protection of Montagnais rights on ancestral lands, the cumulative effects of various development projects, and the political, social, economic, community, environmental and cultural impacts of the project on these communities. A few environmental groups also mentioned how these impacts would affect Aboriginal communities. In addition, subjects like the economic spin-offs of the project, regional development, joint action by the people and recreational, tourism and mining potential were also raised.

The method used by Hydro-Québec to assess the impacts was criticized in terms of either its shortcomings, its results or the faulty basis of the evaluation. The methodological shortcomings of the impact study were among the reasons why the "Mouvement Au Courant" asked for the SM-3 project public hearing to be deferred.

Other reasons for holding a public hearing were given, including the decrease in the diversity of fish species, the impact of eating mercury-contaminated fish on health and the effects on the natural landscape and on wildlife resources. Finally, a number of applicants felt that the mitigating measures put forward by Hydro-Québec to deal with the impacts were inadequate.

Concerns Raised at the Hearing

The Questions

During the 16 public sittings of part one of the hearing, the questions asked by citizens in Sept-Iles or by telephone primarily concerned the subjects referred to in the applications or mentioned during the information period.

In general, the concerns of the two groups of participants were similar. The only noteworthy difference was that the telephone callers asked few questions about the method used by Hydro-Québec to assess impacts and about the SM-3 project assessment procedure.

There were four major areas addressed by participants' questions (Table 10). These were project costs and rationale from the energy standpoint, impact on salmon and on salmon fishing in the Moisie River, regional development and economic benefits and, lastly, the impacts of the project on the Montagnais communities; the latter area included issues concerning mercury and its effects on health.

Table 10 Citizens' concerns (First part of hearing)

Topic	Number of questions
Regional development and economic benefits	67
Moisie River and salmon	65
Rationale in terms of energy and project costs	64
Native issues and mercury	61
The project and its variants	36
Impacts on the natural environment	29
Impacts on recreational activities	26
Quality of Environmental Impact Statement	24
Project assessment procedure	21
Impacts on wildlife (species other than salmon)	14
Safety and monitoring	4
Total	411

The participants also sought to acquire a better understanding of the work planned and the variants being considered by Hydro-Québec. Impacts on recreational activities (resorts, canoeing, hunting, fishing, trapping, etc.), on the natural environment (water quality, erosion, tidal range, etc.) and on wildlife (fish other than salmon, migratory birds, small wildlife, etc.) were also raised.

Hydro-Québec was questioned on several occasions about its impact assessment method. The questions primarily concerned the inventories carried out and the cumulative impacts of the project, as well as other Hydro-Québec activities on the North Shore. Some citizens also attempted to understand the links between the project under consideration and the SM-1 and SM-2 projects, as well as the construction of the line to link the SM-3 generating station to the power transmission system.

In addition, comments contained in the applications about the project assessment procedures led in the first part of the hearing to numerous questions to the panel and to representatives of the various agencies invited.

Briefs

Over half the briefs submitted during the second part of the public hearing came from regional socioeconomic players. The regional county municipalities of Caniapiscau and Sept-Rivières, as well as Sept-Îles, Port-Cartier and Baie-Comeau, the municipality of Gallix and the Corporation municipale de Rivière-Pentecôte submitted briefs describing their interests or their concerns in connection with the project. Industries, firms and small businesses, as well as agencies representing them, were numerous in either supporting the project or setting out their concerns.

Over twenty briefs were submitted by environmental groups, including six American groups. Seven wildlife user associations also stated their opinions to the panel. The commission also acknowledged six briefs from representatives of Aboriginal groups, and from two Aboriginal citizens.

Workers, unions, health and education representatives, elected representatives, one regional youth association, the Club Octogone, and the "Fédération québécoise du canot-camping" had their say about the project. Citizens, whether or not they resided in the Sept-Îles area, also appeared as witnesses and gave their view of the project.

Positions Stated

Positions on the SM-3 project can be divided into three categories: those in favour of the project as submitted by Hydro-Québec, those who disagree with the implementation of such a hydroelectric project and, lastly, those opposed to the diversion of the Carheil and aux Pékans rivers.

Those Supporting the Project Unconditionally

The first category includes those in favour of the project as presented by Hydro-Québec, i.e. with the diversion of a portion of the Moisie River drainage basin. This position was adopted by the vast majority of regional socioeconomic players, which is to say the municipalities, industry and business, as well as the majority of citizens in the region. The large number of briefs received from regional socioeconomic players and the relative similarity of their contents may be explained by the work done by the Regroupement Pro SM-3 well before the public hearing was held in Sept-Îles. As explained in the documents submitted in response to the panel's questions by the Association des commissaires industriels de la région de la Côte-Nord, the Regroupement Pro SM-3 hired two professionals:

[...] to assist firms and organizations who asked the Sept-Îles and Port-Cartier chambers of commerce and economic development corporations for such assistance either orally or in writing.

(Brief from the Association des commissaires industriels de la région de la Côte-Nord, Appendix, p. 1)

Professional assistance was thus made available to agencies and firms, and their participation in the public hearing was sought. Sample contents for a brief and the main reasons for supporting the project as proposed by the Regroupement Pro SM-3 were also provided to any interested parties. An analysis shows that approximately 60 briefs were the direct result of this organized effort.

The reasons given by participants for unconditionally supporting the project had to do with its economic benefits, Quebec's energy needs and the strong sense of belonging that citizens have for their region (Table 11).

However, several regional socioeconomic players demanded the introduction of measures to optimize regional economic benefits, including the processing of wood recovered from the SM-3 reservoir in the region and the reopening of the Port-Cartier pulp and paper plant.

Several participants who were in favour of the project considered that it was important to assure the survival of the salmon populations of the Moisie River and suggested a variety of measures to make the project a success in doing so.

Others mentioned the need to implement specific mitigating measures, such as the relocation of wildlife, improving site working schedules, granting financial compensation, deforesting the Carheil and aux Pékans reservoirs before priming them, completing an additional section of road in the Fermont area, and carrying out an inventory of mining resources on those lands to be flooded. Furthermore, some people argued that an agreement should be signed with the Montagnais.

Table 11 Those supporting the project unconditionally

Reasons	Quotations
Economic benefits	
Economic survival of the region	<p><i>I support the SM-3 project because it will create jobs for a ten-year period. Contracts awarded to companies will create stability and counter the recession that is currently affecting the businesses in our region.</i></p> <p>(Brief submitted by the Bureau Logique, p. 1)</p>
Structural effects	<p><i>The opening up of the land by the access road to the dam will make mining research and forest and wildlife development possible.</i></p> <p>(Brief submitted by the Sept-Rivières RCM, p. 6)</p>
Jobs and social health	<p><i>The many closings and dramatic losses of jobs have had in fact a devastating effect on the population, which is translating into an increase in indicators such as divorce, conjugal violence, etc. A recovery, however mild it may be, would help to reverse the trend, and the SM-3 project and the major impact it will have from this standpoint, will be positive.</i></p> <p>(Brief submitted by the "Corporation de développement économique de la région de Port-Cartier", p. 3)</p>

Table 11 Those supporting the project unconditionally (continued)

Reasons	Quotations
Sense of belonging	<p><i>Out of the hardships caused by the economic convulsions, a deep sense of belonging arose and developed over the years. The social roots are growing constantly, and even people who have lost their jobs want to stay. [...] We are convinced that a satisfactory compromise is possible to preserve the salmon of the Moisie River and to continue with this project, which is the key factor in our economy in these years of world recession. [...] That is why we support the SM-3 project – for the survival of the North Shore and the future of our children.</i></p> <p>(Brief submitted by Ms. Sylvie Dugas and Mr. Ghislain J. Gagnon, pp. 10, 13 and 14)</p>
Quebec's energy needs	
Confidence in forecasts	<p><i>In forecasting energy requirements, [...] we trust Hydro-Québec's estimates. We are, moreover, aware of the fact that fluctuations in the world economy will periodically require Hydro-Québec to adjust its estimates requirements upwards or downwards.</i></p> <p>(Brief submitted by the "Fédération des travailleurs et travailleuses du Québec" [Quebec Federation of Labour], p. 5)</p>
Conservative growth scenarios	<p><i>And from that standpoint, we have always said, and maintained for three years now on each occasion that we intervened, that we believed Hydro-Québec's scenarios to be conservative with respect to growth in demand, and that they in no way reflected Hydro-Québec's experience over the past twenty years.</i></p> <p>(Mr. Richard Le Hir, transcript, part 2, March 25, 1993, evening, pp. 181 and 182)</p>
Preference for hydroelectricity	<p><i>We believe that for the foreseeable one or two decades, no source of electric energy will be able to supplant the hydroelectric process in terms of economic and environmental benefits. We subscribe to the assumption, which has been broadly demonstrated in Hydro-Québec's feasibility studies, that this is the road to follow in the coming decades, and that the completion of SM-3 in its "full" version, is compatible with sustainable development.</i></p> <p>(Brief submitted by the "Fédération des travailleurs et travailleuses du Québec", p. 7)</p>

Opposition to the Project

Environmental groups from outside of the region mainly said that they were in complete disagreement with the development of a hydroelectric project like this one, a position defended by a number of representatives from Aboriginal groups and citizens living on the North Shore and elsewhere.

Six main reasons were given for opposition to the Sainte-Marguerite River hydroelectric development project (Table 12). These are the absence of an energy rationale, impacts on the Montagnais community, on salmon or on other species of wildlife, the incorrect assessment of impacts and, lastly, disagreement concerning the project assessment procedure.

Table 12 Opposition to the project

Reasons	Quotations
Energy rationale	
Doubts concerning increased demand	<p><i>In view of the uncertainty of the energy demand forecasts, where is the rationale for the construction of a hydroelectric project like SM-3, which involves high capital costs and a relatively long construction period. The lack of flexibility for this option exposes us to great financial risks that could prove to be excessively costly.</i></p> <p>(Brief submitted by "Lumière sur l'énergie". p. 5)</p>
Inadequate energy conservation efforts	<p><i>The building of SM-3 does not provide any encouragement for us to take urgent energy conservation measures. Hydro-Québec has revised its energy conservation objectives downwards in its 1993 development plan. In 1992, Hydro-Québec achieved only 22% of the energy savings forecast in its 1990 plan. The ABQ considers energy conservation and energy efficiency to be very important because they provide us with a direct method for reconciling resource conservation and energy policy. They are a crossroad that makes it possible for us to redirect our current practices towards conservation and hence towards sustainable development, in addition to creating more jobs per dollar invested.</i></p> <p>(Brief submitted by the "Association des biologistes du Québec". p. 13)</p>

Table 12 Opposition to the project (continued)

Reasons	Quotations
Criticism of electricity exporting policy	<p><i>Is it logical to borrow money to export electricity to create for ourselves environmental and social problems, when all the jobs that will be created by the use of the electricity will be in the United States. Moreover, the interest payments (on the money borrowed) that will be leaving Quebec will stimulate someone else's economy, not our own. Are we not risking a net loss rather than a benefit?</i></p> <p>(Brief submitted by "Les Ami-e-s de la Terre de Québec", p. 10)</p>
Interest in other energy issues	<p><i>Greenpeace Quebec believes more than anything else in the virtues of energy diversification. We believe that an energy policy based on a variety of sources of production remains the wisest path to follow. The use of wind as a source of energy can no longer be taken lightly, as it unfortunately is by Hydro-Québec. Hydro-Québec has never believed in Quebec's wind potential, even though it is genuine and considerable.</i></p> <p>(Brief submitted by Greenpeace, p. 3)</p> <p><i>Hydro-Québec's philosophy is reflected in its equipment plan, which is essentially based on hydroelectric development to meet demand not for electricity services, but for electricity. Other conventional sources of energy play a minor role, for example cogeneration.</i></p> <p>(Brief submitted by the "Mouvement Au Courant", p. 39)</p>
Failure to integrate externalities	<p><i>The cost of the SM-3 project does not reflect all costs for the people of Quebec related to production, transportation and consumption of the electricity in question. Hydro-Québec includes only direct costs, such as equipment investment and operating and maintenance costs. But the production, transportation and use of electricity also generate a great number of indirect costs (externalities) which are not included in the reported costs, but which Quebecers nevertheless have to pay for with their taxes [...]</i></p> <p>(Brief submitted by the "Ami-e-s de la Terre de Québec", p. 15)</p>

Table 12 Opposition to the project (continued)

Reasons	Quotations
Need for public debate	<p><i>In conclusion, the SM-3 project cannot be accepted at this stage. It must be preceded by an overall debate on the energy needs that Quebec wishes to shoulder in the future, and on the methods it wants to use to meet these needs.</i></p> <p>(Brief submitted by the "Amis de la vallée du Saint-Laurent". p. 5)</p>
Impact on the Montagnais community	
Ancestral way of life	<p><i>The Innu people have inhabited their land for thousands of years, leading a self-sufficient life that is in harmony with nature; the integrity of nature is essential for their physical and spiritual survival. For the Innu (like all people who maintain harmony in their universe), the whole cannot be broken down into parts. They know that if one part is altered or damaged, that the whole is affected, because everything in the universe is interrelated.</i></p> <p>(Brief submitted by the "Conseil des femmes sur l'environnement", pp. 2 and 3)</p>
Territorial claims	<p><i>Before speaking of compensation for the SM-3 project, the Government of Quebec and its acolytes (Hydro-Québec, mining and forestry companies) should begin by first negotiating compensation for land that they have broken, polluted and used, that is to say the flooding and pollution of a portion of Nitassinan through the use of existing dams, mining and forestry in Nitassinan, the railways, and power transmission lines in Nitassinan.</i></p> <p>(Brief submitted by the "Coalition pour Nitassinan". p. 14)</p>
Land use and competition for resources	<p><i>The fact that certain areas of land have been deemed more or less irrecoverable has led several Atikamekw and Montagnais families to abandon their traditional activities on these lands. Some parts of the land have become practically unusable because non-Aboriginal activities and the presence of outsiders has become so intense. What remains are often remote lands which are difficult to reach or whose wildlife potential is uneven.</i></p> <p>(Brief submitted by the "Conseil des Atikamekw et des Montagnais", p. 5)</p>

Table 12 Opposition to the project (continued)

Reasons	Quotations
Mercury contamination and effects on health	<i>Decomposing trees, pollution and microbes in stagnant water lead to mercury. Fish become diseased and they in turn pass the diseases on to the animals and humans who consume them.</i> (Brief submitted by the "Coalition pour Nitassinan", p. 17)
Limited employment opportunities	<i>It is difficult to enter the construction field because competency cards are required and there are reluctant unions. The cards are unavailable to native people.</i> (Brief submitted by the "Coalition pour Nitassinan", p. 16)
Desire to be involved in development	<i>We are not opposed to development on our ancestral lands, but we would from now on like to be fully involved, and constructively, in all steps of the decision-making process.</i> (Brief submitted by the "Conseil des Atikamekw et des Montagnais", pp. 5 and 6)
Impacts on natural environment and wildlife	<i>Flooding will also destroy vegetation and wildlife and radically change ecosystems. A significant release of methane gas over a period of several years will further contribute to atmospheric pollution.</i> (Brief submitted by the "Centre de ressources sur la non-violence", p. 3)
Impact assessment methods	
Methodological shortcomings	<i>On the one hand, the impact assessment methodology used by Hydro-Québec is based on an incomplete description of the environment, which makes it impossible to properly understand the consequences of the project on the natural and human environment. Thus the division into three major zones breaks the analysis of the impacts on the Sainte-Marguerite River down into separate parcels. On the other hand, the weighting of the project elements appears to us to be dubious and unsound. The integration of social and cultural impacts is treated on the same level as the impacts of the reception facilities, firms or vegetation, without any further distinctions or details [...]</i> (Brief submitted by the "Association des biologistes du Québec", 2nd part, p. 6)

Table 12 Opposition to the project (continued)

Reasons	Quotations
Cumulative effects not evaluated	<i>I believe that at this point we must also ask this important question, which is to say how many dams are there in Quebec? How much land area, in terms of total area has Hydro-Québec flooded? What is the total accumulation of mercury here in Quebec? How many salmon have been sacrificed, at Bersimis, elsewhere, in all the rivers that have been sacrificed? How many trout, how many nesting areas, how many migration areas for caribou have disappeared, as well as for other animals, small game and large game? (Mr. Gilbert Pilot, transcription, part 2, March 19, 1993, afternoon, pp. 25 and 26)</i>
Deficiencies in Environmental Impact Statement	<i>Thus the "Conseil des Atikamekw et des Montagnais" opposes the Sainte-Marguerite-3 Hydro-Québec project for the following specific reasons: [...] (3) The SM-3 project is based on an impact study that has many deficiencies and uncertainties, including concerning the following aspects: economic rationale of the project, impacts on the economic, social and cultural environment of the Montagnais, archaeological heritage, ecological balance of the Moisie River, the problem of mercury and cumulative impacts; [...]</i> (Brief submitted by the "Conseil des Atikamekw et des Montagnais", pp. 16)
Impacts not assessed	<i>To begin with, the Hydro-Québec project submitted for assessment is partial and obsolete. The project it submitted for assessment is not the project that it plans to implement, as the panel has discovered. First of all, the lines of transportation required by the project are not included, and new variants, including SM-2 and SM-1, were already given serious consideration before the hearings began. These variants, which may be an alternative to using the flow of the Moisie, are absent from the Environmental Impact Statement.</i> (Brief submitted by the "Mouvement Au Courant", p. 18)
Project assessment procedure	
Term too short	<i>First of all, the BAPE must do a credible assessment of this megaproject, and it can not assume a priori that four months will be enough to do so, given the scope and complexity of the project.</i> (Brief submitted by the "Mouvement Au Courant", p. 14)

Table 12 Opposition to the project (continued)

Reasons	Quotations
Disagreement concerning locations of hearing	<p><i>Moreover, all interested citizens should have been able to take part personally in the public hearings; the first part of the hearings, held in Sept-Îles and broadcast on cable, could only reach a limited number of groups and interested parties [...] The televising of the hearings may have been something positive and interesting, but it can never be a substitute for the personal attendance by intervenors.</i></p> <p>(Brief submitted by James Bay Committee, p. 1)</p>
Limitations of procedure	<p><i>We deeply regret the fact that the SM-3 project is subjected to a procedure that is less demanding and less transparent than the procedure used to review the impacts of the Grande-Baleine project. There was no public participation in the formulation of the guidelines for the preparation of the Environmental Impact Statement for the SM-3 project. In addition, the Environmental Impact Statement prepared by the proponent for SM-3 and submitted to MENVIQ in July 1991 was only made public in September 1992.</i></p> <p>(Brief submitted by "Lumière sur l'énergie", p. 2)</p>
Criticism of the federal government's role	<p><i>The requirement that the federal government suggest a member of the panel, and that issues of federal jurisdiction be mentioned in the panel's terms of reference, that the names of members of the panel and its final report be submitted to the Canadian Minister of the Environment, are more a form of technical cooperation that has nothing to do with the application of the federal procedure. In fact, we believe that these minimal requirements contradict the spirit of the federal procedure and dangerously reduce the scope, in a discretionary manner, and in spite of the federal responsibilities with respect to the SM-3 project.</i></p> <p>(Brief submitted by the Conseil des Atikamekw et des Montagnais, p. 12)</p>

Table 12 Opposition to the project (continued)

Reasons	Quotations
Awarding financial assistance	<p><i>Financing must be shared among the participants of all regions of Quebec. It is important to understand the regional point of view, but the external point of view is equally important in view of the national scope of the project. And it would be helpful to equalize opportunities for travel, accommodation, and research for the presentation of briefs.</i></p> <p>(Brief submitted by the Ami-e-s de la Terre de Québec, pp. 2 and 3)</p>
Impacts on the Moisie River and on salmon	
Outstanding value of the Moisie River	<p><i>[...] at the rate things are happening, Quebec will no longer have any remaining major rivers in the natural state within its boundaries [...] So much so that in the aftermath of the public debate discussed in this brief, the UQCN (l'Union québécoise pour la conservation de la nature) points out and recommends: that Quebec rivers suitable for harnessing be identified in terms of the method of development assigned to them. A number of particularly outstanding Quebec rivers could be given a heritage zoning, while certain others could be set aside for hydroelectric development as needs are identified [...] According to us, the Moisie and its basin ought to be one of these heritage rivers.</i></p> <p>(Mr. André Stainier, transcription, part 2, March 26, 1993, evening, pp. 7 to 9)</p>
Uncertainties and risks for salmon	<p><i>The Moisie River is set apart from other rivers by the outstanding characteristics of its salmon population. The issue is to determine whether these risks are acceptable in the case of an outstanding natural resource like the salmon of the Moisie (scientific committee). We believe that the answer is NO.</i></p> <p>(Brief submitted by the "Coalition pour Nitassinan", p. 33)</p>

Opposition to the Diversion

To conclude, opponents of the diversion of a part of the Moisie River basin are primarily environmental groups from the Sept-Îles region, associations of wildlife users, a number of native representatives, and a few citizens from the area.

In general, they felt that the risk to the salmon populations of the Moisie River is too great. However, in view of a variety of considerations, the most important of which relates to economic growth in the region, a number among them have proposed a hydroelectric project on the Sainte-Marguerite River, but a rejection of the Hydro-Québec proposal to divert a portion of the Moisie River basin. Some of their arguments therefore coincide with those of the group opposed to the project and some with participants who support the diversion project (Table 13).

Several among them made a series of recommendations designed to do such things as reduce the impacts of the project on the Sainte-Marguerite River, encourage regional economic spin-offs, reduce tensions between communities, and prevent impacts on the quality of drinking water. Also, because they believe that there are important deficiencies that remain with respect to what is known about wildlife and habitats within the area being studied, some asked for additional wildlife inventories to be carried out prior to project authorization.

Lastly, we wish to note that several of the groups, agencies and citizens opposed to the diversion of a portion of the Moisie River drainage basin also discussed in their briefs the project assessment procedure and the method used by the proponent to assess impacts. These concerns were analogous to those of the participants who said they were in complete disagreement with a hydroelectric megaproject of this kind.

Table 13 Opposition to the diversion

Reasons	Quotations
Protection of the Moisie River and salmon populations	
Major issue for the Montagnais	<p><i>As we speak of a diversion today, our own vision, let me tell you, is that the salmon would be saved and Nutchiniit Atusseun would be saved too. If we were in another territory, we would probably see it otherwise. But for us, the issue that touches us most deeply is the salmon.</i></p> <p>(Mr. Élie-Jacques Jourdain, transcription, part 2, March 26, 1993, morning, p. 31)</p>
Outstanding value of the Moisie River	<p><i>[...] the Canadian Wildlife Federation (CWF) is in favour of including the Moisie River in the network of Canadian heritage rivers. In view of the natural state of the river, one which is not yet disturbed by development, the CWF continues to encourage every initiative that would see it made eligible for the network. If the diversion of the aux Pékans and Carheil rivers were to go ahead, this opportunity would be lost forever.</i></p> <p>(Brief submitted by the Canadian Wildlife Federation, p. 2)</p>
Uncertainties and risks for salmon	<p><i>The monitoring methods announced are in no way sufficient to enable us to conclude that any decline in the genetic makeup of the Moisie River salmon or any decline in population would be noticed in time. Once the project is built, if any major negative impacts were observed, the burden of proof would always remain with analysts other than the proponent's to show that what is being observed has something to do with the water quality, with the consequences of the management of the controlled flow of the Moisie, and of the structures built by the proponent.</i></p> <p>(Brief submitted by Takuaitkan Uashat mak Mani-Utenam, pp. 23 and 24)</p>

Table 13 Opposition to the diversion (continued)

Reasons	Quotations
Impacts on standards of fishing	<p><i>Our experience shows that with slow flows, salmon are found in fewer numbers in the pools and that it is nearly impossible to capture any. As managers, that is one of our major concerns. One thing is certain, and that is that the diversion of the Carheil and aux Pékans rivers would not make it possible to provide the same standard of fishing that we have today, hence the very great risk of a decline in populations in each area, which would have direct repercussions on the economic impacts of the Moisie River.</i></p> <p>(Brief submitted by the "Association des gestionnaires de la rivière Moisie", p. 10)</p>
Reduction of impacts	<p><i>The SM-3 dam is an important element in the local economy, but the many negative impacts on the environment that are anticipated require the "Corporation de protection de l'environnement" to intervene to reduce these to the greatest extent possible and to thus ensure that the same ecological wealth that we now have will be available to the next generation and future generations.</i></p> <p>(Brief submitted by the "Corporation de protection de l'environnement de Sept-Îles", p. 2)</p>

Other Concerns Without a Specific Position

Approximately fifteen groups, agencies and citizens prepared briefs which, although they state very precise concerns, do not strictly speaking take a position on the project submitted by Hydro-Québec.

Some of these were essentially a criticism of the proposals in the 1993 *Development Plan*, of the planning methodology or of the choices made by Hydro-Québec with respect to the development of new energy systems.

Other participants discussed the territorial claims of the Montagnais or other specific issues such as the sharing of environmental responsibilities or opportunities for work for natives.

Specific requests were made by some to compensate for the inconvenience that the project would likely cause them. These requests have to do with the right to obtain compensation from Hydro-Québec in the event of financial loss related to project impacts, an amendment to the Hydro-Québec applications to eliminate lands from exploration and the staking of mine claims, mitigation measures with respect to the impacts on canoe campers, and enforcement by the proponent of a contract clause requiring contractors to use the services of independent truckers during the work.

A Specific Concern : Seismic Risks

Only one subject raised during the period devoted to questions from citizens did not appear again in the second part of the hearing. This concerns the security of structures, and in particular seismic risks.

Following the first part of the public hearing, the panel received a letter from the Environmental Affairs Office of Energy, Mines and Resources Canada (EMR). According to the Department, the Environmental Impact Statement prepared by Hydro-Québec should have contained an evaluation of the seismic risks of the SM-3 project. The latter pointed out that such an assessment normally examines the probability of natural earthquakes, their magnitude and the seismic risks engendered by the works. As a consequence, the panel sent a supplementary request for information to Hydro-Québec on March 5, 1993, and another letter to EMR for details about the nature of and reasons for its misgivings.

On March 18, the panel received a reply from Hydro-Québec (filed documents A102 and A103) in which it stated that the seismic risks were taken into consideration during the preparation of the project. In addition, the proponent stated that the Geological Division of Hydro-Québec was cooperating with the Geological Survey of Canada to formulate a monitoring plan for any seismic activity induced by the development of the SM-3 project, and a monitoring network before, during and after the filling of the SM-3 reservoir. In its reply of March 26, 1993 (filed document B37),

EMR provided further details about the gaps in the impact study without, however, noting any major concerns about the likely contents of the information deemed to be missing.

On the one hand, in view of the replies received and in view of the fact that this subject was not taken up by citizens in the second part of the hearing, the panel considers that the question of seismic risks is not a major issue for the SM-3 project. Moreover, the Panel believes that this question, if the work were to be completed, should be covered by a specific study by the agencies or departments concerned to ensure that the required safety levels were checked and met.

Chapter 4

The Project and the Regional Economy

Participants generally raised a number of questions concerning the project's economic impact, its effects on the social climate and its apprehended impact on current economic activities. One of the main concerns expressed at the public hearings was that assurances and guarantees should be given that the anticipated economic impacts would in fact be realized.

The first part of this chapter focuses on the issue of the project's expected socio-economic effects on the regional economy. The second concerns the project's possible impact on existing activities in the region, that is the exploitation of wildlife resources, navigation, vacation homes, mining and drinking water supplies. The third examines the scope of compensation and mitigation measures put forward by the proponent in light of the expectations of the population affected by the project. The situation of the Cascades plant in Port-Cartier is also addressed.

Economic Impact

Economic Situation

Major development projects such as SM-3 affect human communities. The human environment disrupted by the project encompasses the towns on the shoreline, the northern town of Fermont and the region's Montagnais communities.

The SM-3 project is to be implemented in a community where economic times are hard. In an economic profile of the North Shore and northern Quebec regions, the Department of Industry, Commerce and Technology/Ministère de l'Industrie, du Commerce et de la Technologie du Québec (MICT) observes that the past decade was particularly difficult for the regional economy (filed document B21). According to the "Office de planification et de développement du Québec", the North Shore economy, which is based on exploitation of its natural resources and primary processing of a limited range of products, lacks diversification and is therefore more vulnerable:

The severe effects of the iron crisis in Sept-Îles and Schefferville clearly show the disastrous consequences of a lack of diversification.
(Filed document B22, p. 52)

The fragile nature of the North Shore economy was described by industrial leaders and Baie-Comeau city councillors:

[...] the North Shore [...] is one of the most important regions for natural resources in Quebec. However, its economic structure is fragile because it is of a single-industry type and is fundamentally based on the exploitation of natural resources, including electricity, and on the primary processing of wood and ore. It therefore derives little benefit from the economic spin-offs generated by its resources, since they are quickly exported to central Quebec and abroad [...].
(Brief by the City of Baie-Comeau, p. 16)

Since the North Shore's economy is based on the primary sector, it is characterized by fluctuations, successive periods of strong growth and depressions all linked to the demand for raw materials.

These fluctuations can easily cause massive lay-offs from plant closings, as was the case in Port-Cartier and the Rayonnier Québec plant in 1979, when 2,000 workers were dismissed. More recently, the Cascades plant has closed its doors, resulting in 450 lost jobs, while the Québec Cartier mining company has laid off 15 % of its employees in the past six months and the Alipêche plant in Sept-Îles closed its doors in 1991. When these major firms disappeared, skilled labour left the region and the regional population declined. The populations of Sept-Îles and Port-Cartier, which were hit hard by the 1982 recession, fell 16.3 % and 13.4 % respectively. While the combined population of both towns was 43,000 inhabitants in 1970, by 1991, it had fallen to 32,245 (filed document A33). According to the 1991 census (filed document A33), the population of Fermont fell 15 % between 1981 and 1986 to 3,750 inhabitants.

An overview of the labour market situation in the North Shore and northern Quebec regions (Table 14) shows there were 50,600 persons in the labour force in 1992. The unemployment rate was 13.3 % compared to 12.8 % for Quebec as a whole (A33 and B36). These annual averages do not reflect changes within a single year or between municipalities. For example, according to the Canada Employment Centre, the unemployment rate in the Port-Cartier and Sept-Îles regions climbed to 20.2 % in February 1993. One study also indicated that the rate among the Montagnais of Uashat-Maliotenam was 66 % in October 1989 (A42, p. 29).

When SM-3 is built, most of the workers will come from the construction sector. However, according to the Association de la construction (région Côte-Nord), 1992 ended with a "20 % reduction in the number of active construction workers on the North Shore and in the loss of nearly one-half of hours worked" (brief by the "Association de la construction du Québec, région Côte-Nord", p. 4). The sharpest declines were recorded in the industrial construction and engineering sectors. According to the Association, this decrease may be explained by the disappearance of several large work sites, the Alouette aluminum plant in particular. The termination of these major projects has resulted in a sharp increase in the number of workers available on the North Shore. Thus, in February 1993, nearly 55 % of workers registered with the office of the Commission de la construction de la Côte-Nord were available, that is 2,731 workers (brief by the Association de la construction du Québec, région Côte-Nord, pp. 4 and 6).

Table 14 Labour Market, 1991 and 1992 - North Shore and Northern Quebec Regions

	2nd Quarter 1991	Year 1991	2nd Quarter 1992	Year 1992
TOTAL POPULATION				
Population aged 15 or less	81,000	80,000	80,000	80,200
Labour force	55,000	54,000	50,000	50,600
Unemployed	8,000	8,000	6,000	6,700
Inactive	26,000	26,000	30,000	29,600
Employment rate	67.9 %	64.7 %	62.5 %	63.1 %
Unemployment rate	14.5 %	13.5 %	12.0 %	13.3 %
15-29				
Total population	24,000	24,000	25,000	
Labour force	16,000	16,000	14,000	
Unemployed	3,000	—	2,000	
Inactive	8,000	8,000	11,000	
Employment rate	68.4 %	66.3 %	55.9 %	
Unemployment rate	18.8 %	—	14.3 %	
30 or more				
Total population	57,000	56,000	55,000	
Labour force	39,000	38,000	36,000	
Unemployed	5,000	5,000	4,000	
Inactive	18,000	18,000	19,000	
Employment rate	68.6 %	67.5 %	65.9 %	
Unemployment rate	12.3 %	12.9 %	10.5 %	
Source: Filed document A33.				

In addition, a construction worker must hold a skill certificate if he intends to work on a site. When questioned at one of the public hearings, a representative of the “Commission de la construction du Québec (CCQ)” confirmed that the certificates are issued based on the unemployment rate in the construction sector:

Yes, under the regulations governing the skill certificates, access to a new worker in the region, the admission of a new worker hired by an employer, is normally based on a labour shortage figure that is set at less than 5% of the regional labour force. And that person must first have taken the 30-hour safety course in order to be eligible.

(Mr. Jacques-Émile Bourbonnais, transcript, part 1, evening of February 8, 1993, p. 170)

According to MICT, manufacturing activity on the North Shore is not very diversified and is concentrated in the RCMs of Sept-Rivières and Manicouagan (filed document B21). The last major business to set up in the region, the Alouette aluminum plant, created 531 direct jobs in 1992.

Most of the businesses in the Montagnais community of Uashat-Maliotenam are linked to the tertiary sector. According to the study by Service de recherche G.L.F. Inc., their expertise is most often limited to jobs available on the reserve (filed document A42, p. 113). Furthermore, only 24 workers hold a skill certificate qualifying them for construction employment (document A42, p. 52).

Quality of Social Life

The economic problems facing a region are usually accompanied by some deterioration in the quality of that region's social life. Several participants expressed that extensive job losses in the Sept-Îles—Port-Cartier area were responsible for the social deterioration in the community:

The human environment, which, in our view, is perhaps more important than anything else, is in crisis. A link has already been established between unemployment, family violence, alcoholism, separation, divorce and learning problems. This is a reality in our regions [...].

(Brief by the “Association des commissaires industriels de la région Côte-Nord”, p. 7)

[...] The absence of jobs and economic activity in the regions, more so than in the major centres, saddens people, causes them to move away, and too often splits up families as children leave.
(Brief by the “Chambre de commerce de Sept-Îles”, p. 10).

Some initiatives have been introduced in an attempt to diversify the regional economy and thus to improve the quality of social life. The “Corporation de développement économique de la région de Port-Cartier” is preparing an initial development plan to promote maximum utilization of resources, such as forests and mines, and development of the natural environment, including hunting, fishing and “ecotourism” (brief by the “Corporation de développement économique de la région de Port-Cartier”, p. 1). At one of the public hearings, the mayor of Sept-Îles briefly described possible development projects, including a liquid hydrogen plant, a brickworks, mining prospecting, iron processing and tourism development. The RCM of Caniapiscau has also produced a development scheme designed to realize the recreational, tourist, mining and forest potential in its region. Similarly, the Montagnais have founded the “Association des gens d'affaires de Uashat mak Mani-Utenam” and the “Société de développement économique, whose mandate is “to become involved in various issues of major and minor economic importance for our two communities” (brief by the “Société de développement économique de Uashat-Maliotenam” and “Association des gens d'affaires de Uashat mak Mani-Utenam”, p. 1).

Contracts and Jobs

The firm Urbanex conducted a study for the proponent on the value of contracts which regional businesses could win with the SM-3 project. Two scenarios were developed.

Under the more optimistic of the two, regional businesses could receive nearly \$330 million in contracts over the 10 years of the project, that is \$10 million for deforestation and timber recovery, \$26 million for the manufacture and installation of machinery and equipment, \$84 million for temporary services at the main camp and for providing goods and services to Hydro-Québec management, plus nearly \$210 million for construction work (filed document A27, p. 160). This scenario is based on a series of assumptions: a specific participation rate and a maximum success rate for

North Shore businesses, as well as an increase in the regional economic impact through contract-splitting, calls to tender on invitation and introduction of a regional content criterion for contractor and supplier selection (document A27, p. 163).

Under the less optimistic scenario, the value of contracts obtained would be \$140 million. The assumptions underlying this scenario are that the proponent and prime contractors would limit their efforts to encourage project participation by regional businesses to a strict minimum and there would be less interest on the part of those businesses (document A27, p. 163).

According to the study, a 10% profit margin is anticipated on the value of all contracts, that is between \$1.4 and \$3.3 million per year for the duration of the project.

The proponent expects the project's economic impact on regional workers would be in the order of \$240 million, sustaining an average of 800 regional jobs per year during construction (document A1). Roughly 600 jobs would be directly related to the project, including 100 indirect jobs related to site supply contracts and 100 induced jobs related to the supply of consumer goods. The proponent estimates 350 on-site jobs will be held by workers from outside the region, for a total average of 950 jobs for the duration of the project. The 600 regional jobs would thus represent 63% of on-site jobs. These figures do not include the labour required to deforest the SM-3 reservoir. It should be noted here that non-regional businesses that obtain contracts will be required under CCQ regulations to hire regional workers on a priority basis.

It should be pointed out, however, that 950 jobs means that 950 workers will be employed for at least six months of one year. According to the proponent, this number of jobs corresponds to an average of 550 person-years (filed document A29).

Table 15 shows the annual breakdown of workers on the SM-3 and Carheil-aux Pékans sites, by number of workers for the term of the project. Table 16 gives the same breakdown in person-years.

**Table 15 Workforce Breakdown by Trade and Worker Class
(Number of Workers)**

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
SM-3 Site	537	612	947	970	1,196	1,058	1,027	810	432	7	7,596
Carheil-aux Pékans Site	—	43	353	352	131	53	—	—	—	—	932
SM-3 Project	537	655	1,300	1,322	1,327	1,111	1,027	810	432	7	8,528

Source: Filed document A124.

**Table 16 Workforce Breakdown by Trade and Worker Class
(Person-Years)**

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
SM-3 Site	305	357	537	551	684	603	628	466	251	3	4,385
Carheil-aux Pékans Site	—	25	200	200	75	30	—	—	—	—	530
SM-3 Project	305	382	737	751	759	633	628	466	251	3	4,915

Source: Filed document A124.

According to the proponent, the Sainte-Marguerite project should contribute to an average 1 % per year decline in the North Shore unemployment rate over 10 years. Including the other jobs created (in the forest, manufacturing and service sectors), the drop could be 1.3 % to 1.6 %. For the Montagnais community, the proponent estimated the employment rate reduction at 4 % on average per year.

In the operating phase, the proponent expects that roughly 20 permanent jobs would be created. Purchases of goods and services required in the region to maintain project infrastructures will amount to \$350,000 on average per year (filed document A1, p. 18).

At one of the public hearings, the proponent described the measures it intends to introduce to maximize the project's regional economic impact:

The first measure we took, that we are going to take, is to form a liaison committee. This liaison committee is a committee between Hydro-Québec and the various players in the region, the economic players in the region, to ensure a communication link. Then a file will be kept on regional businesses so that we are completely familiar with regional suppliers and contractors. We will keep an up-to-date file. Then, the third measure is a call to tender for deforestation work, which will be restricted to regional contractors for the Carheil and aux Pékans roads and reservoirs. You also have the calls to tender on invitation for minor supplies, that is to say, currently for supplies amounting to less than \$100,000 which will be made by inviting regional businesses to bid. You also have project engineering consulting firms participating. That is going to be done, and that has already been done in the preliminary project phase.

(Mr. Michel Gaudette, transcript, part 1, afternoon of February 3, 1993, pp. 112 and 113)

According to the proponent, the committee's primary role is to consult and inform the various regional players concerned by the project. The committee's objectives are to recommend actions to increase the impact in the region, to make available contractors in the region aware of Hydro-Québec's procedures and to inform the population about project-related requirements. When questioned about the experience of similar committees, the proponent briefly discussed the liaison committee established for the construction of the twelfth line in Saguenay - Lac Saint-Jean:

This committee worked during the start of the project and through a whole action strategy in the community — creating business files and identifying regional businesses and holding a lot of meetings and making a lot of contacts. As a result, I believe that we, Hydro-Québec, we consider that there was successful integration in the community.

(Mr. Patrick Arnaud, transcript, part 1, evening of February 11, 1993, pp. 32 and 33)

The study of the economic and social impact on the Montagnais communities filed at the hearing (filed document A42) examined the project's impact on demographics, labour, employment, businesses and public utilities. The study focused particularly on the scarcity and instability of jobs on the reserves, suggesting a series of actions that might help mitigate these problems caused by the implementation of SM-3. These proposed actions focused, in particular, on setting a minimum number of jobs reserved for Montagnais, the possibility of hiring unskilled workers, the need for flexible management suited to aboriginal personnel, labour training and qualification and awarding contracts to native businesses.

The proponent also analyzed the technical and financial capability of local businesses to do work for the project. According to the Urbanex study (filed document A27), these businesses generally have little experience on large sites such as SM-3. Meetings with regional contractors enabled the proponent to see that local businesses would take part more as subcontractors, given their limited technical and financial capability for managing major projects:

We held a meeting with regional contractors, and we realized that these firms would be the right size to subcontract with the large firms in the Quebec club. There is a club of large contractors, and these large contractors are not people from Sept-Îles.

(Mr. Patrick Arnaud, transcript, part 1, February 11, 1993, evening, p. 138)

According to Hydro-Québec, the contract signed with the large contractors would include a clause requiring them to call upon local firms:

[...] but in the negotiations that will be conducted to sign or finalize contracts with those firms, as soon as we have the authorizations, there will be, in those negotiations, an obligation to subcontract to local firms for particular aspects where regional capabilities and skills are recognized.

(Mr. Larry Frigault, transcript, part 1, evening of February 10, 1993, p. 85)

More specifically, this obligation on Hydro-Québec's part would include road surveying, technical support for road work and subcontracting to local engineering firms in support of national firms. The proponent stated that,

generally speaking, it would encourage contractors to use regional subcontractors, which would have an interest in subcontracting to regional businesses, thus enabling them to submit more competitive bids.

In addition, Hydro-Québec intends to do some contract-splitting to accommodate local business skills and capabilities. However, some contracts cannot be divided:

That doesn't mean there will be excessive splitting because we are still concerned about doing the work on time, but you can rest assured that we will do our utmost.

(Mr. Larry Frigault, translation, part 1, evening of February 10, 1993, p. 102)

An attempt was made in the Service de recherche G.L.F. Inc. study to evaluate the capability of Montagnais businesses that might take part in project work. The economic impact for these businesses could include jobs for three to six persons, on average, each year, and 30 to 50 jobs during the busiest phase (filed document A42, pp. 124-130 and 235).

Spin-off Effects

In addition to the impact in the form of contracts and jobs, a major project could also stimulate regional economic activity. According to a study conducted for Hydro-Québec, experience with the large Manic-Outardes hydroelectric site shows that:

[...] forest operations appear to have benefitted from the opening of this part of the region, particularly the deforestation of areas flooded when the reservoirs were primed.

(Filed document A35, p. 68)

Furthermore, local contractors, particularly in the residential construction and specialized manufacturing sectors, apparently benefitted from the impact of this project. Although, according to the study, the site's closure resulted in a business slowdown for some contractors and small industrial firms which directly served the site, the Manic-Outardes project apparently brought prosperity to businesses and the recreation-tourism sector.

Spin-off effects were discussed at the public hearings by representatives of the CSN, the FTQ and the “Corporation de développement économique de Port-Cartier”. The proponent mentioned that road access to the project would promote forest and mining operations:

There is a positive impact, that is, regional forest development and regional mining development, which represent a very large share of the regional economy since we are in a region of mines and forests.
(Ms. Geneviève Corfa, transcript, part 1, evening of February 5, 1993, p. 51)

In particular, the representative of the Department of Forests/Ministère des Forêts du Québec (MFO) mentioned that the access road to the SM-3 station would open a basin “[...] that could permit access to 400,000 m³ of softwood per cutting year.” (Mr. Roger Lafrance, transcript, part 1, evening of February 8, 1993, p. 36)

The proponent also believes that the SM-3 project could permit development of a small secondary industry for major industrial projects and that, for reasons of reliability of supply, a high energy demand industry could attempt to establish itself as close as possible to energy sources:

It is true that the Hydro-Québec network is integrated, but I also believe you must nevertheless consider that, when you are near a source, you can supply these major industries directly and therefore there are lower line costs associated with that supply and therefore an undeniable benefit. [...] when an industry that uses great amounts of energy wants to set up operations, it tries to set them up as near as possible to energy sources because it will try to supply itself directly from the station.

(Mr. Patrick Arnaud, transcript, part 1, evening of February 9, 1993, pp. 160 and 161)

In addition to the economic effects, the project’s social impact on native and non-native communities was examined in studies conducted by the proponent. For the cities of Sept-Îles and Port-Cartier, the Urbanex study found that “[...] the local populations should combine their efforts to welcome the itinerant community of the SM-3 work site” (filed document A27, p. 186).

It concludes, however, that the effect will be distinctly less perceptible than for the Manic-Outardes project because these towns have reached a much greater size and degree of development than Baie-Comeau and Hauterive in the 1960s. Among other social effects, the study states that the presence of workers in the local communities should not place any major constraints on social adjustment, and it concludes that:

[...] in social and cultural terms, because of the size of the regional communities [...] we do not feel that the impacts identified should be considered at this stage.
(Filed document A27, p. 187)

According to Urbanex, slightly fewer than 100 persons from the outside will decide to move to the region, joining a population of 36,000 inhabitants. The region can meet the needs of its new citizens, in the view of Sept-Îles mayor, Mr. Jean-Marc Dion:

Without any additional investment, Sept-Îles can support a project such as SM-3 with all the infrastructures it already has.
(Brief by the City of Sept-Îles, pp. 3 and 4)

For the town of Fermont, the study notes that the population will likely have:

[...] to deal with the comings and goings of groups of workers, varying with the mobility of the trades associated with the progress of the work being done and varying in number and frequency with the years and seasons.
(Filed document A27, p. 188)

G.L.F. Inc. conducted a detailed study of the SM-3 project's social impact on the Montagnais community of Uashat-Maliotenam. This issue is examined in Chapter 6 of this report.

The project would require building two camps to house the workers on the SM-3 and Carheil-aux Pékans sites. No study has been conducted on the social impacts of the work sites on workers' families. In the proponent's view, based on the Great Whale project, this kind of analysis is not relevant because the impacts are not specific to any one project in particular and would in any case be the responsibility of organizations such as the "Association des entrepreneurs du Québec" (filed document A53).

Population's Hopes

A number of participants expressed the view that the project is essential to improving the precarious economic situation of Sept-Îles and Port-Cartier:

Now, in the short term, even though we have projects being planned, we can't be sure we have any particular project that will solve our problems. SM-3 really represents a very important lifesaver, a way of improving our economic situation.

(Mr. André Rioux, transcript, part 2, evening of March 26, 1993, p. 172)

More particularly, a number of local contractors are counting on the project to ensure that their businesses survive, as witness, the testimony of Mr. Daniel Michaud, of the firm Roussy and Michaud, land surveyors:

We are hoping there will be stabilization; not growth, but if we can remain stable and rehire the employees we recently had to lay off, keep our local labour. Because labour is enormously expensive here; [it is] very difficult to bring in labour and keep it.

(Mr. Daniel Michaud, transcript, part 2, afternoon of March 27, 1993, p. 26)

The cost of skilled labour and its possible departure if the SM-3 project is not implemented are also concerns for commercial and industrial players:

Consequently, North Shore businesses in the manufacturing and construction sectors which benefitted from construction of the Alouette aluminum plant and which could win contracts for SM-3, as well as commercial businesses in the Sept-Îles area, are hoping that the project will take off quickly. If work doesn't start too late, they could keep their staff, particularly their good employees, who may otherwise be the first to leave, and maintain profitability.

(Brief by the "Corporation de promotion industrielle et commerciale de Sept-Îles", pp. 16 and 17)

In the view of several business and industrial players, the SM-3 project would enable them to increase their sales and hire new employees, thus helping to return their businesses to economic prosperity. Industries Raymond (1989) Inc., for example, which specializes in the design,

manufacture and machining of heavy welded industrial equipment expects that SM-3 will increase its current number of employees by 20%. R. Tremblay et Associés, on the other hand, while not saying what effects it anticipates the project will have on its activities, says that construction of the Alouette aluminum plant enabled it to increase the number of full-time technicians it needed by 30, whereas its regular personnel consisted of roughly 10 persons (brief by R. Tremblay et Associés, land surveyors, p. 3).

Others feel SM-3 would have structuring effects on the regional economy, promoting the mining, forestry and recreational and tourist industries. The "Association des commissaires industriels de la Côte-Nord", for example, would like the project to be implemented for its economic impact during the construction phase, but also for its long-term effects on the regional economy:

[...] To us, implementation of this project means, not indirectly, but directly, once the project is fully implemented [...], effects that will enhance our development [...]. And the road, the main structuring effect, will, in our view, be very important for that mining development because the back country is not very accessible [...]. The road also has a structuring effect for opening hunting and fishing areas [...]; project implementation will bring access roads into service. For forest resources, these roads, which will stabilize supply costs, will make available an area called le Garemand [...].
(Mr. Guy Landry, transcript, part 2, afternoon of March 17, 1993, pp. 71-73)

Lastly, the SM-3 project represents an opportunity to diversify the region's economic structure, making it less vulnerable to fluctuations in the raw materials market. While recalling that most of the North Shore's manufacturing businesses developed in order to provide services to the mining and forestry sectors, the "Corporation de promotion industrielle et commerciale de Sept-Îles" noted that some of them acquired a third field of

expertise in industrial construction with the Alouette aluminum plant project. The SM-3 project could consolidate their expertise in a fourth field: hydroelectric construction. In the Corporation's view:

The SM-3 project, by providing experience on a large construction site in the field of large equipment maintenance and special construction, will give participating regional businesses greater capability to adapt to any large work site in future.

(Brief by the "Corporation de promotion industrielle et commerciale de Sept-Îles Inc.", p. 20)

Representatives of the Montagnais business community also expressed their expectations of the project:

The project obviously holds out promising prospects for economic impact which the region is entitled to expect, but it should not be forgotten that we are part of this society and that we must be partners in the project.

(Brief by the "Association des gens d'affaires de Uashat mak Mani-Utenam", p. 10)

The eventual introduction of the SM-3 project has also raised hopes that the deteriorated social climate will improve:

A recovery, no matter how small, will help reverse the trend, and, in this context, with the major impact it will have, the SM-3 project will be positive.

(Brief by the "Corporation de développement économique de la région de Port-Cartier", p. 3)

In the view of the representatives of the Port-Cartier School Board, tensions among families and in the community are being felt in the schools. The consequences are lower academic performance. The high school drop-out rate (30%) relative to that of the North Shore as a whole is not unrelated to these tensions. In their view,

[...] there can be no doubt that the SM-3 project would help make a significant improvement to the social environment and, consequently, provide a more suitable, more stable academic life for young people.

(Brief by the Port-Cartier School Board, p. 2)

The project's influence on the school drop-out rate was also noted by the Corporation de promotion industrielle et commerciale de Sept-Îles:

For 10 years, the SM-3 project will provide North Shore young people with opportunities for low skill jobs as well as high tech jobs.
(Brief by the "Corporation de promotion industrielle et commerciale de Sept-Îles Inc.", p. 12)

Lastly, participants have a sense of pride in and belonging to the North Shore region:

[...] the project will enable new generations of North Shore citizens to be proud of their region and to stop feeling like abandoned citizens.
(Brief by the "Corporation de la promotion industrielle et commerciale de Sept-Îles Inc.", p. 15)

Doubts About Impact

The possibility of maximizing the project's impact raised some doubts, particularly regarding contracting out to regional firms. The CSN, among others, recommended that:

[...] local contractors be chosen on a priority basis over all outside contractors to do work which they are able to do.
(Brief by the "Conseil central des syndicats nationaux de Sept-Îles", p. 29)

Although the proponent has often made such a commitment, the CSN representative indicated that the purpose of this recommendation was to ensure it fulfilled it. The same scepticism about the proponent keeping its promises was expressed by a regional contractor who fears that small contracts may slip through the hands of local firms and be hidden in larger contracts intended for the prime contractors:

It's easy to take a surveying contract and make it part of another contract for soil testing, with a soils laboratory, as I have seen, or to give it out within large firms [...]. That's usually the method [...].
(Mr. Rodrigue Tremblay, transcript, part 2, afternoon of March 16, 1993, p. 70)

When asked how to prevent this situation, Mr. Tremblay appealed to Hydro-Québec's good will, specifying, however, that the liaison committee suggested by the proponent was a step in the right direction, provided a sizable number of its decisions and recommendations were considered. The Panel observed on many occasions that representatives of the socio-economic sector saw the liaison committee as the key to guaranteeing maximum impact for the region.

This was the case of the "Corporation de promotion industrielle et commerciale de Sept-Îles", whose first recommendation was the immediate creation of a liaison committee with Hydro-Québec which "would ensure proper distribution and exchange of information concerning SM-3, maximization of regional economic impacts and participation in this project by economic decision-makers from our sector" (Mr. Gilles de Champlain, transcript, part 2, evening of March 26, 1993, p. 161). This recommendation was repeated by the "Corporation de développement économique de la région de Port-Cartier" and by the "Association de la construction du Québec", North Shore region. However, although these recommendations were accompanied by a description of this committee's role, similar to the description which the proponent gave at the hearing, they contain no information describing the scope of its mandate. Mr. Rodrigue Tremblay made this observation at the hearing:

At present, we don't know exactly what this committee's responsibility is going to be. Will this committee be completely independent and authoritative; will this committee's decisions be binding or will they merely be recommendations [...]

(Mr. Rodrigue Tremblay, transcript, part 2, afternoon of March 16, 1993, p. 71)

Consequently, it is difficult to take a position on the powers which the proponent intends to grant this committee and on the real possibility of maximizing the number of contracts awarded in the region. Although it asked a number of questions on the subject, the Panel obtained no details on ways to force the proponent to meet its commitments; such details were not requested by participants.

Hydro-Québec has considerable experience in managing major hydroelectric sites. The relations between the proponent and the populations affected by

those projects, however, have come under some criticism. The “Association de la construction du Québec” would especially like Hydro-Québec to get a little more involved in the community :

We're accustomed to seeing companies in projects, in the industry, mining companies[...] We get the impression they're more involved in the community than Hydro-Québec.

(Mr. Alain Imbeau, transcript, part 2, evening of March 19, 1993, pp. 81 and 82)

The Montagnais also expressed the desire that the proponent open up to the possibility of working together with people in the community :

And that's why we would foresee, and why we propose there be, a local round table in which natives would be involved, or that there be follow-up throughout the process of the SM-3 project, and that there be clearly identified needs and action, clearly identified participation in the project.

(Ms. Hélène Boivin, transcript, part 2, evening of March 18, 1993, p. 167)

Unfortunately, jobs are scarce and unemployment is endemic among us, as is the case for the very great majority of native communities in Quebec. We are not opposed to job development opportunities, but we would like to hear the truth on this subject and not be put off or pushed to one side, as has always been the case in the past and until recently with the Alouette project.

(Brief by Takuaiakan Uashat Mani-Utenam and the Atikamekw and Montagnais Council, p. 54)

In the view of some, in order to achieve maximum impact, the proponent must change its attitude about cooperating with the community. R. Tremblay et Associés, which has asked Hydro-Québec to give priority to local firms for work on SM-3, asked the following question :

The proponent is always talking about subcontracts for local firms. Why couldn't local firms give subcontracts to outside firms ?

(Brief by R. Tremblay et Associés, land surveyors, p. 3)

On this subject, Mr. Tremblay would like to see a softening of measures for issuing guarantees on the financial capability of businesses, measures which he considers too restrictive:

Isn't there a way to improve the warranty? [...] Aren't Hydro-Québec and the government responsible for ensuring that each has its share?

(Mr. Rodrigue Tremblay, transcript, part 2, afternoon of March 16, 1993, p. 77)

Some of the proponent's decisions were also criticized by people from Fermont, in particular the "Association des marchands", which lamented the fact that Hydro-Québec had not chosen to set up the Carheil-aux Pékans site camp closer to town, which would have helped maximize the local impact.

We therefore find it hard to understand why Hydro-Québec wants to build an encampment 50 kilometers from the city. Rather than isolating itself from the other inhabitants of this already isolated region, Hydro-Québec could have enjoyed economies of scale because of the fact that Fermont already has drinking water, water supplies, water treatment, electricity, supply structures and other services.

(Brief by the "Association des marchands de Fermont Ltée", p. 2)

Such a change in attitude would presuppose, among other things, a softening in the procedures established by the proponent. On this subject, the Panel believes the proponent should consider revising its procedure for awarding contracts to local subcontractors which, based on information gathered at the hearings, are perhaps too restrictive. It might be better to extend the obligation to subcontract to local firms beyond road surveying, technical support for road work and local engineering firms and to consider all contractors whose capabilities and skills are recognized. As the independent truckers requested concerning section 75(25) of the *Transport Act* and *Bulk Trucking Regulations*, a softening in this regard could also be granted in order to extend the section to include all contractors who win contracts to build access roads to the SM-3 site. Lastly, with a view to maximizing impact, it would be preferable to begin discussions before reaching a decision that might affect the communities concerned. The location selected for the Carheil-aux Pékans camp is a good example of what can happen in this regard.

Hiring Regional Workers

The hiring of regional workers also raised some concern, as clearly reflected in the testimony of Ms. St-Pierre:

[...] when megaprojects like this one come along, there are often outside contractors who make submissions [...]; they very often come in with their own men [...], at least, if we can hope they'll hire perhaps 80% of our men who live here, whether, as I said, they are from Sept-Îles, or in any case from the region, Port-Cartier [...]
(Ms. Liliane St-Pierre, transcript, part 2, evening of March 19, 1993, pp. 109-110)

The CSN, for its part, recommended:

That every effort be made to maximize the hiring of regional labour before calling in outside labour.
(Brief by the "Conseil central des syndicats nationaux de Sept-Îles", p. 29)

The Urbanex report, to which the proponent referred in setting its regional labour hiring objectives, contains some useful information on this matter. First, the construction sector is governed by the "Commission de la construction du Québec", and all construction workers are governed by the construction order. According to this order, every contractor must first hire workers from the region where its work site is located. The workers must hold a competency card. Only when the local workers asked are not available can the contractor hire outside workers. It should be noted that a contractor's regular employees are beyond this Panel's control. It is expected that 64% of the working hours on the Sainte-Marguerite project will be governed by the order, and 36% will not (filed document A27, p. 99).

As mentioned above, provision has been made for an average 600 regional workers to be hired for the SM-3 project, 63% of jobs on the site. This percentage is calculated under a scenario based on experience with the Manic-5PA site, assuming a maximum of 70% of workers governed by the order and 36% to 50% not governed by the order will come from the region.

This evaluation also reflects the supply and demand of labour in the region, and supply may have changed since the study was conducted. According to Urbanex, the 70 % ceiling may be explained:

[...] on the one hand, by the fact that the major contractors (most often from outside the region) prefer to work with their usual teams and, on the other hand, by the difficulty for the region in meeting the need for highly skilled workers [...].

(Filed document A27, pp. 103 and 105).

Table 17 shows the origin of workers on the Manic-5PA site in July 1988, by job class. As may be seen, 72 % of workers governed by the construction order were from the region, and local recruitment was high for woodworkers (100 %), day labourers (86 %), carpenters (92.5 %) and truck drivers (86 %), but low for foremen (17.5 %), blasters (50 %), drillmen (27 %) and skilled workers (62.5 %). For jobs not governed by the order, the majority of workers were from outside the region. Local recruitment was high only for Hydro-Québec technical and office personnel (78 %) and for security and guard personnel (69 %). The table also shows the workforce that would be required by the SM-3 project at the start, peak and end of the project.

Table 17 Regional Workers by Job Class

	Manic 5PA Site		Anticipated workforce (SM-3)		
	Number in July 1988	%	1993	1997	2001
NOT GOVERNED BY ORDER					
Management personnel - contractors	10 of 74	13.5%	29	67	26
Management personnel - Hydro-Québec	17 of 54	31.5%	21	64	21
Technical and office personnel - contractors	5 of 20	25.0%	34	77	30
Technical and office personnel - Hydro-Québec	28 of 36	77.3%	21	79	27
Food and caretaking personnel	24 of 59	40.7%	38	85	33
Security and guard personnel	9 of 13	69.2%	4	10	4
Sub-total	93 of 256	36.3%	147	382	141
GOVERNED BY ORDER					
Foremen	2 of 16	12.5%	40	88	35
Woodworkers	1 of 1	100.0%	3	7	3
Day labourers	63 of 73	86.3%	43	267	0
Carpenters	62 of 67	97.5%	11	50	5
Mechanics	15 of 20	75.0%	60	85	9
Heavy equipment operators	24 of 34	70.6%	93	141	15
Truck drivers	6 of 7	85.7%	98	149	16
Electromechanical specialists	31 of 45	68.9%	12	31	168
Blasters	4 of 8	50.0%	1	23	5
Drillmen	4 of 15	26.7%	1	39	9
Skilled workers	25 of 40	62.5%	17	39	16
Miscellaneous	22 of 34	64.7%	11	26	10
Sub-total	259 of 360	71.9%	390	945	291
Total	352 of 616		537	1,327	432

Source: Adapted from filed documents A27 and A29

Maximum hiring of workers from the region would require that the prime contractors recruit more local workers to support in their usual teams, and, on the other hand, that the region have a larger pool of skilled labour. The proponent should include measures designed to increase local hiring in the contracts. Mr. Raynald Vachon, native construction worker, illustrated this point:

[...] you nevertheless have to think about the people who want to work in this. [...] and it is absolutely necessary that, at some point, special agreements be reached with the contractors because the contractors, in the construction industry, with Hydro-Québec's contracts, they are given full hiring power, and that's what is dangerous. If Hydro-Québec can take charge of that to guarantee natives a reasonable proportion of the hiring [...].

(Mr. Raynald Vachon, transcript, part 2, evening of March 26, 1993, p. 93)

The proponent did show some willingness to maximize regional hiring:

What I can tell you is that, currently under government regulations, we estimate the number of regional workers under CCQ policy and under employment policy at 600, and we currently estimate the number of workers who will come from the outside at 300. Now those are clearly estimates. And since we at Hydro-Québec are in the process of maximizing economic impact, I believe that, as a result of the incentive clauses we have in our contracts, that number of 600 may perhaps be increased.

(Mr. Patrick Arnaud, transcript, part 1, evening of February 12, 1993, p. 32)

Lastly, the proponent should work with the CCQ and the union locals to ensure that existing regulations concerning the competency cards do not undermine this objective of maximizing local hiring, particularly in the native community, where there are not many so-called "skilled" workers. Lastly, the local population should be informed of these measures so that every decision on these subjects is clear.

Furthermore, as suggested by the CSN, Hydro-Québec should take charge of training specialized workers who may be required for the project (Table 17) by informing the Quebec Department of Education/Ministère de l'Éducation du Québec (MEQ), the "Commission de formation professionnelle" and the CCQ of "its labour requirements and that it is taking an active part in training since it knows better than anyone else which job classes it needs" (brief by the "Conseil central des syndicats nationaux de Sept-Îles Inc.", p. 28). The strong demand for truck drivers, particularly during the first five years of the project, could require a softening in Hydro-Québec's policy on the hiring of independent truckers. Lastly, the Collège d'enseignement général et professionnel (CEGEP) de Sept-Îles mentioned that, based on experience with the Alouette project:

[...] the regular budgets allocated for adult training and development are totally inadequate in a situation where a major project requires a large number of skilled labourers [...].
(Brief by the CEGEP de Sept-Îles, p. 14)

Permanent Effects on Economic Activity

In its analysis of the issue, the Panel also focused on the actual capability of businesses to secure the project's benefits, particularly in the awarding of contracts. A number of participants in the community stated their positions on the subject. The "Corporation de promotion industrielle et commerciale", in particular, cited its experience with the Alouette aluminum plant construction project:

In more concrete terms, perhaps an additional factor in the Alouette project, which is a project that was spread over two and a half years, our contractors on the North Shore won \$75 million in contracts in two and a half years. That means \$30 million per year. These guys are perfectly capable of fulfilling contracts. We now have a project that will be spread over nine or 10 years. And right now, I don't think there will be any problem, if we can manage properly the way it's done.
(Mr. André Rioux, transcript, part 2, evening of March 26, 1993, p. 181)

It is hard to evaluate the local capability to manage large contracts on the basis of the information provided at the hearings. On this subject, Mr. Tremblay believed that certain local firms would be able to win sizable contracts:

Why couldn't I? We just did the entire Alouette aluminum plant contract, which was pretty big, in the orders of magnitude that Hydro-Québec is talking about. So, personally, I can see absolutely nothing against it. I'll cite my company as an example, [...] I can name a few businesses from Sept-Îles that are perfectly capable of fulfilling these contracts.

(Mr. Rodrigue Tremblay, transcript, part 2, afternoon of March 16, 1993, pp. 76-77)

However, this view was apparently not fully shared by other regional contractors:

At Robertson Lake, you have a dam already under construction. We've heard a lot about it. The general contractor is Construction Saint-Laurent. The contract was awarded for more than \$150 million, I believe, so no local business is able to bid on projects like that.

(Mr. Sylvain Gauthier, transcript, part 2, morning of March 19, 1993, p. 6)

In light of these differing views, prudence suggests favouring contract-splitting as far as possible. The proponent has indicated its intention to do so, and a number of socio-economic groups have also recommended it. However, ways of guaranteeing that contracts will be split were not clearly defined, but rather left to the liaison committee. In the absence of any information concerning splitting procedures and the size and number of contracts to be split, it was impossible to determine to what extent these contracts can be absorbed by the region, although the proponent "listened to local businesses" (Mr. Larry Frigault, transcript, part 1, evening of February 10, 1993, p. 102), and gave assurances that it would take their views into account. In the Panel's view, contract-splitting is essential to maximizing regional impact. However, terms and conditions remain to be determined and implemented.

The project's structuring effects may possibly be an important regional development component that extends beyond the project construction period. A number of socio-economic players explained their views on these effects, particularly in the mining, forestry and recreation-tourism sectors. The Panel once again observed differing and in some instances, contradictory views expressed by the participants. On the subject of the creation of new outfitting operations on the eventual SM-3 reservoir, Mr. Gilles Marquis, who owns such an operation on Holt Lake, believes that the SM-3 reservoir could generate revenue in the order of \$5 million annually (Mr. Gilles Marquis, transcript, part 2, morning of March 18, 1993, p. 92). However, this view differed from that of the "Fédération québécoise de la faune (FQF)", which stated that:

[...] the control of water levels in the SM-3 reservoir may not be all that compatible with vacation activities [...] and the attraction of the future SM-3 reservoir seems limited despite the proponent's intention to introduce ouananiche.

(Brief by the "Fédération québécoise de la faune", p. 69)

Similarly, regarding forestry activity, some believe that:

[...] the requirements for deforesting the SM-3 reservoir before it is filled will certainly be an important factor in favour of reopening the business Cascades Port-Cartier [...].

(Brief by the "Corporation de promotion industrielle et commerciale de Sept-Îles", p. 20)

Others, however, wonder "whether there will really be any takers for this wood" (brief by Innu Takuaikan Uashat mak Mani-Utenam, p. 21). And views on the possible impact in the mining sector are no closer to being unanimous, while requests by the proponent to restrict or reduce staking done could compromise this activity's development.

Lastly, while some agree that SM-3's facilities will be regional tourist attractions (brief by the Sept-Îles Chamber of Commerce, p. 8), others wonder whether there can be any interest in "coming to admire a series of earth and rock dikes and dams that disfigure the natural landscape" (brief by the RCM of Caniapiscau, p. 7).

As for the “Corporation de développement économique de Caniapiscau”, the project as designed will not generate structuring effects, at least for the town of Fermont:

In Fermont, the economic impact is virtually non-existent; the residual environmental impact is not properly offset; it puts a brake on the community's potential economic growth. The project fits in poorly with mining development orientations and obliterates the population's effort to take charge of its own economic development by promoting and developing its mining and tourist potential. The project is not a structuring one and not the sort that will develop the region.

(Brief by the “Corporation de développement économique de Caniapiscau”, p. 2)

Lastly, although proximity to an energy source may be a factor in locating high energy-consuming industries, Hydro-Québec's electrical network is completely interrelated, and the energy produced at the SM-3 site will be added to that produced by all existing facilities. The benefit of proximity is, consequently, not a great one, and other factors may influence location selection for such industries.

In the Panel's view, these conflicting opinions make it difficult to assess the extent of the anticipated structuring effects, particularly since those effects do not appear to have been specifically evaluated by the proponent.

No Confirmation Possible

Several measures were suggested to the proponent for maximizing the project's impact in the form of contracts and the hiring of local workers. As stated, however, those measures in no way bind Hydro-Québec to its stated commitments. In the Panel's view, no concrete guarantees of these impacts have been confirmed, and the testimony heard suggests it is not Hydro-Québec's customary practice to adjust its methods and administrative measures in order to maximize regional impact.

Changes in attitude and practices on the proponent's part could eliminate traditions and resistance and remove administrative barriers to giving preference and priority to local players.

Furthermore, although positive effects are anticipated, neither proponent nor participants were able to demonstrate the project's impact on the regional economic situation, particularly in the long term. In the proponent's view, the project means the creation of an average 800 jobs per year, which would be held by regional workers, and the awarding of contracts varying between \$140 million and \$300 million for the duration of construction, as well as roughly 20 permanent positions after its completion. For a number of local businesses, this means an increase in their earnings and number of employees, but none was able to determine specifically the project's actual scope in the short and long terms. The differing views on structuring effects made the project's possible long-term impact even more uncertain.

Fears associated with the economic impact on the region and the project's impact in general have led to uncertainty about its effects on the social climate. It is not impossible that the decline in the unemployment rate may cause a decrease in the drop-out rate, in family violence, etc. However, the 800 jobs created may not reduce the number of unemployed by the same figure, given the vagaries of the iron and lumber markets. Thus, the gains associated with the SM-3 project could be offset by possible lay-offs in other sectors. According to the statistics cited at the hearings, 770 persons were unemployed in Port-Cartier in January 1992 and 2,990 in Sept-Îles in March 1991, and there were 2,485 income security claimants in Sept-Îles, Port-Cartier, Moisie and Gallix in December 1992 (Mr. Gérard Vibien, transcript, part 1, afternoon of February 4, 1993, p. 14).

Furthermore, the Environmental Impact Statement contained nothing on certain factors, in particular the effects of on-site life on workers' families:

First, we believe that special schedules which would enable male and female workers to be with their families at regular intervals would be a step in the right direction.

(Mr. Alain Bouchard, transcript, part 2, evening of March 18, 1993, p. 6)

Although these impacts would likely be smaller than those associated with so-called “isolated” work sites, they could possibly diminish the desired positive impacts. It is the Panel’s view that a study of those impacts should have been conducted because it would have given the population a clear idea on this point.

The lack of information on the project’s actual impact on the communities and on the real capability of local businesses to absorb the impact of a project the scope of SM-3 makes any comparison with other project development options difficult. It would have been interesting to compare the economic impact of such options with those currently put forward by the proponent.

It appears reasonable, however, that a more modest project, for example, one not involving the diversion of the Carheil and aux Pékans rivers, could generate a similar number of jobs in the region, first of all by using less outside labour and, second, by including local worker hiring clauses in the contracts with the prime contractors.

Similarly, an extension of the work period would likely increase regional benefits. However, the proponent made no mention of any such extension. On this point, Urbanex observed:

[...] extending the work period would make it more possible to stagger the demand for labour and to increase participation by regional workers in the various projects [...].
(Filed document A27, p. 96)

An example of this kind of staggering could be postponing the diversion option for a few years. Such staggering might make it possible to tailor the contracts more to the local businesses’ real capability, as the “Corporation de protection de l’environnement de Sept-Îles” pointed out:

The “Corporation de protection de l’environnement de Sept-Îles” recommends extending the project over a longer period of time and awarding smaller contracts so as, first, to enable the region to benefit from the project’s economic impact over a longer time and, second, to enable contractors to bid on work of smaller scope.
(Brief by the “Corporation de protection de l’environnement de Sept-Îles Inc.”, p. 22)

Socio-Economic Impact

The territory affected by the project is extensively used for its wildlife resources. It contains two “zones d’exploitation contrôlée” (ZEC) (controlled exploitation areas): the Matimek ZEC on the Sainte-Marguerite River and the Moisie River ZEC, as well as a fishing club, four outfitting operations along the Moisie River and one more on the Nipississ River. The Sept-Îles–Port-Cartier Wildlife Reserve is located due west of the Sainte-Marguerite basin. The study area is located almost entirely within the Saguenay beaver sanctuary, where the Montagnais have exclusive trapping rights. Since 1981, the Montagnais community has operated the Nutshimiu Atusseun Training Centre, which was founded to promote the revival of hunting and trapping as well as employment for young people. Canoe camping expeditions also regularly travel circuits on the Moisie, Sainte-Marguerite, Carheil and aux Pékans rivers.

In addition, the economic mining potential of the study area is considered “very good” by the “Fonds régional d’exploration minière de la Côte-Nord (FREM)”. The area includes a mining operation in the Mont Wright sector, and lands have been ceded to the “Société d’exploration minière Mazarin” to exploit a graphite deposit at Knife Lake.

Vacation homes are mainly located along the Sainte-Marguerite River, particularly on the edge of the Sainte-Marguerite-2 reservoir. Vacationers draw their drinking water directly from the reservoir. The Clarke sector (population approximately 325 inhabitants), one of the neighbourhoods of the City of Sept-Îles, also draws its drinking water from the Sainte-Marguerite River (SM-1 reservoir).

Wildlife Resources : Dissatisfaction

In the Environmental Impact Statement, the proponent described the exploitation of the region’s wildlife resources and the apprehended impact of the SM-3 project. This description focuses essentially on the drainage basins of the Sainte-Marguerite, Carheil and aux Pékans rivers (Environmental Impact Statement, Parts 4, 5 and 6).

The situation of the Moisie River is discussed in a separate section of the Environmental Impact Statement (Part 7), more specifically, the issue of salmon fishing and the impacts on the activities of the outfitting operations, the Moisie River ZEC and Montagnais users.

In overall terms, the proponent considers that the project's impact on the exploitation of wildlife resources will be negative and of medium to high intensity during the construction and operation phases. The proponent believes the impact of the construction of access roads on the exploitation of wildlife resources will be positive.

The Sept-Îles-Port-Cartier Wildlife Preserve is located almost entirely outside and to the east of the Sainte-Marguerite River drainage basin. The Matimek ZEC, an area of approximately 1,854 km², is largely within the Sainte-Marguerite River basin and extends to the north upstream of the future SM-3 dam.

Activities in the ZEC are managed by the "Association chasse et pêche sept-îlienne Inc.", a 402-member organization, and are based in large part on the use of the SM-2 reservoir:

For us, the SM-2 basin is an access route for fishing, hunting, outdoor activities, boating, cottages, snowmobiling, cross-country skiing [...].

(Mr. André Legendre, transcript, part 1, evening of February 5, 1993, p. 97)

The Association foresees positive economic impact as a result of the SM-3 project:

In light of continuing regional development which will be further stimulated by the introduction of infrastructures related to this dam's construction, we anticipate a major increase in vacation housing, fishing, outdoor activities, boating and snowmobiling in our area.

(Mr. André Legendre, transcript, part 1, evening of February 5, 1993, p. 98)

However, it also foresees negative impact, particularly for hunters, fishermen and trappers. For these users, the dam and SM-3 reservoir will destroy very good brook trout fishing areas. Furthermore:

The habits of users and game animals will be disrupted by the presence of workers during construction of the dam, the road and power line for a number of years.

(Brief by the "Association chasse et pêche sept-îlienne Inc.", p. 7)

The proponent acknowledges that draining the 10-kilometer branch downstream from the SM-3 dam would have negative effects on users of the Matimek ZEC and deems that impact very negative. Planned compensation measures will include seeding the SM-3 reservoir with ouananiche, as well as providing access to replacement fishing areas. The proponent does not foresee providing any financial compensation for hunters and fishermen; however, trappers would receive "financial compensation in respect of trapping areas affected" (Ms. Geneviève Corfa, transcript, part 1, evening of February 5, 1993, p. 99).

The territory consists of 17 parcels of land and 11 trapping units intended for non-native users, all located north of Sept-Îles and east of the Sainte-Marguerite River. According to one representative of the "Association provinciale des trappeurs indépendants (APTI)", these units would not be directly affected by the project:

That's because the territory that is going to be flooded will be on the beaver sanctuary and we are off the beaver sanctuary, where we trap.

(Mr. Richard Tremblay, transcript, part 2, evening of March 15, 1993, p. 41)

However, the Association foresees access problems for some trappers who, by travelling to their territory via the Sainte-Marguerite River, could possibly encounter difficulties during operations because of changes in ice conditions downstream from the SM-3 station (Mr. Richard Tremblay, transcript, part 2, evening of March 15, 1993, pp. 41-42).

Furthermore, the Montagnais use the entire territory. Trapping is an economic activity, but there is fairly limited data for assessing the extent of this activity. Based on one study conducted for the proponent by the firm

CÉRANE, the average annual income per trapper over the last five years was an estimated \$1,177 (filed document A42, p. 188). The low reported incomes were apparently the result of a decline in market fur prices.

The study area is located within the Saguenay beaver sanctuary. The sanctuary grants the Montagnais exclusive trapping rights, but does not apply for hunting and fishing activities.

According to the proponent, the creation of reservoirs and introduction of access roads would affect 11 trapping lots, including nine upstream from the future SM-3 dam. The flooded area would represent 3.64% of the lots affected, that is 501 km² (Environmental Impact Statement, Supplement 1, chap. 2, p. 1). All these trapping lots are exploited in various forms in the context of individual initiatives, trapping programs or activities of the Nutshimiu Atusseun Training Centre. The project's impact on the Centre and the Montagnais' traditional activities are described in greater detail in Chapter 6.

The mitigation measures considered, such as financial compensation for trappers and cooperation with native groups, attest to the proponent's wish to integrate the project in the environment. However, the Panel observed that, on various occasions, these measures would provide only partial satisfaction for individuals suffering the project's negative impact.

On the subject of seeding the SM-3 reservoir with ouananiche, one representative of the "Association de chasse et pêche sept-îlienne" observed:

But, in concrete terms, you tell me about perhaps seeding the SM-3 reservoir with ouananiche; don't you think that it would be better to put it in the SM-2 reservoir? That's where all the users are.

(Mr. André Legendre, transcript, part 1, evening of February 5, 1993, p. 103)

The possibility of providing access to replacement fishing areas in order to offset the loss of one brook trout fishing site located downstream from the SM-3 dam also raised questions by one member of the Fédération

québécoise de la faune, who mentioned, on the subject of the lakes located in the Sainte-Marguerite River basin :

They don't have any fish, according to the ichthyological studies recently conducted by the Department of Recreation, Hunting and Fishing.

(Mr. Conrad Reid, transcript, part 1, evening of February 3, 1993, p. 17)

Indeed, one study conducted by that Department to assess the sport fishing potential of some 12 watercourses in the Matimek ZEC (filed document B9) revealed that the brook trout was absent from all the watercourses tested, water acidity being the major limiting factor. This observation is one of a number that led participants to emphasize the fact that these studies clearly reflect an incomplete knowledge of the territory and of the real needs of the communities concerned.

When questioned about the impact of the territory's flooding on Montagnais hunters and trappers, the proponent answered that "there will indeed be an adjustment by hunters and trappers to the new territory" (Ms. Geneviève Corfa, transcript, part 1, afternoon of February 10, 1993, p. 118).

This answer appears to underestimate the real scope of the impact on Montagnais users. The CAM and the Uashat-Maliotenam Band Council instead emphasized the high value of the territory lost:

The proponent wants to emphasize, as it did at the hearings, that the flooding will affect only 3.64% of the land area affected and 0.44% of the total area of the Sept-Îles division of the Saguenay beaver sanctuary. However, it is not so much the percentage of territory lost that counts for our traditional activities, but rather its quality. Since these are mainly very productive riverbank areas, we believe the lost habitats may represent the majority of the usable portion of the lands affected, which makes it impossible to exploit them and obtain a satisfactory yield, particularly with competition from non-native operators.

(Brief by Takuaikan Uashat mak Mani-Utenam and Atikamekw and Montagnais Council, p. 52)

The slowdown or early abandonment of trapping activities on certain lots, which was observed during the Manic-Outardes project (filed document A35) is a concern for the Montagnais. One representative particularly feared that opening the territory by means of access roads could result in a stepping up of forestry activities and, consequently, considerable impact on the trapping lots:

And these territories are completely encircled, [...] so they are going to be completely affected; it won't be just 5% of the trapping territory of those two families.

(Mr. William Jourdain, transcript, part 1, afternoon of February 10, 1993, p. 111)

The Panel believes that wildlife exploitation activities could be more seriously disrupted than the proponent's assessments suggest. A number of mitigation and compensation measures recommended by the proponent may prove unsatisfactory because of the differences of opinion over the true scope of the project's impact on these activities. The Panel is of the view that more appropriate measures should be developed with the organizations and individuals concerned.

Some briefs contained suggestions which should be examined. A few are presented in greater detail in the following chapters.

Navigation Constraints and Safety

Under subsection 5(1) of the *Navigable Waters Protection Act*, authorization of the SM-3 project is subject to formal approval by the federal Minister of Transport. According to that subsection:

No work shall be built or placed in, on, over, under, through or across any navigable water unless (a) the work and the site and plans thereof have been approved by the Minister, on such terms and conditions as the Minister deems fit [...]

(Excerpt of subsection 5(1) of the *Navigable Waters Protection Act*, R.S.C., Vol. VII, 1191, chap. N-22, p. 2)

The request for approval is the reason why the federal government undertook the environmental assessment process and took part in this public review of the project. Department of Transport Canada's (DOT) representative at the public hearing explained the stages in the process leading to the issue of a permit under the Act (Table 18).

Table 18 Process of Issuing a Permit Under the Navigable Waters Protection Act

Stage	Activity
1.	Navigability of the watercourses at the location of the temporary or permanent works of the project is established.
2.	Where the waterway is deemed navigable, the proponent submits a formal request for approval.
3.	A document authorizing project implementation is issued. It contains recommendations obtained through popular consultation. At this stage, the DOT may refuse to approve the project.

Source: Mr. Réjean Gélinas, transcript, part 1, afternoon of February 5, 1993, pp. 37-39.

In the case of the SM-3 project, the DOT observed in an inspection of the site that the Sainte-Marguerite River was navigable within the meaning of the *Navigable Waters Protection Act* at the location of the main dam and coffer dam upstream (Canadian Coast Guard, letter of October 6, 1992). The aux Pékans and Carheil Rivers were decreed non-navigable at the location of the P-2 and CH-4 works (Mr. Réjean Gélinas, transcript, part 1, afternoon of February 5, 1993, p. 34).

According to the federal authorities concerned, the negative assessment of the navigability of the Carheil and aux Pékans Rivers at the sites of the works did not exclude those rivers from the process of project authorization by the Minister of Transport Canada:

The permit will concern only the SM-3 site, but the conditions will concern the work as a whole.

(Mr. Réjean Gélinas, transcript, part 1, afternoon of February 5, 1993, p. 39)

When questioned by the Panel as to the navigability criteria and their applicability for sporting purposes, for canoe camping, for example, the DOT representative answered that the Department:

[...] determines navigability for business, transportation, agriculture and recreational purposes. If one of these components is used in order to travel a river, the river is deemed navigable.

(Mr. Réjean Gélinas, transcript, part 1, afternoon of February 5, 1993, pp. 34 and 35)

The river's characteristics and safety are also considered in determining the navigability of a watercourse:

For us, flow is not taken into account. What is taken into account is the depth, width, size of the watercourse and its ability to bear a boat, whether it be a canoe, a row boat or other boat, no matter what type. [...] If the watercourse is not deep enough, and there are risks of boats running aground, we consider that it is not navigable. Size is very important, and navigation is also a matter of fact. If it is possible to navigate normally, without any risk or danger, in our view, it is navigable.

(Mr. Réjean Gélinas, transcript, part 1, afternoon of February 5, 1993, pp. 41-42)

The brief by the "Fédération québécoise du canot-camping Inc. (FQCC)" discussed the notion of the navigability of a watercourse. It has adopted the international classification of rapids and considers that:

[...] average canoeists should refrain from travelling through rapids more difficult than Class III, especially in fast-flow rivers.

(Brief by "the Fédération québécoise du canot-camping Inc.", pp. 5-6)

According to the international classification of rapids, Class III rapids require advanced mastery of canoeing techniques and may be dangerous for paddlers and equipment if they are long. The notion of safety used by DOT in determining the navigability of a watercourse is also a determining factor

for the FQCC. The latter also considers the navigability of a river as a whole: the presence of riffles, impassable rapids which may nevertheless be portaged, does not make a waterway unnavigable:

We frequently encounter impassable, non-navigable features, which we generally circumvent by portaging. The rest of the river continues to be navigable until there is another impassable feature. We make this point in order to show that the Carheil and aux Pékans are in fact navigable and, in the same way as the Sainte-Marguerite, require all the necessary Transport Canada authorizations.

(Brief by the “Fédération québécoise du canot-camping Inc.”, p. 5)

This interpretation of navigability differs from that of DOT, which appears to divide a watercourse into navigable and non-navigable sections:

So at the location of the main work on the Pékans River, we determined that it was not navigable. However, it is navigable upstream, and it is navigable downstream as well.

(Mr. Réjean Gélinas, transcript, part 1, afternoon of February 5, 1993, p. 34)

This way of considering the navigability of waterways by dividing them up appears to be directly related to the provisions of the *Navigable Waters Protection Act*. A letter from the Canadian Coast Guard to the Department of Fisheries and Oceans Canada (DFO) mentions:

It goes without saying that, if some proposed works are located in portions of waterways considered navigable under the Navigable Waters Protection Act, they will be subject to formal approval under the Navigable Waters Protection Act.

(Filed document B3, p. 2)

These interpretations of the notion of navigability contain differences, but also certain similarities which may help specify navigability criteria. On the one hand, the notion of navigability for recreational purposes applies to boats including canoes. On the other, boating safety is an integral part of the definition of navigability.

The provisions and regulations of the *Navigable Waters Protection Act* provide no criteria which the Minister of Transport must consider in approving a project. Consequently, the Panel is interested in the reference to the international classification of rapids made by the FQCC. In defining the limits of navigability, these suggestions and other assumptions of limits should be examined by the proper authorities.

During the hearings, DOT explained it would give its authorization solely for the SM-3 site, together with some considerations on the work as a whole (Mr. Réjean Gélinas, transcript, part 1, afternoon of February 5, 1993, p. 40).

These considerations were not clearly outlined in the public hearing. On this point, the Panel is of the view that the Department has a duty to examine the consequences for navigability of the works to be implemented and all the environmental costs they incur. This opinion is consistent with the judgment in the *Friends of the Old Man River Society* case :

It is therefore clear that the Minister of Transport must take into account several factors in the cost-benefit analysis designed to determine whether impeding navigation in any major way is justified in the circumstances [...].
(*Friends of the Old Man River Society v. Canada (Minister of Transport)*, Supreme Court of Canada, January 23, 1992, p. 31)

The proponent also gave detailed consideration to the impact of the various works on the hydraulics and hydrology of the Sainte-Marguerite and Carheil and aux Pékans rivers. However, the consequences for the navigability of the watercourse, and particularly the measures to mitigate those consequences, were not addressed in a detailed manner in the Environmental Impact Statement. At best, the following was stated in connection with the SM-2 dam :

[...] with regard to recreation, tourism and vacationing, the river's attraction lies mainly in its navigability, which will not be altered by hydraulic management; it could even be slightly improved [...].
(Environmental Impact Statement, Part 5, p. 198)

The proponent considers that the SM-3 reservoir will have a positive impact on the navigability of the Sainte-Marguerite River because "the creation of the Sainte-Marguerite-3 reservoir will make it possible to confirm the

Sainte-Marguerite River as the 'highway of the back country'" (Environmental Impact Statement, Part 6, p. 21). Boat slips are planned at the dam location.

The proponent admits that creating the Carheil and aux Pékans reservoirs could create unfavourable navigation conditions. It proposes setting up access ramps and partially deforesting those reservoirs to create navigation lanes in order to soften the visual impact. Deforestation work would cover an approximate area of 345 and 534 hectares respectively for the aux Pékans and Carheil reservoirs.

This analysis was considered inadequate by DFO, which noted in its initial environmental assessment report:

The SM-3 project could therefore have notable effects on navigability and affect navigation on the area's watercourses. However, the lack of specific information makes it impossible to determine the scope of the impact and mitigation opportunities.
(Filed document B8, p. 11)

The impact on canoe camping activities was discussed very little in the Environmental Impact Statement. Regarding the Sainte-Marguerite River, frequented by an average of 20 to 30 canoeists each year, the FQCC noted:

Lastly, canoe camping via this river will be done on an immense lake cluttered with raftwood and involve a 10-kilometer portage across the headrace. This circuit will clearly no longer be of any interest to canoe campers.
(Brief by the "Fédération québécoise du canot-camping Inc.", p. 10)

In the case of the Moisie River, the FQCC has reported traffic of between 80 and 150 persons a year for an expedition length of 14 to 18 days since the access routes via the aux Pékans and Carheil Rivers became popular.

According to that organization, the draining of the Carheil River over a distance of 10 kilometers as a result of the CH-4 storage work means that:

[...] to all intents and purposes, this river will be dead for any activity, including canoeing. No one will be tempted to portage the

last 10 kilometers of this river to cross the residual marshes and the drained bed.

(Brief by the "Fédération québécoise du canot-camping Inc.", p.10)

A decline in use of the aux Pékans River as a result of a possible five-kilometer portage downstream from the P-2 work is also expected. The SM-3 project suggests there will be "a pronounced drop in use of the Moisie River and its definite withdrawal from the adventure tourism program" (brief by the "Fédération québécoise du canot-camping Inc.", p. 12). According to that organization's representative, the program, which is currently being introduced, could generate income in the order of \$50,000 a year from the Moisie River alone (Mr. Pierre Trudel, transcript, part 2, morning of March 29, 1993, p. 71).

These negative impacts are also foreseen by the RCM of Caniapiscau:

In these conditions, the downstream canoe run on the Moisie River from the Carheil or aux Pékans Rivers is one of the Fermont region's greatest tourist attractions, and the Sainte-Marguerite-3 hydroelectric project will eliminate it.

(Brief by the RCM of Caniapiscau, p. 8)

Winds are the main intangible factor encountered by canoe camping expeditions on all the major lakes:

Headwinds prevent canoes from advancing, whereas tail winds risk filling them with water from the rear, particularly at the start of an expedition when the canoes are heavy, lower in the water and therefore more subject to this type of problem.

In these situations, canoeists usually travel close to the shore for safety's sake, but must wait until the winds die down when they have to cross open water.

(Brief by the "Fédération québécoise du canot-camping Inc.", p. 8)

Travelling on the Sainte-Marguerite River will also be more dangerous for the Montagnais, in addition to the canoe campers. This problem was also observed in the reservoirs of the Manic-Outardes complex (filed document A35).

Based on these demonstrations by recreational boating specialists, the Panel acknowledges that the popularity of the Sainte-Marguerite River for canoe camping could decline with the creation of the SM-3 reservoir. This impact could only be partially mitigated by means of the measures planned by the proponent. With regard to the Carheil-Moisie circuit, the 10-kilometer portage from the CH-4 work will become such an obstacle that the circuit could, to all intents and purposes, be abandoned. Expeditions could, however, shift to the aux Pékans-Moisie route, provided it did not suffer unfavourable navigation conditions. Two factors could constitute constraints on the popularity of the Carheil-aux Pékans circuit with canoe campers: the aux Pékans reservoir, where the forest is partially cleared, will replace a 32-kilometer section of the river with a vast lake, and the presence of the P-2 control work, where the proponent intends to increase flow co-efficiency during slow and medium periods to $15 \text{ m}^3/\text{sec.}$:

In our view and that of the experts, and based on experience, at $15 \text{ m}^3/\text{sec.}$, the aux Pékans River will no longer be navigable.
(Mr. Pierre Trudel, transcript, part 2, afternoon of February 5, 1993, p. 17)

A minimum flow of 20 to $25 \text{ m}^3/\text{sec.}$ would be necessary, according to the FQCC, for the aux Pékans River to remain canoeable (brief by the "Fédération québécoise du canot-camping Inc.", p. 14), failing which, portages over a distance of 5 kilometers would significantly diminish this river's attraction for canoe camping.

The elected representatives of the RCM of Caniapiscau underscored the importance of canoe camping for the Fermont region's economic development (Mr. Robin P. Bélanger, transcript, part 2, evening of March 15, 1993, p. 106).

In this perspective, the Panel is of the view that the proponent should join with the FQCC, the RCM of Caniapiscau and any other group to discuss conditions and ways for reconciling the SM-3 project with continued opportunities for tourist uses of existing river circuits. The proponent should, among other things, consider the possibility of completely clearing the forest around the Carheil and aux Pékans Rivers in order to maximize canoeists' safety on those watercourses. The feasibility of a reserved flow acceptable for canoe-camping should also be explored.

The proponent itself showed a certain open-mindedness on this subject:

If we were certain that the Carheil and aux Pékans circuits were very popular circuits, we would definitely have thought of something [...].
(Ms. Genenière Corfa, transcript, part 1, afternoon of February 5, 1993, pp. 80 and 81)

These suggestions for mitigating the consequences for navigability, and the changes to the works and to the management of flows that might result should be examined by DOT and possibly be considered as conditions for approval of the project by the Minister of Transport.

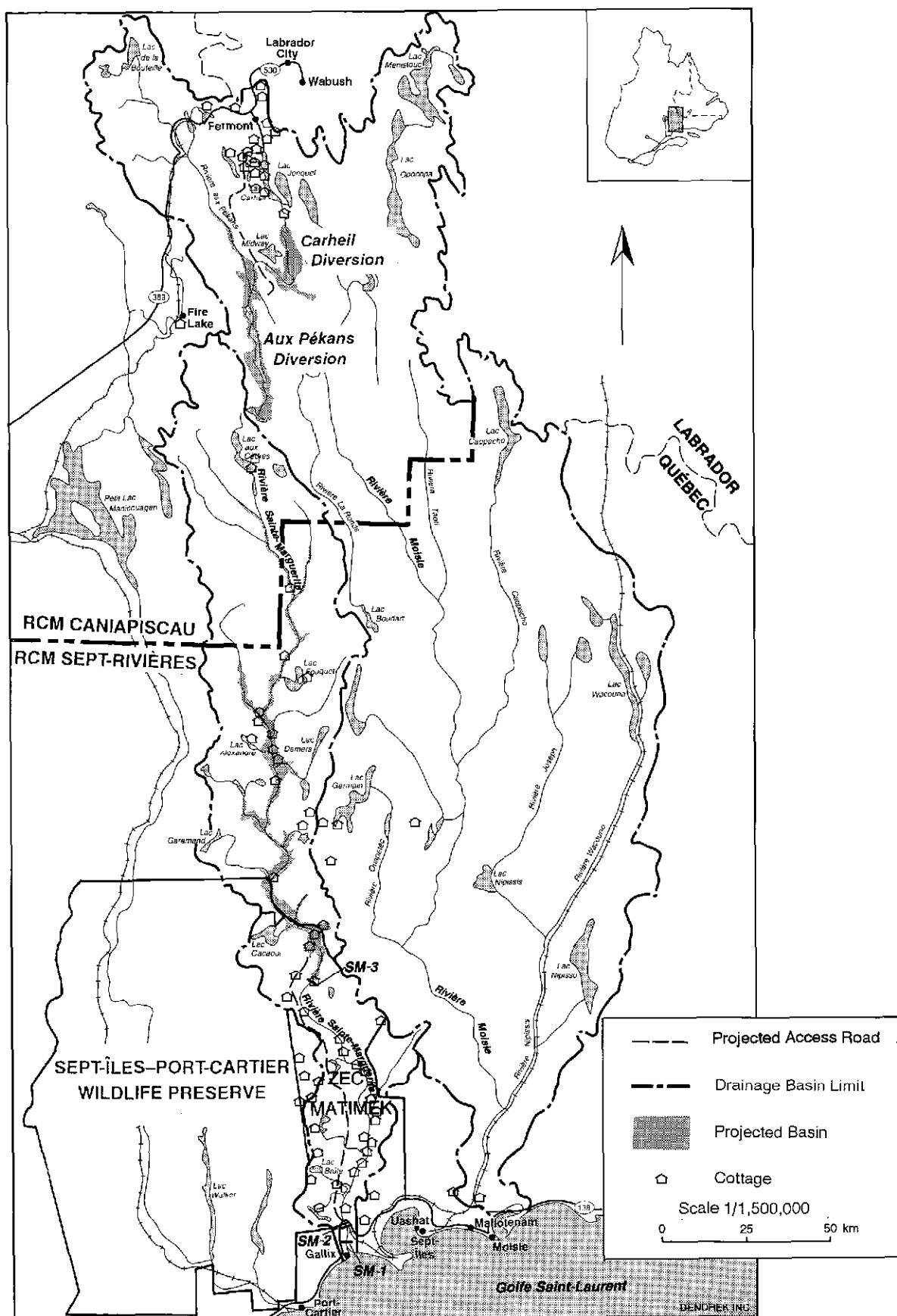
Disadvantages for Vacation Homes

Vacation homes are concentrated along the Sainte-Marguerite River (Figure 4). The FQCC has counted at least 80 cottages on the edge of the SM-2 reservoir, the majority of which are located in the Matimek ZEC.

There are far fewer vacation homes farther north. Nine structures were counted on the edge of Carheil Lake and would not be affected by the project. There are no officially counted structures in the area of the future aux Pékans and Carheil reservoirs.

On this subject, the Environmental Impact Statement mentions that “familiar access routes, as well as camp sites, camps and cottages will disappear” (Environmental Impact Statement, Part 5, p. 161) as a result of the priming of the SM-3 reservoir. According to the proponent, 10 camps and cottages are located within the limits of that reservoir. The proponent is providing for compensation for these cottages on a case-by-case basis.

Figure 4 **Location of Cottages**



Source: Adapted from the Environmental Impact Statement, Summary, Map 2, Human Environment.

The temporary draining of the Sainte-Marguerite River section downstream from the SM-3 dam would cause problems for the owners of five cottages located between the dam and the limit downstream from the SM-2 reservoir. The proponent is considering compensation measures to offset this inconvenience:

There is already an existing forest road, and it will therefore be usable, and perhaps this forest road can serve as an access road to the existing cottages [...] The measures that we could take are roads, that is to say there are existing forest roads, so we could have access by foot. But no provision has been made for a road.

(Ms. Geneviève Corfa, transcript, part 1, afternoon of February 4, 1993, p. 36)

This measure, that is access by foot to the cottages, could prove inadequate, in particular because of the distance between the road and the cottages located on the riverbank:

It [the access road] is several kilometers long on the west side, and there is no access road on the east side for cottagers on that side, on the east side of the Sainte-Marguerite River.

(Mr. Conrad Reid, transcript, part 1, evening of February 3, 1993, pp. 28-29)

The matter of the drinking water supply for the cottagers located downstream from the SM-3 dam in the temporarily drained section was also raised:

The question is whether there will be a drop in the water level of its aquifer during priming?

(Mr. Denis Bouchard, transcript, part 1, evening of February 10, 1993, p. 71)

This particular aspect was not explicitly addressed by the proponent, which noted, however:

We would have to check to see exactly which underground water level is involved, where it is located, check with the distances relative to the Sainte-Marguerite River and give an answer. We don't have an answer at present [...] But the initial information we have is that there is a very large volume of groundwater.

(Ms. Geneviève Corfa, transcript, part 1, evening of February 10, 1993, p. 72)

There were also some concerns about drinking water quality during priming:

During the priming of SM-3, the water in the SM-2 basin will be very acidic because of the tributaries which will supply the only water to the basin. As a result, this will do considerable harm to the aquatic wildlife and to cottage owners who draw their drinking water from the river.

(Brief by the “Association chasse et pêche sept-îlienne Inc.”, p. 7)

The Panel therefore finds that cottagers should retain access to their cottages and have drinking water in sufficient quantities and of adequate quality. The proponent will therefore have to propose ways of providing access to the cottages that will allow vehicles to pass, assess the potential of and changes in the groundwater level downstream from SM-3 and monitor water quality in the SM-2 reservoir, particularly during priming of SM-3. Corrective measures will be taken as necessary in case of problems.

Mining : Northern Activity

The proponent stated that there is little mining activity in the estuary and coastal areas and none in the continental basin. The situation is different on the northern plateau, since most of this territory is a mining area. The Environmental Impact Statement also mentions that there is attractive economic mining potential for gold, copper, zinc and black granite in the continental basin. The northern plateau is rich in copper, nickel, zinc and silver.

This description of mining activity and mining potential is, generally speaking, consistent with that given by the FREM:

On the whole, we would readily agree with the picture painted of mining conditions in our territory. We could argue about the existence of any specific development potential, but that is not the essential point of this brief because we agree that the territories' economic mining potential is very high. As for the accessibility of a territory under mining development, its importance, properly speaking, is self-evident.

(Brief by the “Fonds régional d’exploration minière de la Côte-Nord”, p. 13)

The importance of mining on the northern plateau was clearly illustrated by the RCM of Caniapiscau:

Mining activities are to the territory and populations of the RCM of Caniapiscau what the heart is to the human body. They have created it, and they enable it to continue living; without them, it would not survive.

(Brief by the RCM of Caniapiscau, p. 10)

To develop mining in the territory, the RCM of Caniapiscau favours action to diversify through mining exploration and research. In 1985, the City of Fermont founded the FREM, which undertook a major exploration program that led to the discovery of a rich deposit of high-grade graphite. According to the “Société d’exploitation minière Mazarin”, the deposit’s reserves are large enough to be exploited for at least 25 years, thus creating more than 100 permanent jobs (brief by the “Société d’exploration minière Mazarin Inc.”, p. 3). In addition, “all the feasibility and profitability studies have been completed, and the project is now ready to go” (brief by the “Société d’exploration minière Mazarin Inc.”, p. 2).

In 1980, MER founded FREM to carry out “mining prospection and exploration activities tailored to the specific situation of the North Shore and recommendations by the community” (brief by the “Fonds régional d’exploration minière de la Côte-Nord”, p. 8).

Among the main aspects of this problem, the FREM noted the small amounts invested in exploration in this region, the incomplete basic geological knowledge of the region, the attraction of the five-year plan for acquisition of geo-scientific knowledge undertaken by MER in 1989, and the lack of access roads to most of the territory (brief by the Fonds régional d’exploration minière de la Côte-Nord, p. 6).

The proponent described the impact of the SM-3 project on mining activity in the study area. It noted, in particular, strong positive impact for the northern plateau and medium impact for the continental basin because of the presence of new road infrastructures which will be conducive to mining exploration and exploitation.

However, there appears to be no unanimous agreement on this description of the extent of the impact as perceived by the proponent:

Because, in fact, the reservations are not about the project as such, but about the way of dealing [...] with the mining world throughout the project as a whole; [...] the reservations concern the manner in which the proponent has conducted certain preliminary studies on the impact on mining activity.

(Mr. Daniel Danis, transcript, part 2, morning of March 16, 1993, p. 95)

In particular, a number of participants questioned the actual extent of the positive impact of new road construction on the exploration of mining areas:

Under this project, the proponent thus proposes to build approximately 25 kilometers of new roads and plans to rebuild roughly 100 kilometers of existing roadway. [...] The 25 kilometers of new roads will provide access to approximately 250 square kilometers of virtually inaccessible territory, which is, in itself, a positive impact on mining development, if and only if the new territory and all the territories already available remain accessible for prospecting and basic exploration.

(Brief by the "Fonds régional d'exploration minière de la Côte-Nord", p. 19)

The territory's accessibility is not guaranteed since the proponent asked MER to restrict and exempt from staking more than 2,700 km² of territory under study, under section 32(4) of the *Mining Act* (R.S.Q., chap. M-13.1), a request which MER is apparently prepared to grant (filed document B27). Figure 5 shows the region concerned by the request. More than 1,200 km² of the 2,700 km² are apparently located on the northern plateau, which includes the mining deposit of the société Mazarin (brief by the RCM of Caniapiscau, p. 12).

The proponent provided some details on its request, stating, however, that the so-called reserved territories did not prevent mining exploration or exploitation:

The reason we are making this request is that we are surrounding the reservoirs with a polygon to ensure that, in the corners where there are reservoir crests, exploration will not be carried out too close to the future reservoir because there would then be risks of seepage.
(Mr. Patrick Arnaud, transcript, part 2, evening of March 17, 1993, p. 152)

The idea of restricting staking or exempting such large areas from staking was strongly criticized as inappropriate by several participants, who saw this measure as a barrier to mining development and economic development:

The reservoirs are reserves for Crown purposes, for hydroelectric purposes. We can always say yes, but that does not prevent staking. That's true, it doesn't prevent staking, except that the proponent then has to go see Hydro-Québec and they have a phenomenal list of constraints, which, in the mining field, means we have just lost every potential promoter of a high potential area.
(Mr. Robin Bélanger, transcript, part 2, evening of March 15, 1993, p. 125)

The effect of Hydro-Québec's application to the Crown for a reserve is to subject the southern portion of the territory of the RCM of Caniapiscau to permanent specific constraints.
(Brief by the Corporation de développement économique de Caniapiscau, p. 14)

The Panel acknowledged that reserving certain areas near hydroelectric works and reservoirs for safety reasons was a valid idea. However, like the RCM of Caniapiscau, the Panel believes that, to encourage companies to prospect in the region, favourable conditions must be created to stimulate interest and thus simplify the action required in order to carry out activities.

[illegible]

Source: Adapted from Brief MM-4

Consequently, the Panel requests that the proponent make a downward revision of the land areas subject to the application for exemption from and restrictions on staking, so as to hamper mining development as little as possible and to maximize the positive impact anticipated by the proponent. In particular, the proponent should consider the present and future activities carried out on the northern plateau by the société Mazarin, which has invested heavily in exploration work and which holds mining title in the area concerned by the application.

Furthermore, to simplify the authorization process for staking on the Crown reserves, the Panel suggests that an administrative agreement be reached between the representatives of the mining industry, the proponent and MER to set out the rules for the various types of work to be done on those lands. Such agreements have been reached in the past (e.g., the agreement mentioned by “the Association des prospecteurs du Québec” on mining in the Aiguebelle reserve in Abitibi-Témiscamingue, between the mining industry, the MRC Rouyn-Noranda and MER) (brief by the “Association des prospecteurs du Québec”, p. 2).

The project raises another aspect of mining activity. The flooding caused by the SM-3, Carheil and aux Pékans reservoirs would also have an impact on mining operations:

The reservoir will also cover areas of unknown mining potential. We should point out that there are no mining claims in the flooded area, whereas the pink and black granite deposits are located south of it. The impact of the Sainte-Marguerite-3 reservoir on forestry and mining operations is therefore considered negative and not very extensive.

(Environmental Impact Statement, Part 5, p. 201)

[...] since there are no mining claims in the area that will be flooded, the impact of the Carheil and aux Pékans reservoirs on forestry and mining operations is considered nil.

(Environmental Impact Statement, Part 5, p. 131)

This impact assessment was questioned by FREM, among others:

Was the mining potential of the flooded lands adequately assessed in order to ensure that information that might be relevant to future mining development would not be lost?

(Brief by the "Fonds régional d'exploration minière de la Côte-Nord", p. 22)

In its brief, this organization showed that there is mining potential in both the flooded lands and in the lands near the future reservoirs, for which the proponent has filed a reserve application. The study which it conducted essentially consisted in locating geochemical anomalies in the territory, that is to say "abnormally large trace amounts of minerals or metals in lake bottom sediments" (Mr. Daniel Danis, transcript, part 2, afternoon of March 16, 1993, p. 117). These anomalies are of some interest for possible mining operations:

[...] if we go anywhere, we have a probability in one in 10 million; and if we go to known targets, that is to anomalies and indicators, such as what we have in these reservoirs, we can increase our chances a thousand times. So we increase our chance of finding a mine to one in ten thousand.

(Mr. Daniel Danis, transcript, part 2, afternoon of March 16, 1993, p. 145)

The proponent apparently did not consider the presence of anomalies in the flooded basins, since it said that the impact of priming the reservoirs on mining operations in these areas was nil or low.

Judging by the remarks of one of its representatives, MER did no work to assess the mining potential of the flooded lands:

And given that the area will be partly flooded, and that there will eventually be an exemption from staking, and thus from all mining activity, possibly on certain infrastructures which Hydro-Québec wants to introduce, I believe it is imperative to go ahead with work on it.

(Mr. Roch Gaudreau, transcript, part 1, evening of February 11, 1993, p. 214)

The Panel believes that the flooding of the lands as a result of the SM-3, Carheil and aux Pékans reservoirs could result in the loss of useful geological information. Given the probability of finding a mine, this would mean the possible disappearance of exploitable mining potential. It should be noted here that, according to Mr. Danis, from FREM, it is possible to exploit a mine under a reservoir:

There is no problem in extracting a mining resource if it is valuable enough; there is no problem extracting it from the banks or from a distance that could be several thousand meters from the edge of the reservoir.

(Mr. Daniel Danis, transcript, part 2, afternoon of March 16, 1993, p. 124)

MER is responsible for carrying out the prospecting program for the gathering of geological information in the area. According to the Department's representative, the cost to complete detailed cartographical studies of the flooded sector would be in the order of \$600,000 to \$800,000 (Mr. Roch Gaudreau, transcript, part 1, evening of February 11, 1993, p. 214). However, since the amounts are not in the Department's budget, it appears "that a collaborative effort by Hydro-Québec would be welcome on this specific project" (Mr. Roch Gaudreau, transcript, part 1, evening of February 11, 1993, p. 216), that is a contribution of the same value as that made by the Société de développement de la Baie-James for the geological work in the James Bay area.

The proponent answered that such an effort with MER could be considered (Mr. Patrick Arnaud, transcript, part 1, evening of February 11, 1993, p. 218).

The Panel encourages every collaborative effort that would make it possible to explore the lands in the short term before they are flooded. The joint effort desired by MER would focus mainly on the logistical aspect of the exploratory work to be done.

Water Intake from the Clarke Sector

Some participants at the hearings said they feared the project's impact on the intake of drinking water from the Clarke sector. Since the City of Sept-Îles is likely to incur new costs if this problem arises, this subject is addressed in the present chapter.

The proponent conducted a study on the quality of the Sainte-Marguerite River water. The study showed that, on the whole, water quality in the river is similar to that in the other rivers on the North Shore. In particular, the watercourse is sensitive to acidification (Environmental Impact Statement, Part 4, p. 120).

The project's possible effects on water quality downstream from the SM-3 dam during the construction and operation phases were also examined. According to the proponent, "the disruptions caused by deforestation will do very little to alter water quality in this reservoir" (Environmental Impact Statement, Part 5, p. 151); "the impact of the priming of the Sainte-Marguerite-3 reservoir on water quality in the Sainte-Marguerite-2 reservoir will be of low intensity" (Environmental Impact Statement, Part 5, p. 152), and, during the operating phase, "water quality in the SM-2 reservoir in the short and long terms will therefore be equivalent to that in the SM-3 reservoir in the long term" (Environmental Impact Statement, Part 5, p. 186).

The problem of the project's impact on the drinking water supply was not addressed in as detailed a manner, however. The proponent mentioned that, during the priming of SM-3, the quality of water pumped at the Clarke sector water intake "should be adequate for drinking water supply, except for colour and iron content, two variables which alter water's esthetic qualities" (Environmental Impact Statement, Part 5, p. 152). Furthermore, "operation of the Sainte-Marguerite-3 reservoir will in no way affect Clarke City's drinking water supply. The water will have only slightly more mineral and organic content than at present" (Environmental Impact Statement, Part 5, p. 187).

Some participants were concerned, however, about the possible changes in water quality in the Clarke sector supply network:

In addition, expected low pH values could undermine treatment at the filtration plant. Lastly, since the water will be highly coloured, [...] chlorination of the water could lead to the formation of trihalomethane compounds that could be carcinogenic.

(Ms. Claudette Villeneuve, transcript, part 1, evening of February 2, 1993, p. 133)

The proponent acknowledged this problem and is currently studying solutions:

We have considered taking measures during the priming period and also when the project goes ahead, if it ever does, and the measures considered are, in particular, to link Clarke City to the Sept-Îles municipal network [...] so that there is no risk of trihalomethane formation.

(Ms. Geneviève Corfa, transcript, part 1, evening of February 2, 1993, p. 135)

When questioned on the problem of the Clarke sector's drinking water, the mayor of Sept-Îles confirmed that the town would accept its responsibility to ensure the people in that area had drinking water, that negotiations were proceeding satisfactorily and that the option of connecting the Clarke sector network to that of Sept-Îles appeared to be the most promising one:

[...] We are currently [...] In order to prevent delays in any phase, we are very seriously considering connecting this drinking water that comes from our water plant and forwarding it to Clarke City.

(Mr. Jean-Marc Dion, transcript, part 2, morning of March 16, 1993, p. 6)

The "Corporation de protection de l'environnement de Sept-Îles" was in turn questioned about the connection option and said it also considered it an "ideal solution" (Ms. Claudette Villeneuve, transcript, part 2, morning of March 18, 1993, p. 116), provided, however, that "the City of Sept-Îles has solved the problem of trihalomethane formation in its system" (brief by the "Corporation de protection de l'environnement de Sept-Îles Inc.", p. 8).

The date on which the corrective measure would be implemented was another concern. However, in response to the question of exceeding the esthetic and health criteria during the work period, the problem that was raised by Mr. Bouchard of the "Corporation de protection de l'environnement de Sept-Îles", the proponent answered that it promised to correct the situation (Mr. Patrick Arnaud, transcript, part 1, evening of February 10, 1993, pp. 68-69).

Although the problem of drinking water quality in the Clarke sector was only partly addressed in the Environmental Impact Statement, the Panel observed that the proponent admitted it and offered alternative solutions designed to guarantee the area's inhabitants adequate water quality. Like the City of Sept-Îles, the Panel considers it important that "during the work, the population of Sept-Îles not be taxed in any way with regard to its drinking water" (Mr. Jean-Marc Dion, transcript, part 2, morning of March 16, 1993, p. 5).

The measure should be introduced when notable changes in water quality are foreseeable, that is to say at the start of deforestation work. The Panel also believes that MENVIQ should ensure that the potential problem of trihalomethane formation in the Clarke sector system, as identified by the "Corporation de protection de l'environnement de Sept-Îles", is not aggravated by the option chosen for supplying that area with drinking water. The issue of what the optimum option is should be discussed with the Department of Health and Social Services Quebec/Ministère de la Santé et des Services sociaux du Québec (MSSQ) before a decision is made.

Lastly, the proponent should ensure that all information pertaining to water quality in the Sainte-Marguerite River is available to citizens, as suggested by the "Corporation de protection de l'environnement de Sept-Îles":

The "Corporation de protection de l'environnement" requests that analyses be conducted on a quarterly basis and that the findings be made public. The "Corporation de protection de l'environnement" also requests that the technical studies done in relation to the appropriate mitigation measures be made available to it.

(Brief by the "Corporation de protection de l'environnement de Sept-Îles", p. 8)

Limits of Mitigation

Given the desire for formal guarantees of maximized and sustainable economic impact from the project for Sept-Îles and Port-Cartier and the numerous socio-economic effects on the region's citizens, considerable additional efforts will be required of the proponent to meet the population's expectations and to respond to citizens' requests for impact compensation measures.

Diversified Measures

Mitigation or the elimination of some of the negative impact of projects is part of Hydro-Québec's environmental policy. In the case of the SM-3 project, three types of measures are being proposed: routine mitigation measures, which include the environmental development program, specific mitigation measures, and measures pertaining to salmon.

With respect to the routine mitigation measures, the works would be carried out in accordance with Hydro-Québec's environment code (1991), which "contains a series of measures routinely applied by Hydro-Québec to protect and develop the environment" (Environmental Impact Statement, Part 6, p. 1).

The various activities concerned are, in particular, deforestation, earthwork, crossing of the watercourses, installation of camps and residences, drinking water supply, wastewater treatment, waste management and dismantling and redevelopment of activities. The proponent also indicates that measures promoting regional spin-offs from hydroelectric projects are part of the routine mitigation measures in the human environment.

Hydro-Québec has introduced an environment development program as a general way of compensating regional populations affected. The program's purpose is to promote harmonization between development and the protection and development of the environment. Through this policy, Hydro-Québec enables municipalities, RCMs and native communities to design and develop environmental projects to protect or improve their own environments (filed document A28, pp. 2-3).

Hydro-Québec develops initiatives that are eligible for funding in cooperation with the municipalities and native communities. Credits allocated by Hydro-Québec are determined on a case-by-case basis. It should be noted that, for projects under \$500 million, the credits assigned to the program amount to 1 % of the project's cost for a line project and 2 % for a power station. These credits are allocated to the municipalities or native communities under a joint program management formula.

Hydro-Québec is responsible for program management on projects of more than \$500 million.

In the case of the SM-3 project, the scope of the development program was stated by the proponent's spokesman :

But we have an assessment [...] which is in the order of 1 %, and so that is a good indication [...].

(Mr. Patrick Arnaud, transcript, part 1, evening of February 10, 1993, p. 141)

In the proposed *1993 Development Plan*, the proponent suggests that the field of application of the environment development program be expanded to include initiatives also promoting regional economic development. On this point, the proponent's representative stated :

So this is a component which is at the final discussion stage within the company, and it is a component which is intended to help the regions engage in economic development that can enable them to secure spin-offs in other provinces or other regions of Quebec where there are Hydro-Québec projects and, in general, projects in the field of energy.

(Mr. Patrick Arnaud, transcript, part 1, evening of February 5, 1993, p. 12)

This new economic component has not yet been approved by the government. However, Mr. Arnaud stated :

[...] but I think that, as part of the Sainte-Marguerite project, this program will be approved and will go into effect.

(Mr. Patrick Arnaud, transcript, Part 1, evening of February 5, 1993, p. 131)

However, it appears that regional development related to a hydroelectric development project is not, properly speaking, one of the project's objectives, but rather one of its effects. In the case of megaprojects, the impacts may be such that the projects have structuring effects for regional development and resource allocation. Mr. André Laporte wrote in an article:

[...] all Quebec regions expect Hydro-Québec projects to have permanent local economic effects. However, each region has its own strengths and specific problems.

(Laporte, 1982)

These major projects thus could determine territorial development choices in the absence of other frameworks for such development.

Particular mitigation measures specific to the SM-3 project are described in Part 6 of the Environmental Impact Statement (Table 19). Most of these measures are commented on in this report.

Specific mitigation measures for salmon in the Moisie River are also proposed in Part 7 of the Environmental Impact Statement. They focus on the installation of control works to manage a regulated flow for salmon and for fishing in the Moisie River (pp. 105 to 120) and on maintaining a regulated flow to the Moisie during construction of the works (pp. 120-121). Lastly, Hydro-Québec is proposing developments that would help improve conditions of the salmon habitat and of salmon exploitation. These measures could include construction of a fish pass permitting the spread of salmon to new territories through the main course of the Moisie River, recovery of kelt, the purchase of commercial fishing licences and new fish holes (Environmental Impact Statement, Part 7, pp. 132-133).

Table 19 SM-3 : Specific Mitigation Measures

Nature	Environmental Impact Statement Part 6 PAGE
- road safety	2
- maintenance of residual flow in Sainte-Marguerite estuary during construction	2
- stabilization measures for banks of peat bogs and ecotones	2
- collection of floating debris in reservoirs	3
- recovery of merchantable timber from SM-3 reservoir	3
- access to replacement fishing grounds for loss of section of Sainte-Marguerite River	3
- introduction of ouananiche in SM-3 reservoir	3
- rejuvenation cutting of vegetation for wildlife	4
- distribution of information to ensure smooth integration of project in community with respect to contracts, jobs, regional economic spin-offs, restrictions on access to territory and road traffic during construction	4
- awarding of small contracts and contracts to consultants or to business groups	4 and 5
- creation of a special placement service	5
- compensation for owners of flooded lands	5
- cooperation with Montagnais in area affected by project	5
- control of aux Pékans and Carheil reservoirs	6
- control of territory and exploitation of wildlife resources by workers	6
- publication of a consumer fish guide in the case of mercury	6
- experimental fishing to expedite return to initial mercury level conditions	6
- archaeological inventories	10
- access ramps to SM-3, Carheil and aux Pékans reservoirs for canoes	10
- measures to reduce pressure on accommodation and food services in Fermont	10
- introduction of a snowmobile trail downstream from SM-3	11

Source: Environmental Impact Statement, Part 6

These highly varied measures are presented together by the proponent without any assessment of the terms and conditions of their implementation or resulting costs. On this point, the CAM mentioned in its comments on the Environmental Impact Statement's conformity that:

The mitigation measures are in fact studies that have to be done, experimental procedures to be set up and terms and conditions to be set down, programs to be established [...] Contrary to what is requested in the guidelines, the proponent has presented no compensation measures for these residual impacts [...].

(Filed document B1, pp. 12-13)

Requests by Participants

Some participants at the public hearings said they were satisfied with the measures planned by Hydro-Québec. Others, however, found the mitigation measures were non-existent, inappropriate or inadequate. But many, whether satisfied or dissatisfied, made suggestions and requests for additional measures based on the expected or apprehended impact of the SM-3 project. These requests concerned the regional economy, public health, exploitation of the territory's resources and vacation homes.

These requests were related first to the loss of enjoyment or opportunity by citizens and organizations as a result of the persistent residual impact, despite the mitigation measures introduced by the proponent. Firmer commitments and better mitigation measures, such as those proposed by the FQCC (brief, p. 13), are thus expected from the proponent.

Other requests came as a result of the fact that it was impossible or difficult to mitigate certain project impacts. Participants wanted measures to compensate for the impact on them. For example, the "Association chasse et pêche sept-îlienne Inc." asked Hydro-Québec for a sum of \$1.5 million to construct accommodation infrastructures for vacationers as well as for the treatment and seeding of 10 lakes in the Matimek ZEC (brief, p. 8). This amount was not considered firm by the Association's representative, who, on

May 3, 1993, issued a reassessment of the disadvantages and losses caused by the residual impact on the ZEC, setting a dollar figure at \$3,648,714 (Brief, appendix, p. 4).

The RCM of Caniapiscou also made requests during the hearings. In its brief, it observed that:

The mitigation measures proposed by Hydro-Québec are, in our view, inadequate to minimize the negative impact on the natural and human environments of the Fermont area and to promote harmonization of this project's various components with the provisions of our development plan.

(Brief by the RCM of Caniapiscou, p. 35)

The RCM thus requested exceptional mitigation measures:

[...] total deforestation of the Carheil and aux Pékans reservoirs, elimination of the zones exempted from staking for mining activities, the disenclosure of Fermont through the construction of an additional section of highway (389).

(Brief by the RCM of Caniapiscou, p. 36)

Furthermore, despite the mitigation measures it proposes in addition to those stated by the proponent, it foresees that:

This project will permanently jeopardize future development opportunities by irrevocably committing major resources — wildlife, tourist and mining — in the territory.

(Brief by the RCM of Caniapiscou, pp. 37 and 38)

To compensate for these inevitable losses, the RCM demanded that Hydro-Québec pay an amount into the Fonds d'exploration minière du Nouveau-Québec.

Port-Cartier Plant

Representatives and citizens of Port-Cartier made representations concerning one specific regional request. These people view the eventual necessity of deforesting the SM-3 reservoir and selling the merchantable timber as an opportunity to promote the reopening of the Port-Cartier pulp plant (the former Cascades plant), thus creating hundreds of jobs in the long term.

Mr. Gilles Marquis, former manager of the Cascades plant in Port-Cartier, summed up the situation as follows:

When the SM-3 project is implemented, Hydro-Québec will be required to dispose of the timber that will be flooded by the dam or dams, and which will represent a volume of one million cubic meters, the fibre quality of which, in its density and natural whiteness, is superior to anything else in North America. The major tree species are spruce (70%) and fir (30%), and average tree size is less than that needed to be efficiently used by sawmills. These fibres will therefore have to go to a paper mill for pulp and paper manufacturing.

In addition, access roads will open up new exploitable areas that will supply the plant over the long term: the roads [...] will provide access to an extensively forested area (Garemand and Germain sectors) with annual capacity of 400,000 m³, which could be delivered to the Port-Cartier plant at a very competitive price.
(Brief by VFP Consultants Inc., p. 2)

Regarding the causes of the Cascades closure, Mr. Marquis stated:

The initial investment plan was [...] for \$35 millions [...] but the project increased to \$125 million [...] and they had a lot of trouble in the early going to start up the plant, and during that time, the market began to fall. So that's the reason why Cascades was forced to close the plant. However, if production costs had been lower, we would have been able to compete in this field [...].
(Mr. Gilles Marquis, transcript, part 2, morning of March 18, 1993, pp. 26-28)

Since the plant's closure in 1990, regional economic promoters have made major efforts to reopen the plant, in particular by appealing to new investors. According to information provided by the mayor of Port-Cartier, Mr. Anthony Detroio, a fairly well structured recovery plan is available and depends on the introduction of the SM-3 project:

It is a fact, Mr. Chairman, that we have come here with our problems of a pulp and paper plant that has closed [...] But we thought that this was a lifeline, no, that this was our chance, a unique chance to have a project such as Hydro-Québec's, to have a timber volume of one million of cubic meters of available wood.

(Mr. Anthony Detroio, transcript, part 2, evening of March 18, 1993, pp. 136-137)

The mayor demanded that the issue of timber recovery from the SM-3 reservoir and its processing in the region be resolved before the Hydro-Québec project was approved by the government. This condition seemed to him to be a key factor in developing the terms and conditions for reopening of the plant, which would then require a contribution by Hydro-Québec to the cost of supplying the plant:

And with this agreement in principle, I have investors who are ready, who are saying: If I know what my timber cost is, I can calculate the profitability of my finished product. With this agreement, I immediately have an idea how much my timber is going to cost me at the plant. At the same time, that could even resolve the matter of reopening the Port-Cartier pulp plant.

(Mr. Anthony Detroio, transcript, part 2, evening of March 28, 1993, p. 152)

The region's citizens seem to feel that the necessity of processing the timber cut on the SM-3 reservoir site in the region is not open for discussion. They therefore requested that talks between the MFO, Rexfor and Hydro-Québec proceed on this basis. The citizens seemed aware that this contribution by Hydro-Québec was inadequate in order to reopen the plant.

The "Corporation de développement économique de la région de Port-Cartier" gave the Panel its perception of the SM-3 project's role in the pulp plant's reopening. The project would help lower production costs

because timber would be available at a predictable cost and might be subsidized. The opening of new, more accessible cutting areas via access roads to the SM-3 station would also be a significant asset.

These benefits, however, would not guarantee that the plant would reopen. The Corporation then outlined a less costly scenario for Rexfor, which consisted in processing the SM-3 reservoir timber in the region. The advantages of this scenario, in the Corporation's view, would be all the greater since the neighbouring plants do not need new supply areas and the additional cost of transportation to Baie-Comeau could reach \$15 to \$20 million.

Then, jointly with the City of Port-Cartier, the Corporation presented a development plan for the recovery of the regional forestry and pulp and paper industry on the basis that the proponent must dispose of a large quantity of timber at the lowest possible cost:

We recommend:

(1) that an amount equivalent to the additional cost to dispose of the wood, which we assess at \$20 million, be invested in order to reopen the Port-Cartier pulp and paper plant;

(2) that a regional development fund be created composed of a portion equivalent to or greater than the fund reserved for environment development;

(3) that 50 % of amounts from a future development fund be reserved for the start-up of sawmills to supply the Port-Cartier plant with wood chips.

(Brief by the City of Port-Cartier, Appendix, p. 5)

The Panel is not in a position to judge in any comprehensive way the complex factors involved in reopening the Port-Cartier pulp and paper plant. It was unable to measure the influence that a positive response to the Corporation's requests might have on the plant's reopening and sustainable operation. Lastly, it does not know either the intentions or the identity of the private investors approached by the reopening committee represented at the hearing by the town's mayor. However, in the current troubled context of the pulp and paper industry as a whole, the problem of disposing of timber from

the potential deforestation of the reservoirs remains unresolved. Since the additional costs to dispose of the timber from the SM-3 reservoir are Hydro-Québec's responsibility, the Panel is concerned over the risk that these costs might be considered too high and that the timber may rot in the forest without being processed.

In addition, neither the proponent nor the MFO representative gave the Panel any indication as to possible ways of disposing of the timber in other Quebec regions or even outside the province.

Bearing this in mind, the Panel believes that Hydro-Québec, MFO and Rexfor should find ways of developing the timber from the SM-3 reservoir and ensure that it is processed in an appropriate manner, thus preventing high quality timber from being wasted.

Hydro-Québec should, on a priority basis, examine scenarios for developing or disposing of timber in the Sept-Îles and Port-Cartier region and submit them to the regional economic promoters interested, particularly in the sawmill industry. Opportunities for exporting the timber outside the region and outside Quebec should be considered as a last resort, once it has been determined that the additional outlays needed to transport the timber could not be better used, for example, as an initial injection of funds in a local wood processing plant, whatever it might be.

The recommendations of the "Corporation de promotion industrielle de la région de Port-Cartier" could thus serve as a source of inspiration for this joint effort by Hydro-Québec, the departments and regional organizations to promote commercial development initiatives in the region involving the forest biomass available as a result of the SM-3 project. And before transporting the timber outside the region for processing in another plant, Hydro-Québec and MFO should consider that action's negative consequences on the workers and forest businesses of the destination region.

Promising Proposals

The Panel has compiled the requests presented in the briefs (Table 20). The origin, nature and approximate cost of the proposals are described, where available. The Panel has also identified the government organizations usually responsible for such projects.

Table 20 Requests Made to Hydro-Québec

Intervenor (according to briefs)	Nature	Cost (\$)	Government organization usually responsible
Mr. Aylmer Whittom	1. Introduction of aquaculture		
	– for salmon	not specified	MLCP
	– for other sport fish	not specified	MLCP
RCM of Caniapiscau	2. Total deforestation of Carheil and aux Pékans reservoirs	not specified	Hydro-Québec
RCM of Caniapiscau	3. Mining exploration fund	\$1 million plus	MER (mines)
"Fonds régional d'exploration minière de la Côte-Nord" RCM of Caniapiscau	4. Mining exploration of areas to be flooded	\$5 million	MER (mines)
"Corporation de développement économique de la région Port-Cartier" "Corporation de promotion industrielle et commerciale de Sept-Îles"	5. Regional development fund (venture capital)	\$6 million minimum	Canada-Quebec regional development agreements Regional Development Secretariat "Société de développement industriel" (SDI)
"Corporation de protection de l'environnement de Sept-Îles"	6. Drinking water in Clarke sector	\$1 to 3 million	City of Sept-Îles Department of Municipal Affairs MENVIQ
"Association chasse et pêche sept-îlienne"	7. Developments in Matimek ZEC	\$1.5 million plus	MLCP
"Cégep de Sept-Îles"	8. Salmon research centre	not specified	MLCP Department of Postsecondary Education and Science
Representatives of Baie-Comeau CSN	9. Centre for studies on non-conventional energy sources	not specified	Hydro-Québec (R & D) MER

Table 20 Requests Made to Hydro-Québec (continued)

RCM of Caniapiscau	10. Disenclosure of Fermont (Highway 389)	\$20 million plus	Department of Transport Quebec (MTQ) Canada-Quebec agreements
Michel Gignac	11. Improvements to salmon rivers	not specified	MLCP Canada-Quebec agreements
Representatives of Baie-Comeau	12. Recurring compensation to the region for negative project impacts	not specified	Hydro-Québec
People of Port-Cartier	13. Reopening of Port-Cartier pulp plant	\$20 million	SDI, MFO, Rexfor, Caisse de dépôt, private promoters, etc.
"Corporation de développement économique de Caniapiscau"	14. Tourist development	not specified	Department of Tourism MLCP
"Fédération québécoise de la faune" "Association provinciale des trappeurs indépendants"	15. Wildlife development measures	not specified	MLCP
RCM of Sept-Rivières	16. Development of historical and other features	not specified	Cultural Affairs
"Fédération québécoise du canot-camping"	17. Development fund for other routes and creation of a heritage river program	not specified	MLCP
	Additional measures to mitigate impacts on canoe camping	not specified	Hydro-Québec MLCP

The total cost to implement the requests amounts to \$55 million, without taking into account future compensation of Montagnais communities, total deforestation of the Carheil and aux Pékans reservoirs, the regional research centres, development of salmon rivers on the North Shore and aquaculture centers. The Panel has of course observed that Hydro-Québec's provisions for responding to these requests, that is \$13 million or 1 % of the project's costs, are inadequate.

The Panel also finds that the requests submitted to Hydro-Québec go beyond that Crown corporation's authority under its mission; a number of requests fall instead under the jurisdictions of the various levels of government.

Comparison with the measures planned by the proponent reveals a major discrepancy between those measures and citizens' requests. For example, the proponent has no budget item to improve Highway 389, which is supposed to disenclose Fermont. Regardless of the SM-3 project's implementation, the RCM of Caniapiscau has already approached the Department of Transport Quebec/Ministère des Transport du Québec (MTQ) and the Federal Regional Development Secretariat on this matter.

The centre for study on non-conventional energy sources, for its part, could coincide with Hydro-Québec's existing research and development programs.

With the exception of damage directly compensated for by the proponent, a centre for research on non-conventional energy sources, timber disposal costs and compensation to be negotiated with natives, the requests can only be examined in the context of the environment development program and of the regional development program, if it were to be authorized. For the moment, Hydro-Québec's board of directors has the authority to set these budgets. The relatively formal development program limits the number of eligible organizations and the extent of financial assistance which remains independent of losses incurred by those organizations. Furthermore, the possibilities of the new regional development support program put forward by Hydro-Québec remain hypothetical. In short, there is no match between the funds set aside for these programs and the expectations of citizens wishing to be compensated.

Compensation Commensurate with Impact

Since there is no match between the amounts budgeted by Hydro-Québec in its programs and citizens's requests, the FQF requested an increase in compensation budgets:

[...] given the extent of the Sainte-Marguerite River project's residual impacts on the environment, FQF recommends that the budget allocated to Hydro-Québec's environment development program be substantially increased.

(Brief by the Fédération québécoise de la faune, p. 57)

The Panel is of the view that Hydro-Québec should ensure that the proposed mitigation measures and sums available are commensurate with the project's impact.

Given that there is no specific criterion for assessing the size of development program budgets, the Panel suggests that, in its accounting, Hydro-Québec consider the numerous citizens' requests in its accounting as items external to the project.

The content of these requests should provide Hydro-Québec with indicators for reorienting the principles of its environment development program and adequately structuring its future regional development program to provide funds based on the project's negative impacts and to aim all financial assistance toward sustainable regional development and permanent job creation.

In their present form, the mitigation measures are, to a large degree, inadequate in participants' minds. This should encourage Hydro-Québec to review the manner in which it determines those measures, by involving citizens in their development and clarifying rules for selection and distribution of funds set aside.

The Panel is not in a position here to assess the merits of each request, but it recognizes the interest they represent. Of course, a review of all the requests shows that the amount of funds involved could be impressive if the proponent had to grant each one.

The scope and number of the requests made in the context of the assessment of the SM-3 project reflect popular expectations which Hydro-Québec should carefully address. Thus, before undertaking initiatives that differ from their usual activities or with very indirect links to the project, the parameters of the environment development and regional development support programs should be set. The Panel, for its part, notes that the purpose of such parameters should be to keep Hydro-Québec's economic contributions in the region within its fields of expertise. In the case of the SM-3 project, proposals such as a centre for studies on non-conventional energy sources and the creation of a fund for business development in the field of hydroelectric or energy equipment should be favoured.

Chapter 5

The Risk for the Salmon of the Moisie River

Very early in the developmental stages of defining and examining the project, the issue of the salmon of the Moisie River became a major factor. The number of documents published and hearings held attest to the importance of the matter for both the proponent and the users of the river. This led the proponent to revise certain statements and set up study groups and advisory committees. Concurrently, users of the river turned to expert appraisals and the support of previously existing or new associations.

The importance of preserving the salmon was unanimously acknowledged by the participants and the proponent. Where controversy came into play was on the way to ensure the survival of this resource, and the problem centred on the uncertainties arising from the measures proposed by the proponent. Several participants in the hearing underscored the fact that the proponent's intervention risked altering the unique nature of the Moisie River, whose value extends beyond that of the salmon, when it comes to its recreational uses and the traditional activities of the Montagnais. The river's character is not due to a single resource, but to the combination of the elements that make up the Moisie basin, including the quality of its navigable waters and the beauty of its natural landscapes.

The proponent plans to divert tributaries that flow naturally into the Moisie toward the Sainte-Marguerite. The result would be extremely interesting from the point of view of energy production, while representing a relatively modest reduction of the mean flow of the Moisie River at its mouth. This

situation, which may seem surprising in view of the concerns of the applicants and the numerous Native and non-Native participants, is worth a more detailed examination.

The Moisie River

The Moisie is the largest unharnessed and unaltered river of the North Shore, with a mean flow of 436 m³/s (Environmental Impact Statement, part 7, p. 21.) By virtue of its unspoilt character and majestic, rugged scenery, its current attraction is principally recreation and tourism. It is part of the Quebec adventure tourism circuit for canoe-camping, but it is best known for its fishing camps, which concentrate almost exclusively on salmon; the Moisie is one of the principal salmon rivers in Quebec, and enjoys an international reputation for salmon fishing:

The Moisie is without a doubt one of the most unique rivers in Quebec.

(technical document 113, p. 4)

[...] [its] unique character is highly prized by salmon fishers and canoe campers, whether they are from Quebec, the other Canadian provinces, the United States or overseas.

(Environmental Impact Statement, part 7, p. 102)

For Natives, the Moisie River is an essential part of their culture and traditional way of life. The salmon of the Moisie River have always been a source of sustenance:

The Moisie River of the Whites is our Mistashipu, our Great River. We have been fishing salmon here since the beginning of time.

(Brief by the "Conseil des Atikamekw et des Montagnais", p. 32)

Mistashipu is without a doubt the most precious salmon river of the Atlantic [...]. Mistashipu is the jewel of Montagnais and Quebec heritage.

(Brief by Innu Takuaikan Uashat mak Mani-Utenam, p. 17)

Despite its untouched character, hearing participants recalled that the Moisie River had undergone some human interventions which, as reported by the proponent:

[...] contributed to altering the integrity of the river and its watershed. These interventions had either positive or negative impacts on the salmon and their habitat, but their scope has not been assessed in a precise manner.

(Environmental Impact Statement, part 7, p. 102)

Positive interventions for the salmon were the introduction of artificial pools and migratory passes that allow the salmon to colonize new segments of the river, and the rail transport of spawners in the upstream section of the Nipissis River since 1972. A first pass was set up in the mid-1960s on Katchapahun Falls and a second on the Nipissis River, which was used from 1968 to 1973. Among interventions that may have had a negative impact were the construction of a railroad by the Quebec North Shore Labrador Railway (QNSLR) in the 1950s and a bridge on Route 138 in 1973, along with inflows of waters contaminated by mining residues from the Mont Wright mine near Fermont. These incidents, which occurred in 1977, 1978 and 1985, introduced a quantity of red-coloured water that could be seen as far as the river mouth.

No specific study has assessed the cumulative impacts of these interventions. In this regard, the proposed diversion of part of the flow of the aux Pékans and Carheil rivers into the Sainte-Marguerite constitutes a supplementary intervention on the watershed of the Moisie River.

The management and protection of the rivers of Quebec are carried out with reference to their resources. Depending on the species, fish and wildlife resources are the responsibility of two provincial departments, the Department of Agriculture, Fisheries and Food/Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec (MAPAQ) and the MLCP and of two federal departments, the Department of Fisheries and Oceans (DFO) and the Department of the Environment Canada (DOE). The water itself comes under the federal and provincial departments of the Environment. Under the *Navigable Waters Protection Act*, DOT has a voice in any modification proposed to a waterway that could hinder navigation. Over the past years, a movement of non-governmental organizations has arisen in this country to form a network of Canadian heritage rivers, protecting waterways

of an untouched nature or of national historical interest. Some organizations, including participants in the hearing, have already begun steps for the inclusion of the Moisie River in this network.

A paper filed at the hearing by the “Fédération québécoise pour le saumon atlantique” (FQSA) (filed document C1) sums up the legal status of the Atlantic salmon. The species is governed by provincial, federal and international laws, regulations and agreements. In Quebec, the legal status of salmon rivers for sport fishing comes under the system of property rights and the administration of this system. Today, most rivers are part of the public domain, but sometimes private clubs, controlled harvesting areas (ZECs), fishing camps and wildlife reserves may operate as well. The control and regulation of salmon fishing is the responsibility of the MLCP. Since the species migrates outside territorial waters, six countries, including Canada, have signed an international salmon convention whose aim is to conserve, restore and manage the species by establishing controls on fishing in the high seas, on accidental capture and on pollution, and by cooperating in research and information.

The Salmon of the Moisie River

The life cycle of the salmon was summarized by the proponent (Environmental Impact Statement, part 7, pp. 70 to 73) and the participants in the first part of the hearing. The salmon is an anadromous species: it reproduces in fresh water and spends its adult life at sea. Its eggs hatch in the rivers in June and the juvenile phase, first as alevins and then as parrs, will last from 3 to 4 years in the river. After this period, the young salmon go through a transformation process called smoltification and become smolts. At this stage, they descend the river in their seaward migration to the ocean, where they take on 99% of their weight. The salmon born in the rivers of Quebec travel beyond the Gulf of St. Lawrence and can even go as far as the waters off Greenland before returning to spawn in the river where they were born. Depending on whether they have spent one, two or three years at sea, gaining weight proportionately, they are called grilse, second-year salmon or third-year salmon.

The salmon begin to swim back upriver in their spawning migration as spring flood levels ease off, and spawn in October, on the gravel river

bottom, where the eggs spend the winter under the ice. Due to their appearance, salmon that have spawned are called black salmon (or spent salmon). Some return immediately to sea, but most wait until the following spring to return, after a winter spent in the river. They can return to spawn as many as five times in the same river. The mechanisms that enable adult salmon to find the way back to their natal river are not yet completely understood. Scientists believe they use the lines of the earth's magnetic field to navigate at sea, and that when they approach shore, they recognize the specific odour of their native river. This odour is thought to come either from the waters of the river itself, or from hormones emitted by the alevins, parrs or smolts living in it. The various stages in the life of a salmon take place in a six-year cycle for grilse, and an eight-year cycle for third-year salmon.

The salmon population of the Moisie River consists almost exclusively of second or third-year salmon, large fish that have spent more than one year of life at sea, along with a large proportion of salmon that return to spawn more than once. The average weight of line catches is between six and nine kilograms. Several questions in the public hearings focused on the number of individuals in this population, and more specifically on the number of spawning adults, or parent fish. In its Environmental Impact Statement, the proponent mentioned the approximate assessment of from 10,000 to 32,000 individuals, a figure accepted by the MLCP. The proponent has developed a new method of hydroacoustic tallying which consists in transmitting waves under water and converting the echoes into numbers of fish (Mr. Frédéric Lévesque, transcript, part 1, February 4, 1993, evening, pp. 41 to 48). According to the proponent's statements at the hearing, this method reduces the margin of error to about 10% of the number of individuals. The first results obtained in 1992 made it possible to count slightly less than 10,000 salmon during the spawning migration

(Ms. Geneviève Corfa, transcript, part 1, February 4, 1993, evening, p. 86). According to the MLCP representative at the hearing:

[...] the hydroacoustic method proved [...] the most appropriate.
(Mr. Mario St-Pierre, transcript, part 1, February 4, 1993, evening, p. 51)

Even though the Atlantic salmon is one of the most-studied fish species in the world, the hearings revealed that there are a number of gaps in our basic knowledge of its biology and of the particularities of the Moisie population.

The genetic composition of the Moisie population is not known, nor is the age structure of the adult population and the proportions of alevins, parrs and smolts. Also, even though it is possible to define reasonably well the principal variables of the salmon habitat in the river as to tolerance of temperature, current speed and substratum, scientists still do not have a complete knowledge of the importance of the process on more precise scales such as the production of food for the juvenile salmon, or on larger scales, such as the relative importance of summer droughts and spring floods as determining factors in the development of stocks.

Fishing Activities

The Moisie River is largely recognized as one of the three best salmon rivers in the world. Estimates of its salmon runs are [higher] than the combined runs of all the salmon rivers of the Gaspé and the Lower St. Lawrence regions.

(Brief by the Atlantic Salmon Federation, p. 2)

According to information gathered in exchanges with the panel, the Moisie River salmon represent 45 % of the sport catch of the mid-North Shore, 22 % of that of the northern shore of the St. Lawrence, and 9 % of that of all Quebec. In fishing days the Moisie fares even better, representing respectively for the same regions 65 %, 26 % and 10 % of the annual total (Mr. François Caron, transcript, part 1, February 11, 1993, afternoon, pp. 160 to 162). There are only seven rivers in Quebec where more than 1,000 salmon are caught per year, and the Moisie is by far the richest, with 2,199 salmon caught in 1992. As is the case for the rest of Quebec, the catch in the Moisie has been growing since 1984, with an annual average of 1,800 over the past six years. The number of fishing days is also on the rise, and the success rate remains constant. Moreover, while elsewhere between 34 % and 51 % of river catches are small salmon that have spent only one year at sea, 98.5 % of salmon caught in the Moisie are large salmon that have spent two or three years at sea.

Several participants drew the panel's attention to the factors that affect the success of fishing. The "Association de protection de la rivière Moisie Inc." (APRM) established an exhaustive list, including the experience of the fisherman, a knowledge of the territory, weather conditions, salmon runs, the

limpidity of the water, the temperature of the water and the speed of the current (Brief by the "Association de protection de la rivière Moisie Inc.", p. 32).

The rate of flow was identified as one of the principal factors, since it is related to the water level and speed of the current, two elements that have a direct effect on the salmon runs. Strong rates of flow force the salmon to wait in pools in various sectors of the river and its tributaries for more favourable conditions for the voyage upstream.

As well, factors such as the temperature and turbidity of the water are influenced by flow rates:

A high rate of flow [...] at the beginning of the season will have the effect of keeping the water at very low temperatures [...] and maintaining a large number of particles in suspension [...].
(Brief by the "Association de protection de la rivière Moisie Inc.", p. 32)

Lastly, variations in water level influence the behaviour of salmon in the river:

It has generally been noted that salmon seem to move when there has been a variation, either a rise or a fall, in the water level.
(Mr. André Boudreault, transcript, part 1, February 12, 1993, evening, p. 97)

The rhythm of the salmon's spawning run, which takes place throughout the summer, has an influence on the success of fishing activities in the various sectors of the river. Upstream catches are made late in the season, while they are made early in the estuary. Native line and net fishing takes place for the most part in June, with 88 % of the catch on average during that period from 1985 to 1989. In comparison, in the Haute-Moisie fishing camp, the sport fishing season runs until mid-September.

The Economic Importance of Salmon

The most obvious regional economic impact of the activities related to sport salmon fishing are the seasonal jobs and spending by the fishing camps:

The Moisie River provides employment to more than 200 people who work there from early May to the end of September. Most of these people come from the region [...] The various operators along the Moisie spend a total of some \$2 million annually.

(Brief by the "Association des gestionnaires de la rivière Moisie", p. 3)

This evaluation corresponds roughly to those obtained on the basis of the number of fishing days or the number of salmon caught. The salmon economic development plan establishes these two variables at \$230 per day and \$1,000 per salmon. For the Moisie River in 1992 (7,830 fishing days and 2,200 salmon), the direct value of the resource would be \$1.8 or \$2.2 million respectively (Ms. Geneviève Corfa, transcript, part 1, February 8, 1993, evening, p. 9)

However, according to the proponent's economic studies, the analysis must transcend the profits and expenses of those who provide the equipment and services required by fishermen on site. It must also take into account the indirect benefits, including the pleasure of being on the site, or even:

[...] that of watching a documentary on salmon on television, or [...] of knowing that a natural habitat is being left in its natural state [...] To determine the total economic value of the salmon resource comes down to answering the following question: If we must pay in order to take advantage of what the river offers, what would be the total amount paid by those who benefit from it?

(filed document A111, p. 1)

The analysis by Luc Michaud, consulting economist, attempted to measure, in addition to the expenses incurred in order to take part in the activity of fishing, the amount of money that would have to be paid to each fisherman or other user in order to compensate them for having to abandon that activity. For Quebec, the sum was established at \$6,422 per fisherman per year, on average. If we add to this figure the actual expenses of \$1,617, we obtain a

total value of \$8,039 per fisherman per year. The direct costs of the fishermen, or \$1,617, actually represent a mere 20% of the total value of the resource:

In multiplying by the number of fishermen (in Quebec), 15,010, we obtain a net total gain of \$97,444,920 per year, in 1988 dollars. If we spread this over 50 years at a rate of 8%, we obtain a value of \$1.2 billion!

(filed document A111, p.15)

Although the Gaspé region, thanks to its accessibility, accounts for 60% of this total, the river that generates the most profit is the Moisie, which represents about 8% of the total or \$7.75 million. This economic score confirms its title as the champion river.

To these considerations must be added the value of Native fishing. The Montagnais have a quota of 350 salmon for netfishing and 700 for line fishing. According to MLCP data, these quotas are not always reached. Based on information obtained, and attributing a value of \$170 per specimen, the economic value of the net quota would be about \$60,000 (technical document 508). But in reality, the same evaluation exercise as for non-Native sport fishermen would have to be carried out in order to find the true value of this fishing activity. However, no such study has been brought to the panel's attention.

The Diversion and Regulated Flows

The proponent's proposed development includes the diversion of 74% of the flow of the Carheil and aux Pékans rivers, which flow naturally into the Moisie River, into the Sainte-Marguerite. This measure to increase hydroelectric production at the SM-3 station is considered advantageous from an economic point of view, since the diversion, without regulated flow, would assure about 37% of the total production, while its implementation represents only about 17% of the total cost of the project (Environmental Impact Statement, part 3, p. 14). For the Moisie River, this diversion would

mean an annual average reduction in flow of 42% where it meets the aux Pékans river and of 13% at the mouth of the Moisie. The flow reduction would have impacts that would run the risk of:

[...] affecting salmon habitats and certain phases of the salmon's life cycle, and affecting users of the river and the resource.
(Environmental Impact Statement, part 7, p. 1)

The Concept of Regulated Flow

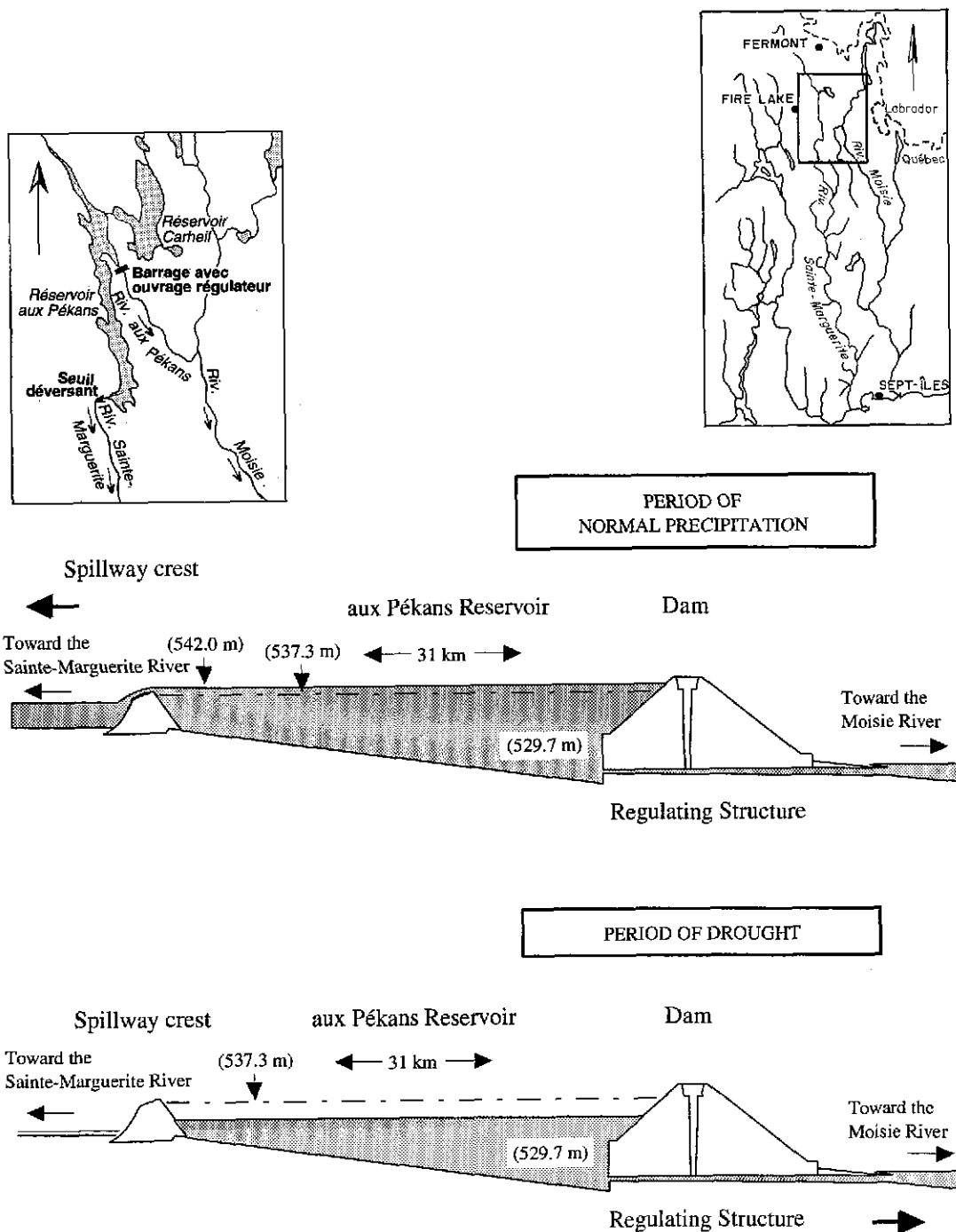
In order to limit these impacts, the dam of the aux Pékans reservoir would be equipped with a regulating structure allowing for the return of part of the flow of this affluent to the Moisie. It would consist in two gates that could be regulated according to the flow to be restored. The operating principle of regulated flow is illustrated in Figure 6. When the water level in the aux Pékans reservoir exceeds the 537.3 m mark, which occurs during the spring rise and occasionally in the fall, a volume of water will flow over the spillway crest toward the Sainte-Marguerite River and become available for electricity production. When the water level goes below this mark, which can happen during the summer dry period, the water can no longer flow over the spillway crest toward the Sainte-Marguerite and it remains in the reservoir, whence it can be released as needed into the aux Pékans River which flows into the Moisie River.

The structure is designed for flows varying between 120 and 280 cubic metres per second (m^3/s) and will give priority to the salmon:

This structure will make it possible to bring water from the aux Pékans reservoir toward the Moisie River in order to counter the impacts on the salmon and their habitat, particularly during the long summer droughts. This is called regulated flow. [...] During drought periods, it will be impossible to direct water from the aux Pékans reservoir toward the Sainte-Marguerite River; only the Moisie River will receive water from the reservoir. Thanks to regulated flow, Hydro-Québec will be able to pour the volumes of water required to maintain the various phases of the salmon's life cycle into the Moisie River. Applied during the summer, this measure will make it possible to avoid the loss of habitats for the young salmon; in the fall, it will protect the spawn, and in the winter, it will eliminate the risk of eggs freezing in their nests.

(filed document A1, pp. 13 and 14)

Figure 6 Operation of P-2 Regulating Structure



Source: Environmental Impact Statement, summary, Figure 6, p.40.

According to the proponent, the use of regulated flow would result in a reduction of roughly 8% of the available energy and would increase project costs and total production costs by about 1.5% and 11.7% respectively (filed document A16). However, the average reduction of flow at the mouth would go from 13% to 8.5% (Environmental Impact Statement, part 7, p. 126).

The principles underlying the regulated flow option, as set out by the proponent, are the following:

To avoid a net loss of salmon habitats and the reduced productivity that the structures would likely induce; to use the possibilities offered by the aux Pékans Reservoir to counter the effects of severe natural drops in water levels on the habitat; to maintain the existing hydrological conditions which characterize the salmon habitat throughout the various phases of its life cycle; to avoid maintaining an overly regular flow during summer low water periods; to consider the Taoti site (km 207) as a habitat that must serve as a reference for determining the flow, because of its quality and the proximity of the dam.
(Environmental Impact Statement, part 7, p. 107)

These principles were confirmed by the Moisie River salmon scientific committee, which also approved the value of the proposed regulated flows. This committee, formed in 1988 by biologists and hydroliticians, was set up to advise on the methods and results of the proponent's impact statements, to analyze the corrective measures put forward and to make recommendations on supplementary studies. The committee also gave its opinion as to the appropriateness of regulated flows as a measure for mitigating the effects of the diversion on the salmon. According to the committee:

In particular, the idea of a regulated flow seems to be a very appropriate and innovative mitigation measure. Obviously, the effectiveness of such a measure remains to be seen.
(Environmental Impact Statement, part 7, p. x)

This optimistic statement is tempered by some uncertainty as to the performance of regulated flows for preserving the various salmon operations:

Despite the proposed mitigation measures, there are still some uncertainties and possibilities of biological risk associated with this project.
(Environmental Impact Statement, part 7, p. xii)

The proponent gave two examples of the application of the principle of regulated flow for the preservation and possible enhancement of the salmon resource. The first is the Cheticamp River in Nova Scotia, 18% of whose waters were diverted for hydroelectric production. The reservoir that was created is equipped with a regulating structure that allows for the restoration of a regulated flow during the summer period. Follow-up studies revealed that after the diversion, the density of alevins and parrs increased in the river, as did the number of sport catches. (Ruggles, 1988).

The second example is that of the Snake River in Oregon. This river, whose average annual flow is greater than that of the Moisie River and which was once renowned for its runs of more than 25,000 Pacific salmon, was harnessed for its hydroelectric potential. Several studies were carried out, particularly on the question of necessary flow rates for the preservation of the salmon. According to the results of these studies, the optimum and minimum flow rates represent, respectively, 95% and 66% of the average annual flow rate of the river. According to the proponent, these figures are comparable to those of the regulated flows of the Moisie River, which would allow for the restoration of 90% of the average annual flow at the mouth, and 75% at the Taoti site.

The proponent also directed the attention of the panel to the case of the Caniapiscau River in Quebec, where no regulated flow was planned for the protection of the salmon. The diversion of this river for hydroelectric production reduced the flow by 35% at the confluence of the Koksoak River. Five years after the diversion, follow-up studies on Native fishing have not revealed a change in the harvest.

On the Moisie River, the presence of a ZEC, four fishing camps and a fishing club has added a further constraint to reduce the inconveniences of a decreased flow on the success of fishing. The proponent thus examined the impacts of a diversion with no regulated flow on the number of fishing days lost and on the difficulties of navigation and access to the salmon pools for each of the sectors identified in Figure 7. Generally, the impacts on the exploitation increase as we move upstream, due to the increased percentage of flow rate cuts. For example, the Haute-Moisie fishing camp, whose territory lies between kilometres 129 and 172, would be more affected by the diversion, especially since its fishing season corresponds to the summer dry period. The low water levels of the summer of 1988 made for difficult

navigation and were not very favourable for fishing, and the proponent estimates that such conditions, which occur 20 % of the time under natural conditions, could occur 50 % of the time with the diversion.

The Moisie-Nipissis fishing camp, further downstream, would see its fishing season shortened by two to six days on average at the Crans Serrés pool, while navigation difficulties, which begin to arise when levels descend below 350 m³/s, would be accentuated with the diversion. For the Moisie ZEC, the proponent estimates that the diversion would shorten the fishing season by three days on average and that navigation difficulties would not increase tangibly during average and weak flows, and would remain the same during strong flows.

The situation as set out in the Environmental Impact Statement is schematically summarized in table 21.

Following meetings with users, the proponent concluded it was necessary to regulate a supplementary flow for fishing activities. A task force of users was set up to define measures to maintain existing fishing conditions and ensure the viability of the various groups and organizations that use the river (Environmental Impact Statement, part 7, p. 116):

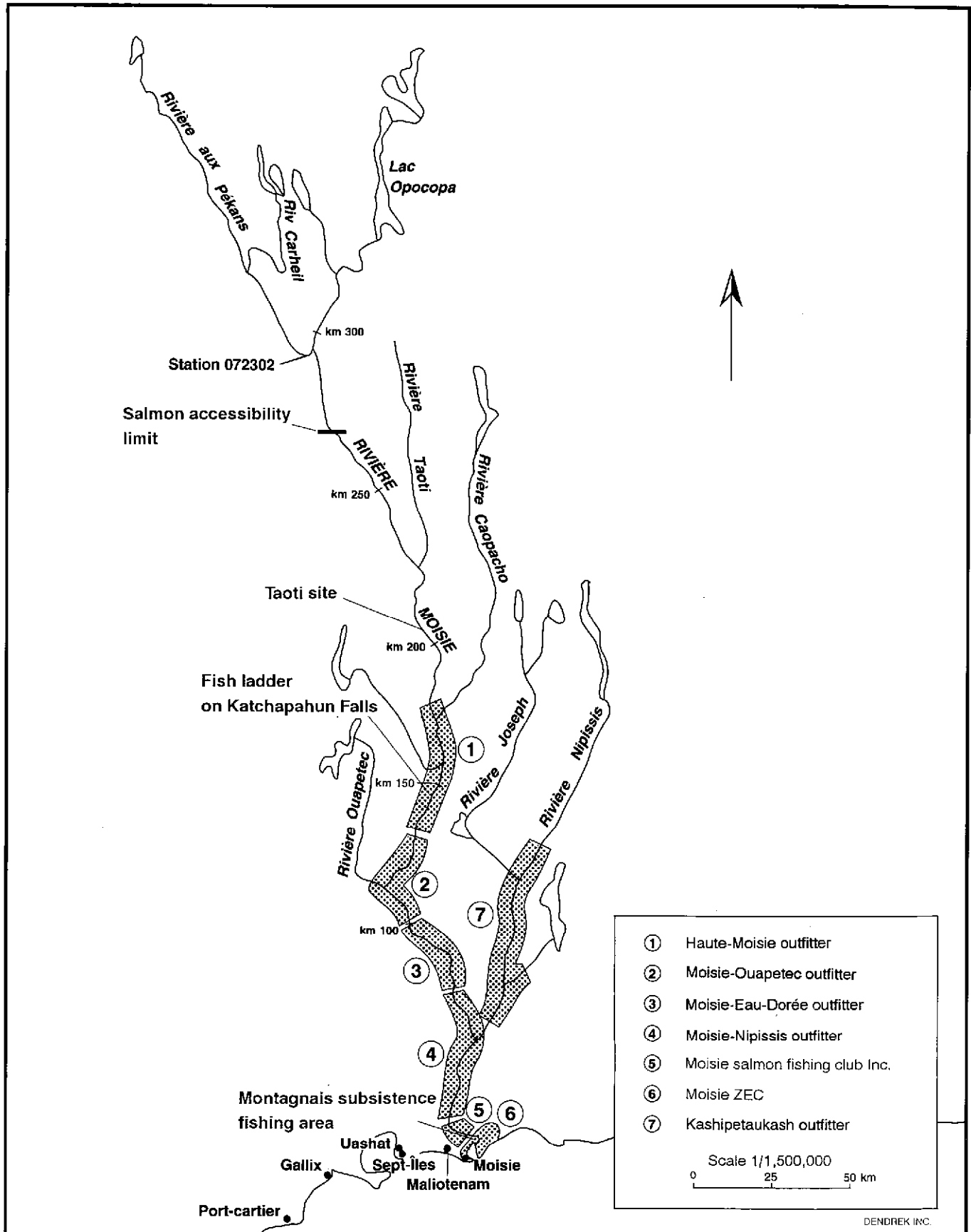
Regulated flows for fishermen would allow for variations in water level that are favourable to fishing and would reduce the difficulties users have in getting around when water levels are at their lowest point in the summer.

(Brief by the "Association de protection de la rivière Moisie Inc.", appendix)

Using fish and flow statistics, we were able to identify the fishing periods and the conditions that outfitters meet for their fishing periods, the best and the less advantageous periods, and this enabled us to determine the regulated flows needed to mitigate the dry periods that the camps on the intermediate and upper parts of the river encounter in the summer.

(Mr. André Boudreault, transcript, part 1, February 12, 1993, evening, p. 101)

Figure 7 Location of the ZEC and fishing camps on the Moisie River



Source: Adapted from the Environmental Impact Statement, part 7, Figure 23

Table 21 Impacts of diversion without regulated flow on fishing conditions

Sector	Approximate fishing season	Decline		Impacts
		Flow %	Level cm	
Moisie ZEC	May 1 - June 30	13	10-17	- season shorted by 3 days
Moisie Club	June 1 - July 15	13	15-20	- little effect except during low hydraulicity
Moisie-Nipissis outfitter	June 10 - August 15	13-17	15-20	- season shortened by 2 to 6 days
Moisie-Eau-Dorée outfitter	July 1 - August 15	18	20	- difficult operation in low-water period
Moisie-Ouapetec outfitter	July 1 - August 31	19-21	20	- difficult operation in low-water period
Haute-Moisie outfitter	July 15 - September 15	22-24	20	- difficult operation in low-water period

Source: Adapted from the Environmental Impact Statement, part 7, pp. 84 to 103.

According to Hydro-Québec, with regulated flows, the reduction of flows at the beginning of the season would favour the salmon run, as the fish would stay downstream for less time. Conversely, the mitigation of the summer dry periods would favour the upstream camps:

[...] we have estimated that there would probably be a few days of fishing lost in the ZEC [...] the [Moisie-Nipissis] camp would lose some days of fishing in the Crans Serrés pools [...] for the Eau-Dorée, Ouapetec and Haute-Moisie camps and even the Joseph sector, [...] regulated flow, for the salmon and fishing, will probably give them very favourable conditions in the dry period.

(Mr. André Boudreault, transcript, part 1, February 4, 1993, evening, pp. 211 to 213)

Structure Management

For the proponent, the adequate management of regulated flows is a key element for the optimum operation of the SM-3 station. This management would make it possible to optimize hydroelectric production while providing the Moisie with flows to counter the quantitative losses of habitat and maintain fishing conditions. In six locations between P-2 and the mouth of the Moisie River, the proponent plans to install devices to maintain a constant measure of water levels. The proponent plans to use these measures to control the gates and provide the required flows at the appropriate times for fishermen and salmon.

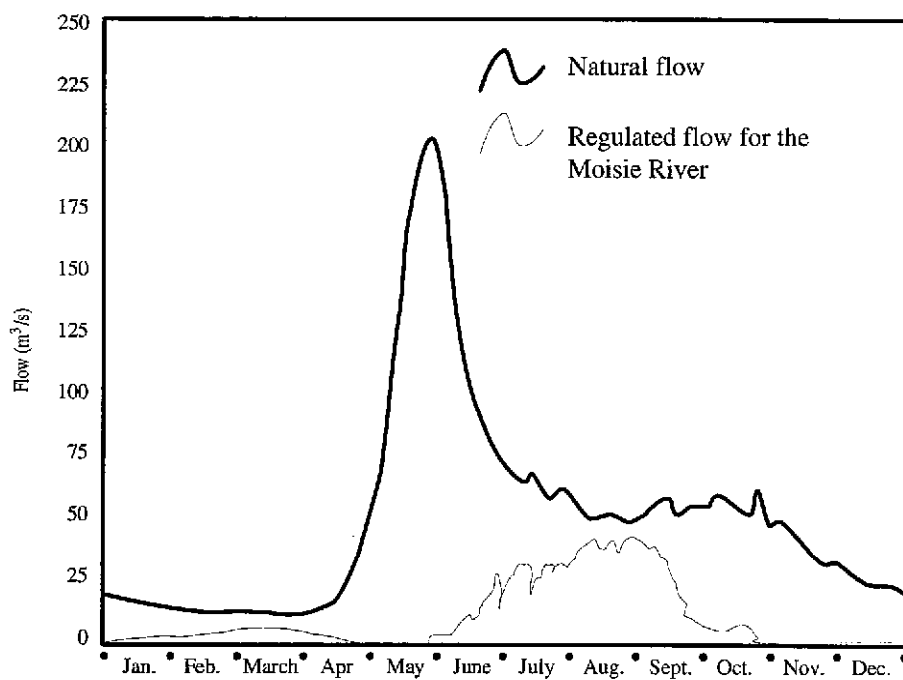
Hydro-Québec plans to restore a maximum guaranteed flow of $120 \text{ m}^3/\text{s}$ to the Moisie River. However, when the aux Pékans reservoir is at full capacity, the spillway gates could return up to $280 \text{ m}^3/\text{s}$. The mean hydrograph at the aux Pékans reservoir for the years 1957 to 1989 is presented in Figure 8. It shows that during a period of about one month, from mid-May to mid-June, the average is about $200 \text{ m}^3/\text{s}$. However, the actual flow in the flood period regularly exceeds this Figure. According to the data of the Environmental Impact Statement, the spring flood reaches on average, once every two years, a flow rate of $462 \text{ m}^3/\text{s}$ at the MENVIQ 072302 station, located a few kilometres from the confluence of the aux Pékans and Moisie rivers. Based on the relation between maximum average spates at the regulating structure and at the 072302 station (filed document A24), the flood rate at the planned location of the regulating structure would reach $342 \text{ m}^3/\text{s}$ on average one year out of two, which is superior to the maximum capacity of the spillways (280 m^3).

Calculation of regulated flows for the salmon was carried out at a reference site known as the Taoti site, selected after the examination of five other sites along the Moisie River:

The Taoti site was chosen by the scientific committee as a reference site because it is the furthest site upstream, the most sensitive to flows, and the highest quality.

(Ms. Geneviève Corfa, transcript, part 1, February 11, 1993, afternoon, p. 105)

Figure 8 **Mean hydrograph (1957-1989) at the aux Pékans regulating structure**



Source: Filed document A24

A photo-interpretative analysis of the morphology and form of the river bed that was carried out by the proponent allowed it to conclude on the representativeness of the sites studied for the Moisie River overall.

The Taoti site, located 207 km from the mouth, will also be used for the management of regulated flows (Mr. Francis Therrien, transcript, part 1, February 4, 1993, evening, p. 21).

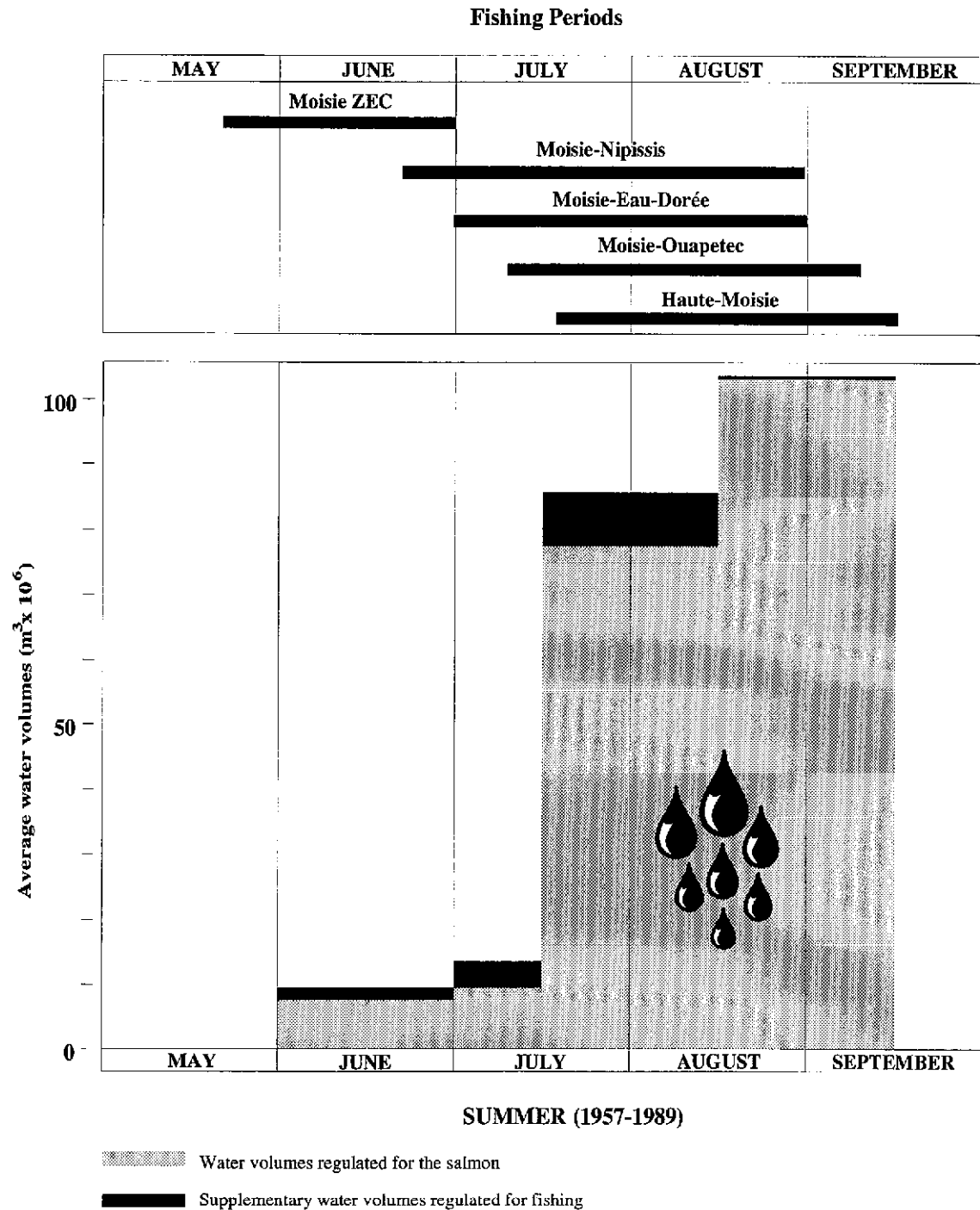
The flows established by the scientific committee are presented in Table 22 for various periods of the year. These do not include the regulated flows for fishing. During these periods, the proponent plans to provide intermediate regulated flows to ensure the transition between one flow and the next. No regulated flow is planned for the spring, when part of the water behind the regulating structure would be directed toward the Sainte-Marguerite River to feed the SM-3 reservoir.

Table 22 Regulated flows for salmon at Taoti site

Salmon function	Period	Minimum Regulated Flow m ³ /s
Rearing of juvenile salmon	June 1 - Sept. 15	135-140
Spawning	Sept. 25 - Oct. 25	100
Incubation of eggs	Dec. 1 - April 30	30
Source: Adapted from the Environmental Impact Statement, part 7, pp. 112 to 114.		

Figure 9 shows the water volumes reserved for the salmon and for fishing in the Moisie River, based on a hydrological analysis covering the years 1957 to 1989. It should be noted that the regulated flows for the salmon become more and more important after mid-July, during the summer drought, while the regulated flows for fishing are required from June to September, during the fishing season.

Figure 9 Volumes of water regulated for the salmon and the fishing activities in the Moisie River



Source: adapted from the Environmental Impact Statement, part 7, Figure 32, p.119.

The regulated flows described in Table 22 lead us to suppose that at the Taoti site, constant flows would be maintained during the summer period, as well as during the spawning and incubation periods, which would contradict one of the principles ratified by the scientific committee which stipulates that “an overly regular flow during the summer period should be avoided” (Environmental Impact Statement, part 7, p. 107). When questioned on this, the proponent confirmed that the rules of applied management for the regulated flows aim to preserve as much as possible the form of the natural hydrograph; that is, to maintain the flow variations of the Moisie River. For management during summer low-water periods, the proponent mentioned that a maximum flow released from the aux Pékans reservoir would be a function of a water deficit at the Taoti site, i.e. of the difference between water quantities before and after the diversion:

So as not to disturb the hydrology of the Moisie River, we should not compensate more than three times the water deficit at Taoti.
(Mr. Francis Therrien, transcript, part 1, February 11, 1993, afternoon, p. 198)

The application of the management regulation, in extremely low water periods as was the case in 1959, would mitigate the severity of the drought, but would not necessarily permit regulated flows of 135 m³/s at the Taoti site (filed document A14, Figure 1.7). However, it would ensure that the aux Pékans reservoir would not become drained during this period. Finally, the proponent mentions in its Environmental Impact Statement that, taking into account precipitation and the travelling time of water released at the regulating structure toward the Moisie River, “it is more realistic to predict a flow-rate fluctuation of between 5 m³/s and 10 m³/s at the Taoti site during periods of regulated flow” (Environmental Impact Statement, part 7, p. 112).

The addition of regulated flows for fishing would also contribute to increasing the flows along the Moisie River and, consequently, at the Taoti site. According to the proponent’s studies, the contribution of precipitation and the release of water volumes for salmon and fishing, combined with flow management that respects the natural flow variations of the Moisie River, would make it possible to obtain an average flow of 148 m³/s at the Taoti site between July 1 and September 15 (Ms. Geneviève Corfa, transcript, part 1, February 10, 1993, evening, p. 235).

The ability of the aux Pékans reservoir to provide supplementary regulated flows was discussed by a participant at the hearings:

[...] if ever we conclude that supplementary flows are needed to mitigate the impacts on the Moisie River, by blocks of 5 m³, [...] how many times, on a 33-year cycle, would we risk draining the reservoir?

(Mr. Bernard Lynch, transcript, part 1, February 11, 1993, afternoon, p. 168)

According to the proponent, an increase in regulated flow in summer dry periods would not influence the emptying of the aux Pékans reservoir, by using the same management regulation mentioned earlier. According to its studies, the maximum fluctuations in the water level in the reservoir, which define the range, would have increased in frequency. While the range would reach 4 m on average once every 20 years for a regulated flow in the summer of 135 m³/s, this same range would occur more frequently if the regulated flow were to increase to 140 or even 150 m³/s.

Although increasing the regulated flow in the summer would not drain the aux Pékans reservoir, the proponent nonetheless specified that it would effect the economic profitability of the project:

If the project as we have presented it and the conditions we have estimated are carried out, we will have a project at 3.8 cents (per kilowatt-hour); if the follow-up committee decided to restore more water, at those times our profitability would be reduced from the energy standpoint.

(Mr. Patrick Arnaud, transcript, part 1, February 11, 1993, afternoon, p. 159)

Taking into account the holding capacity of the aux Pékans reservoir, the proponent estimated that the diversion would cease to be profitable — that the project cost would rise above 4.6 cents per kilowatt-hour — if 44% of the waters from the diversion were returned to the Moisie River (filed document A43, p. 1). According to the present proposal, the regulated flows returned to the Moisie River represent 19% of the waters of the diversion. The proponent's flexibility would not be constant, but would depend on the conditions of hydraulicity present each summer. Table 23, based on the proponent's data, shows this tolerance.

Table 23 Tolerances in the allocation of regulated flows

Summer hydraulicity conditions	Average regulated flow m ³ /s	%	Supplementary tolerance m ³ /s	%	Total Average annual tolerance m ³ /s	%	Average annual flow aux Pékans m ³ /s
Average	10	19	13	25	23	44	42
Low (1959)	21	42	1	2	22	44	49
Low (1962)	14	35	3	8	17	43	40

Source: Adapted from filed document A43.

As shown in Table 23, the tolerance is good for summers of average hydraulicity; however, it decreases considerably in conditions of low hydraulicity. During summers of high hydraulicity (not specified here), the tolerance would be even greater, given the significant flows and absence of severe drought that would decrease the need for regulated flows. It must be specified that the supplementary tolerance calculated by the proponent is applicable to sustain the periods of low water that generally occur from July to October.

The time taken by the water released at P-2 to reach the estuary of the Moisie River was also discussed by the proponent during the hearings. Based on the profile of the river and on certain hypotheses concerning the form and roughness of the main channel, the proponent estimated that the water would take between two and three days to travel the 300 km between the P-2 regulating structure and the MENVIQ (072301) measuring station located about 30 km from the mouth of the Moisie River. According to the proponent, the Moisie is comparable to a large rapids, with a flow speed that is more or less constant with flow rate variations and “most often, the water level will take the variation of the flow rate” (Mr. Francis Therrien, transcript, part 1, February 4, 1993, evening, p. 10).

The proponent confirmed that the travelling time would be considered to ensure the delivery of water volumes required by users of the river in the appropriate time periods, "that is, that the lag time in travel will be taken into account in the management of the regulated flow" (Ms. Geneviève Corfa, transcript, part 1, February 4, 1993, evening, p. 25).

Flow releases are planned during the winter season to ensure an adequate water cover to guard against the eggs freezing in the spawning grounds. Depending on the hydraulicity, these flows could be required as of November. However, it could happen that the gates of the P-2 regulating structure remain closed during part of the winter, drying a section of the aux Pékans River over a distance of 3 km immediately downstream from the structure and considerably reducing the flow rates on the following 20 km. The management of these flows was cause for questions on the part of some of the participants :

Because we know that the flows, the first winter flows in November and December, maintain a certain level. Thus, during this time, we do not need to release flows into the Moisie River. That would be more into the February and March period, in the 30 km. dry section, where there would be about five or six feet of snow, and we would like to know how that is going to travel over the spawning grounds on the Moisie River [...].

(Mr. Daniel Girard, transcript, part 1, February 4, 1993, evening, pp. 144 and 145)

These concerns do not seem to be shared by the proponent, which refers to its data on the aux Pékans River and its experience elsewhere in Quebec :

Actually, the winter path of the water will be traced by the drainage of Todd Lake which is just 3 km downstream from the dry section, downstream from the Pékans regulating structure.

(Mr. Francis Therrien, transcript, part 1, February 12, 1993, evening, p. 200)

The Use of Mathematical Models

A mathematical model is the representation of a phenomenon, such as the flow of water in a river, through the use of equations. As these equations are generally difficult to solve, the phenomenon is simulated by computer. Modelling usually requires a vast quantity of data acquired on site. These data are first used to obtain an initial representation, as faithful as possible, of the phenomenon observed, a step called benchmarking. It is then necessary to ensure that the model is capable of faithfully reproducing the phenomenon, which is the validation phase. This validation calls for testing the model with new data. The reliability of the model to reproduce the observed phenomenon depends on several factors, including the quality and quantity of data on the site, the exactitude of equations and the way the phenomenon to be simulated is represented in the mathematical model.

The proponent made an intensive use of mathematical models to evaluate the negative impacts of the diversion on the salmon and to calculate the regulated flows needed to mitigate these impacts. It used models to represent the water's flow, the salmon habitats and the water temperature. The first two models were used to quantify the loss of salmon habitats that would result from the diversion, and to obtain a value of regulated flows that would cancel out this loss. The mathematical model of water temperature was used to assess the anticipated changes in water temperature in the Moisie River after the diversion with regulated flows.

The hydrodynamic and habitat models were the subject of several questions from participants in the hearings, and will thus be briefly explained here.

The hydrodynamic model used allows for the calculation, in a river or section of a river, of the flow speeds and depths of the water. The model is bivariate, i.e. capable of calculating the average flow speed in specific areas of the river. The depth of the stream can also be obtained in these points. This model is also capable of simulating the uncovering of the banks following the lowering of the water level. According to the proponent, it thus represents a useful tool for the simulation of the loss of fish habitats.

The source data required for benchmarking and validation include the bathymetry of the river, the granulometry of materials on the bed of the river, readings of current speed, flow and depth. The roughness of the river bed is also required, but it is obtained through trial and error. The expected margin of error is about 10% for flow speeds (filed document B13, p. 221), 5% for

flow rates (Environmental Impact Statement, supplement 1, chapter 1, p. 9) and 10 cm. for the depths (Mr. Michel Leclerc, transcript, part 1, February 4, 1993, afternoon, p. 68).

The habitat model essentially consists of curves defining the optimum and minimum conditions for rearing and spawning. The physical variables retained are flow speed, water depth and the granulometry of the river bed. The curves defining the habitat conditions of the Moisie River, called “acceptability curves”, were obtained from on-site data.

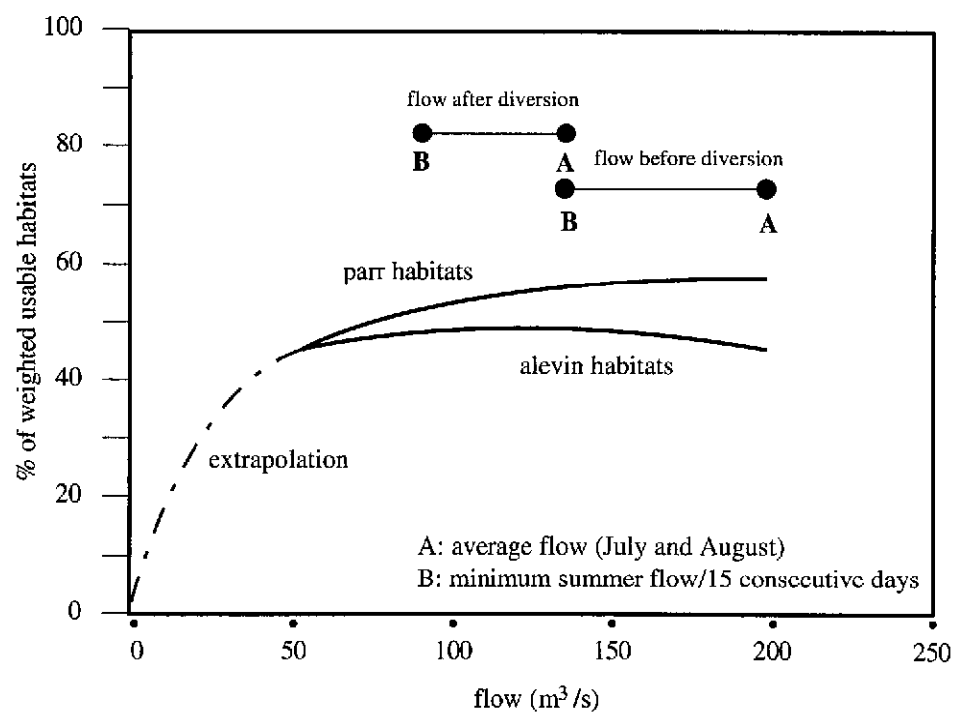
The values simulated by the hydrodynamic model — flow speed and depth — as well as the granulometric data collected on the site were incorporated into a global habitat model to produce maps that show the habitat conditions for each section of the river that was modelled. The approach for the integration of hydrodynamic data and habitat data to describe the river habitat conditions is called “Instream Flow Incremental Methodology,” or IFIM. This method, used by the proponent on six sites along the Moisie River, made it possible to identify the Taoti site as being the most sensitive to variations in water level and thus to flows.

In order to quantify the expected habitat losses, the proponent calculated, according to the habitat maps, the percentage of habitat areas usable by alevins and parrs, depending on flow rates. Figure 10 shows the curve obtained for the Taoti site, called the weighted usable habitat curve. This curve made it possible to determine the flow rate required to cancel out the habitat losses, by analyzing the 33 years of hydrological data available for the Taoti site. The proponent does not explicitly mention the margin of precision attained in the global habitat model.

The Monitoring Program

The general level of knowledge about the Moisie River salmon is definitely one of the principal factors of uncertainty noted by the scientific committee. Other uncertainties arise from the methodology, particularly the imprecision and the margins of error of the various mathematical models used in the Environmental Impact Statement. Among the gaps in knowledge of the salmon, the committee notes the influence of modifications of the physico-chemical parameters of the water on the biological functions and life cycle of the salmon, as well as on the ecological process which determines the long-term selective adaptation of the salmon.

Figure 10 Weighted usable habitat curve for juvenile salmon at the Taoti site



Source: Environmental Impact Statement, part 7, Figure 29, p.109.

The proponent, during the hearings, provided an explanation of the biological risks and uncertainties relating to the Moisie River salmon:

When we, when the scientific committee speaks of risk, it means that we are at the limit of our knowledge today in the area of predicting the impacts. Thus, given that we go to the very limit of our knowledge, when we speak of biology and make forecasts, there are always going to be some areas of uncertainty.

(Ms. Geneviève Corfa, transcript, part 1, February 4, 1993, afternoon, p. 148)

To assess the related risk, the proponent proposes the introduction of a follow-up program on the physical and biological elements of the Moisie River. It also plans to create a management body that would oversee the application of follow-up measures and “adapt them to the various situations that arise, as well as to knowledge acquired along the way” (Environmental Impact Statement, part 7, p. 138).

According to the proponent, measures of regulated flow, the follow-up program and follow-up committee would guarantee that the Moisie River would not be endangered:

Thus, over and above this forecast, with the guarantee of a follow-up, we are sure that the Moisie River is not in danger [...]. Today, we cannot say that the Moisie River could be in danger or at risk with the Environmental Impact Statement we have done, with the best experts that we have consulted [...]. With all this, we cancel out the risk of endangering the salmon of the Moisie River.

(Ms. Geneviève Corfa, transcript, part 1, February 4, 1993, afternoon, p. 148)

The program foresees the establishment of a sampling system for juvenile habitats, the study of juvenile and alevin populations, inventories of spawning grounds, the characterization of the genotype of the river population and evaluating the size of the adult population by hydroacoustic tallying.

The importance of establishing the basic state of the river was underlined by the MENVIQ, which noted:

[...] we consider that Hydro-Québec will need to have a good knowledge of the initial state to start up the follow-up program when the regulating and diversion structures are ready to operate.

(Mr. Gilles Brunet, transcript, part 1, February 4, 1993, evening, p. 71)

According to the proponent, the time left until the diversion becomes operational, which is planned for 1997, will be enough to become familiar with the basic state of the Moisie River:

[...] over a five or six-year period, we are going to be able to determine the fluctuations before the structures are set up, and we will be able to see whether the same rates of fluctuation continue afterwards.

(Mr. André Boudreault, transcript, part 1, February 4, 1993, evening, p. 59)

It plans to invest some \$10 million in the follow-up on the Moisie River from 1993 to 2006 (filed document A20). However, the proponent points out that the program will extend beyond 2006.

It will set up a follow-up committee whose goal will be:

[...] to ensure the proper management of the regulated flow and any modifications that the follow-up committee could have decided to make to the regulated flow system.

(Mr. Patrick Arnaud, transcript, part 1, February 3, 1993, evening, p. 48)

The proponent proposes that the follow-up committee include representatives from several organizations and groups such as the MLCP, the MENVIQ, the FQSA, the "Association des gestionnaires de la rivière Moisie" (AGRM), the "Association de protection de la rivière Moisie" (APRM), Hydro-Québec, the Montagnais community and independent members of the scientific community. (Ms. Geneviève Corfa, transcript, part 1, February 3, 1993, evening, p. 46). The follow-up committee would have an advisory role and make recommendations to the proponent, which would

be responsible for the operation of the regulated flow (Mr. Patrick Arnaud, transcript, part 1, February 3, 1993, evening, p. 48). The proponent did not propose any particular legal status for the committee.

According to the proponent, in the event of a negative impact on the salmon of the Moisie River, a flow adjustment could be made in accordance with the recommendations of the committee, if the impact were linked to the flow of the Moisie River (Ms. Geneviève Corfa, transcript, part 1, February 3, 1993, evening, p. 51).

Citizens' Concerns

The diversion of the Carheil and aux Pékans rivers toward the Sainte-Marguerite River is one of the major elements of the project. The unique character of the Moisie River led the proponent to devote resources and energy to the study of the possible repercussions of the diversion on the salmon and on the users of the Moisie River. It also chose to revise its diversion project to make it environmentally acceptable. According to the Moisie River salmon scientific committee:

[...] the studies carried out by Hydro-Québec are of an exceptionally high quality and use all available techniques.
(Environmental Impact Statement, part 7, p. x)

The unique character of the Moisie River also led several individuals, groups and associations to examine the risks of the diversion having a negative impact on the salmon.

Doubts about the Models

The reliability of the IFIM approach for calculating habitat losses, and specifically the validation aspect of the mathematical models, was questioned:

[...] we would like to have some confirmation, because in this matter, when you talk about hydrodynamic models and new methods, about the methodology, and you tell us that this is precise and that the margin of precision is extraordinary, it might be a good idea to check with other researchers who have already used hydrodynamic models for validation purposes, or above all with those who have not been able to validate the model.

(Mr. Daniel Girard, transcript, part 1, February 4, 1993, afternoon, pp. 44 and 45)

The problem of model validation was also raised in the SM-3 initial environmental assessment report produced by DFO:

The hydrological model developed and used by the proponent for the assessment of the project's potential impacts on the Moisie River has not gone through the different stages of scientific validation normally required in this type of approach. The proposed model, in fact, does not receive the unanimous consensus within the group of researchers and administrators specializing in riparian habitats.

(filed document B8, p. 8)

When questioned on this subject by the panel, the DFO representative responded that the department's opinion was based on that of the MLCP, which included comments on the validation of hydrodynamic models, the indexes of acceptability and the global habitat forecasting model.

The panel wants to highlight that there was some confusion in the hearings concerning the terminology used to describe the various mathematical models. This confusion is also present in some briefs, particularly that of the APRM, where the hydrodynamic models seems to be confused with the global habitat model (Brief by the "Association de protection de la rivière Moisie Inc.", p. 24). Clearly, this confusion made the exchanges more difficult.

The MLCP's report on the conformity of the Environmental Impact Statement, produced in October 1991, is the document containing the most information concerning the validation of the mathematical models used by the proponent. On the subject of the validation of the hydrodynamic model, it states:

A fundamental step seems to have been forgotten, in the case of the hydrodynamic modelling: validation after benchmarking. It is surprising that the models obtained at a reduced flow, after a benchmarking at a greater flow, were not verified on the terrain. It would have been very easy to measure the zones uncovered during reduced flow to compare the measurement with that obtained through modelling with the corresponding flow.
(filed document B1, MLCP notice, October 1991, p. 3)

When questioned on the subject, the proponent replied that:

[...] in a hydrodynamic modelling effort like this one, the first thing that must be done is validation. And it is obvious that we will take measurements of currents, for example, and these measurements must be reproduced. The reports list those measurements, and show the results of the model with respect to them. Statistical operations were performed, and the end result is characteristic figures of about 10% average on the precision of speeds. Normally, this is about the best we can get with this type of model, I don't see how, on what basis, it can be said that this was not validated.
(Mr. Michel Leclerc, transcript, part 1, February 4, 1993, afternoon, pp. 75 and 76)

The question of the validation of the global habitat model was also raised by the MLCP, which noted:

[...] the global forecasting model should have been validated to allow us to verify changes in habitat quality during a reduction in flow.
(filed document B1, MLCP opinion, October 1991, p. 5)

The scientific committee also made a recommendation on this subject:

Lastly, the numerical model should be the subject of an on-site verification.

(Environmental Impact Statement, part 7, p. ix)

From the exchanges at the hearings and the documents filed with the panel, it was not possible to ascertain whether a validation of the model on-site, subsequent to the submission of the scientific committee's opinion, had been carried out by the proponent.

Consequently, it becomes difficult at this point to speak about the margin of model accuracy for quantifying habitat loss. This point was raised in the hearings, with reference to habitat losses at the Taoti site:

[...] we speak about an average of 5 to 6 percent in habitat losses. I would like to have the deviations from that average.

(Mr. Bernard Lynch, transcript, part 1, February 10, 1993, evening, p. 267)

In response to this question, the proponent emphasized the conservative approach used to calculate habitat losses, and stated that the accuracy of the habitat model "is the accuracy of the hydrodynamic model" (Mr. André Boudreault, transcript, part 1, February 10, 1993, evening, p. 271).

In the end, the validity of the methodological approach used by the proponent was not unanimously accepted by the scientific community. In a report by the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC), doubts were expressed as to the scientific rigour of the IFIM approach used by the proponent to quantify salmon habitat losses (filed document B12).

The MLCP, based on that report, mentioned in its conformity report that:

The use of these indexes of acceptability has not been unanimously accepted in the field. According to the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC subcommittee report 90/8, 1990), models are obtained by multiplying several numbers derived from curves, whose precision is questionable. The cumulative error following these operations can be considerable.

(filed document B1, MLCP report, October 1991, p. 1)

Uncertainties Concerning Flow Allocation

The regulated flows for the salmon prescribed by the proponent and ratified by the scientific committee apply to the Taoti site, the reference site for the requirements of the species. However, the assurance that the salmon habitats would be preserved along the Moisie River left some participants sceptical:

The test site the furthest upstream on the Moisie River is the Taoti site. Despite its quality and its sensitivity to flow reductions, we find a mill race of more than 60 km colonized by salmon. A large proportion of this sector is made up of very good salmon habitats (part 7, Figure 18, p. 57). This is also the portion of the river that will be affected the most by the diversion.

(Brief by Takuaiakan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 35)

This is where we started asking questions, because it was inconceivable that a conclusion could say that they had studied a kilometre of a river like the Moisie River, and that there was no loss of habitat, when we know that the salmon ascend the Moisie River along 266 kilometres — that's more than from Sept-Îles to Baie-Comeau.

(Mr. Jean Masse, transcript, part 2, March 17, 1993, evening, pp. 18 and 19)

For the management of regulated flows in winter, the proponent's explanations concerning the way the water would travel to the Moisie River, while maintaining the salmon resource intact, did not convince certain persons, as shown in the testimony of an AGRM representative:

I don't have Hydro-Québec's certainty and confidence concerning the distance that the water has to travel and what can happen in the winter when you release water [...]. If ever something happens in the winter on the Moisie River, we don't lose one year of salmon, we lose the smolts, the parrs, the grilse, the second-year and third-year salmon — we lose the harvest of five or six years of spawning. And that thought is frightening [...], we're looking at huge flows that are going to have to be released sometimes in the winter. And we're

worried about that. Hydro-Québec are full of confidence, they tell us there will be no problem, no slush; but we are not convinced. However, we're not scientists.

(Mr. Bernard Lynch, transcript, part 2, March 18, 1993, afternoon, pp. 138 and 139).

Regulated flow management for fishing activities, which was introduced at a late date, has been a source of misunderstanding between the proponent and the users. Users criticized the mass of documentation that had to be read and assimilated in little time, and the difficulties in understanding the complexity of the proposed system. Even in the hearings, explanations were sometime unclear. Consequently, the management system for regulated flow has given cause for several concerns.

It was noted that because of the length of the river, water released would take a certain length of time to travel from the aux Pékans reservoir to the Moisie estuary. When the proponent affirmed that the time taken for the water to travel from P-2 to the river mouth would be about two or three days, the AGRM challenged these estimates after discussions with hydrologists, suggesting that the actual time would be more along the lines of three to six days (Mr. Bernard Lynch, transcript, part 1, February 4, 1993, evening, p. 15).

Water level conditions are not the same everywhere on a given day, and a released flow that is favourable for some parts could be unfavourable for others. Due to their dispersion along the river and to the relatively few days per year that are favourable to fishing, users do not see how they can come to an agreement on a flow management system that will ensure equitable fishing activities for all users:

It takes five days to travel to the mouth, but it takes three days to reach some camps. Now we have to find a flow that suits everyone, that does not favour some camps at the expense of others, because everyone's interests are different. [...] I must tell you that we still haven't found a solution; we've been talking about it, but we haven't found the answer.

(Mr. Bernard Lynch, transcript, part 2, March 18, 1993, afternoon, pp. 88 and 89).

We have been wondering about the mechanism for the operation and control of the facilities that will control the flow. The environment that users of the Moisie currently operate in is very different from one place to another along the river, and leads us to wonder whether it is really possible to find a solution that meets the needs and expectations of all parties.

(Brief by the Moisie-Ouapetec, Moisie-Eau-Dorée Inc., Haute-Moisie Inc., outfitters, p. 2)

Users underline the importance of the right flow in the right place at the right time, because fluctuations in water levels, which are directly dependent on flow, have an impact on the success of fishing:

Having been a guide at the upstream camps, I can say that often, 50% of the time, the fishing will be good, but sometimes the water level drops just eight inches or a foot, and the conditions become difficult[...]. It rains and the levels rise, the level rises two feet and as soon as it starts to drop again, it'll be excellent for three or four days.

(Mr. Bernard Lynch, transcript, part 2, March 18, 1993, afternoon, p. 85)

In the end, the "Association des gestionnaires de la rivière Moisie" says it is ready to follow the whims of nature, but not necessarily the decisions of a management committee. Since the regulated flows will benefit some and not others, they risk being a cause of discord that does not currently exist:

[...] today we trust in nature, which manages the flow. One year, there's less water and the upstream camps are favoured; the next, there's more water, and the lower river has the advantage. In the end, it all balances out[...]. We are not convinced that that balance could be struck with regulated flows.

(Mr. Bernard Lynch, transcript, part 2, March 18, 1993, afternoon, pp. 91 and 92)

The outfitters and fishermen are also worried about the fact that they feel navigation will be more difficult after the diversion. The AGRM believes that lower water levels in the Moisie ZEC, even by only a few centimetres, will compromise navigation in the sector (Brief by the "Association des gestionnaires de la rivière Moisie", p. 34).

Another concern of users is the volumes of water the proponent proposes releasing for fishing activities. According to representatives of the AGRM, the APRM and the Moisie-Nipissis camp, the flows regulated by the proponent would not be nearly enough to ensure the success of the fishing activity. The Moisie-Nipissis camp in particular foresees measurable economic losses, on the basis of average number of fishing days lost:

The mean annual loss due to diversion with regulated flow over 33 years, according to our estimates, is 6.7 fishing days at Crans Serrés, which is the equivalent of (\$4,000 x 6.73), of \$26,800 in 1992, equivalent to the break-even point for the year.
(Brief by the Moisie-Nipissis outfitter, p. 35)

It is also feared that regulation would cause economic losses simply because it would reduce uncertainty as to the quality of fishing. It is well known that uncertainty and risk are elements of the motivation that guides the sport fisherman:

Currently, the flows are regulated by nature, we always sell our best fishing periods, but we also have clients who, given that the best periods are taken, will take a risk [...] a little before or after the best fishing period. They will take the risk [...] that the salmon will be a bit late [...] if all of that is regulated, we tell our clients: we've got salmon on our territory from such to such a date, and the other dates, we no longer sell.
(Mr. Bernard Lynch, transcript, part 2, March 18, 1993, afternoon, p. 89)

Unknown Factors about Salmon

On several occasions the panel noted that participants did not share the proponent's assurance concerning uncertainties and possibilities of biological risk as a result of gaps in our knowledge of the Moisie River salmon:

We feel that the collection of reliable data over several years is an essential step before being able to make an adequate assessment of the potential impacts of the SM-3 project on migration and other activities affecting adult salmon.
(Brief by Takuaiakan Uashat mak Mani-Utenam and the "Conseil des Atikamekw et des Montagnais", p. 37)

In particular, they feared that modifications in flow would lead to changes in certain traits of the Moisie River salmon. Our current ignorance of the genotype prevents us from measuring the potential effects:

[...] the salmon living in a rapidly flowing section of the river have a genetic adaptation giving them a hydrodynamic body type, while those in zones of high predation may inherit pigmentation that helps them to hide. Neither the scientific committee nor Hydro-Québec could reliably predict the impacts on the Atlantic salmon, since we have no idea of the genetic make-up of the stocks of the Moisie River.
(Brief by the Atlantic Salmon Federation, p. 7)

However, due to the quantity and scope of studies required, some believe it is unlikely that the basic state of the salmon population will be known before the start of the diversion work for the project:

In all likelihood, it is unthinkable to claim that the body of missing information could be acquired and accumulated between now and the beginning of the construction work that will affect the Mistashipu drainage basin. Certain data banks, to be statistically valid, will take several years to be built up, as is the case, for example, for the evaluation of populations by the hydroacoustic method.
(Brief by Takuaitkan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, pp. 42 and 43)

According to the MLCP, we must take into account the average life cycle of the salmon, which is from six to eight years in the Moisie River (Mr. Mario St-Pierre, transcript, part 1, February 4, 1993, evening, pp. 49 and 50). The APRM goes even further:

It is known that the Moisie River salmon life cycle is an average of seven years and that for a good idea of returns, we need a minimum of data collection over 14 years, or two complete cycles.
(Brief by the “Association de protection de la rivière Moisie”, p. 41)

In any event, the Atlantic Salmon Federation (ASF) doubts, despite all these preliminary studies, that it would be possible to establish a relation between the diversion and a change in the development of the salmon stock. The ASF had this to say on the subject:

Hydro-Québec proposes to study the biology of salmon during the period preceding the start-up of the project and to use this as a standard for identifying changes due to the diversion. However, the environment is not stable (Bovee 1982), and environmental conditions such as the weather, in the pre-project period, can differ significantly from the conditions met during the priming of the reservoirs (day 1 of the modification of the environment). This makes impossible the differentiation between the impacts of natural sources and the impacts caused by the diversion, unless an independent assessment of the variations caused by the natural fluctuations is established. This is especially true when working with a small data base like the one that will be available for the Moisie River.
(Brief by the Atlantic Salmon Federation, pp. 9 and 10)

For the ASF, it is not certain that the proponent's proposed follow-up program will be adequate:

The proposed study to establish basic ecological conditions for the salmon is extremely vague as it is presented. What will be measured? At how many stations? How often and over what periods of time?
(Brief by the Atlantic Salmon Federation, p. 10)

The APRM fears that:

[...] a chemico-physical change in the water, no matter how minimal, could have a very great effect on the salmon's return to its native river. Naturally, research in this area is in the embryonic stages.
(Brief by the "Association de protection de la rivière Moisie", p. 26)

Several participants underscored the narrow scope of studies carried out by the proponent on the salmon habitat. In particular, the definition of habitat used by the proponent to model and assess the habitat loss for alevins and parrs is overly restrictive:

In the habitat model for the Moisie River, only three variables were considered: water depth, substratum granulometry and flow levels. The critical variables of microhabitat were not examined.
(Brief by the Atlantic Salmon Federation, p. 6)

The microhabitat includes a range of characteristics of the environment inhabited by the alevins and parrs, which is also used by other species:

These components include the configuration of the bed, the width of the channel (which impacts on the current velocity [...]), the proportion pools/rapids, the wave length of the meanders, the size of dominant particles, the presence of fine particles in the substratum, the presence of cover, the size of fish, the morphology and ability in swimming, the feeding strategies at various periods of the year, predation and the spatiotemporal separation of food resources for the different species that occur.
(Brief by the Atlantic Salmon Federation, pp. 5-6)

The Scope of the Monitoring Mandate

During the hearings, the panel noted that participants were unanimous in wanting the proponent to provide formal guarantees of protection for the salmon and fishing activities. However, some voiced reservations about the advisory nature of the mandate as proposed by the proponent. According to these participants, the monitoring committee should be given decision-making powers:

However, we believe that the control of regulated flow should be given to a neutral body with supervisory, rather than advisory, power with respect to Hydro-Québec.
(Brief by the Sept-Îles Chamber of Commerce, p. 12)

Lastly, the FQSA proposed a “salmon convention” as a means of ensuring the conservation and development of the salmon resource in a way that is

compatible with hydroelectricity. This legal measure, with a view to guaranteeing the protection of salmon and fishing activities, is considered necessary by the FQSA since:

International expertise shows us that any monitoring of regulated flows or other mitigation measures that is not enshrined in an agreement between the concerned parties is not complied with by proponents.

(Brief by the “Fédération québécoise pour le saumon atlantique”, p. 16)

The management body, which would include representatives from provincial departments and associations such as the APRM, the AGRM and the FQSA as well as Hydro-Québec, would, according to the FQSA, have the following powers:

- *The power to see that all monitoring and mitigation measures ordered are implemented, as well as those that are subsequently determined, and specifically the management of controlled flows, in order to optimize the conservation and development of the salmon resource.*
- *The power to take legal action obliging the proponent to comply with the commitments made and included in the agreement.*
- *The power to choose, together with the proponent, the specialists to sit on the scientific committee.*

(Brief by the “Fédération québécoise pour le saumon atlantique”, p. 17)

The Integrity of the Moisie River

Numerous participants emphasized the need to preserve the natural integrity of the Moisie River. They spoke of its unique character, its heritage value, and the importance of its wild, untouched nature for recreation and tourism activities:

For sport fishermen, the word will spread that it is a spoiled river, and it is hard to sell a debased product [...] We will be going from an exceptional river to a spoiled river.

(Mr. Bernard Lynch, transcript, part 2, March 18, 1993, afternoon, p. 104)

Given the importance of the unique character of the Mistashipu River, it should not be used as a laboratory in which to experiment with new techniques in the environmental assessment of river environments.

(Brief by Takuaikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 46)

Soon, there will be no great and beautiful wild rivers left in Quebec, the entire territory will be crisscrossed with a network of power lines, which like spider webs will spoil the beauty of our mountains and valleys.

(Brief by Innu Takuaikan Uashat mak Mani-Utenam, p. 22)

According to some participants, waters from the aux Pékans reservoir could affect the quality of the water of the Moisie River. The CAM believes that water released during certain periods will be of poor quality. The APRM fears that fish like pike and grey trout, whose numbers could increase in the aux Pékans reservoir, may represent a threat to the salmon if they go over the regulating structure. According to the CAM, the partial regulation of the flows of the Moisie River by reducing the flood levels of the aux Pékans River could alter the natural productivity of the river, which is the sustenance base for the alevins and parrs. Lastly, Mr. Lynch, a participant from Sept-Îles, expressed concern about the introduction of mercury from the aux Pékans reservoir, and its gradual assimilation by the young salmon of the Moisie River.

Environmental Impact Statement Too Restrictive

In the end, the participants were concerned by the fact that the Moisie River impact statement was limited to the salmon, even though other wildlife could also be affected by the diversion and controlled flows:

The Moisie River is a complex environment whose biological cycles [...] and complex interactions must be maintained [...]. The impact statement did not cover these interactions (for example, the production of invertebrates, of zooplankton and land organisms which nourish the juvenile salmon.) The initial statement did not

even identify the other species that could be either competitors or predators. This is certainly not conducive to, and may even be a hindrance to the reliable forecasting of impacts.

(Brief by the Atlantic Salmon Federation, p. 9)

The restricted nature of the statement, which deals only with the salmon of the Moisie River to the exclusion of other major salmonid populations in this river (particularly in the lower section and the estuarine zone), is a cause for serious concern for the ASF.

(Ibid, p. 13)

In this regard, the Quebec Wildlife Federation (QWF) shares the opinion of the DFO, which in its initial environmental assessment considered that the Environmental Impact Statement did not conform to the guidelines of the MENVIQ.

A Risky Experiment

Several participants wondered about the wisdom of diverting the waters of the Carheil and aux Pékans rivers towards the Sainte-Marguerite. The APRM believes that:

The decision to go ahead with the diversion constitutes the biggest experiment in the field of Atlantic salmon that has ever been undertaken in the world, with all of the risks inherent in it.

(Brief by the “Association de protection de la rivière Moisie”, p. 43)

This particular aspect guided the panel, for whom “the question remains as to whether these risks are acceptable in the case of a natural resource as unique as the salmon of the Moisie River (Environmental Impact Statement, part 7, p. xi).

Faulty Models

The panel noted that the proponent, in order to obtain the parameters of its hydrodynamic model, undertook a series of readings on the six sites recommended by the scientific committee. Moreover, at the Taoti site, it carried out simulations covering flows of from 70 to 200 m³/s. However, the

data collected only covered flows between 120 and 188 m³/s, which means that model validation was not carried out for extremely low water level conditions. Moreover, the validation apparently did not cover a major aspect affecting habitat loss, which is the uncovering of the shorelines. According to the MLCP, little information was provided on the simulation of the drying out of the river banks, and validation of their position during hydrodynamic simulations was not carried out (filed document B1, p. 4).

Consequently, the panel believes that the reliability of the simulations and of the extrapolation for weak flows are uncertain, due largely to the fact that the uncovering of the riverbanks becomes increasingly pronounced with flow reduction. However, the accuracy of water levels to within 10 cm, the knowledge of the hydraulic behaviour of waterways and the numerous applications of the model are signs of its reliability for extrapolations outside the flow values used for the validation. The panel nonetheless considers that it would have been preferable if the proponent had established a validation in the field for very weak flows, with particular attention to validation of the uncovering of the banks.

Moreover, due to the lack of information about the validation of the habitat forecasting hydrodynamic model, it is hard to ascertain its precision. However, contrary to what the proponent claimed in the hearings, the panel believes that the precision of the habitat model cannot be considered on a par with that of the hydrodynamic model, for the habitat model has uncertainties of its own, particularly with respect to acceptability curves. Since the simulation results of the hydrodynamic model are used as source data for the habitat model, its precision is necessarily inferior. Presently, it cannot be assessed, since certain parameters of this habitat model were adjusted on the basis of subjective judgements.

Another major issue is the validity of the methodological approach used to quantify the habitats. According to a scientific opinion filed by Mr. Geoffrey Power, the use of the IFIM method depends on a number of hypotheses, as follows:

1. the depth, current speed and substratum are the most important variables of the physical habitat influencing the distribution and abundance of fish;

2. the depth, current speed and substratum have an independent influence on habitat choice ;
3. preferential factors with respect to depth, current speed and substratum can be combined to obtain an acceptability index for habitats which in turn allows for the calculation of weighted useable areas ;
4. there is a positive linear relation between weighted useable areas and the fish biomass.

The credibility of the IFIM approach depends on the verification of these hypotheses for each site simulated. Even though the hypothesis may be correct, and assuming that depth, current speed and substratum are important factors in habitat choice, other factors may also influence this choice. According to the ASF, the variables used by the proponent in the application of the IFIM technique are variables of macrohabitat alone. Critical microhabitat variables were not incorporated in the habitat model, which makes calculations of habitat loss less reliable :

The assessment of habitat is only partial and conclusions based on future habitat changes in the Moisie River are extremely uncertain. These uncertainties are a major concern for the ASF and other groups (MLCP 1992, p. 12). If microhabitat variables were included in the habitat model developed by Hydro-Québec, we believe that the estimated habitat losses would rise significantly.
(Brief by the Atlantic Salmon Federation, p. 6).

The methodological approach employed by the proponent considers that the granulometry is stable, which means it is independent of current speed and water depth. This hypothesis has apparently not been subjected to verification in the field, which further adds to the uncertainty as to habitat modelling. The brief by Takuaiakan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais” expresses this concern :

Granulometry is considered a stable element in this model, whereas we know that the substratum of a river adjusts with the dominant flow, which will be at least intermittently modified by the flow reduction. Yet Hydro-Québec does acknowledge the importance of substratum dynamics in establishing the quality of a salmonid habitat, since this aspect was considered in modelling ouananiche

habitats on the Ashuapmushuan. The granulometry of test sites, considered stable in the Moisie River model, seems to us here to be a significant limitation in the qualitative assessment of project impacts on the salmon and their habitats.

(Brief by Takuaikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 34)

Lastly, in reading G. Power's opinion, we see that several scientific works have questioned the validity of a positive linear relationship between weighted useable areas and the biomass.

These methodological shortfalls challenge the habitat predictions based on this technique. However, we should mention that the IFIM method was widely used, especially in the United States, with some success (Armour and Taylor, 1991), and that “even if the method is less than perfect, the prediction that losses in salmon production would be minimal if the summer flow is maintained at equal to or more than 137 m³/s at the Taoti site could prove correct” (filed document D1, pp. 7 and 8).

Predictable Concerns

The management of regulated or controlled flows for salmon and fishing includes grey areas that make it difficult to carry out an accurate assessment of the performance and limitations of this mitigation measure. The panel recognizes the sensitivity of the Taoti site to quantitative habitat losses, but is concerned by the fact that regulated flow management on 266 km of river would be carried out on the evidence of one site alone. This concern is principally based on the representativeness of the sites studied by the proponent. The proponent has classified habitat categories according to a photo-interpretative analysis of the morphological characteristics and the form of the river bed. To date, according to the proponent, no inventory has been carried out on the occupation density of various sections of the river by juvenile salmon, which would allow for the assessment of the relative importance of these sections for the resource (Environmental Impact Statement, supplement 1, pp. 1 to 7).

On the subject of reserved flow management for fishing, the panel recognizes that the proponent has tried to reconcile the interests of the various users of the Moisie River by proposing regulated flows that take into account the optimal fishing conditions and fishing periods for each group of users.

Fishing conditions are closely tied to river flow conditions, particularly above salmon pools, as was explained by participants:

One thing is indispensable in order to take salmon on the Moisie River: the current speed on the pools you are using. Our experience has shown that with weak flows, the salmon are rarer in the pools and it is almost impossible to catch them.

(Brief by the "Association des gestionnaires de la rivière Moisie", p. 10)

Apparently, the proponent did not carry out detailed studies on the hydraulic conditions of these pools, which makes it difficult to extrapolate these conditions for a different flow system. The proponent does not even seem to be sure of the exact location of these pools.

The proponent made only a vague inventory of our pools, and in no way studied them to assess the impacts on each territory.

(Brief by the "Association des gestionnaires de la rivière Moisie", p. 14)

The panel also studied the hydrographs of the Taoti site and the mouth of the Moisie River produced using the principles of regulated flow management. The examination revealed that at the Taoti site during the summer period, the addition of regulated flow for fishing caused "jumps" in the hydrograph that stray considerably from natural flow conditions. This behaviour is particularly evident for simulated hydrographs of the years 1989, 1987, 1985, 1977, 1976, 1967 and 1959. The presence of these jumps seems to diminish downriver, due to the dispersion of the volume of water released in the river, and disappears completely in the Moisie estuary, as we see in the hydrographs of the impact statement, part 7 (annex F). As the hydrographs were not available in several places between these two sections, the panel was not able to examine them. However, it is expected that sites upstream would have more distorted hydrographs than those downstream. Knowing the importance of water level fluctuations on fishing levels, one wonders what the impact of the jumps in the hydrograph will have on the success of fishing, and whether it is possible that all users can be equally satisfied. The effect of these points on salmon functions is also unknown.

Lastly, the behaviour of the salmon under rapid variations in water temperature was not documented, although studies showed that salmon have particular thermic requirements throughout the various phases of their life

cycle (technical document 109). It is thus possible that the regular variations in temperature caused by the regulated flows will cause changes in salmon behaviour, modifying the quality of the fishing activity.

For example, spawning run peaks for the parent fish occur when the water temperature is between 10 and 14 degrees Celsius (technical document 109, p. 17). The proponent's studies showed that diversion with regulated flow could lead to daily fluctuations of temperature that in certain cases could be as much as 3 to 5 degrees Celsius (Environmental Impact Statement, supplement 1, chapter 1, p. 43).

The probable economic losses described by certain outfitters, and particularly by the Moisie-Nipissis fishing camp, were examined by the panel. The proponent affirmed in the impact statement (part 7, p. 94) that the range of flows in which salmon are caught in the Crans Serrés pool is between 300 and 450 m³/s. According to data provided by the camp, a total of only nine salmon have been caught over six years when flows were inferior to 450 m³/s. The regulated flows for fishing will apparently be insufficient for the maintenance of the quality of fishing in this camp, and it is not impossible that the quality of the other camps will decrease as well.

Other uncertainties remain concerning the management of regulated flows in winter, when they must travel over 3 km of dry river bed, and on the risks of the formation of ice jams or frazil (needle ice) in the Moisie, which could be damaging for the spawning beds. In the hearings, the proponent explained that the formation of ice cover in the Moisie River is accompanied by a rise in the level and that this elevation allows for the irrigation of the spawning beds. However, the behaviour of the ice cover during a reduction of flow or the addition of water was not made clear. Due to these uncertainties, the panel believes that the problem of ice cover dynamics has not been sufficiently examined by the proponent for a guarantee that management would not affect the salmon resource, even though certain elements, such as the fact that the flows released in the winter would be practically constant, suggest that the formation of ice jams would not be a major problem.

Last, the panel looked at the techniques used by the proponent to generate the 33 years of daily flows at the Taoti site under natural flow conditions and with the diversion. These flows were calculated on the basis of the flows at the MENVIQ station 072301 in the Moisie estuary. The principal technique consisted in "transposing" the daily flows of station 072301 onto the Taoti

site using “transposition factors” (Environmental Impact Statement, part 7, p. 23). These factors were obtained from the area of the basins at station 072301 and the Taoti site and the distribution of precipitation on the Moisie watershed. Although current hydrology statistics techniques were used, the panel questions the exactitude of the flows generated, which were not provided by the proponent. Several elements can introduce errors into calculated values, including the absence of a perfect correlation between the Taoti site and station 072301. As well, the transposition factors are flawed by errors, whose seriousness will depend on the hydrological behaviour of the Moisie basin and the realism of the precipitation distribution retained for the calculations. It is not impossible at this stage that errors in the flows calculated at the Taoti site, if they prove to be significant, could lead to a review of the regulated flow values for the salmon and fishing activities. In order to obtain the precipitation distribution, the proponent used the data from the weather stations of Sept-Îles and Wabush, which is not really adequate to describe the weather conditions on the Moisie watershed.

No Comparable Examples

Among the examples of river diversion provided by the proponent, that of the Cheticamp River in Nova Scotia tends to demonstrate the success of regulated flows as a mitigation measure for a diversion. However, the panel believes that it would be difficult to transpose the results of the development of the Cheticamp River onto that of the Moisie River. Firstly, the Cheticamp is a river with a modest flow that is sixty times less than that of the Moisie River in summer. As well, the regulated flows on the Cheticamp River were on average more than 100 times less between 1978 and 1987 than those planned for the aux Pékans River. Moreover, the migratory distance for the salmon of the Cheticamp River is only 16 km, as compared with the 266 km travelled by the Moisie River salmon. Furthermore, the increases in catches and salmon stock after the diversion on the Cheticamp River are not significant.

In the case of the Koksoak River in Quebec, the monitoring of salmon fishing returns over a five-year period following the diversion of the Caniapiscou River have not shown a change in the harvest, according to the proponent. However, according to Mr. Mario St-Pierre of the MLCP, “a post-diversion monitoring of five years is very short, too short, with respect to the life cycle of the Koksoak salmon (Mr. Mario St-Pierre, transcript,

part 1, February 10, 1993, evening, p. 133) for a decision on the lack of impact of the diversion on the salmon stock of this river. The life cycle of the Koksoak salmon is between seven and nine years.

The last example given by the proponent was that of the Snake River in Idaho. This river has an annual mean flow of 575 m³/s, which is higher than the Moisie River's annual mean flow of 436 m³/s. According to the proponent, the regulated flows are the same for both rivers. However, a recent review of the scientific documentation shows that the salmonid populations of the Snake River have dropped considerably, certain salmon stocks have disappeared, and others are endangered. (Nielsen et al, 1991; Chapman et al, 1991; Collins et al, 1975).

Irreversible Losses

According to the proponent, risk assessment and management would guarantee that the salmon of the Moisie River would not be at risk. The panel wishes to point out that the mere act of pushing studies to the limits of our current knowledge is not enough to reduce the risk for the salmon to an acceptable level. SM-3 provides a good example of this situation. Additional information on the salmon of the Moisie River led the proponent to review the conclusions of its initial studies on habitat losses caused by the diversion (Brief by the Atlantic Salmon Federation, p. 4). For the panel, the reduction of the risk to a level that could be called acceptable must include an assessment of this risk followed by the identification of more effective means for its reduction. In view of the importance of the issues linked to the resource, the risk will have to be extremely low.

The first step in assessing the risk consists in knowing the basic state of the salmon and the physico-chemical, biological and ecological characteristics of the river. In this respect, the proponent's impact statement is deficient. No information is provided on the principal ecosystems of the Moisie River or on the factors that ensure their quality and productivity. We find no information on the species that feed the salmon, nor on those which compete with them or prey on them, and whose state could be affected by the proponent's action. These elements, and several others, are part of the salmon habitat and have not been incorporated in the proponent's definition.

With respect to the salmon themselves, certain aspects of the life cycle were not examined. The proponent did not study the problem of the return of parent fish to the native river and the factors which guide them. As was mentioned in the hearings, it is possible that the introduction of water from the Moisie basin into the Sainte-Marguerite estuary could constitute an undesirable "element of attraction". As well, the introduction of ouananiche, a freshwater salmon, into the Sainte-Marguerite basin could provide yet another attraction for the migrating salmon in this same estuary.

Even though the proponent began its studies of the Moisie River salmon in 1987 and a considerable amount of data has been collected on the various phases of its life cycle, it was only in 1992 that the first reliable data on the adult salmon populations were obtained. If we consider that the year 1992 marks the beginning of the acquisition of data on a salmon life cycle, the collection of basic data will not be completed until 1999, or the end of a cycle. It thus appears highly unlikely to the panel that the original status of the Moisie salmon would be very well known at the beginning of the Carheil - aux Pékans diversion, which is set for 1997.

However, if basic data on the Moisie salmon were available for 1997 and data analysis showed impacts that had not appeared in the preliminary studies, would the salmon be endangered? The ASF believes so:

It is our opinion that to undertake the construction of diversion structures at the same time as determining existing conditions carries a significant risk for the salmon population of the Moisie River. If unacceptable, unmitigatable risks appear once billions of dollars have already been invested in the construction, a decision to alter or abandon the project would be, in our opinion, impossible. In the case of a conflict, the salmon will lose out.

(Brief by the Atlantic Salmon Federation, p. 10)

Questioned on the subject of procedures that could be set up to protect the salmon, a MENVIQ representative mentioned that the Council of Ministers' decree by virtue of section 31.5 of the Quality of the Environment Act could include conditions allowing for structure adjustments. However, the readjustments would not be extensive:

On the issue of monitoring, we could find that certain aspects, for example the regulated flow at a given point in the river, do not

correspond to the modelling forecast in the impact statement, and that losses are being observed in salmon levels. At that point, we could change certain aspects of the decision. The decree, with its conditions, could be modified. If the decision-maker has the power to issue an authorization, he also has the power to modify it. There could be some adjustments; but I am not talking about a major readjustment that would result in the project no longer resembling the original version submitted to public consultation.

(Mr. Gilles Brunet, transcript, part 1, February 3, 1993, evening, pp. 69 and 70)

The panel considers that changes in the regulated flows and the management principles of these flows remains the principal, if not the only, readjustment for reducing the risks and uncertainties associated with the diversion. The role of a monitoring committee would be to act in an advisory capacity for the application of this measure. However, the panel remains concerned as to the real possibility of reducing the risks.

First of all, the proponent explained that the aux Pékans reservoir, with the existing management principles, has a sufficient capacity to increase the regulated flow during low water level periods without draining the reservoir. However, no real analysis was carried out to verify this flexibility under other management scenarios. For the panel, the latitude for countering unexpected effects on the salmon seems very narrow, consisting in either a reduction or an increase of the regulated flow during low water level periods. This scenario assumes that the low water level flows control the salmon populations in the Moisie River. The scientific committee has voiced the opinion that on the Moisie River the minimum flow, during a period of 15 consecutive days, is a determining factor for the salmon populations. According to Mr. Yvon Côté, an MLCP biologist and member of the scientific committee on the Moisie River salmon, other flows are important for the life of the salmon as well, and it is possible that the spates may play an important biological role (Mr. Yvon Côté, transcript, part 1, February 11, 1993, afternoon, pp. 45 and 46). For example, it is plausible that spates may offset the progressive accumulation of sediments which could fill in the spawning beds. According to the proponent, the regulated flows would cancel out significant habitat losses. If, however, the losses were qualitative, the regulated flow management principles during the spring spates and weaker summer spates would have to be reviewed. For the panel, the exhaustive analysis of regulated flow management remains to be carried out.

Further, the decision to reverse flow management systems presupposes that the impact noted on the salmon would be reversible. Yet the ASF is concerned that certain impacts would be irreversible:

It is the opinion of John Bailey, a geneticist with the Atlantic Salmon Federation, that a change in the flow management system of the Moisie River could have an irreversible impact on its salmon population. The question is not only whether there will be salmon in the river, but whether the Moisie River will maintain its famous spawning run of large salmon.

(Brief by the Atlantic Salmon Federation, p. 7)

Due to gaps in the knowledge of the Moisie River and its salmon, the possibility of irreversible impacts caused by flow changes and the uncertainty as to the management of the regulated flow, the panel feels that it is not possible at this point to predict with any degree of certainty the effects of the diversion on salmon behaviour, stock development and fishing harvests.

An Inordinate Risk

In conclusion, the panel agrees with the opinion voiced by the scientific committee on the Moisie River salmon; the idea of controlled flows represents an interesting approach for mitigating the impacts of the diversion on the salmon and on users of the Moisie River. However, there are still a number of uncertainties as to the expected performance of this measure.

First of all, the examination of the cases of the Cheticamp and Koksoak rivers shows that the data collected before and after their diversion does not allow us to conclude that this method of management had either positive or negative effects. Significant natural variations in the stocks and relatively restricted data bases make it impossible to draw any real conclusion. As well, the severe decline in salmon stocks in the Snake River leads us to question the performance of regulated flow in mitigating the impacts of hydroelectric plants.

Further, even though the choice of the Taoti site was made with the help of scientific experts, there remain questions as to its representativeness and the

assurance that regulated flow management according to this test site would cancel out the risk of any habitat loss. A detailed knowledge of the distribution and density of alevins and parrs seems essential for the evaluation of habitat loss on the entire portion of the Moisie basin affected by the project.

Regulated flow management in winter, in the opinion of the panel, did not receive the examination it should have received. The panel does not share the proponent's optimism regarding winter management of regulated flow and its impacts on the salmon. The potential affects of the drying out of a section of the aux Pékans River should be the object of careful assessments. The possibility of maintaining a minimal regulated flow during the entire winter season could be a possible solution to potential problems relating to bringing water to the Moisie River. Obviously, the effectiveness and profitability of this measure remain to be verified.

The indications given by those participants who are directly concerned suggest that regulated flow management for fishing could benefit some users at the expense of others. Consequently, the proponent should review the option that has been retained. This would require a greater awareness of the possible impacts of diversion and regulated flow on the quality of the fishing. On this matter, the proponent should work with the managers of the Moisie River to complete the inventory and carry out hydraulic studies of the salmon pools, in addition to clarifying salmon behaviour during rapid flow variations.

The proponent should also ensure that the assumptions underlying the application of the IFIM method are verified at the sites that were studied, incorporate microhabitat variables into its modelling, and carry out an on-site verification of the applications of the approach.

Given the importance of the salmon resource of the Moisie River, the panel feels it would be wise to know the basic state of the river before coming to a decision on the diversion. This basic state would include a knowledge of the genetics and microhabitat of the salmon, as well as the different biological cycles which characterize the river, including those of other species of fish. In the event a change in salmon stocks or fishing harvests is noted and the basic state is not yet well known, it would be extremely difficult to attribute this change to any specific cause, including the regulated flow, as was

pointed out by the ASF. The question that was raised in the hearings remains: who would be responsible for the scientific proof as to whether the observed changes can be attributed to the diversion?

All participants in the hearings agreed that the environmental acceptability of the project would consist above all in the protection of the salmon resource. This presupposes that the monitoring program would be designed in such a way that any change in the salmon stock could be assessed, and the cause identified with respect to the diversion. According to the ASF:

[...] an independent assessment of the natural variability allowing for the differentiation between natural impacts and those caused by the change can be established by correlating the biological profiles of the Moisie River salmon with those of other rivers of the North Shore during the period preceding the priming of the reservoirs, and by following the natural profiles in these rivers after priming.

(Brief by the Atlantic Salmon Federation, p. 10)

Secondly, priority on the Moisie River must be given to the salmon and not to hydroelectric development. To guarantee this priority, the panel believes that a monitoring committee with advisory powers would be inadequate, for the proponent would not be obliged to follow its recommendations. Consequently, this committee should also be given the power to have the monitoring and mitigation measures that are set out in the governmental decree enforced, along with any other measure or research judged necessary with respect to the development of the salmon resource, including returning the river to its natural state. The applied research group on macroecology was quite adamant on this subject:

But if the environmental monitoring of the species indicates that the risk is greater than was anticipated, Hydro-Québec should accept — and the government should so oblige it in its decree — to return the necessary flow to the salmon, even if this means a significant decrease in the power and profits generated by the hydroelectric development.

(Brief by the Applied Research Group on Macroecology, p. 4)

The panel noted that the development project as currently planned does not allow for a complete return to natural conditions, since the capacity of the regulating structure, which is 120 m³/s, is inferior to the maximum flow

during the spring spate, which is 200 m³/s. Moreover, the maximum capacity of the structure, when the aux Pékans reservoir is full, is inferior to the spate flow which is likely to occur on average once every two years. The very design of the structure should be reviewed.

The panel also believes that the executive power of the monitoring committee should be accompanied by the legal power to enforce its decisions, in accordance with the suggestions of a private agreement of the FQSA. It would also be a good idea to harmonize this agreement with the existing national regulations and the international agreement on Atlantic salmon which Canada has signed.

The panel recognizes that these are measures and undertakings which could be costly, adding to the already projected cost of the diversion structures, the salmon monitoring and regulated flow management. However, the Atlantic salmon of the Moisie River is a unique renewable resource whose sport value is estimated at \$7.75 million per year. Added to this assessment is the as-yet unestimated value of the salmon as a source of subsistence and cultural symbol for the Montagnais, the value of other recreational uses of the Moisie River such as canoe camping, and the intrinsic value of the river. The panel believes that the salmon should be considered one of the elements that give the Moisie River its unique character as one of the exceptional and accessible great rivers of Quebec that has not yet been the subject of major alterations, and which is internationally recognized. The Panel believes that this unique character justifies using every possible means to preserve both the river and its salmon for future generations.

Chapter 6

The Development of the Communities in the Area

The impacts of the SM-3 project on the activities and development of communities in the area, and specifically on Native communities, is one of the major environmental issues of the project. Debate on the social and human impacts continually returned to current uses of the land and the disturbances that would result from the project. Questions relating to Native communities were raised not only by their representatives, but also by several participants from the North Shore, Quebec and even the United States.

In this chapter we present and analyze more specifically the impacts of the project on the traditional activities of the Montagnais communities. The consequences of the development of a project on this scale are examined in relation to the land claims of the Montagnais, the use of resources and the occupation of the area concerned. Throughout, the panel examines the importance of maintaining the culture and traditional activities of the Native communities, as well as ways of harmonizing the various development visions of the region affected by the project.

The Lifestyle and Activities of the Natives

The impact of the hydroelectric development project on the lifestyle and traditional activities of the Montagnais with respect to the Sainte-Marguerite and Moisie river basins was very much in the forefront at the public hearings.

Present and Active on the Territory

A brief summary of the studies carried out on the Native communities for the proponent enables us to obtain an historical overview. The Montagnais community of the Sept-Îles region lives on two reserves: Uashat, west of the city, and Maliotenam, 16 km to the east. This community groups several families who were historically separated. Around 1920, the families that hunted and fished the basins of the Sainte-Marguerite River were grouped within the bay of Sept-Îles, and those hunting and fishing in the Moisie River basins were located in the village of Moisie. In 1952, the federal government ordered the displacement of the Moisie Montagnais to the current site of the village of Maliotenam. Despite the government's attempt to group the Sept-Îles band and the Moisie band on the current site of Maliotenam, the Montagnais in Sept-Îles resisted. In 1962, due to pressure caused by the expansion of Sept-Îles, a reserve was created at Uashat.

The waterways formed by the Sainte-Marguerite and the Moisie Rivers have helped maintain a vast network of social relations between the bands in the constitution of hunting groups, for example, or through marriage. This phenomenon can still be observed today (technical document 505, p. 16). As well, the Moisie River has been the centre of traditional activities for Montagnais bands, and continues today to serve as a gathering place for activities such as salmon fishing in the Moisie ZEC (technical document 506, p. 68).

In 1991, there were 2,560 persons living either on or off the reserves in the community (Native Affairs Secretariat, 1992). Only one band council is recognized by the governments, even though the creation of a distinct band council for each reserve was accepted in a referendum in the community. In the community of Maliotenam, near the Moisie River, there are many

traditionalists working to maintain or return to ancestral values and lifestyles. The community of Matimékosh, some 500 km north of Sept-Îles, is also affected by the project, since the Montagnais in this region have for centuries worked the territories extending from Sept-Îles to Schefferville.

The presentation made to the Royal Commission on Aboriginal Peoples (Royal Commission on Aboriginal Peoples, November 1992) showed that some twenty families from Uashat and Maliotenam live by traditional activities and that the majority hunt and fish periodically. A study filed by Hydro-Québec (filed document A42) describes these activities by season within the assessment zone of the project. The spring hunt for migratory birds takes place along the coast and on the inland plains. Summer fishing for trout, salmon and cod takes place on the lakes, rivers and gulf. Fishing goes on year round, with the sites changing depending on the species sought. In the fall, small and big game hunting is practised on the lands of the continental basin. Winter is the season for trapping and big game hunting. The products of the hunting and fishing activities are distributed within the community.

The Montagnais have practised subsistence salmon fishing in the Moisie River for centuries. This activity was gradually reduced with the arrival in the 19th century of operators and businesses from outside the region (technical document 504). In the 20th century, commercial salmon operations were gradually replaced by sport fishing reserved for those holding the licenses. Today, several Montagnais frequent the Moisie ZEC and practice line fishing there. Fishermen licensed by the band council practise netfishing, and four nets can be positioned in sectors of the river they have been given near the mouth (technical document 508, p. 2). The salmon that are caught are the property of the band council, which oversees their distribution in the community.

For eleven years, the Nutshimiu Atusseun Centre has offered training for young people who wish to practice traditional activities, particularly in the forest where elders act as instructors and guides. This acquisition of the knowledge and skills of the elders has to date enabled 400 young people from the community to go back to the roots of Amerindian culture and rediscover their Montagnais identity. At the November 19, 1992, hearing of the Royal Commission on Aboriginal Peoples held in Uashat, the Centre

officials also mentioned the role it plays in training young people seeking employment, and the difficulties in having its training programs recognized by government agencies.

Impacts on Montagnais Activities

Parts 4, 5 and 6 of the Environmental Impact Statement describe the environment, the project's impacts and the mitigating measures. However, they provide few details on the Montagnais presence and activities in the area, or on the project's effects on the Montagnais. Moreover, this information is scattered throughout the Environmental Impact Statement, which makes it difficult to carry out a complete assessment of the impacts of the project on the Natives.

Supplementary information provided by Hydro-Québec (Environmental Impact Statement, supplement 1, section 2) gives some information about caribou hunting, salmon fishing and trapping by community members, as well as on the economic contribution of these activities. We also find two maps on the use of the land by Natives and on the archaeological potential of the Sainte-Marguerite River. The Environmental Impact Statement is still incomplete on this topic, however. These gaps were pointed out by the MENVIQ in the analysis of conformity:

The lack of information on the effects of the project on the culture, the economy and the use of the land as well as the far too excessive compartmentalization in identifying the elements of the environment and the related impacts prevents us from judging the scope and significance of the impacts of the Sainte-Marguerite project on the Montagnais communities of Uashat and Maliotenam. The presentation of an overall portrait of the repercussions on the Montagnais communities would give us the true impact of the Sainte-Marguerite project.

(Analysis of conformity report, MENVIQ, p. 14)

Part 5 of the Environmental Impact Statement localizes these various impacts and describes them (part 5, pp. 75 to 161): activities that are “disturbed” or “perturbed” by the access road, the “destruction” of strategic campsites, the “disturbance” of heritage spaces, “hazardous” driving on the

access road. Supplements to the Environmental Impact Statement add little to these assessments, despite the existence of documents known to the proponent that respond to questions of the MENVIQ (Environmental Impact Statement, supplement 2, p. 7). According to Hydro-Québec, some of those documents were not available in their final version at the time the Environmental Impact Statement was submitted because they had not been approved by the CAM; their contents were therefore not included in the report on the project's impact assessment.

The project is located within the Saguenay beaver reserve. With an area of 140,000 km², it counts 121 traplines operated by the Montagnais, 78 of which are the responsibility of inhabitants of the Uashat and Maliotenam reserves. Among these 78 lots, 21 are in Labrador (filed document A42, pp. 208 and 209). The Sept-Îles division counts 96 traplines spread over 113,131 km² (technical document 505, p. 29), 11 of which would be directly affected by SM-3, with 192 potential users.

Not until the public hearing did the proponent file a document that succinctly described the principal effects of the project on the Natives: the disturbance of traditional activities, risks of exposure to methylmercury, the disturbance of 11 traplines, the loss of 19 identified campsites, improved access to the territory but loss of its control, competition for the fauna between Native hunters and others, and the loss of the two extremities of Grand Portage and of areas with archaeological potential (filed document A58).

Despite the delay in the final publication of technical reports, which was condemned by the Native representatives and hard for the panel to understand, these studies, combined with those carried out previously for the proponent, are detailed and very useful for a knowledge of the project's effects. They give a good picture of the current methods of operation and use of the territory by Montagnais populations (technical documents, series 500). The documents also give a background on the use of the territory and the development of Sept-Îles. Hundreds of Montagnais place names for the various locations are indexed, along with more than 350 identified campsites. Inventories of the territory's archaeological potential are included, as is a study on the history of the Moisie River salmon fishing operation.

These studies also describe the impacts in the sectors affected by the project, on the basis of a knowledge of the activities practised there by the Montagnais. During the construction phase, the presence of work camps, displacement of the fauna, drying out of sections of the rivers and priming of the reservoirs would have a direct impact on the best Montagnais sites for camping, hunting and fishing, and would bring increased pressure to bear on the available wildlife resources. During the operation, on a permanent basis, the project's repercussions would be due to road access to the area for new wildlife, forestry and mining operations. Montagnais activities, traplines and the Nutshimiu Atusseun training centre would be disrupted.

According to the same study, three priority fishing zones would be affected. Two of these are well-known lake trout waters, a section of the Garemand stream in the basin of the Sainte-Marguerite River, and Lake aux Cèdres and Lake Gras, where the Nutshimiu Atusseun centre has set up base camps. The other sensitive zone is the region immediately above and below the Grand Portage rapids, where families hunting or travelling in the sector fish for trout (filed document A42, pp. 204 and 205).

On these questions, the concerns of the Natives were presented by several participants, the principal organizations being the Uashat-Maliotenam Band Council, the official representative of the Montagnais reserve, and the CAM, which represents three Atikamekw communities and nine Montagnais communities and is the spokesperson for both nations in negotiations with the Quebec and Canadian governments. During the public hearings, the panel also heard from the Nitassinan Coalition, which filed a brief on behalf of the traditionalists of the community. Business people, a labourer and a Native rights specialist also gave their views on the project. Other non-Native sympathizers, some of American origin, supported the Montagnais positions and particularly those of the Nitassinan Coalition.

The absence of a specific chapter on the Natives in the Environmental Impact Statement was vehemently condemned by the CAM and the Conseil de bande. For them, this type of treatment reflects the lack of consideration given to the Montagnais by the proponent:

Finally, in the presentation of its study, the proponent chose to devote a separate section to the impacts on the salmon, which is a major issue, but not on the impacts on the Montagnais, another major

issue. [...] We condemn this decision by Hydro-Québec, for the current organization of analyzed data allows neither us nor any other reader to come to a comprehensive understanding of the impacts of the various elements of the project on the Innu territories, activities and communities affected.

(Brief by Takuaiikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, pp. 14 and 15).

The Natives nonetheless acknowledge that they have the necessary elements from other sources to do their own assessment of the project, which they did during the public hearings:

Despite this, thanks to the joint scientific committee, we have far more detailed information than was available during the hearings on the projects of Lac Robertson and the Radisson-Nicolet-Des Cantons line. Based on the various studies carried out by the proponent on the archaeology, the history of our presence on the Moisie River, the use of the territory and the socio-economic impacts, and our knowledge and information, we can make our own assessment of the impacts of the SM-3 project on our traditional activities, our economy, our communities and our culture.

(Brief by Takuaiikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 51).

In view of the absence of an integrated and comprehensive treatment of the impacts on the Montagnais community in the Environmental Impact Statement, the panel reconstituted a consolidated presentation of these impacts on the basis of information obtained in its inquiry and during the hearings, looking at the cultural and social impacts and the cumulative effects. Figure 11 shows the known sites of occupation by the Montagnais and the Nutshimiu Atusseun training centre. However, data for the Moisie basin are only partial.

Impacts On Montagnais Culture

The impacts of the project on the ancestral way of life of the Montagnais constitute one of the reasons for opposing the project. Effects on their way of life would be significant:

To destroy their hunting and fishing lands, their forests, irreplaceable sources of medicine, inseparable elements of their way of life, to do away with their sacred ancestral sites, their cemeteries and historical gathering places that retain relics bearing witness to their history, would, among other consequences, constitute a new attack upon the integrity of the Native peoples that would add to the long and tragic list of crimes perpetrated against them since Europeans first arrived on this continent [...].

(Brief by the "Conseil des femmes sur l'environnement", pp. 2 and 3).

For the Innu people, the different forms of life present on Nitassinan are contained within a circle that binds them in an interdependent relationship with one another. Thus the Innu people's right to exist cannot be detached from our links with the various life forms. [...] This attitude of the Innu towards our Mother Earth is poorly understood by Hydro-Québec, the governments, and whites in general. Or perhaps it is that they do not want to understand our relationship with Mother Earth?

(Brief by the Nitassinan Coalition, p. 3)

Although the way of life and use of the territory have changed over the years, seasonal schedules still persist. The feeling of belonging to the territory remains very strong:

Even if current practices on the territory are characterized by an intermittent occupancy, the Montagnais continue to maintain close ties and a strong sense of identification with the territory. This sense of belonging and knowledge of the land that accompanies it constitute the essence and the originality of this culture.

(technical document 506, p. 71)

Source: Adapted from Environmental Impact Statement, supplement 1, appendix i, map 1, and the MLCP beaver reserves map

The primary relationship between the Montagnais and the hunting grounds is expressed in terms of responsibility, mastery and control, rather than the idea of ownership:

For in the Innu universe, the question of the earth is not really a question of ownership, but rather a question of being able to live with the earth so that we can continue our relationship with the earth and our heritage.

(Brief by Mr. Armand Mckenzie, p. 3, French version)

When we speak of land, we are not speaking of ownership [...]. We are speaking of the consequences of the development of our ancestral land on our heritage overall, on the traditional way of life that is still practised to a significant extent by the members of our nation, on the territory that is a source of succour for several of our young people, who find it a source of peace, a source of individual and community well-being, of intense spiritual life, of understanding of their culture and their value as humans and as Innu.

The loss of an important part of our ancestral land and the general pressure caused by the opening up of the land to public access could constitute the loss of the heritage value of a land area which is the seat of our language and our culture.

(Brief by Innu Takuaikan Uashat mak Mani-Utenam, pp. 33 and 34)

The collected testimony makes it possible to determine the impacts on ancestral values. Thus the lack of ethical behaviour toward the elders with regard to ensuring the transmission of the hunting ground and its developments to their descendants in the same state as the previous users had left it would be sorely felt by the persons whose hunting grounds would be affected. It is more than a delineated territory that is at stake: it is a space developed and frequented by successive generations with its own installations, infrastructures (portages, paths, rest areas, cache sites, campsites), axes of circulation and defined operating areas for the capture of various species.

Moreover, in the opinion of the Natives, the transformation of “two of the most beautiful rivers” of the territory (Brief by Takuaikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 20) constitutes a major impact. For the Montagnais, the rivers occupy not only a

major place as principal lines of communications and as sources of sustenance, they also represent a meeting ground. The meeting that takes place each summer at the mouth of the Moisie River plays a role in contributing to subsistence and represents a cultural event.

The increased activities of other occupants of the territory and the perturbations they would represent for the activities of the Natives give rise to a sentiment of dispossession of an ancestral heritage, invasion of sacred sites and of being driven toward more isolated, less productive lands:

The opening of the territory and the invasion of our ancestral lands by a horde of hunters, fishers, outfitters, tourists, vacationers and operators of all kinds would signal a new dispossession. This is what we have already experienced in the past in the basins of the Péribonca, Bersimis, aux Outardes and Manicouagan rivers.

(Brief by Takuaikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, pp. 49 and 50)

This cultural loss is aggravated by the upheavals the project would bring to bear on the Nutshimiu Atusseun training centre, one of the symbols of a return to traditional Montagnais culture. The proponent notes that the activities of the centre would be affected because two of the main campsites they are based in would be flooded and about ten of the 26 locations used are located in proximity to zones that would possibly be submerged (Environmental Impact Statement, supplement 1, pp. 2 to 10). It proposes compensation and assistance in finding replacement sites as compensatory measures. The Montagnais are not enthusiastic about this suggestion:

They can always say to us, like for the wildlife, that we just have to move our activities elsewhere, but other sites could already be in use or could not be of a good enough quality to sustain a significant number of users. For us, the current operation of the Centre is satisfactory and preferable to any alternative solution which would be just a stopgap measure, such as the compensations suggested by Hydro-Québec.

(Brief by Takuaikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, pp. 53 and 54)

For the panel, even if the displacement of activities toward other sites were an option, the sites currently chosen for their wildlife and cultural value

could not easily be replaced since we are talking about the “living heritage” of ancestral activities. The mitigation measure proposed by the proponent is unsatisfactory, for there are limitations in its ability to compensate for the upheaval caused by the project.

This question relates to the problem of control of the territory and the overall compensation to Montagnais communities which will be examined later in this chapter.

Socio-Political Impacts

The diversity of users of the territory is expressed in the ethnicity of the belonging to a region (filed document A27, p. 61). Two distinct groups are present on the territory. First are the Natives. The rest of the population comes mainly from fishing families that occupied the North Shore before 1850 and from miners and loggers who came to the region after 1950.

According to the Urbanex study (filed document A27), trappers seem to be the most actively involved in fishing, hunting (small and large game), trapping and vacation activities. These activities are practised in a deliberate choice to live in the woods, which is an integral part of the Quebec psyche, rather than as a true source of profit.

The same study reveals that conflicts between users of the territory already exist, first in social relations, where a good part of the problem “lies with the white users” due to their “lack of understanding of the Montagnais cycles in using the space” (filed document A27, p. 63). Several sources of misunderstanding were identified, for example, between the trappers and the members of the Matimek ZEC. The problems are also expressed through dissatisfaction with the MLCP policy which favours permanent and occasional rivalry in the exploitation of resources, thus compromising the conservation of the most profitable species.

Over the years, certain measures of harmonizing the exploitation of resources have had to be developed, such as the regulation of beaver reserves and the MLCP policy on fur trapping (technical document 501, pp. 132 to 140).

The project's arrival on land frequented by successive generations of Montagnais and its impacts on their traditional activities would create new tensions both within the Montagnais communities and between them and the new occupants of the territory, whether they be temporary, such as the construction workers, or permanent, as in the case of the operators of new wildlife, forestry or mining activities.

The divisions and internal disruptions of the communities are pointed out by the Natives themselves:

As we know, the intense debate that SM-3 has provoked between us is the cause of severe political dissent and a movement of secession. Our social fabric is currently being sorely tried [...]. What will happen to it if the project goes through? We dare not even imagine.
(Brief by Takuaikan Uashat mak Mani-Utenam and the "Conseil des Atikamekw et des Montagnais", pp. 56 and 57)

The assessment of the project's social and economic impacts on the Montagnais community identified three major elements linked to the territory: access, management and use (filed document A42, p. 216 and following). Among the principal social impacts of the new use assigned to a portion of the territory by the SM-3 project, the study underlines the destabilization of relations within families, between Native communities, and between the Native occupants and new arrivals on the land. The tensions and conflicts that are anticipated if the project goes through are already present in the region and coloured the debate on the project.

The project's impacts on Native communities reveals an international dimension as well. The attention given to Native issues on the world scene has influenced the behaviour of those involved in the debate on SM-3 and affects the possibilities of reconciling respective groups' interests and activities.

The American debate on the need for energy from Quebec was echoed in the public hearings. In their briefs, groups from the United States or from other Canadian provinces expressed their sympathy with the Montagnais position.

To deprive the Natives of their way of life and their traditions is unacceptable.
(Brief by the Vermont Sierra Club, p. 2)

Although the final goal of this project is to ensure a sustainable future for citizens of the province, it must not be attained at the price of the elimination of a race, its heritage and its way of life.

(Brief by Wabanaki Cultural Resource Center, p. 2)

These groups also stated their doubts about energy requirements, their opposition to imports of Quebec electricity and their fears concerning the environmental and social effects of the project. These points, developed in Chapter 8, contributed to the deterioration of the regional social climate and provoked a reaction within certain organizations, including the Applied Research Group on Macroecology, which protested “the lies which are becoming international references” (Brief by the Applied Research Group on Macroecology, appendix, p. 42).

Cumulative Effects

The successive impacts of plants and reservoirs on the Montagnais way of life were virtually ignored in the Environmental Impact Statement. For the Montagnais, the question of cumulative impacts is very important:

If we do not look at the impacts of the various developments on a territory and if we are not aware of the history of isolating the Innu, how can we be aware of and understand the truth about our environment and our culture?

(Brief by Innu TakuaiKAN Uashat mak Mani-Utenam, p. 25)

In the 1980s, Hydro-Québec undertook a research program in an attempt to determine the influence of developments of the basins of the principal rivers of the North Shore on the estuary and the Gulf of St. Lawrence (technical documents 701 and 400). However, these studies covered only the biophysical aspects of the problem of regulating the St. Lawrence basin, and will be discussed in the following chapter.

During the hearings, the panel tried to reconstitute the elements of an examination of the cumulative effects of the existing Hydro-Québec developments, hydroelectric dams and power lines, in a portion of the territory that is the subject of Montagnais claims: the Bersimis beaver reserve, adjacent to the Saguenay reserve where the Sainte-Marguerite

project is located. Although the exercise was only partial and requires validation, it was carried out to demonstrate the possibility, within reasonable time periods and with modest means, of recording cumulative effects in the examination of development projects on land subject to claims.

In 1980, a scientific consultant carried out an exercise for the CAM recording the effects of past and future hydroelectric developments by Hydro-Québec on lands used by the Atikamekw and the Montagnais of Bersimis (Charest, 1980). The study showed the consequences of 11 plants and 4 reservoirs existing on the Bersimis, aux Outardes and Manicouagan rivers, with an estimated total area of 3,717 km², belonging to Hydro-Québec, Quebec North Shore and Quebec Cartier Mining:

The ecological upheavals for Montagnais hunting grounds affected by the dams and reservoirs have been numerous and have affected both the aquatic and terrestrial ecosystems.
(Charest, 1980, p. 328)

The impacts of major hydrological modifications to waterways were translated by the modification of the migratory and alimentary patterns of the species affected and by the disappearance of species such as the Atlantic salmon in the Bersimis River. Referring to future Hydro-Québec projects, the author is concerned by the practice of approaching the development of the rivers of the middle and lower North Shore “drainage basin by drainage basin” (Charest, 1980, p. 334).

More recent data on the cumulative effects of existing projects on the Montagnais community were provided at the request of the panel by Hydro-Québec (filed document A83). The current installations represent the harnessing of 5 rivers by 11 dams. The reservoirs and power lines in the region affect at least 47 traplines out of a total of 87 in the Bersimis beaver reserve.

Hydro-Québec pointed out that for the most part, these lines are affected over less than 10% of their respective areas. The hunting grounds, according to Charest (1980, pp. 329 and 330), were nonetheless abandoned because they are flooded and difficult to access, or less attractive for a variety of reasons including water level variations and the lower productivity of the aquatic environment.

Other studies carried out for Hydro-Québec gave comparative bases for the assessment of the impact of future projects as well as data for the measurement of cumulative effects. An impact assessment of the Manic-Outardes project on the human environment, including the construction of roads, three temporary villages and a quay in Baie-Comeau, was carried out only after the project had been set up. But the losses for the Montagnais community are clearly laid out, and related to the flooding of the richest and most productive zones and the disruption of 50% of the hunting grounds. The “cumulative dimension” of these repercussions on the environmental and human aspects is also underlined:

Generally, it seems obvious that the presence of hydroelectric developments has a negative effect on the Montagnais' exploitation of wildlife resources, whether due to the abandonment of territories or a decrease in the use of the affected territories.
(filed document A35, p. 20)

Looking at the various Hydro-Québec projects planned in the region, the Montagnais voiced their concern at the “hydroelectric future” of the territory and the absence of cumulative impact assessments of past and future projects:

The way Hydro-Québec and the Quebec government proceed for hydroelectric development in non-regulated territory, case by case and project by project, does not provide us with any study analyzing the cumulative impact of this development choice [...]. For us, it is high time that the total of the positive and negative, direct and indirect, environmental, economic and social impacts of all the projects on our territories were tallied [...].
(Brief by Takuaiakan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 58)

For the Natives, the cumulative effect of this succession of projects leads to the continued and permanent degradation of their survival conditions, the disintegration of local economies, individual fatalism with respect to government decisions, demobilization regarding a traditional way of life, and the growing isolation of Native communities with respect to local and regional populations:

This yet again attacks and weakens one of the foundations of our ancient culture: the deep relationship we have with the land. We

become all the more convinced that our destiny is in the hands of others, the "decision-makers", and we sink further down into a fatalistic attitude, the despair and social problems that we already suffer due to our dispossession and disempowerment.

(Brief by Takuaiikan Uashat mak Mani-Utenam and the "Conseil des Atikamekw et des Montagnais", p. 57)

In certain cases, these deteriorations in the fabric of communities and traditional social balances can lead to radical stances and social problems.

Other aspects undergo progressive deteriorations, particularly the loss of the quality of life of the Natives, and the enjoyment of free and easy access to an environment and to resources of quality. The degradation of water quality in the reservoirs and mercury contamination are examples of the tangible losses that diminish the pleasure of spending time and of harvesting activities in the natural environment.

Different Assessment Criteria

Impact assessment methods seem to be the source of a noticeable lack of understanding between Native participants and the proponent. Their visions at the very basis of the impact assessment are very different. First of all, the Natives criticized the proponent for carrying out assessments that give a greater importance to the non-Native vision of development:

Our philosophy with respect to Mother Earth is very old, and we live according to her, and not by altering her. The disparity between the visions of Hydro-Québec and the community is very great and should be taken into consideration by the public as a whole. Over the past months, several public consultations have confirmed the gap between our vision and that of Hydro-Québec.

(Letter from Mr. Élie-Jacques Jourdain, chief of the "Conseil de bande de la communauté montagnaise de Uashat et Maliotenam", addressed to the Minister of the Environment, October 26, 1992)

There is a remarkable dichotomy between the negative impacts for some and the positive impacts for others of opening up the territory (Environmental Impact Statement, part 5, Figure 20, p. 136 and Figure 26, p. 207), which was pointed out in the hearings:

The Hydro-Québec access roads have contradictory repercussions, depending on the point of view. Considered one after the other, the various activities they would generate — hunting and sport fishing, forestry, mining, electrical production — are considered as factors of economic development at the regional and national level by non-Natives, or as factors of destruction and loss of territory by the Natives.

(Brief by Takuaikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 49)

The Natives consider that such an assessment is better suited to a vision of the impacts in the perspective of proponents for whom the territory is economically under-exploited. For the Montagnais, the cultural and traditional dimensions of their relations to the territory and its resources are priorities in their evaluation of the impacts.

The natives also criticize Hydro-Québec for the subjective nature of the attribution of ratings to the project's impacts. They recall their interventions in other projects:

We had already underscored the subjective nature which left a lot of room to the interpretation of “experts” for the assignment of a rating for the intensity of the disturbance, its scope and its relative value. Of these last three operations, the one most open to argument is without a doubt that concerning the relative value of elements as illustrated by Table 16 in part 5 of the preliminary project report (pp. 51-52). We consider that the scores which appear reflect essentially non-Native values, and first and foremost those of the proponent and/or its experts. If Montagnais values had been taken into account the results would have been significantly different for the classification of forest vegetation, riparian ecotones and the various wildlife categories, for example.

(Brief by Takuaikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 13)

For example, impacts on the harvesting of wildlife resources on the northern plateau are called “moderately negative” (Environmental Impact Statement, part 5, Figure 20, p. 136), since the upper part of the Sainte-Marguerite River and the basin of the aux Pékans River were not subject to extensive trapping operations by the Montagnais (Environmental Impact Statement, part 5, p. 78). This assessment was challenged in the public hearings, for when the Montagnais values are taken into consideration, these impacts could be called “highly negative”, since the Montagnais hunt caribou in this region. These territories are also used in the activities of the Nutshimiu Atusseun centre.

The Natives consider that all access roads will have a major and severe negative impact:

The definitive opening of a significant part of our ancestral territory to non-Natives is one of the major repercussions of the SM-3 project, one of the issues according to the terms of Hydro-Québec. [...] we can imagine that the greater part of the territory will become accessible to hunters and sport anglers, except for the wildest regions. For the proponent, whose attitude is non-Native, this is a strong positive impact, as mentioned in the hearings. However, the preliminary project report identifies medium negative impacts for the Natives due to perturbations caused by the presence of non-Native users. This rating was given because the road infrastructures favour our own access to the territory. We do not deny this, but this advantage seems minor in view of all the inconveniences it will cause us. This is why we consider that the access roads installed by Hydro-Québec will have a major negative impact.

(Brief by Takuaikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, pp. 46 and 47).

Unlike Hydro-Québec, the Innu believe that the inconveniences due to use of the road for dam construction will be severe: the presence of heavy trucks, displacement of construction workers toward the coastal cities on weekends, their continual presence during the week, and an increase in traffic on the permanent access road to the dam.

Impacts will remain even after the application of mitigation measures: the road will travel through beaver habitats near Gauthier, Perron and du Lac à Lac lakes.
(Brief by the Nitassinan Coalition, p. 23)

The proponent notes that SM-3 construction work will have major repercussions on the heritage integrity of the sites. The Environmental Impact Statement acknowledges that the Grand Portage sector is a significant site for the Montagnais community of Uashat and Maliotenam, and that it would be subjected to a highly severe impact (Environmental Impact Statement, part 5, p. 211). Hydro-Québec proposes the mitigation measure of creating and making available an audiovisual document on the rapids upstream from SM-3 before they are emptied and on the Grand Portage trail. This document would be considered a “collective and archival memoir”. The proponent nonetheless acknowledges that the residual impact would be severe (Environmental Impact Statement, part 6, p. 10).

However, for the Montagnais, this measure is inappropriate:

[...] the burial grounds located on part of Grand Portage, the passage used by our ancestors to reach the back country of Nitassinan, would be permanently blocked [...].
(Brief by the “Société de développement économique de Uashat-Maliotenam” and the “Association des gens d’affaires de Uashat mak Mani-Utenam”, p. 6)

Our heritage passage, the Grand Portage, would be dry, but according to the proponent that doesn’t matter, it would produce an audiovisual document so that our children could see what it looked like when it was alive, it would be a “collective and archival memoir”. Only the disappearance of sites with an archaeological potential and the disturbance of the Grand Portage site are considered heritage areas. The Montagnais heritage, apparently, can be reduced to archaeology. What a great acknowledgement of our culture and our traditional way of life!
(Brief by Innu Takuaikan Uashat mak Mani-Utenam, p. 19)

To these dissatisfactions with the impact assessment are added those on the methods employed. The joint technical brief of the CAM and the “Conseil de bande” analyzes the work methods of Hydro-Québec. In addition to drawing

attention to the “virtually utopian task” of absorbing the enormous impact assessment report (1,600 pages) and the some 120 technical reports made available at the beginning of the public hearings, the brief underscores the incomplete nature of the “archaeological studies.” These were to be updated to take account of landscapes to protect and to begin digs on the archaeological sites discovered:

We need supplementary research to locate more specifically the archaeological and historical sites attesting to the regional occupation of the Innu. And the Innu should be in charge of this research.

(Brief by TakuaiKAN Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 26)

With this, we also hope to ensure that our ancestral rights and culture are respected. In concrete terms, we propose that digs take place before the dam is built and that the toponomic inventory of the territory be completed. These items would be returned to the Innu nation, which, if unable to enjoy their location due to flooding, could at least transmit their history to future generations.

(Brief by the “Société de développement économique de Uashat-Maliotenam” and the “Association des gens d’affaires de Uashat mak Mani-Utenam”, p. 7)

The methodology of the assessment of the social impacts of major hydroelectric projects was discussed during consultations on the guidelines for the Grande-Baleine impact studies. The presentation by Mr. Paul Charest indicated that impact assessments must henceforth examine more extensively the social repercussions of projects, particularly those affecting Native communities. The changes he suggests bear upon the accessibility to the exterior, the access of the general population to ancestral territories, contacts between temporary workers and the Native population, and the rivalry for certain resources. According to the researcher, the psychosocial stress attributable to rapid changes caused by megaprojects also deserves closer attention. In the end, Native groups should be more involved in studies that concern them.

A High Environmental Cost

The CAM referred to the overall impacts and the gaps in the assessment in presenting the position of Native representatives:

[...] we cannot help but see this megaproject as a source of ecological disturbance, obsolete development and latent conflict for years to come. We are not against all hydroelectric development, but the SM-3 project as presented by Hydro-Québec carries risks and choices that we are not prepared to take. [...] Consequently, and for the more specific reasons following, the "Conseil des Atikamekw et des Montagnais" is opposed to Hydro-Québec's Sainte-Marguerite-3 project.

(Brief by the "Conseil des Atikamekw et des Montagnais", pp. 15 and 16)

The reasons follow: the absence of consideration of the land claim, the risks for the Moisie River salmon, gaps and uncertainties in the impact statement, and the shortcomings of the public review. This opposition to the project is matched by the very strong position taken by the Nitassinan Coalition, which declares it has "258 reasons" to oppose the SM-3 project.

For its part, the Band Council of the Montagnais Community, directly affected by the project, took a more moderate position, emphasizing that the most important factor is the diversion of the two tributaries of the Moisie River:

For us, the salmon are the major factor. If there were no diversion, supposing there were no diversion, it is obvious that even if the Montagnais position is not clear in the sense that it goes along with the project, it is clear that the major points of interrogation would fall aside and the rest would be a matter of adjustments. Thus if the Sainte-Marguerite were completed without diversion, the problems would no longer be the same.

(Mr. Bernard Cleary, transcript, part 2, march 15, 1993, evening, p. 84)

We are most concerned with the question of the salmon. Today, when the young cross the 138 at Sainte-Marguerite, the second dam, and the first lower down, I have never seen Natives protesting against

those two dams. All that I hope, no matter what happens with the project, is that we can define a territory or at least promise the Natives that in this territory they will no longer be disturbed.

(Mr. Élie-Jacques Jourdain, transcript, part 2, March 26, 1993, morning, p. 31)

The band council brief refers to the major consequences of the Sainte-Marguerite river basin development project, the lack of justification of the project, the need for stimulation of the regional economy, and the environmental and social price exacted (Brief by Innu Takuaikan Uashat mak Mani-Utenam, pp. 36 and 37).

These representations, combined with information provided by the proponent, showed the panel that SM-3 would have true negative impacts on the Montagnais communities and lifestyle. The first difficulty in assessing these impacts is to admit to their existence and scope. In this regard, the impact assessment carried out by Hydro-Québec fell short in its treatment of available information on Montagnais issues, and in the obvious methodological flaw in the assessment and weighing of social and human impacts.

The basic values of the impact assessment of the project by Native communities were not assimilated and integrated by the proponent in its statement. The Montagnais vision could nevertheless serve as a reference to add to the assessment grid parameters relating to the conservation of the environment and the maintenance of the activities of occupants of the territory. The assessment could also expand to include elements of intangible but significant value such as the peace, harmony and beauty of the landscape, particularly in areas where nature remains untouched.

A review of Hydro-Québec's assessment methods would be necessary in order to respect the diversity of visions of the environment. This review would lead to a better integration of the viewpoints expressed by other participants, particularly the ecologists, environmentalists and wildlife conservationists. The harmony with nature that underlies the Native assessment of the project reflects the concerns of the environmental groups:

The Innu still have what industrialized society has lost: an intimate and holistic relationship with our mother the Earth. That loss is what has led to the destruction and pollution we see today, which SM-3 is part of.

(Brief by the "Conseil de protection de la santé et de l'environnement de Gaspé", p. A-1)

The impacts on the Native communities and activities are major and difficult to avoid in this type of development project. However, a consideration of the concerns and proposals of the Montagnais could lead to a major review of the project's design and allow for the development of mitigation measures adapted to the lifestyle, culture, values and aspirations of the Natives.

On the basis of indications obtained in public hearings, the criteria of access to the territory and resources is primordial for the Montagnais. They want to retain the broadest and, in some cases the exclusive access to the sites of their traditions and activities. Among the measures proposed, the panel retained a better identification of sites to be protected through archaeological studies, a joint choice of locations for the relocation of camps or other sites that are lost, a supplementary assessment of the cumulative impacts of the hydroelectric projects, and the empowerment of the communities in the management of project impacts, as well as providing them with the necessary means for this management.

For the panel, the integration of Native requirements for the project and harmonization with the use of the resources and territory by the Natives can only be achieved with the participation of the communities involved and by taking account of the diversity of viewpoints involved. A demonstration of willingness to cooperate would show that the proponent respects the Montagnais communities and could increase support for Hydro-Québec's development plans for the territory:

[...] the official information provided by Hydro-Québec and its intentions with respect to us (Natives) are far from being clear and precise as was requested by the panel. [...] In this context, we are very concerned about what could happen, if the project were unilaterally authorized, without previously negotiated agreements with the government and with Hydro-Québec, as was the case for the Lac Robertson project.

(Brief by Takuaikan Uashat mak Mani-Utenam and the "Conseil des Atikamekw et des Montagnais", pp. 55 and 56).

According to the Natives, the differences in vision led the proponent to underestimate or disregard certain impacts that are significant for the populations, their activities and the exploitation of the resources of the territory. Illustrations of these shortcomings are presented further on in the

case of modifications to waterways, the competition related to use of the territory and the upheaval of riparian habitats subjected to fluctuations in water levels.

Community Involvement in the Development

The occupants of the territory all affirm their sense of belonging:

I think that my family has been here for close to 100 years. I feel that we are people of Nitassinan, people of the territory. My grandfather worked with the Natives, he had a general store in Clarke City, and he outfitted them when they went out into the forest. We coexisted with them, and I think it is important that we mention that. It should be known that there are people here whose families have been here for 350 years, families in Sept-Îles; we too have roots. Thus I believe it is as much our land as it is theirs, even though I recognize that they were here before the arrival of the whites, but in 1993, we have to be realistic.

(Mr. Luc Dion, transcript, part 2, March 15, 1993, evening, p. 190)

The various groups have in common the desire to be involved in development decisions that concern them. The public hearings showed the panel that the groups had specific but diverging views on the way to develop the region and more specifically the territory opened by SM-3. The panel saw an increased possibility for social tension between Natives and new users due to a greater accessibility to the land. These possibilities are acknowledged by the proponent:

Any increased mining, forestry or hydroelectric activity arising from road construction would encroach upon previously inaccessible territories and perturb the natural environment. The Montagnais forest activities, which have been highly prized in the community for generations, would also be disturbed. [...] As road development favours access to the back country for all, we can anticipate additional tension between the two user groups in the territory.

(Environmental Impact Statement, part 5, p. 205)

This increased access to lands traditionally frequented by the Uashat and Maliotenam Montagnais could engender tensions between them and non-Natives. The presence of non-Natives will have a significant effect on the availability of wildlife resources and on the practice and harvest of Montagnais fishing, hunting and trapping activities. These repercussions would mainly affect the trapline holders on the territory affected.
(ibid, part 5, p. 168)

On this subject, the FQF wonders whether Hydro-Québec is not using a “divide and conquer” strategy, and maintains that a dialogue on wildlife conservation already exists between the Montagnais and sport hunters. According to the FQF, an agreement to share wildlife resources should continue. The problem, according to the FQF, is more a question of management of the territory (Mr. André Pelletier, transcript, part 2, March 26, 1993, evening, p. 149).

Current Negotiations

Public hearings on the Sainte-Marguerite project were held at a time when everything indicated that negotiations between the governments and the Montagnais had reached a crucial phase. Deadlines were established by the Quebec government for a special bargaining committee to reach an agreement in principle in June 1993 and a final agreement in 1994.

The Atikamekw and Montagnais nations represented by the CAM have since 1975 claimed rights on a territory extending over 700,000 km², of which 550,000 km² are in Quebec and 150,000 km² in Labrador. The official presentation of their claims was accepted by the federal government in 1979, and negotiations began in 1980:

In September 1988, the governments and the CAM signed a general agreement defining the future proceedings of negotiations and in April 1989 they signed an agreement on provisional measures. The latter agreement provided for specific consultations with the CAM and for means of intervention by the CAM in the case of projects in hydroelectricity, tourism, mining, etc., on the land claimed. The CAM refused to renew this agreement when it expired on April 30,

1991, but Hydro-Québec has continued to apply the spirit of the agreement in its consultations with the CAM on the Sainte-Marguerite-3 project.

(filed document A57, p. 2)

The CAM returned to negotiations and signed an agreement in principle in August 1991. In October 1992, a mandate was given to a new negotiator of the Quebec government.

The 1989 agreement on provisional measures provided for the creation of a task force to develop specific measures concerning “Hydro-Québec’s projects on the Sainte-Marguerite River” (filed document A39, annex). This group did not negotiate; rather, it exchanged information. On the territory subject to claims, the principle maintained by the governments was that the development projects should proceed normally and the Natives had no veto powers on these projects. For Hydro-Québec, this approach means the normal continuation of its projects in the territory:

The Quebec government has always refused the moratorium called for by the CAM on any hydroelectric or other development project during the bargaining period, as it did not want to affect the development of Québec through delays in negotiations, and so as to affirm its sovereignty over the territory.

Hydro-Québec cannot subject its development project to the outcome of these negotiations and it considers that Quebec has the right to authorize development on the public lands of Quebec, and thus that it is justified in constructing SM-3, subject to the required government authorizations.

(filed document A57, p.2)

Without owning the territories, the Natives nonetheless have rights to the use of certain resources. They have the exclusive rights to trapping in the vast areas defined as “beaver reserves”. These reserves constitute a method of conserving and enhancing furbearers and ensure an operational exclusivity on territories where, by virtue of a regulation (L.R.Q., c. C-61) administered by the MLCP, “only the Indians and Eskimos may trap or hunt furbearing animals.” Each reserve is subdivided into traplines under the responsibility of the head of a family or the elder of a group of trappers.

The territory, Nitassinan for the Montagnais, is seen as a source of subsistence and wealth. This territory, which is well known by the Natives, who have named all of its land parcels, is filled with trails, portages, caches and shelters for subsistence activities. This intimate relationship with the territory risks being damaged in areas where major hydroelectric projects are set up, as was reported in a Hydro-Québec statement on the Manic-Outardes complex :

This conception of the territory and the Indian title is the basis of petitions, complaints and claims by the Montagnais over past decades. The colonization, industrialization and exploitation of the wildlife for recreational purposes have progressed so far that the Montagnais claims now include compensation for past damage caused to the territory. The Manic-Outardes project is certainly in this list. As for the future, Montagnais leader want a say in the development of the resources of their ancestral land.

(filed document A35, p. 31)

Among the reasons expressed by the Natives for the categorical refusal of the project or for opposition to its development as currently presented, the principal ones are linked to the gradual loss of territories caused by the invasion resulting from opening up the territory, and to the appropriation of resources by local and regional populations. Traditionalist groups explain this opposition as follows:

[...] it is because we are sovereign over Nitassinan that we refuse the hydroelectric development project on our territory.

(Brief by the Nitassinan Coalition, p. 36)

This loss risks accentuating the increasing process of isolating the Innu with respect to the territory, the development and our activities on the territory. This intervention permanently eliminates a number of development opportunities for the territory that are consistent with our own models, our own priorities and values, and our own development methods.

(Brief by Innu Takuaitkan Uashat mak Mani-Utenam, pp. 33 and 34)

The conclusion of the statement on the economic and social impact on the Montagnais community sums up the expectations and desires of the Natives concerning projects on the territory:

The community will no longer be willing to stand aside for projects that will affect its environment, and it claims its right to intervene in collective projects planned on its territory. [...] The Uashat and Maliotenam Montagnais are not opposed to the development of projects by outsiders on their territory if they can maintain conditions ensuring the continuation of Montagnais activities and projects. More: the Montagnais want to participate and benefit from these developments, along with the local Euro-Canadian population, if these projects respect their conditions.
(filed document A42, p. 243)

The CAM representatives confirmed this assessment:

We are not opposed to development on our ancestral lands, but we want to be involved, in a constructive way, in each stage of the process.
(Brief by the Conseil des Atikamekw et des Montagnais, p. 5)

Several of their concerns about the project will only be answered in agreements on land access and resource use, whether these agreements extend over the whole of the territory in question or are specific to the SM-3 project. The requests submitted to the panel with respect to SM-3 concern the recognition of a role for the Natives, particularly in the protection of the environment and the development of the territory:

If at least we could agree on a minimum, such as protection of the environment and joint management of the territory, that would be a good starting point. [...] and we are not even talking about "the integrity of the Quebec territory!" [...] This is why we feel it is so important to recognize and confirm our powers with respect to environmental questions.
(Brief by Mr. Armand McKenzie, p. 3, French version, translation)

Not only does the project do considerable damage to Mother Earth, but we wish to emphasize a harmonious and respectful development of nature.
(Brief by the Nitassinan Coalition, p. 36)

Certain organizations consider that such agreements with the Native communities are essential:

In the face of this deteriorating social consensus, the Conseil central recommends that the Quebec government negotiate with the Natives who inhabit the region and come to a satisfactory settlement with them before any work begins, and that the BAPE panel call for Hydro-Québec to examine the project's impact on Amerindian culture.

(Brief by the "Conseil central des syndicats nationaux de Sept-Îles", p. 45)

After all the trials and tribulations of the debate on the Grande-Baleine development, we must start the process anew by integrating all of the appropriate parameters in the review and above all, the parties must sit down at a bargaining table and establish the basis for an approach based on the equality of the people involved and on the need for sustainable development for Quebec.

(Brief by the "Comité d'appui aux Premières Nations", p. 25)

The Nitassinan Coalition, which is against the project, proposes development principles for the territory which correspond to Native aspirations of social, cultural, political and economic development; a local identity and sense of belonging; local information and dialogue; action for occupation of the territory; recognition of areas and levels of organization at the level of communities, tribes and nations; the autonomy of local communities; agreements between territorial partners; and egalitarian development and redistribution of wealth.

Rivalry for Resources

The panel noted that the aspirations of the Native communities are totally absent from the development plans presented by the RCMs of the territory. In their land development plans, the RCMs take no account of the Natives. In this, the panel sees a further indication of possible tensions between the various communities coexisting on the territory.

In the same way as the Natives, the groups represented by the RCMs presented their concerns on changes in the occupancy of the territory and the use of its resources that would result from the project, particularly in Fermont. The RCM of Caniapiscau presented the panel with the incompatibility of the Sainte-Marguerite project and its own plan for development of the territory:

After an in-depth examination of its development plan and consultation with the urban planning and land development directorate of the Department of Municipal Affairs, the council of the Caniapiscau RCM noted that the work planned by Hydro-Québec on its territory for the Sainte-Marguerite-3 hydroelectric project contravenes certain major allocations of the land, whose development objectives are clearly defined in the development plan. (Brief by the Caniapiscau RCM, p. 4)

These departures from the development plan affect recreation/tourism and mining allotments, as well as policies on maintaining the quality of the environment and public security. The Caniapiscau RCM fears the impacts of the project on its desire to develop original and coherent activities on its territory to counter the dangers threatening these northern municipalities: “the desertion of their territory and identity” (Brief by the Caniapiscau RCM, p. 2).

As a result of the studies on the social impacts of the project, the proponent was aware of the possible repercussions of a poor integration of the project in regional development plans:

[...] it no longer seems that the region as a whole is entirely in agreement with megaprojects as a way to assure its development. Cultural identity, which until now centred on the idea of well-paid work in northern, isolated conditions, in the major projects, now seems to be directed toward feelings of belonging and putting down roots nourished by other regional qualities whose endangerment is negatively perceived. (filed document A27, p. 253)

The proponent was also made aware that future activities of coordination and supervision of the territory were not satisfactory. The number of managers and agents of the MLCP and the MER in Sept-Îles and Port-Cartier is already

insufficient for current needs. The access road which would extend into the new territories would lead to a situation where the territory to be covered would be even greater. The fact that it is not possible to enforce current regulations adequately would impact on human relations (filed document A27, p. 227).

In the opinion of the Caniapiscau RCM, Hydro-Québec has not taken account of regional wishes in the project development:

It seems clear that Hydro-Québec has not taken account of the development orientations favoured by the regional populations and all of the efforts that the community has made to date to stimulate the region.

(Brief by the Caniapiscau RCM, p. 33)

The integrated management of the territory and its uses seems to several parties to be an approach that could forecast and mitigate conflicts, by harmonizing the vocations of the territory and ensuring a balance between the different uses. However, for Hydro-Québec, the territory affected by the project is an ordinary territory whose management responsibilities come under government authorities and their areas of jurisdiction. Once completed, the roads would be the responsibility of the MTQ. Similarly, the management of the various resources of the territory would be assumed by the responsible departments in the areas of mining, forestry and wildlife. Hydro-Québec nonetheless reserves for itself the zones required to ensure its operations, and controls potential operations such as mining in these areas.

This view of the future development of the area and the use of its resources raised several objections, particularly from the Montagnais and the representatives of the Caniapiscau RCM, who want their role in the development of the territory respected. The Montagnais claim certain powers of control over the access to and use of the territory:

We know that we cannot count on the MLCP to limit access by non-Natives to wildlife resources during and after the construction of SM-3. On the contrary, it has always favoured this access, to our disadvantage. Yet control of access to the territory seems to us to be

the key factor that would allow us to retain control of the parts of the territory not affected by Hydro-Québec's facilities, and to ensure rational management according to our principles of conservation.
(Brief by Takuaiakan Uashat mak Mani-Utenam and the "Conseil des Atikamekw et des Montagnais", p. 49)

Other participants likened Hydro-Québec's attitude toward the resources of the territory to an invasion or even an appropriation which, for certain resources, would come down to expropriation. This attitude was pointed out in the case of mining resources by the Société d'exploitation minière Mazarin, which plans to develop a graphite deposit in the Fermont region in collaboration with the Fonds d'exploration minière du Nouveau-Québec:

Most of the conditions and obligations called for by Hydro-Québec represent nothing more than a disguised expropriation of our acquired rights of exploration and of extended operation.
(Brief by the "Société d'exploitation minière Mazarin Inc.", p. 4)

Differences in the vision and objective of development on the Sainte-Marguerite are analogous with those Hydro-Québec encountered on other rivers such as the Haut-Saint-Maurice and the Ashuapmushuan. When the parliamentary committee was reviewing the proposed 1993 *Hydro-Québec Development Plan*, representatives from the regions where these projects were set up, including the "Regroupement pour la protection de l'Ashuapmushuan", a claimant in the present hearings, outlined the conflicts in the use of their respective territories and proposed partnership as a formula for cooperation and dialogue with the groups concerned.

The "Corporation de gestion du bassin de la rivière Saint-Maurice" explained its preferred options for future Hydro-Québec developments. These proposals are well suited to the proposed development on the Sainte-Marguerite River:

Our experience of coexistence in the region leads us to conclude that unfortunately, the company has not been able to alter its culture to create a tradition of collaboration with the groups of the region. Too often, Hydro-Québec comes into the regions with an attitude of colonizing a conquered land.

We say that Hydro must act as the catalyst of regional solidarity, rather than seek to divide those in the region by throwing money around, which is an unacceptable attitude. [...] In the area of integrated development, the centralist mentality has seen its day. Any project should be considered in a comprehensive perspective that takes account of all other development aspects in accordance with the population. Before making irreversible decisions, before pouring cement that will last a hundred years and more, we must have a clear vision of the long-term development of the area.

(“Corporation de gestion de développement du bassin de la rivière Saint-Maurice”, February 1993, p. 16)

The panel underscores this absence of a real involvement of the communities in the integration of the project into the various local and regional development plans, despite the desire of the concerned groups and the actions of organizations that represent the populations of the territory :

What consideration is given to the needs and potentials of the region in terms of regional development, quality of life, conservation of resources, non-interference in the practices, achievements, aspirations and rights of Native populations? Was this project designed jointly with the populations of the region and of Quebec in general, in view of its public nature, its impacts on the region and its integration within the national energy development scheme?

(Petition by the “Amis de la vallée du Saint-Laurent”, November 11, 1992, p. 1)

This community involvement in the development is one of the social aspects of sustainable development which Hydro-Québec claims to adhere to, based on a sense of belonging, the appropriation of resources by the communities, and the empowerment of local and regional groups.

Confusion Concerning Responsibilities

The hearings allowed the panel to note that Hydro-Québec’s responsibilities in economic development seem to be poorly understood by the participants, particularly those representing business and the municipalities. This confusion is understandable, considering that the role of Hydro-Québec in

regional development was in the process of being discussed and defined at the time of the hearings. Proposals in this area were examined in the *1993 Development Plan* submitted to the parliamentary committee on the economy and labour in February 1993. The initial mission of the company, according to Hydro-Québec, is:

[...] to provide electricity to Québec under the best conditions, to optimize the comparative advantage that hydroelectricity represents for Québec and to diversify its activities in energy-related areas.

(Proposal in the 1993 Development Plan, Hydro-Québec, annex C, 1992)

Through its economic contribution to a region, a megaproject has repercussions; however, when Hydro-Québec plays a supporting role in regional development, it can only do so within the limits of its mandate, with its prejudices in favour of energy resources. Inevitably, this leads to expectations and dissatisfaction on the part of regional representatives.

The panel was able to measure the multiple, highly diverse and perhaps exaggerated expectations that resulted from Hydro-Québec's positions. Without having a mandate and without the appropriate instruments of intervention, Hydro-Québec is in a situation of having to arbitrate on the use of the territory and its resources:

However, lacking any real planning at the national level, can we fault the people of the region for trying to do the best they can with the available means [...]?

(Brief by Takuaitkan Uashat mak Mani-Utenam and the "Conseil des Atikamekw et des Montagnais", p. 50)

The fact that occupants want to be involved in development decisions affecting them offers an interesting way of solving the problems of rivalry caused by the absence of a comprehensive development plan for the territory. The use of regional and local procedures for dialogue becomes a consensus-seeking approach.

This approach presupposes, first of all, that Hydro-Québec acknowledges the interests of current occupants of the territories where it wants to set up projects and appeals to their expertise in planning and assessing development options that are compatible with their activities. The desired

formulas for partnership for the development and use of the territory's resources remain to be defined, either within the current process of negotiation for the Natives, or according to an appropriate cooperative procedure for the RCMs. However, Hydro-Québec must be cautious, for it is not about to assume the powers and responsibilities of other government institutions.

Connections With Land Claims

The territory's development principles entail the explicit acknowledgement that the project is located in a region where the Montagnais have practised and continue to practise activities whose maintenance and development they claim for the future. This previous occupation of the territory grants them rights with respect to traditions based on their knowledge of the earth and its resources, the development of their activities and their communities on the land.

The ties between territorial negotiations and the examination of a specific project cannot be overshadowed. Despite the limited role of Hydro-Québec in these negotiations, its presence on the territory gives it the opportunity to harmonize specific projects with the global negotiations. Moreover, the negotiation of financial compensation depends on known projects and the exploitation plans of the various proponents for the energy, forestry, wildlife, mining and tourism resources.

As well, SM-3 has impacts on the ongoing land negotiations overall, and the Natives condemn Hydro-Québec's lack of consideration of these impacts:

In Hydro-Québec's presentation of SM-3, there is no assessment of the project's impacts on our land claims. They are mentioned, but only to advise that they must not interfere with the development program.

(Brief by the "Conseil des Atikamekw et des Montagnais", p. 6)

During the hearings, all questions on use of the land and the resources by the Montagnais were systematically referred by the proponent to the ongoing negotiations with the governments.

In this area, the Natives show a fairly fatalistic attitude:

If we speak of SM-3 specifically, it is clear that the project has reached a point where the involvement of the Montagnais members of the community is very difficult to imagine in any way that would be satisfactory to them.

(Mr. Denis Brassard, transcript, part 2, March 16, 1993, evening, p. 50)

Native organizations acknowledge that they were part of the advisory process when the project and guidelines were being drawn up, and that they were consulted on the notice of conformity. However, they are disappointed with the results:

The project is still there, we voiced our numerous concerns and they have not been responded to. Furthermore, we are still looking at the ongoing comprehensive land claim, and we don't know what is going on! We are negotiating seriously, in good faith, with both governments, and at the same time, developments are underway in which we have no say at all. We can make minor comments and suggest minor changes, we take part in meetings, we are given certain information slightly before it is given to other groups, but the projects are implemented all the same.

(Mr. Denis Brassard, transcript, part 2, March 16, 1993, evening, p. 56)

As well, they say that the experience of Lake Robertson has taught them it is perhaps better to act in one's own defense:

I refer you to the case of Lake Robertson, where Natives participated in the public hearings. We had faith at the time, but the end result is that we are in court. We defend ourselves as best we can.

(Mr. René Simon, transcript, part 2, March 16, 1993, evening, pp. 58 and 59)

Native expectations far exceed the measures planned by Hydro-Québec to mitigate and compensate for the impacts. Without formally calling for a veto right on the project, the Natives do not want the decision on SM-3 to be made before agreements relating to the existence of ancestral rights are completed for the portion of the territory affected by the project.

This position is supported by several participants in the hearings who do not belong to the Native community :

For SM-3 to be more acceptable to Natives, we must determine for this region of Quebec, as was done for James Bay, category I lands (for the exclusive use of Natives), category II lands (exclusive hunting, fishing and trapping rights year-round for the Natives) and category III (year-round hunting, fishing and trapping rights for the Natives and exclusive rights on certain species) so that the Atikamekw and the Montagnais may continue to practice their traditional activities in a sustainable manner.

(Brief by the Applied Research Group on Macroecology, p. 5)

In more or less the same way, the FTQ, in an exchange with the panel, considered legitimate the Montagnais position that to make a decision and begin work on SM-3 before negotiations on their rights are settled is in itself a breach of those rights :

If I were in their position, I would insist on the same condition. [...] You don't sign an agreement that is only halfway through negotiation!

(Mr. Clément Godbout, transcript, part 2, March 18, 1993, afternoon, p. 170)

Representatives from the Montagnais community suggested to the panel elements they would like to see included in a specific agreement concerning SM-3:

[...] if the project is authorized by the government. If that were the case, Hydro-Québec would have the duty to bargain with us for control of access to wildlife resources and the use of the land by non-Natives.

(Brief by Takuaikan Uashat mak Mani-Utenam and the "Conseil des Atikamekw et des Montagnais", p. 50)

Any power of control must naturally take into account all users of the same resources of the territory, particularly the ZECs for the wildlife resources. Hydro-Québec showed it was ready to take part in negotiations in this area:

On several occasions, Hydro-Québec made the offer to the Uashat-Maliotenam Montagnais and the CAM to negotiate a project agreement on Sainte-Marguerite-3. Specific discussions to that end began on January 14, 1993.
(filed document A57, p. 3)

However, Hydro-Québec's view (filed document A57, pp. 3 to 5) differs from the basic demands voiced by the Montagnais. The agreement advocated by Hydro-Québec would be limited, at first glance, to measures aimed at mitigating the negative consequences of the project. Points mentioned concerned information exchanges, participation in the implementation, compensation for loss and damages, impact mitigation measures and works, funds allocated to supporting traditional activities and community development, training and hiring workers, and procedures for litigation and for the transfer of temporary facilities when work is finished.

The panel, aware as it is of the differing points of view held by Hydro-Québec and the Montagnais, feels that there are enough elements in place to begin discussions with a view to an agreement on the Sainte-Marguerite project, provided that an independent party can reconcile the divergent positions.

Hydro-Québec does not have the power to limit access to the area except on the roads built for its facilities. The Montagnais recognize that this is a government prerogative belonging to departments such as the MER, the MLCP and the MFO, especially for control on the land not directly affected by SM-3. This underscores the interest of the proposal for a sectorial round table, as suggested by the QWF, to discuss these issues in the presence of the managers and users concerned:

In this context, the QWF recommends the creation of a sectoral meeting between white and Montagnais users for this sector of the North Shore. This round table would be made up of representatives from the following organizations: the "Conseil Atikamekw-Montagnais (CAM)", the "Conseil de bande de Uashat-Maliotenam", the Quebec Wildlife Federation (FQF), the "Association des trappeurs indépendants", the

MLCP, the Department of Forestry, the Department of Energy and Resources (MER), Hydro-Québec, and the mining and forestry industries. The main mandate of this round table would be to reach consensus on the following points:

- the harvesting of wildlife resources in territories newly made accessible to whites;*
- the development of tourism and fishing camps with exclusive rights around the SM-3 reservoir;*
- the management of replacement fishing sites offered by Hydro-Québec;*
- the development of forestry and mining operations in these territories.*

(Brief by the Quebec Wildlife Federation, p. 68)

Dialogue With Territorial Authorities

The Natives affirm their desire to be the agents of a form of real sustainable development and to work toward the integrated management of all resources beyond the mere extraction and export of the wealth of the territory.

For the panel, dialogue with the authorities responsible for the development of the territory could facilitate the reconciliation of the divergent development perspectives and rival claims to the use of the resources. The avenues which were identified as a result of the hearings suggest development that is grounded in interdependence and in allowing for the common and sustainable use of the resources, while ensuring environmental protection:

[...] I think that we can come to an agreement on the idea of two different communities in a given region.

(Mr. René Simon, transcript, part 2, March 16, 1993, evening, p. 78)

Reporting on the discussions about economic development and natural resources in the brief in its first series of hearings, the Royal Commission on Aboriginal Peoples presented possible avenues of reconciliation between

communities competing for the use of the resources of a common territory. The proposals touched upon the development of industries adapted to Native ways:

[...] the small-scale development of resources available to Native locations [...]. Tourism, wood industries, greenhouse crops in the North and traditional activities in the wilderness [...].
(Royal Commission on Aboriginal Peoples, 1992, p. 67)

In the case of SM-3, the development of measures of harmonizing the various development aspirations of the territory remains to be done. Over and above negotiations with the Montagnais with a view to a sectorial agreement on the project, the government should ensure that the other organizations with jurisdiction on the territory — the RCMs and the other departments — are part of the process.

To be effective and achieve results that are acceptable to the various social groups concerned, these exchanges and agreements must, in the opinion of the panel, respect and confirm the responsibilities of the regional communities in the development of the area and the project. In this perspective, the development priorities, the allocation of funds by the proponent and the choice of projects that could benefit from such funding should be decided by regional authorities with whom Hydro-Québec would liaise.

If the regional development program proposed by Hydro-Québec were accepted by the Quebec government and implemented as part of the Sainte-Marguerite-3 hydroelectric development project, it should harmonize with the choices of the regional authorities concerned.

Another suggestion for the clarification of the objectives of Hydro-Québec's potential program for regional development arises out of the positions expressed by organizations specifically concerned with the energy sector. Referring to the "virtues of energy diversification" (Brief by Greenpeace, p. 3), several organizations want a commitment from Hydro-Québec in the sense of support to the innovation and demonstration of non-conventional energy sources, specifically in the area of wind and solar power:

To conclude, we deplore the fact that Hydro-Québec does not devote more time and effort to the development of non-polluting sources of

energy such as wind and solar power, which seem to us to be the way of the future. We know that these sources pose specific technical problems such as that of stocking, but we believe that if Hydro-Québec gave them as much attention and investment as it does to the development of hydroelectricity, several solutions could be developed that would contribute to saving our territories from most of the future major dam and reservoir projects on other rivers that have yet to be harnessed.

(Brief by Takuaitkan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, pp. 19 and 20)

The panel believes these suggestions point to an interesting direction that should be explored by Hydro-Québec for its contribution to the economic development of the North Shore, all the more so in that, according to its own assessments, this region is among those whose potential for windpower and small plants allows us to “envisage the development, in one of our unlinked networks, of a commercially viable system in the years to come” (filed document A122, p. 5).

Chapter 7

Impacts on the Natural Environment

The SM-3 hydroelectric complex consists of many works which will have numerous impacts on the environment. This chapter examines the main impacts on the natural environment, in particular those caused by the flooding of considerable areas of land, and mercury accumulation. Some of these impacts are hard to measure accurately in the short term, while others were not addressed in the Environmental Impact Statement. Several impacts cannot be significantly mitigated, according to the proponent, and may have consequences on various scales. They should be examined in a broader perspective which takes into account the size of the hydrographic basin and includes an assessment of the cumulative effects on a regional scale.

Mercury Contamination

Mercury in the Reservoirs

Mercury is of geological origin and naturally present in the air, water, soil, plants and land and aquatic animals. Concentrations are generally very small, that is to say trace amounts. In specific natural conditions, however, mercury levels in the flesh of certain animals may be higher than the accepted standard for safe human consumption. The Canadian standard is 0.5 mg/kg, that is 0.5 ppm. High mercury concentrations are generally the result of industrial activities and subsequent spread of mercury through the atmosphere or through water. Studies conducted twenty years ago revealed

another source of mercury contamination: hydroelectric reservoirs. This phenomenon, which is now fairly well documented, is described by the proponent (Environmental Impact Statement, part 4, pp. 128-130).

The rapid flooding of vast areas of land containing large quantities of organic matter such as plants, plant debris or earth causes intense bacterial decomposition. Bacteria release the mercury present in this organic matter and chemically transform it into a form called methyl mercury. In this form, which is approximately ten times more toxic than its metallic form, mercury becomes available to enter the food chain. Very little of this mercury is excreted by the organisms that ingest it through their food, and it thus accumulates in certain tissues. There follows a more or less extensive bioaccumulation among fish, depending on their species, their feeding habits and their size relative to age.

To assess this problem in the context of the SM-3 project, the proponent conducted fish surveys in the areas it proposes to flood. In its surveys, it enumerated 17 species of fish in the estuary, the main ones being smelt, tomcod, northern sucker and brook trout. In the continental basin and on the northern plateau, respectively 8 and 9 species were enumerated, including northern sucker, northern pike, lake whitefish and lake trout, which are the main species at risk with regard to mercury contamination. The fish-eating species such as the northern pike and lake trout are at greater risk than the non-fish-eating species such as the northern sucker and lake whitefish.

The proponent also assessed current mercury levels in the study area. No data were taken in the estuary. In the continental basin, fish in the SM-2 reservoir built 36 years ago had relatively high mercury levels, greater than those in fish in neighbouring natural environments or old reservoirs such as Dozois (37 years) and Gouin (67 years), but comparable to those in fish in more recent reservoirs such as Manic. For fish in the area of the future SM-3 reservoir, the data are very partial, but mercury levels appear to be lower than those observed in the SM-2 reservoir. On the northern plateau, concentrations were low in the non-fish-eating species, but those in the fish-eating species currently exceed Canadian standards for human consumption.

The project's implementation would cause profound changes in these ecosystems and alter the current mercury balance in fish. On the one hand, the proponent is expecting changes in fish communities. In the future

reservoirs, the fact that fish populations will be diluted in a larger volume of water would initially cause a reduction in population densities. There would subsequently be an increase in the number of individuals and in the total biomass, which would eventually return to normal values for lake systems. This development would be accompanied, however, by changes in the composition of those communities, with certain species becoming more abundant than others. The process would mainly favour the northern pike and perhaps the lake whitefish, but have the opposite effect for the lake trout and brook trout.

On the other hand, mercury concentrations would change simultaneously in the flesh of various species of fish. To assess these changes in the three reservoirs and in the upstream section of the Sainte-Marguerite River, which would be swollen by the flows from the Carheil and aux Pékans diversions, the proponent has relied on its previous experience with the James Bay reservoirs and on a modelling study (Environmental Impact Statement, part 5, pp. 120-124, 188-192). The mathematical model used is based on the one which made it possible to simulate the release of phosphorus in northern reservoirs. Since phosphorus is a by-product of the decomposition of the same submerged organic material which releases mercury, the proponent thinks that the model could adequately predict mercury quantities that would be released. The model's operation entails using assessments of various parameters, including the quantity of phosphorus already present in the soils that will be flooded, the water turnover rate in the reservoirs and the sedimentation coefficient. According to the proponent, the model's accuracy is within 30%, but it is the only model capable of simulating changes in mercury levels in fish. The model's predictions may also be adjusted on the basis of actual measurements made on identical species which the proponent has monitored in the James Bay reservoirs.

The findings for the future SM-3 project reservoir indicate that maximum mercury concentrations would be reached in the lake whitefish between the fourth and sixth years after priming and between the seventh and ninth years in the northern pike and lake trout. Maximum levels would be significantly higher in the Carheil and aux Pékans reservoirs, that is respectively 1.33, 2.78 and 3.97 mg/kg for the three species than in the SM-3 reservoir (0.34, 0.87 and 1.24 mg/kg). The differences may be explained by the larger volume of the SM-3 reservoir relative to land area and the quantity of organic matter flooded. Concentrations would return to neighbouring natural values after 20 to 30 years for the Carheil and aux Pékans reservoirs and 30 years

for the SM-3 reservoir. Because of greater contamination upstream, mercury levels in fish in the SM-2 reservoir would increase, according to the model's estimates, to 0.3 and 0.82 mg/kg between the fourth and eighth years for the lake whitefish and northern pike respectively. The proponent foresees no negative impact for mercury on the fish, but expects potential impact on human consumers of those fish species.

Management and Monitoring

Because of its origin, mercury contamination in reservoirs is hard to prevent. In addition, the proponent observes that there is no realistic method for removing organic matter from the areas to be flooded (technical document 301, p. 34). Deforestation, which is costly, would reduce expected mercury levels by only 7% or less, depending on the reservoir. This is because the trunks and branches release little mercury since they degrade extremely slowly. Most of the mercury released comes from humus, leaves and leaf litter, but scouring the area to be flooded is an unrealistic measure. However, the proponent examined the possibility of selective fishing a few years after flooding to remove the most contaminated fish from the reservoirs (Environmental Impact Statement, part 6, p. 6).

The proponent's strategy thus consists in managing the risk caused by mercury exposure after the reservoirs are built. Mercury mainly affects the nervous system. In humans, as in animals, it accumulates as it is ingested because excretion of the metal is a very slow process. The purpose of preventive measures is to limit consumption of contaminated fish so as to maintain total mercury quantities in individuals below an allowable safe standard. The proponent relies on the World Health Organization (WHO) and the federal Department of Health and Welfare (HWC) to define that standard. The standard varies with the individual and should be higher for pregnant women, since the nervous system of the fetus is developing. There is currently no standard for pregnant women because WHO recently withdrew the one that was in effect pending more thorough studies (Ms. Geneviève Corfa, transcript, part 1, afternoon of February 9, 1993, pp. 47-48).

The proponent expects to manage the mercury problem on the basis of its experience with its James Bay reservoirs, where reservoir fish contaminated by mercury are consumed by the Cree. Since fish is a staple, the Cree

Council does not necessarily adhere to the WHO standards, which would be too restrictive and would considerably limit consumption. Together with federal authorities, the Cree are applying action levels, which are an attempt to balance dietary needs with mercury exposure :

[...] What the Cree Scientific Committee is trying to do is not to apply WHO standards strictly because they are indeed too restrictive and would considerably limit fish consumption even in natural lakes. [...] Since fish has high nutritional value, and it is preferable to see the good effects of some fish consumption on health, even if there are mercury concentrations, it is better for the Cree to eat more fish than indicated by the World Health Organization. There has therefore been a readjustment, and we are looking at action levels.

(Ms. Geneviève Corfa, transcript, part 1, afternoon of February 9, 1993, pp. 48-49)

This scientific committee has agreed to an allowable daily dose based on the length of time mercury remains in the human body and on concentrations in fish. It has thus determined the number of meals of each species which the various groups of individuals may consume per week. Changes in mercury concentrations are monitored by taking tissue samples from individuals at risk.

Based on this expertise, the proponent estimates that the consumption of fish from the SM-3 and SM-2 reservoirs would represent only a slightly higher exposure risk than in the present situation. Consuming fish from the Carheil and aux Pékans reservoirs, which would be more contaminated, represents a greater risk. The proponent has proposed preventive measures which amount to reducing maximum acceptable fish consumption by a factor of 4 to 6 times over 10 to 15 years. The Montagnais are particularly at risk given their traditional consumption of the fish in the Sainte-Marguerite River basin. The situation would improve from the fourth until the ninth year after priming, depending on the species and the reservoirs, but it would take 25 years before they could return to their present consumption habits (Environmental Impact Statement, part 5, pp. 132 to 134 and 202).

As was the case in James Bay, the proponent is proposing limits for each reservoir on the weekly permissible number of meals involving the major fish species. The proponent will monitor health risks by regularly catching fish-eating and non-fish-eating fish in the various sectors of the developed

territory in order to monitor changes in mercury concentrations and to validate its accumulation model. It proposes to involve consumers as partners in a monitoring and communication program on risk cost-benefit management:

Monitoring [mercury levels in fish] over time will make it possible to inform the population by means of consumer guide, posters and videocassettes about reservoir conditions, the phenomenon's duration and the period required to return to natural conditions. The population [...] may alter its consumption so as to remain at an acceptable exposure level. Subsequently, we can monitor changes in the highest risk groups [...] It goes without saying that this kind of program must be developed together with the local institutional partners [...]

(Environmental Impact Statement, supplement 1, c. 3, p. 40)

The proponent laments the fact that its management plan is lacking one important component: quantitative data on current fish consumption by natives in the study area:

We know they consume fish, fish from natural lakes, from Gras Lake, and so on, but we don't know exactly in what quantity. These data are not available. They [the natives] were not interested in providing them. [...] We can't force anyone to provide information.

(Ms. Geneviève Corfa, transcript, part 1, afternoon of February 9, 1993, pp. 27-29)

Fears About Health and Wildlife

Hydro-Québec expected that mercury contamination would be one of the project's major issues. Reaction by the native communities confirmed that expectation. Their representatives analyzed all aspects of the matter with regard to impacts on health, use of the territory and the social fabric.

Their analysis of the biological process of contamination shows that the phenomenon is still not completely understood:

There is still considerable uncertainty about the severity (extent) and duration of this contamination. Some data from northern Quebec

and northern Manitoba have shown that much remains to be understood about the processes leading to mercury contamination after flooding.

(Brief by Takuaikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 28)

The phosphorous model for predicting mercury quantities released by bacterial action does not appear to be without its weaknesses:

[...] This model based on phosphorous transfer after flooding applies in a limited way to the time scales for the stabilization of mercury levels in fish. It is true there is a need for this type of model, but it is unrealistic to think at this point that the Hydro-Québec model can claim to predict the impacts of this problem in the context of the SM-3 project.

(Brief by Takuaikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 28)

The QWF echoed this assessment:

[...] The modelling of phosphorous concentrations in the reservoirs entails a fairly large margin of error, 30%. This error has to be taken into account when applying this model to mercury concentrations. Special attention should be paid to the model's effectiveness.

(Brief by the Quebec Wildlife Federation, p. 62)

The QWF observed that the model's general predictions do not appear to apply to all the reservoirs:

[...] The SM-2 reservoir is 36 years old. One can well wonder why the mercury level in that reservoir has not returned to the levels observed in the natural environment. [...] This observation casts doubt on the validity of the model for predicting contamination levels in the aquatic wildlife in the reservoirs. Other parameters, which have not been taken into account, would have an influence on the methyl mercury salting out rate.

(Brief by the Quebec Wildlife Federation, pp. 61 and 62)

The “Association des biologistes du Québec” raised a question concerning the behaviour of mercury during the various seasons as a result of changes in water circulation :

The description of these impacts [i.e. mercury] in the Environmental Impact Statement presented is inadequate. For example, how will mercury behave in the reservoirs during thermal stratification in summer? Will there be sectors in the reservoirs that are more contaminated than others?

(Brief by the “Association des biologistes du Québec”, part 2, p. 7)

The CAM suggested that some answers to these questions may be found by studying various components of the ecosystems that would be flooded. In particular, it is fundamentally important to study fish communities. The parameters that could influence changes in mercury levels over time include fish species present, the number of fish in each species and age group, their growth, food consumption and mercury excretion rate. In their view, the proponent has not measured any of these parameters adequately.

Consequently, given natural variability, what little data were provided by the proponent on present mercury levels in fish and the margin of error for the prediction model used, witnesses believed that the likely scenario envisaged by the proponent is not a prudent one:

Since certain species are already contaminated and available mercury predictions appear to be not very accurate, the QWF feels that more pessimistic scenarios should be considered.

(Brief by the Quebec Wildlife Federation, p. 62)

The lack of data on fish consumption by the populations concerned, particularly the habits of the Montagnais, is a weakness which the proponent admits, since it prevents any valid assessment of their possible exposure to mercury :

[...] We believe much remains to be learned about the cycle of seasonal fishing activities by our populations, the fishing effort and its yield, as well as the periods of intensive fish consumption by Montagnais families.

(Brief by Takuaikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 31)

Besides the Montagnais population, a non-native population uses the basins of the study area, and its fish consumption is unknown. For this reason, the FQF recommends:

[...] that, before the project is implemented, Hydro-Québec conduct an inquiry into fish consumption by vacationers and fishermen who frequent the SM-2 reservoir area. If consumption [...] appears to be high, Hydro-Québec should include [them] in its planned follow-up for the health of the native population.

(Brief by the Quebec Wildlife Federation, p. 62)

Risk management is much more important for our populations. [...] This is a matter of our day-to-day lives; it is a matter of our quality of life, and Hydro-Québec has not significantly taken it into account.

(Mr. Robin P. Bélanger, transcript, part 2, evening of March 15, 1993, p. 129)

Native representatives and certain other participants also feel that the proponent has not accurately assessed the real risk of mercury exposure for human health:

[...] In its approach, Hydro-Québec takes it for granted that the toxicity of methyl mercury [...] is well established [...] There are very significant reasons to be uncertain about the long-term effects of human exposure to low levels of mercury and even to minor exposure of the fetus during pregnancy. [...] There are also uncertainties about mercury elimination rates.

(Brief by Takuaiikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, pp. 30 and 31)

Acceptable exposure levels for fetuses cannot be established from the epidemiological data.

(Brief by the “Conseil central des syndicats nationaux de Sept-Îles”, p. 47)

The representative of the MSSQ confirmed that this is a major concern:

The question of the fetus is probably a central question, since the fetus is the most sensitive [...] to mercury. [...] WHO has for several years proposed that care should be exercised with respect to the

exposure of pregnant women, whereas for adults, our knowledge is somewhat more reliable. [...] The equation to be solved is how to lower exposure for pregnant women, while continuing to provide the baby with the neurological benefits associated with certain [nutrients] in fish.

(Mr. Éric Dewailly, transcript, part 1, afternoon of February 9, 1993, pp. 51 and 52)

Lastly, native representatives criticized the proponent for not trying to develop expertise to prevent contamination through mitigation measures instead of restricting itself to managing a risky situation after the fact:

Hydro-Québec did not use the La Grande complex to develop expertise that would enable it to assess the circumstances in which mitigation measures could be deployed. In particular, Hydro-Québec objects to complete deforestation of the Carheil and aux Pékans reservoirs [...], arguing that such an operation would be too costly and of no measurable benefit. In our view, these arguments are only theoretical.

(Brief by Takuaikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 29)

The agreement on mercury [...] for the Cree communities affected by the La Grande complex is based on the assumption that the problem of mercury in the reservoirs is best addressed by taking regular measurements of mercury levels in fish and humans and by encouraging individuals to stop fishing or eating fish from the reservoirs.

(Brief by Takuaikan Uashat mak Mani-Utenam and the Conseil des Atikamekw et des Montagnais”, p. 30)

The Montagnais concluded that the wrong done them because they will have to live in a contaminated territory and use contaminated resources cannot be mitigated by a follow-up program. This program is also an undesired invasion of their everyday lives:

[...] From what we hear, we will have to learn to eat less contaminated fish and to be examined from every aspect. We will become subjects of observation at the service of advancing technology for controlling methyl mercury effects and of

experimentation in the medical monitoring of human beings. It will be our pleasure to follow the little nutritional guide that will be made available to us.

(Brief by Innu Takuaikan Uashat mak Mani-Utenam, p. 6)

In the Montagnais' view, this loss is not only that of their community, since mercury contamination of the reservoirs is a general phenomenon that should concern all Quebecers:

[...] mercury may become a symbol of environmental contamination arising from hydroelectric development in general. It is very important that Quebec not adopt a simplistic approach in which the mercury problem is seen as concerning our communities alone and in which responsibility is viewed as falling solely on the social and health services. Hydro-Québec bears a heavy responsibility for this problem.

(Brief by Takuaikan Uashat mak Mani-Utenam and the "Conseil des Atikamekw et des Montagnais", p. 32)

Few comments were given at the hearing on wildlife contamination other than that of fish by mercury and on the potential effects of this exposure. The QWF observed that the proponent had not considered the effects on birds that would eat contaminated fish and thus become contaminated themselves:

Studies [...] indicate there is a significant increase in mercury levels in osprey nesting near the La Grande complex reservoirs. [...] Concentrations of up to 1.30 ppm in the muscle of the common flycatcher have been analyzed. FQF considers that a follow-up analysis of the contamination of the wildfowl in the area would be acceptable.

(Brief by the Quebec Wildlife Federation, p. 63)

In its project assessment, the DDE (filed document B6, p. 3) recommended characterizing the mercury contamination and its spread through the food chain of the study region by using fish-eating species.

A Problem to Be Mastered

In our current state of knowledge, mercury contamination as a result of reservoir construction is, in the main, a predictable phenomenon, but for which no easily applicable mitigation measures exist. Deforestation does not appear to solve the problem in any significant way, while scouring the earth seems impracticable. Selective fishing during and after priming to remove the most contaminated species is rather an “after-the-fact” measure whose effectiveness has been doubted, even by the proponent. The latter, furthermore, does not appear to have resolved the question of the disposal of contaminated fish that would thus be removed.

The Panel is concerned by a number of weaknesses in this case. In particular, it is difficult to predict changes in fish communities in the future reservoirs since those communities are poorly known prior to the development. Their dynamics depend, among other factors, on the productivity of the reservoirs and on inter-specific relations and determine the number of individuals, the biomass, average size and growth, all criteria which influence mercury levels in fish. Furthermore, the controversy surrounding the inaccuracy of the mercury accumulation model make it difficult to get a clear idea of the scope the contamination problem would take on or of the phenomenon’s duration.

The decision on consumption standards and action levels requires knowledge of fish consumption by people in the territory, in particular by natives, for whom these fish are an important source of food. The action levels and the monitoring program should be determined on the basis of conditions specific to the Sainte-Marguerite River basin, and would not necessarily be the same as in James Bay. It is important to take into account current mercury contamination levels in fish in this area of the North Shore, which may mean human contamination levels already higher than elsewhere. Should a decision be made in favour of implementing the project, the mercury problem can only be managed through negotiations between the parties concerned, which negotiations should be conducted before the project is authorized.

For the moment, the mercury issue is indissociable from the notion of reservoir. It constitutes a negative impact which can be mitigated only very partially. It is true that the problem would tend to disappear, but it is not certain that the 30-year time frame is the right one. If the figure is 50 years instead, as suggested in the appendix to the brief by the CAM, the problem would persist over a period equal to that currently cited for the economic life

of the dam itself. Even without human consumption, the contamination of an ecosystem is, in itself, an undesirable impact. On this point, the Environmental Impact Statement's lack of any assessment of the spread of mercury in the environment, its failure to consider the possible impact of mercury accumulation on fish-eating species such as the otter, fisher, fox and several predatory and aquatic species, as well as the absence of estimates concerning the spread of mercury downstream from the SM-2 dam are all major weaknesses.

As is the case for a number of other components of the ecosystems affected by the project, the proponent intends to correct certain weaknesses and uncertainties by means of studies that would be undertaken after the project is authorized. The Panel feels that some of these elements could have and should have been measured and verified in advance.

The Panel also considers that appropriate mitigation measures should be developed jointly by the proponent and the communities affected. On this point, the work of the James Bay Committee on mercury may serve as an example (technical document 300). The suggestions to be examined include replacement fisheries, methods for the exploitation and aquacultural development of certain watercourses, development of the banks of the reservoirs, including a program to plant grasses and develop the reservoirs' fishing potential.

Project's Impact on Habitats and Wildlife

Generally speaking, the proponent presented its impact analysis in a geographical perspective, dividing the study area into three sectors, which it called ecosystems: the coastal area, the continental basin and the northern plateau (Environmental Impact Statement, part 4, p. 1).

In each of these areas, it distinguished the impacts caused during the construction phase from those related to the operational phase. The impacts on the natural environment were examined by relating the project's various activities or components to elements in the host environment. These elements, such as fish communities, peat bogs, and terrestrial wildlife, may vary with the area being considered. Impacts were assessed and quantified for each of the three areas based on the type of impact (positive, negative,

indeterminate) and its importance. This importance depends on the extent of the impact (one-time, local, regional or national), its intensity (low, medium or high), its duration (temporary or permanent) and the relative value of the elements of the environment concerned:

The relative value of an element refers to its scarcity, its uniqueness and its importance for society, as well as its ability to tolerate a change. [...] The value of the elements in the biological and human environment may be low, medium or high [and] vary from one ecosystem to the next.

(Environmental Impact Statement, part 5, p. 50)

A series of tables summarizing the various residual impacts was presented in Chapter 2. The proponent was criticized on four counts for using this method. First, some criticized the method of presenting the various impacts on one element in particular. To examine each element, each of the sections must be studied with respect to the geographical sectors and, within each of those sections, each of the project phases:

We had trouble getting an overall idea because the information is [...] scattered over the four different sections of the report [...] There is no figure or matrix to provide an overview.

(Brief by Takuuikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 20)

Second, a few briefs criticized the proponent for examining the study area by looking at each of the components separately, rather than considering groups of wildlife and vegetation which are dependent on each other for their survival. This approach would have made it possible to consider the interrelationships between the various biological elements and the physical environment:

Hydro-Québec's approach is to describe the environment on the basis of the planned project. [...] The project's impacts on an element of the environment are presented in the form of several impacts related to each of the project's activities. It is impossible to get an overview of the impacts on the aquatic wildlife, to estimate overall habitat losses for terrestrial wildlife or [...] on the exploitation of resources.

(Brief by the “Association des biologistes du Québec”, part 2, pp. 2 and 7)

Third, the proponent appears to have failed to consider certain elements in the study area as a whole and in certain sectors:

We noticed the absence of inventory data [...] for various [...] species that are hunted or trapped: lynx, fox, marten, hare, porcupine.

(Brief by Takuaiikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 9)

Lastly, some said they found the impact assessment subjective, since it is based on relative values of the elements in the environment. Those values are not necessarily the same for all communities or depending on the type of utilization planned:

The method used to assess the impacts is based on unobjective criteria for three of the four parameters used. Only the score pertaining to the duration of the impact is based on an objective criterion, that is the duration.

(Brief by Takuaiikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 11)

Relying on these points, participants stated their main objections, which are grouped together below under three headings: habitats, animal communities and ecosystems.

Aquatic and Forest Habitats

Witnesses at the public hearings expressed concern about the defects of the draining of river segments. In addition to harming navigation, which was examined in Chapter 4, these actions would have impacts on the wildlife. The virtual draining of the Grand Portage rapids on the Sainte-Marguerite River would constitute a permanent impact:

During the priming of SM-3, the Sainte-Marguerite River will be drained over a distance of 30 to 40 km downstream from the dam for approximately 40 months. The trout, northern pike, their habitats and spawning grounds will be destroyed or at least very disturbed. There will be permanent draining of an approximately 10-km section of the river downstream from the dam which is the best sector for brook-trout fishing.

(Brief by the “Association chasse et pêche sept-îlienne Inc.”, pp. 6 and 7)

During priming, there will also be a temporary lowering of the aux Pékans River's flow downstream from the reservoir's control work, and a major and permanent reduction thereafter:

Everything thus indicates that, for the greater part of the year, 23 km of the river will be virtually drained, while the flow over the last 7 km will be considerably reduced.

(Environmental Impact Statement, part 5, p. 85)

The creation of reservoirs on part of the Sainte-Marguerite, Carheil and aux Pékans rivers would also transform river ecosystems into lake ecosystems. The result would be major changes in all animal and plant communities. Some emphasize that these new lakes would not attain the natural balance of neighbouring lakes because their changing water levels would have a destabilizing effect:

[...] 14% of the banks of the future SM-3 reservoir will be unstable.
(Brief by the Nitassinan Coalition, p. 26)

Several witnesses also pointed out that the proponent had underestimated the extent of changes in water quality in the reservoirs and the resulting impacts on downstream watercourses:

During the priming of SM-3, water in the SM-2 basin will be very acidic because of the tributaries which will be the only source of water in the basin. This will cause considerable harm to the aquatic wildlife [...]

(Brief by the "Association chasse et pêche sept-îlienne Inc.", p. 7)

Creation of the SM-3, aux Pékans and Carheil reservoirs will disrupt the thermal balance in the corresponding rivers which will then adjust to that of the surrounding lakes. [...] There will be marked dissolved oxygen deficiencies in the aux Pékans and Carheil reservoirs, particularly when covered by ice.

(Brief by the Nitassinan Coalition, p. 26)

Although the proponent states that water quality in the Moisie River will not be affected by these developments in the upper basin, we believe the contrary [...] Water from the aux Pékans and Carheil rivers will be of very poor quality [...] when the headraces are

opened [...]; during construction [...] and demolition of the cofferdams [...]; when the tailrace is opened[...]. There will be [...] a major downstream movement of sediments, an increase in turbidity and deterioration of water quality in general.

(Brief by Takuaiakan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 27)

In regional terms, the priming and operation of the reservoirs and diversion works will completely disturb water quality and the physical, hydrological and ecological characteristics of the Carheil and aux Pékans rivers [...]

(Brief by the RCM of Caniapiscau, p. 15)

The flooding of vast areas would destroy the forest habitats in those areas. Merchantable timber would be harvested in the SM-3 reservoir, but some witnesses noted that forest conservation remains one of the objectives of sustainable development:

*The Statement in Principle on Forests, passed at the **Earth Summit** in Rio de Janeiro in June 1992, underscored the urgent need to preserve forest ecosystems. It emphasized the vital role played by forests in protecting fragile ecosystems, drainage basins and freshwater reserves as reservoirs of carbon and rich deposits of biological resources.*

(Brief by the “Association des biologistes du Québec”, pp. 30 and 31)

On the same theme, the QWF recommended that specific development measures be taken in respect of the forest territories that would be made accessible by access routes to the works:

That forest intervention methods more severe than the provincial standards be adopted in the zone in order to effect integrated resource management and, in particular, to maintain the trapping activities of the Montagnais and whites.

(Brief by the Quebec Wildlife Federation, p. 73)

The proponent has not put forward adequate rehabilitation measures for many habitats that will be affected. Some witnesses particularly emphasized the disappearance of riparian ecotones which are excellent habitats for vegetation and for small and large wildlife that live there.

Furthermore, the regular water level changes of several metres in the SM-3 reservoirs (6 m on average and, in exceptional circumstances, up to 14 m) and aux Pékans reservoir (1 to 3 m occasionally and up to 11 m in exceptional circumstances) would create bands of varying widths around the reservoirs where no persistent riparian ecotone could establish itself. The result would be various impacts on the vegetation and wildlife.

[...] 65 km of riparian ecotones will be lost and hydraulic management (excessive fluctuations in water levels) will make it impossible to reconstitute them.

(Brief by the “Corporation de protection de l’environnement de Sept-Îles”, p. 11)

There is no available study enabling us to determine the distribution and extent of riverside ecotones in the study zone. [...] No inventory specific to the riparian and aquatic vegetation was conducted in the territory.

(Brief by the Quebec Wildlife Federation, p. 9)

Lastly, as the Department of Forest Canada (ForCan) noted:

One factor that is all too often forgotten in our environmental assessments is the real weight of so-called exceptional natural spaces. We find such spaces around the three reservoirs. The banks of the existing watercourses which will eventually be flooded are exceptional spaces. The largest populations, the richest vegetation, the wildlife with the most beautiful fur live on these banks, which will be submerged.

(Filed document B5, p. 4)

Animal Communities

The project’s impacts on wildlife were also among the major concerns expressed:

After studying Hydro-Québec’s preliminary report dated July 1991, we have come to the conclusion that there is one fly in the ointment. It would appear that some additional precautions should be taken to protect the animals living in the territory that will be flooded.

(Brief by the “Association des trappeurs indépendants Inc.”, p. 3)

In its brief, the QWF provided an excellent summary of the Sainte-Marguerite project's effects on the wildlife and its habitats. It emphasized that these effects would represent the major residual impacts on the environment. The following presentation is based on the argument presented by the QWF.

Fish

Many witnesses were apprehensive that the changes to the current conditions in the lakes, watercourses and estuaries would affect fish populations in ways not adequately documented by the proponent:

Reduced flows during priming [...] will cause an increase in saltwater in the estuary [...] This will raise the death rate among freshwater species, in particular among the northern pike, burbot and northern sucker. There will also be a negative impact on smelt, lake whitefish, brook trout, gaspereau, tomcod and burbot. [...] The winter water temperature downstream from the SM-2 dam will increase 2.2°C. This rise will decrease the number of days needed for lake whitefish and brook trout eggs to hatch [...] Eggs will hatch 22 days before the normal date [...] At that time, food is more scarce, unless the eggs of their prey (mainly insects) also hatch early.

(Brief by the "Corporation de protection de l'environnement de Sept-Îles", p. 10)

Lake trout will disappear from the future reservoirs.

(Brief by the Nitassinan Coalition, p. 28)

During the construction phase, the lakes will undergo erosion and increased sedimentation, which will frustrate the eating habits of bottom-feeders; [...] lower oxygen levels in the water, particularly at the end of winter, mainly as a result of organic decomposition, will be fatal for all species.

(Brief by the "Corporation de protection de l'environnement de Sept-Îles", p. 15)

Some users requested compensation for the loss of fishing sites:

The liming and seeding of 10 lakes targeted in MLCP's survey campaign [...] as well as the seeding of ouananiche in the SM-2 basin.

(Brief by the "Association chasse et pêche sept-îlienne Inc.", p. 8)

Others, such as the QWF, questioned several aspects of the Environmental Impact Statement, whose compliance with the requirements of the MENVIQ guidelines was disputed:

The QWF estimates that fish habitats were surveyed in only approximately 10% of the Sainte-Marguerite River! How can project impacts be assessed [...] if there is no overall picture of aquatic habitats in the Sainte-Marguerite, Carheil and aux Pékans rivers? [...] The QWF considers that Hydro-Québec's Environmental Impact Statement on the question of fish habitats is not consistent with the guidelines issued by the Minister of the Environment.

(Brief by the Quebec Wildlife Federation, p. 28)

In its brief, this organization also raised problems in the fish survey methodology used and in the disclosure of all data obtained, both for certain species such as the lake trout and northern pike, and for the first stages of life of various species. The destruction of habitats, in particular riparian habitats, would have impacts on the fish populations which the proponent has not assessed:

It is difficult to determine whether the northern pike has appropriate sites for its spawning grounds. The QWF observes that this was a major weakness in the impact assessment. [...] The northern pike's reproduction rate, as well as that of other species is related to a host of factors and [...] the new conditions created by the reservoirs will not necessarily ensure successful reproduction of these fish.

(Brief by the Quebec Wildlife Federation, p. 47)

The QWF also emphasized that Hydro-Québec had forgotten to assess the possible impact of an increase in certain parasites, in particular among the pike and lake whitefish, which could significantly influence changes in these fish populations. Lastly, this same organization criticized the mitigation measures put forward by the proponent.

Adhering to the principle of no net loss of habitats, and adopting the hierarchy of mitigation methods of the DFO, the organization believes that:

The development or restoration of spawning grounds remains an essential prerequisite to seeding in an environment, [which] is a limited method.

(Brief by the Quebec Wildlife Federation, p. 51)

Concerning the seeding of reservoirs, special attention should be paid to the risks of inter-species competition, which could lead to a decline in indigenous trout populations in the reservoirs and their tributaries. Measures designed to make new spawning areas in the tributaries of the reservoirs accessible should also be more carefully considered. As suggested by the QWF, some thought should be given to introducing an incentive program to encourage affected workers at the SM-3 dam encampment to carry out their activities in the organized territories of this zone, in particular the Matimek ZEC and the Sept-Îles–Port-Cartier Wildlife Preserve. This measure would make it possible to prevent over-exploitation of wildlife resources in the territory near the encampments and to reduce conflicts between workers and the Montagnais (*Ibid.*, pp. 70 and 71).

In the case of brook trout habitats which would be lost on the Sainte-Marguerite:

The Federation recommends instead that Hydro-Québec develop a number of brook trout spawning grounds equivalent to the number that will be lost in the section of the Sainte-Marguerite River. These spawning grounds may be developed in the tributaries, adjacent lakes or on sport fishing replacement sites.

(Brief by the Quebec Wildlife Federation, p. 52)

With regard to ouananiche seeding, the QWF notes that the MLCP's current regulations do not authorize this measure and that mercury contamination could in any case prevent this species from continuing or from being usable by human communities.

Small Wildlife

A number of organizations consider that Hydro-Québec is hardly concerned at all with small wildlife. And indeed only the beaver was discussed in the first version of the Environmental Impact Statement:

Only the beaver has been the subject of in-depth ecological studies applicable to populations in the study zone. [...] As for the other species of small wildlife (hare, ptarmigan, otter, fox, etc.), only one of the parcels surveyed [...] appeared to shelter any in the winter of 1988.

(Environmental Impact Statement, Part 4, p. 138)

This observation concerning a territory of several thousands of square kilometers was of course singled out. The proponent admits that the Environmental Impact Statement is weak on this subject:

There was no systematic aerial survey [or any other kind] of small wildlife. [...] The indicators of the presence of small wildlife species other than beaver were noted in the moose and caribou survey conducted during the winter of 1988 [...] The absence of trails in one parcel [...] in no way means that that parcel cannot be used by these animals.

(Environmental Impact Statement, Supplement 1, c. 4, pp. 15 and 16)

In response to questions by MENVIQ during the conformity analysis, the proponent summed up and assessed losses by grouping species by the types of habitats that would be altered:

To assess the value of these forest habitats for small wildlife, we did a synthesis of the biology and habitats of species of socio-economic interest. Five species were examined: the snowshoe hare, the willow grouse, American sable, red fox and Canadian lynx. [...] The results of this [bibliographical] research made it possible to assess the level of interest in each of the five species [...] The wildlife potential of each type of terrestrial habitat was then assessed [and] divided into three classes [...]

(Environmental Impact Statement, Supplement 1, c. 4, p. 26)

MENVIQ found this assessment insufficient:

The grouping done is debatable. [...] We cannot rely on the results obtained based on wildlife habitat potential as a key [...] The proponent must carry out the exercise again [...] forming several groups on the basis of species that have common habitat requirements.

(Environmental Impact Statement, Supplement 2, p. 33)

Although the proponent subsequently submitted this kind of table (Environmental Impact Statement, Supplement 2, p. 34), the study remained unsatisfactory for the CAM, the QWF and the "Association des biologistes du Québec":

[...] No small wildlife survey was conducted in the drainage basin of the Sainte-Marguerite, Carheil and aux Pékans Rivers [...] There

are several deficiencies in the assessment of the small wildlife forest habitat; among other things, the fact that wildlife potential is determined solely on the basis of the forest cover [...] Riparian ecotones are [also] environments much used by small wildlife and are also the first habitats affected by the reservoirs' creation. [...] The species trapped by the Montagnais in the region [...] are the weasel, beaver, squirrel, wolf, otter, lynx, marten, muskrat, fox and mink. It is clear to the QWF, and as mentioned by the "Conseil des Atikamekw et des Montagnais", that the information on small wildlife is incomplete.

(Brief by the Quebec Wildlife Federation, pp. 9 and 10)

There are no data on the abundance and distribution of small wildlife over the various planned reservoirs. What impact will priming have on small wildlife and burrowing animals?

(Brief by the "Association des biologistes du Québec", Part 2, p. 3)

The opinion of the QWF regarding the validity and utility of data on beaver is based on the fact that the riparian ecosystems were not given adequate consideration in the ecological data reference cards used:

The QWF is of the view that the proponent did not provide an adequate response [...] We cannot rely on the findings of the beaver habitat potential analysis, and [...] an inventory would be necessary.

(Brief by the Quebec Wildlife Federation, p. 8)

As a compensation measure to offset the small wildlife habitat losses, the proponent proposes to make rejuvenation cuts in the forest on the edge of the future SM-3 reservoir. To promote numerous species and enhance this mitigation measure, the QWF recommends:

That mosaics of juxtaposed populations of various ages be created to maximize diversity. That unordered cuts in bands of 60 meters maximum width be favoured in order to increase the border effect. That clear cutting in a checkerboard pattern, which forms corridors for predators, be prevented.

(Brief by the Quebec Wildlife Federation, pp. 10-11)

Large Wildlife

The proponent acknowledges that flooding the territory's sectors would result in a loss of habitat for large wildlife, that is moose and caribou. These losses could be reduced by adjusting the project's construction schedule to the requirements of these species:

Major moose habitats will be lost [...] We expect that half of the reservoir will be filled in November, which will cause the animals to travel during the period when food is still abundant.

(Brief by the "Corporation de protection de l'environnement de Sept-Îles", p. 13)

This organization also pointed out that every change in the established project schedule would require a reassessment of the impacts on wildlife.

According to the QWF, potential caribou habitats were not studied, a major deficiency, particularly in the present situation in which moose appear to be replacing caribou in this region. Furthermore, it found that the moose data were not appropriate:

The proponent responded partially to the MENVIQ guidelines with respect to assessing potential winter habitats and surveying moose and caribou populations [...] We cannot rely on the assessment of the potential habitats identified.

(Brief by the Quebec Wildlife Federation, p. 13)

The QWF recommends, in particular, that forest bands be preserved at the edge of lakes and along watercourses and that there be diversified reforestation.

Birds

Many witnesses emphasized that very little consideration was given to bird communities as a whole in the proponent's study. Comments focused mainly on wild fowl, which include the most intensely used species. Most of these species are migratory and, as such, have drawn the attention of the DOE, which is legally responsible for them. This Department criticized the

Environmental Impact Statement for its lack of data that could support the proponent's conclusions regarding forecast impacts. The example of the Carheil reservoir project was mentioned:

How then can it be said in the impact analysis that these [impacts] on birds will be negligible, if the data are non-existent?

(Filed document B6, p. 2)

This same observation was made by other witnesses:

Despite its ignorance of bird populations in the study area and the absence of any point of comparison, the proponent nevertheless concluded that the impacts of its project on these populations will be low.

(Brief by Takuaiakan Uashat mak Mani-Utenam and the "Conseil des Atikamekw et des Montagnais", p. 10)

Contrary to what the directive provides, the QWF finds that the proponent did not conduct a survey of bird populations subsequent to the assessment of potential habitats.

(Brief by the Quebec Wildlife Federation, p. 18)

DOE recommended a number of additional studies on, among other things, the use of Sainte-Marguerite Bay by the bird colonies of Corrosol and Manowin islands, on the spread of mercury and on the situation regarding resource use by native people. The Department also proposed mitigation and follow-up measures (filed document B6).

Rare or endangered species may have been forgotten among these incomplete studies:

With respect to rare and endangered species, the QWF believes it is dangerous to conclude that these species are absent based on the sampling of four parcels.

(Brief by the Quebec Wildlife Federation, p. 19)

The proponent [gives] a poor description of the situation of several groups of species, in particular scoter, garrot, gallinaceans and certain endangered species (peregrine falcon, bald eagle, golden eagle).

(Brief by Takuaiakan Uashat mak Mani-Utenam and the "Conseil des Atikamekw et des Montagnais", p. 10)

[...] There must be a survey of rare and endangered species in the territory and of how the project may affect them.

(Filed document B6, p. 3)

As in the case of small wildlife, methodological errors were pointed out and the project schedule called into question :

The start of priming of the reservoir planned for May greatly endangers the black duck, golden eye, Canada goose and green-winged teal.

(Brief by the "Corporation de la protection de l'environnement de Sept-Îles", p. 12)

For the avifauna, the proponent has used maps of seagrass beds which, in certain instances, are more than 11 years old to characterize the coastal habitats conducive to the avifauna. The scale of the maps used to assess potential wild fowl habitats is not adequate. Hydro-Québec and MENVIQ agree on this point.

(Brief by the "Association des biologistes du Québec", Part 2, p. 3)

Ecosystems

According to the DFO, not all the components of the Sainte-Marguerite River estuary were adequately assessed :

The following concerns should have been addressed [...]: - potential changes in the productivity of zooplankton and bottom-feeding communities; - potential changes in trophic conditions governing feeding among the fish communities; - possible changes in the distribution of commercially exploited fish resources [...] In addition to these concerns, reduced river flow during priming of the reservoir as well as subsequent increased flow could have additional undocumented impacts on: - the specific composition and, consequently, productivity of the fish communities; - the long-term yield of fish resources [...]

(Filed document B8, p. 9)

These fears are consistent with a comment by the ASF concerning the importance of the spring run-off for productivity in the coastal zone of the Gulf of St. Lawrence.

Certain witnesses were dissatisfied with the assessment of the Moisie estuary. In its brief, the CAM pointed to the differences in methodology used by the proponent to study the Sainte-Marguerite River basin and that of the Moisie River, both of which will be affected by the project:

The purpose of not including the lower portion of the Moisie River in the study zone was to exclude it from a true assessment of all impacts and to limit the exercise to a simple, incomplete study on the effects of the diversion on a single wildlife species, that is salmon [...] The preliminary report on SM-3 thus appears to be two studies in one [...] These two parts are not integrated with each other [...]
(Brief by Takuaiakan Uashat mak Mani-Utenam and the Conseil des Atikamekw et des Montagnais", pp. 8 and 9)

Other witnesses emphasized that, with the exception of salmon, the proponent paid no attention to the many biological factors that are part of the Moisie ecosystems:

The narrowness of the study, which focuses solely on salmon in the Moisie, to the exclusion of other major salmonid populations in that river (particularly in the upstream portion and estuary) seriously concerns FSA. Anadromous speckled trout stocks migrate downstream in the Moisie and its tributaries in order to feed in the estuary during summer, then migrate upstream to spend the winter [...] This is a major sport fishing species [...] The proposed diversion will permanently affect the salinity gradient in this estuary. What will be the impact on the anadromous trout?

Furthermore, Whoriskey and Montgomery (1981) observed the presence of a number of whales in the mouth of the Moisie River in early April. Local hydrological conditions had generated an ascending current which had concentrated zooplankton and attracted the whales. This ascending current could be linked to the spring run-off in the St. Lawrence estuary.
(Brief by the "Fédération du saumon atlantique", p. 13)

This observation was shared by DFO in its initial environmental assessment, as well as by the QWF, which:

Recommends that the order of the Minister of the Environment state that the proponent shall conduct surveys of the entire aquacultural community in the Moisie River and that those surveys not be limited solely to the estuary of that watercourse, but encompass its entire basin. The same comment applies to the survey of fish habitats.
(Brief by the Quebec Wildlife Federation, p. 27)

Ultimately, several witnesses observed that the proponent had studied few cases and made little effort to characterize and preserve sites valued by the various local communities. It had merely described the environment in reference to its project and arranged the impacts in classes, forgetting about sets of impacts and the way people see the major factors of their environment:

Hydro-Québec's approach is to describe the environment from the point of view of the planned project [...] There is no assessment of the value of the biological resources such as use value, existence value, heritage value, option value or ecological value (e.g., productivity).
(Brief by the "Association des biologistes du Québec", Part 2, p. 2)

We have been unable to trace the environment's valued components or exceptional sites for any of the cultures considered [...] or to determine how the proponent will ensure they are preserved and protected by mitigation measures [...] The treatment of sites such as Grand Portage, the aux Pékans River's fall into the Moisie, the White Mountain River zone and aux Cèdres Lake do not reflect the unique nature of these sites.
(*Ibid.*, Part 2, p. 1)

An illustration of this criticism appears in the brief by the Uashat-Maliotenam Band Council:

Our patrimonial route, the Grand Portage, will be drained, but, according to the proponent, that's not serious. It will produce an audio-visual document so that our children can see what was there when the place was alive [...]
(Brief by Innu Takuaitkan Uashat mak Mani-Utenam, p. 19)

In addition, according to the “Association des biologistes du Québec”, the historical perspective has been forgotten. The proponent should have placed its project in the context of the evolution and dynamics of the components in the Sainte-Marguerite River ecosystems:

The description of the environment does not set out the changes the environment will undergo from an historical perspective. The Sainte-Marguerite River has been considerably transformed over recent decades, indeed over the past century. In “La Côte-Nord du Saint-Laurent et le Labrador canadien (E. Rouillard, Quebec City, Laflamme et Proulx, 1908, 188 pp.)”, Eugène Rouillard described the river at the start of the century: “The cacaouis, black duck, scoter ducks and others nest in abundance in the swamps and lakes [...] Between the second falls and the Grand Portage, there are 25 salmon passes. In addition to salmon, the Marguerite River teems with lake trout, pike, shad, whitefish, carp, capelin and others [...] The Marguerite River and its tributaries are well covered with white spruce, of good quality and quantity, 30 to 40 inches in diameter at the trunk [...] Along the Grand Portage, the forest is a mix of hardwood and softwood of medium growth.” If a historical perspective had been taken, a description of the environment would certainly have made it possible to situate the project better in time and to define the temporal limits of the impact assessment, including the multi-year sites and seasonal variations in each environmental component [...] The description of the environment should have contained a list of: outstanding sites, falls and rapids, sources, escarpments, lakes, mountains, look-outs, beaches, areas where there are wealth and diversity of wildlife and particular environments.

(Brief by the “Association des biologistes du Québec”, Part 2, pp. 4-5)

Considering Neglected Ecosystems

A list of important elements of the study zone’s ecosystems neglected by the proponent would be a long one, since an exhaustive assessment should have included insects and mollusks that feed most of the fish in the lakes and rivers under assessment, exploited resources such as wild fowl and animal species other than salmon in the Moisie River, several components of the fish communities in the rivers and lakes of the projected reservoirs, as well as large and small wildlife.

Despite incomplete surveys, the proponent appears confident of the possibility that the wildlife species disturbed by the project can “relocate”. However, knowledge of this subject as regards most species is virtually non-existent. The information obtained at the public hearings concerned capture and transportation methods proposed by the “Association provinciale des trappeurs indépendants”, and documents filed by the proponent on adaptation of the beaver, an eminently aquatic species, to the flooding of its territory in James Bay. The little information presented in these preliminary documents did not show the Panel that the findings are applicable to all species concerned. The Panel is thus led to conclude, with the mayor of the municipality of Rivière-Pentecôte, that “small mammals will be particularly affected by the priming of the reservoirs, which may increase their mortality rate” (brief by the “Corporation municipale de Rivière-Pentecôte”, p. 5), that is to say that the term “relocation” could be a euphemism for “death”.

Certain mitigation and compensation measures put forward by the proponent are inadequate or require additional assessments. This is the case, for example, of the replacement potential of neighbouring lakes for sport fishing and seeding the reservoirs with ouananiche. A number of the deficiencies of the Environmental Impact Statement were recognized by the proponent, and they are under examination or, according to the proponent’s plan, will be examined after authorizations are obtained. Many of these works would in fact be integrated in the follow-up assessments. The same is true of the examination of certain mitigation measures which, in the proponent’s view, are to be assessed after the project is authorized.

The Panel recognizes that certain impacts are inevitable and cannot be mitigated without calling the river’s entire hydroelectric operation structure into question. Other impacts, however, could be assessed more thoroughly, and compensation, mitigation or replacement measures proposed. Some of these measures have already been identified by witnesses. A type of planning in which economic imperatives were not considered solely or on a priority basis would perhaps lead to different decisions, particularly in the case of the project’s work schedule :

We cannot save a large part of the existing vegetation, but something can certainly be done to lessen the shock on animals. The moment the reservoirs are primed thus becomes important if the principle of respecting nature described in the Green Plan is to be followed.
(Filed document B5, p. 4)

The Panel's analysis goes beyond the oversights of important factors and certain weaknesses in the mitigation measures. Like some witnesses, the Panel is concerned that the proponent did not choose an approach that would enable it to analyze the impact on ecosystems rather than on particular factors. The proponent's grid of inter-relations is a matrix approach which compartmentalizes the environment and isolates the impacts. It would have been better for the assessment to establish links that would make it possible to monitor the consequences of undetermined impacts and indirect impacts. Dividing the assessment zone into three major sectors (which the proponent wrongly calls ecosystems) obscures the overview which we should be able to obtain for the Moisie and Sainte-Marguerite Rivers. Where strong impacts are identified, more thorough analysis should enable us to monitor the consequences on the other elements of the system.

The assessment of the Sainte-Marguerite River estuary illustrates these points. Estuaries are transitional environments between sea and fresh water. Nutrients and organic matter from the continent as well as the mix of fresh and salt water create particular conditions for natural productivity. The impact of changes in river conditions, called the spring run-off in northern environments, has been studied very little. The Panel shares the doubts raised by the DFO regarding this issue, but would have liked to see a more solid demonstration by that Department's scientists. Hydro-Québec should have provided a more thorough analysis of the various production levels in the Sainte-Marguerite River estuary. Phytoplankton, fish and marine mammals were studied, but more from the perspective of their numbers than their productivity. In its responses to DFO criticisms, the proponent itself observed that it is unrealistic to think one can predict fish production based on primary production data. The Panel was also surprised that the proponent suggested:

An overview of possible impacts by referring to available data on a comparable estuary located in the same region: that of the Manicouagan River.

(Filed document A11, p. 4)

The proponent noted that, in the Manicouagan estuary, "the bottom-feeding community is sparse and the environment unproductive" (filed document A11, p. 4). The Manicouagan River was harnessed in the 1960s, and what can be observed today is partly the result of that development, which unfortunately cannot be compared with the situation in the Manicouagan

estuary before it was harnessed. Since it is highly likely that such data do not exist, this project would precisely afford the opportunity for the proponent to assess the impact of its works on the estuaries of the St. Lawrence tributaries.

The Panel would have liked the proponent to present a synthesis of its many assessments in order to understand the overall impact of its developments on the two hydrographic basins of the Moisie and Sainte-Marguerite. According to the Pearse Commission:

[...] The hydrographic basin or drainage basin generally constitutes the most practical water management unit [...] All water development projects should be carefully analyzed to ensure that benefits exceed costs. This would require systematic and standard assessments that would take into account social and ecological impact as well as direct economic costs and benefits. Ecological risks, the consequences of irreversible decisions and the intrinsic value of maintaining a natural water system must also be taken into consideration.

(Pearse et al., 1985, c. 10)

As for river diversions, the Pearse Commission also stated:

[...] On the whole, water transfers between basins have the same consequences as other water development projects. However, they also raise some specific problems [...] Since they increase flow within one drainage basin to the detriment of another [...] the resulting changes on the environment may be considerable and irreversible. Furthermore, connecting two separate hydrological systems may introduce parasites and other organisms in new environments where they may have considerable and unpredictable consequences.

(Pearse et al., 1985, c. 10)

And lastly, it recommended:

[...] that inter-basin water transfer projects be considered with a maximum of precautions and only where other ways of achieving desired objectives are unfeasible.

(Pearse et al., 1985, c. 10)

Ultimately, the Panel finds that too many elements in the natural environment were not adequately assessed and that too many residual impacts have not been satisfactorily mitigated or compensated for. It concludes that the Environmental Impact Statement is not acceptable in its present state. A number of neglected elements were recognized by the proponent itself in its statement and in the supplements to MENVIQ's questions. The analysis conducted in this chapter is based on others. All these questions should be addressed, if possible, before the project is authorized. Furthermore, the proponent should examine the links between the various impacts and group them together in the form of syntheses in order to assess predictable changes throughout the ecosystems.

While it was impressed by the extensive expertise deployed by the proponent itself, by the various departments which commented on the Environmental Impact Statement and by the witnesses at the public hearings, the Panel nevertheless laments the fact that these resources were pooled so late to enhance assessment of the project. It would be highly desirable in future that there be a formal and transparent process of consultation and cooperation between the proponent, the departments, the professional organizations and the local communities at all stages of the assessment, including in the preparation of guidelines.

Cumulative Effects

The problem of cumulative effects on the natural and human environments, whether on a watercourse or a whole region, was raised on several occasions. The Panel is interested in this issue, although it is not given much attention in the impact assessments. The question of cumulative effects becomes all the more important in the Panel's eyes given that Hydro-Québec is planning to build its twelfth dam on the North Shore, and is managing a total of several hundred dams in Quebec.

The "Association des biologistes du Québec" discussed cumulative effects in its brief from the standpoints of building reservoirs, adding power transmission lines to built-up areas, health risks, loss of land, changes to the environment and lost potential (forestry, biodiversity), both throughout Quebec and on the North Shore.

The Association believes that an analysis of cumulative effects should have been carried out by Hydro-Québec:

In short, the ABQ understands that Hydro-Québec can add to our knowledge about the cumulative effects of the SM-3 project. The analysis and the mitigating measures proposed by the corporation do not, for example, give due regard to:

- the cumulative effects of several projects that affect ecological systems;*
- the effects of secondary activities stemming from the development of SM-3;*
- the synergistic effects of environmental impacts;*
- a satisfactory evaluation of the current status of the environment in which the SM-3 project is to be developed.*

(Brief by the “Association des biologistes du Québec”, p. 32)

As shown in Chapter 6, the CAM also raised the problem of cumulative effects from the standpoint of the construction of a series of hydroelectric dams on the North Shore, and the impacts that the Montagnais have undergone for 40 years now.

The QWF gives as examples the guidelines for the Grande-Baleine complex environmental impact study, the work of the Canadian Environmental Assessment Research Council and Hydro-Québec’s work on the subject. The Federation’s analysis is limited to wildlife and wildlife habitat issues. The future of estuaries, fresh watercourses in the Gulf of St. Lawrence and the cumulative effects on certain species such as caribou and waterfowl have drawn its attention. More specifically, it discusses the hydroelectric potential of the North Shore rivers and concludes that:

This [hydroelectric] potential would indicate that there will be intensive use of this resource [rivers] on the North Shore.

(Brief by the Quebec Wildlife Federation, pp. 77 and 78)

The Canadian Wildlife Federation stated:

[...] The cumulative effects of all activities proposed in the future which could affect the region will have to be taken into account. It is essential to keep the wildlife and plant populations healthy and at their current levels.

(Brief by the Canadian Wildlife Federation, p. 2)

The CSN demanded:

[...] that the proponent undertake exhaustive studies with MENVIQ on the cumulative effects that will be produced by SM-3.
(Brief by the “Conseil central des syndicats nationaux de Sept-Îles”, p. 48)

According to Hydro-Québec:

Cumulative environmental effects are abrupt or gradual changes in an environment that result from the accumulation and interaction of direct or indirect impacts generated by several interventions [...] The changes referred to are the result of the superimposition of impacts in time and space (accumulation), or a synergistic process of impacts related to one another (interaction).
(Filed document A88, p. 4)

Evaluating the cumulative effects on the environment does not necessarily involve thoroughly changing the environmental assessments, but rather broadening the existing analytical framework for impact studies.

In order to show that it is possible to draw a picture of the cumulative effects of the SM-3 project, the Panel decided to develop two facets of the problem that appeared to be particularly important in view of the concerns raised by witnesses at the public hearings.

These facets concerned the changes made to the ecosystems of the Sainte-Marguerite and Moisie Rivers, as well as the added effects of the various hydroelectric development projects on the North Shore rivers.

Existing Developments

In the progress report entitled “Étude sur les effets environnementaux cumulatifs du Plan des installations” (filed document A88), Hydro-Québec identified environmental issues on the basis of a number of criteria. Eleven issues were identified: climate, ground water, wildlife, estuary environments, mercury, structure and organization of the area in question, landscapes and natural and cultural heritages, forest dynamics, regional economies, resident population lifestyles and social values.

Table 24 sets out a portion of this analysis. It describes the characteristics of the hydroelectricity production structures and the area covered by the reservoirs created. The first observation highlighted is that these structures regulated the flows of all major rivers between the Saguenay and the Sainte-Marguerite River. The total developed potential is over 8,200 MW, and the reservoirs cover a total land area of 4,289 km², approximately 7% of the total area of the drainage basins of these rivers. Figure 12 (page 277) illustrates the existing and projected facilities.

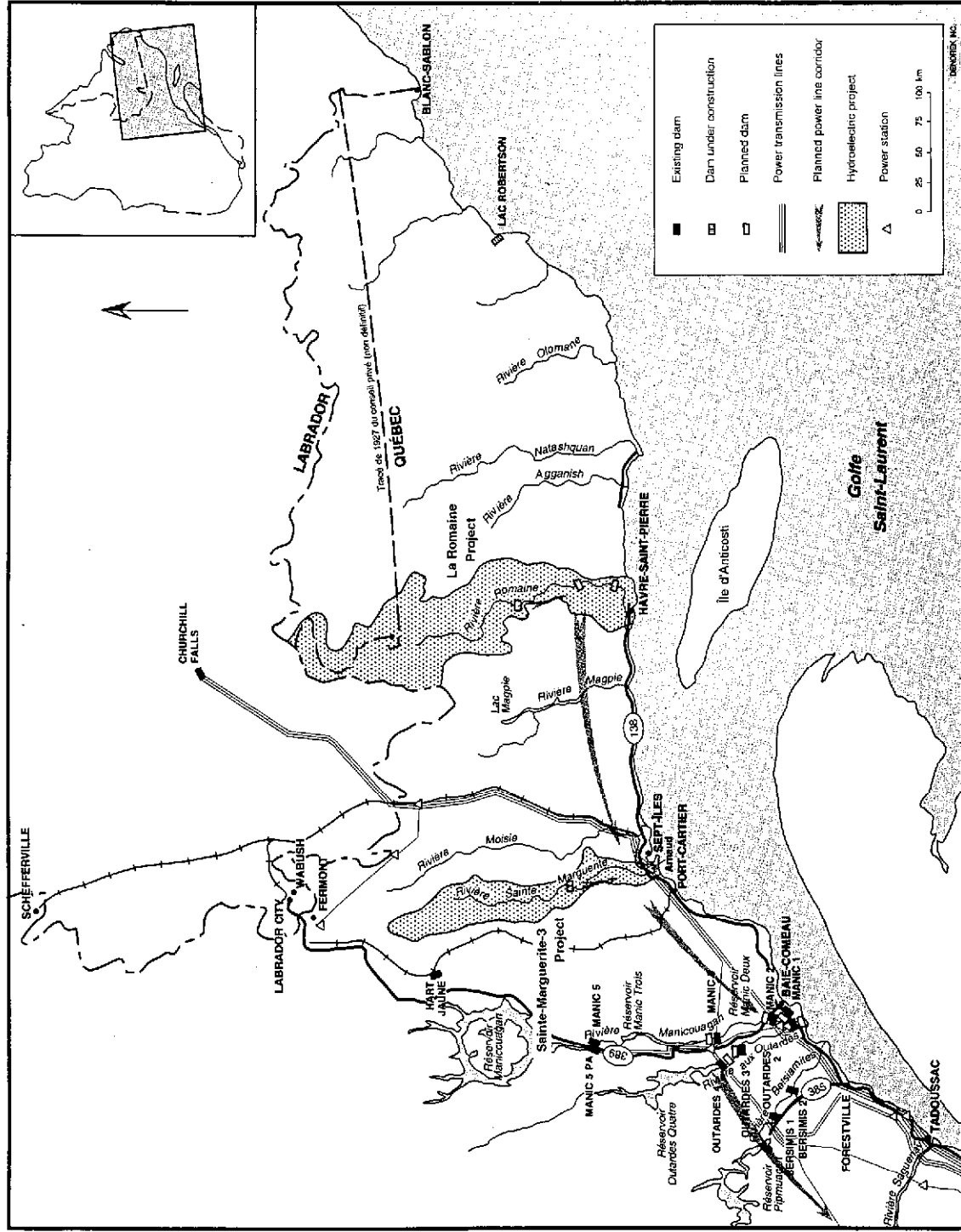
Table 24 Characteristics of North Shore Hydroelectric Generating Stations

	Start of construction	Head (meters)	Number of generating sets	Installed power (kilowatts)	Gross energy production in 1988 (TWh)	Surface area of reservoirs (km ²)
Bersimis-2	1953	116	5	712,200	2.4	42
Bersimis-1	1953	266	8	930,000	4.4	798
Outardes-2	1974	82	3	453,900	1.6	28
Outardes-3	1965	144	4	756,200	3.4	11
Outardes-4	1964	121	4	632,000	2.5	625
Manic-1	1964	37	3	184 410	0.2	11
Sainte-Anne Reservoir	—	—	—	—	—	213
Manic-2	1961	70	8	1,015,200	4.9	124
Manic-3	1970	94	6	1,183,200	4.1	236
Manic-5	1959	150	8	1,292,000	6.5	1 973
Manic-5-PA	1980	145	4	1,064,000	—	—
Hart-Jaune	1960	39	3	48 450	—	228
TOTAL				8,271,560	30,0	4 289

Source: Filed document A83.

This list includes over 235 km² of rights of way for 735 kV and 315 kV hydro lines, which required deforesting and where phytocides are used frequently over one-third of the surface area. Hydrological conditions were also changed in three estuaries in the Baie-Comeau area (Manicouagan, Betsiamites and the Outardes).

Figure 12 Infrastructures and Hydroelectric Projects on the North Shore



Source: Adapted from 1993 Development Plan Proposal, Appendix 3, January 1993

Moreover, following a study on the socio-economic impacts of the Bersimis and Manicouagan projects on the local population centres (filed document A36), the presence of large structures led to the accelerated development of the Baie-Comeau area. For example, when the Bersimis complex was being built, the towns of Forestville and Saint-Luc-de-Laval doubled their population from 1,410 to 2,446 between 1951 and 1986. An improvement in the quality of life through services provided to residents was also noted. The project therefore proved to be a starting point and a stimulus for renewal and diversification of economic activities.

The economic development that occurred in the Baie-Comeau area as a result of hydroelectric projects took several forms. Two access roads, Highways 385 and 389, which were originally built to access the structures, opened up large areas of the land to wildlife resource development and forestry operations.

Highway 385, built to access Manic-5, made it possible to carry out logging over an area of approximately 2,000 km² (filed document B38). Highway 389 and its byways provided easier access to most of a territory with a total exploitable area of approximately 18,000 km².

Construction of access roads and the priming of reservoirs also encouraged increased harvesting of wildlife resources. According to Hydro-Québec, reservoirs are good areas for fishing camps because they have sound potential for certain species of sport fish. However, potential is not as great on the North Shore as in Mauricie, for example (filed document A51), and the camps along the reservoirs are used primarily as relay stations for moving hunters and fishermen towards higher potential areas inland. Table 25 lists the number of hunting and fishing camps located along the reservoirs created by Hydro-Québec in the North Shore area.

Approximately 20 other camps and several ZECs were also created, largely because of the access roads to the dams.

Hydroelectric development in the Baie-Comeau area therefore led to the economic development of the municipalities there, but it also generated environmental impacts from the flooding of the land and the clearing done for roads and the power line corridors.

Table 25 Outfitters Located Along North Shore Reservoirs

Name	Year Established	Number of Camps
Manic-3	1971	1
Manic-5	1964	3
Outardes-4	1969	1
Petit-Lac-Manicouagan	1960	1
Pipmuacan	1956	4
Total		10

Source: Filed document A51.

Based on all the information available, the Panel therefore feels that the overall study of the land in the Baie-Comeau area can serve as an example for the purpose of examining cumulative effects on wildlife resources, and that this would make it possible to obtain a complete picture of the direct and indirect impacts caused by hydroelectric projects in the past on the North Shore.

Possible Developments

Although the Sainte-Marguerite estuary is some hundreds of kilometers away from the estuaries of the Manicouagan, Betsiamites and aux Outardes Rivers, the drainage basin is adjacent to the Manicouagan drainage basin. The Sainte-Marguerite therefore represents eastward continuity to hydroelectric development on the North Shore.

According to the *1993 Development Plan Proposal*, the only other hydroelectric project planned in the short-term on the North Shore is the one at La Romaine, which includes the diversion of the Saint-Jean River, another important salmon river. However, eight other major projects on this region's rivers have been identified by Hydro-Québec, and appear on the map of Quebec's hydroelectric potential (see Table 26 and Figure 12).

Table 26 Potential Hydroelectric Developments on the North Shore

Project	Power	Salmon Potential
Moisie	1 014 MW	Important river
Aguanus	430 MW	River of average importance
Magpie	350 MW	Small river
Natashquan	1 065 MW	Important river
Olomane	310 MW	No fishing
Petit-Mécatina	1 919 MW	N/D.
Romaine	1 416 MW	Important river
Saint-Augustin	236 MW	Small River
Saint-Paul-Bujeault	266 MW	River of average importance
Toulmoustouc	258 MW	Small river
Source: Map of Quebec hydroelectric developments and potential, 1982.		Source: <i>Salmo Salar</i> , vol. 16, n° 1, p. 9 et 10.

Although these projects are not currently part of Hydro-Québec's planning, some of these rivers could be subject to hydroelectric development in the medium term. They have not been included in short-term planning because they are not considered part of the verified economically accessible potential, which totals 18,600 MW out of 40,000 MW and at the moment includes only the Sainte-Marguerite and Romaine Rivers, including the Saint-Jean.

Hydro-Québec is carrying out preliminary studies on the Petit-Mécatina and Magpie Rivers, and these projects could prove economically feasible. Moreover, the future study of other rivers could also reveal economic potential. In addition, Hydro-Québec has estimated that the hydroelectric potential of small and medium-sized generating stations on the North Shore is among the highest in Quebec, with several thousand MWs. According to the proponent, only part of the North Shore potential could, however, prove to be economically feasible. Thus the long-term development of major, medium and low potential sites could lead to significant cumulative effects on wildlife resources and on all human communities on the North Shore.

For example, for the estuaries, one of the conclusions of a study carried out for Hydro-Québec states that if there were to be massive development of North Shore hydroelectric potential:

[...] It is indisputable that if hydroelectric development were to lead to the complete disappearance of the spring run-off, the estuary environment would no longer be what it is today. Thus the perception of cumulative effects lies somewhere between the 18,000 MW scenario [confirmed economically feasible potential] and the disappearance of the spring run-off.
(Technical document 400, p. 3)

For wildlife resources (beaver, water fowl, fish), similar conclusions are to be expected if all the rivers are harnessed. The cumulative effects would, moreover, become increasingly obvious as development projects are added. According to the Panel, such a situation could aggravate conflicts between different uses, particularly if certain activities had to give way to energy development.

Preserving Certain Rivers

The systematic development of North Shore rivers raised concerns among many participants at the hearings:

[...] We agree with the UQCN that more and more people are realizing that, although water is a renewable resource, the number of rivers is limited, and that in the not too distant future, all the natural rivers may be subject to harnessing [...]
(Mr. André Stainier, transcript, part 2, evening of March 26, 1993, p. 7)

The Panel notes how important it is to protect those areas of the land that are outstanding in nature, and agrees with the opinion of the Applied Research Group on Macroecology:

[...] To make the project more acceptable to ecologists, and given that the region contains representative and outstanding sites, it is essential to "set aside" immediately a significant portion of the North Shore land area to meet the proposed criterion of 12% recommended by the Bruntland report.
(Brief by the Applied Research Group on Macroecology, p. 5)

Without passing judgment on the percentage of the land that ought to be “set aside”, the Panel believes, like the CAM, that certain areas ought to be given priority and protected. This protection should extend to the major rivers of the North Shore, but also to the small and medium-size ones that are representative of the natural resources of the area:

If we are not able as a society to preserve the Moisie as it is, what river in Quebec deserves to be so preserved? In a context of sustainable development, a river's water may be profitable for something other than the production of electricity. It is time for Quebec to realize that this resource is not inexhaustible and that we must preserve natural environments for future generations.
(Brief by the “Association de protection de la rivière Moisie”, p. 44)

Some agencies representing the Montagnais, and several other participants, commented on the outstanding value of the Moisie River and recommended that it be preserved intact for the enjoyment of future generations:

[...] That is why we believe that several rivers identified as the most interesting in terms of wildlife habitats, beauty of the landscape and recreational potential ought to be excluded from hydroelectric development projects to become rivers that are part of the native socio-ecological heritage: the Ashuapmushwan, the Mistashipu or the Moisie, the Romaine, the Ekuantshit Shipu or Mingan, the Nastashquan, the Olomanshipu, the Pasquashipu or the Saint-Augustin are among these.
(Brief by Takuaikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 59)

The Panel believes that it is important to realize just what is at stake in this development project: possibly the end of another major wild river that will be turned into a reservoir. The decision must be taken with due regard to all alternative solutions, and all possible methods of mitigation and compensation. Many Quebec rivers have already been harnessed and any new project must be positioned in that context. The proponent indicated at the public hearings that it had not studied non-target species because they were well represented outside the study area. As the representatives of the

native communities noted, the pace of development by the proponent and intensive operations on the North Shore have already considerably transformed the environment:

[...] What remains available to us are often remote and difficult to reach lands where the wildlife potential is irregular.

(Brief by the “Conseil des Atikamekw et des Montagnais”, p. 5)

As for the diversion of rivers, the Panel agrees with the recommendation made by the Pearce Commission to the effect that projects designed to transfer water from one basin to another be envisaged with as many precautions as possible, and only when other ways of achieving goals are unrealizable.

The Panel also believes that Hydro-Québec should immediately begin a study of the cumulative effects of hydroelectric development on the North Shore and integrate these concerns with the preliminary studies carried out on the rivers in the region. The Panel encourages Hydro-Québec to heed the suggestions made by the participants at the public hearing to review its methodology for evaluating impact on the natural environment and for adopting a comprehensive approach. Such an approach, which would include wildlife and heritage values, would make it possible for Hydro-Québec to provide governments and citizens with more information about the rivers that are most appropriate for hydroelectric development, about those which could at the same time serve hydroelectric development and wildlife purposes, and, lastly, those that ought to be preserved for the development of their wildlife or for integral preservation.

The Impacts of Other Project Components

The evaluation of two components of the SM-3 project was not included in the Environmental Impact Statement, i.e. the power transmission line from the generating station to the power transformer and secondary transmission substation at Arnaud, and the rebuilding of the SM-1 and SM-2 generating stations. Although they were not included in the MENVIQ guidelines concerning the preparation of the Environmental Impact Statement, these

projects are nevertheless subject to the environmental impact assessment and review procedure. A third component, the construction of access roads to the structures, although not subject to the procedure, was considered in the Environmental Impact Statement.

Power Transmission Line

Power transmission lines and power transformer or secondary transmission stations of 315 kV are subject to the *Regulation Concerning Environmental Impact Assessment and Review* (R.S.Q., c. Q-2, r. 9). All projects of this type must therefore follow the environmental impact assessment and review procedure and obtain a certificate of authorization from the government before they can be completed. In its written notice of the project, the proponent did not include the power transmission line required to link the SM-3 generating station to the Quebec network. The line was also not included as part of the requirements of the guidelines, and hence the Environmental Impact Statement did not discuss this essential element of the project. According to the proponent:

Hydro-Québec plans to send energy from the SM-3 generating station by means of a 315 kV biternate power line that will run from the north to the south to reach the Arnaud station [...] At the moment, very roughly, it is a north-south corridor. No impact study or corridor study as such have been prepared for this 315 kV line [...] The reason why the impacts of this line have not been studied is that, traditionally at Hydro-Québec, production structures are located first and only then are the transmission lines studied because, according to their scheduling, both in terms of studies and construction, they require several years less than the production facilities.

(Mr. Patrick Arnaud, transcript, part 1, afternoon of February 3, 1993, pp. 21 and 22)

No documents or maps locating the line were supplied by the proponent, but Hydro-Québec did note that the line was to be located in the study area covered by the SM-3 project impact assessment.

The MENVIQ did not question the proponent's way of proceeding in this matter, but did state that coming changes to the impact assessment and review procedure included:

[...] that for the purposes of a review, I would say there would be a joint study of a hydroelectric project with a line project.
(Mr. Gilles Brunet, transcript, Part 1, February 3, 1993, afternoon, p. 33)

Several witnesses at the public hearing said they felt it was unacceptable to separate the review of the impacts that a generating station will have from those of the power line which is necessarily associated with it:

One final point to do with this project is also unacceptable. This is the failure to include in the Environmental Impact Statement the description and evaluation of the power transmission line that the project will require. A high voltage line such as this is a major undertaking that has significant and altogether specific impacts on the natural and social environment. Moreover, such a line would be added to the existing network of lines in Quebec, which is already so dense that together they are having a cumulative impact that can no longer be ignored.
(Brief by the "Amis de la vallée du Saint-Laurent", p. 5)

The issue concerning the lack of an impact assessment of the power line was also mentioned as a reason why a number of environmental groups, including the "Mouvement Au Courant" submitted an application:

In connection with this very project, we first wish to note that the Environmental Impact Statement prepared by the proponent in accordance with guidelines issued by your department does not contain any environmental assessment of the infrastructure required to collect and transport the electricity that will be produced from the site of the generating station to the provincial network.

However, the network for converting and transmitting power is an integral component of the project, and as such, its various impacts and implications should be assessed at the time the production project itself is assessed.
(Application by the "Mouvement Au Courant", October 30, 1992, p. 1)

The Nitassinan Coalition noted:

Nothing is known about the features of the power transmission line. But we believe that it would probably be erected along the highway, which means even more intrusion on the land, with consequences for Innu hunting, netting and trapping.

(Brief by the Nitassinan Coalition, p. 25)

In its brief, the “Comité de la protection de la santé et de l’environnement de Gaspé Inc.” described the apprehended consequences of power lines, which could be subjected to an impact study, mentioning the effects of electromagnetic fields and the spreading of phytocides along the corridors.

In the absence of impact assessments, the Panel studied maps of the natural and human environment included with the summary of the Environmental Impact Statement. The line would be located in an open coniferous forest. Some cottages or camp sites could be close to the line. In addition, the line would be located in the territory of the Matimek ZEC, and hence on land used by the Montagnais and by trappers.

The available documents thus only give a vague idea of the environmental repercussions of the line on the natural and human environment. The Panel believes that the impacts of the power line should have been assessed at the same time as the impacts of the generating station, particularly in view of the fact that the study area is the same.

Access Roads

Hydro-Québec devoted two sections of the Environmental Impact Statement to considering the impacts of the access roads, even though these are not subject to the environmental impact assessment and review procedure, because the corridor required is less than 35 meters. In its study, the proponent distinguished the SM-3 reservoir access road from the generating station access road and the Carheil and aux Pékans site access road.

The proponent carried out an environmental study for the SM-3 reservoir access road as well as an inventory of the study area to determine which elements would be vulnerable to the location of a road. It then identified three possible corridors, described as corridor west, centre and east, and

carried out a detailed survey of those elements of the environment that could be affected. It did a comparative analysis of socio-economic, political and technical and economic aspects, and then consulted socio-economic players and the Montagnais about the choice of a corridor. This analysis led Hydro-Québec to adopt the centre corridor, which appeared significantly better in terms of cost, and length, and because it followed the path of an existing logging road. An access corridor to the dam and an access corridor to the generating station were also identified.

The impacts of the SM-3 reservoir access road on the natural environment did not appear to be a major issue at the public hearings. It was rather the opening up of the land that worried the participants. This specific aspect of the project was, moreover, discussed in the preceding chapter, with respect to its repercussions on the social environment.

On the other hand, Hydro-Québec's choice of an access route to the Carheil and aux Pékans sites elicited reactions from the witnesses from the Fermont region. Their choice was not studied in as much detail as the SM-3 reservoir access road. Hydro-Québec considered two access strategies: either from the north (Fermont), or from the south (Fire-Lake) (Figure 13). Four corridors were examined for the northern access route and three for the southern. The two northern corridors were selected and studied in greater depth. At the hearing, the proponent confirmed its choice for the corridor identified as E. The RCM of Caniapiscau reacted negatively to this choice, considering that:

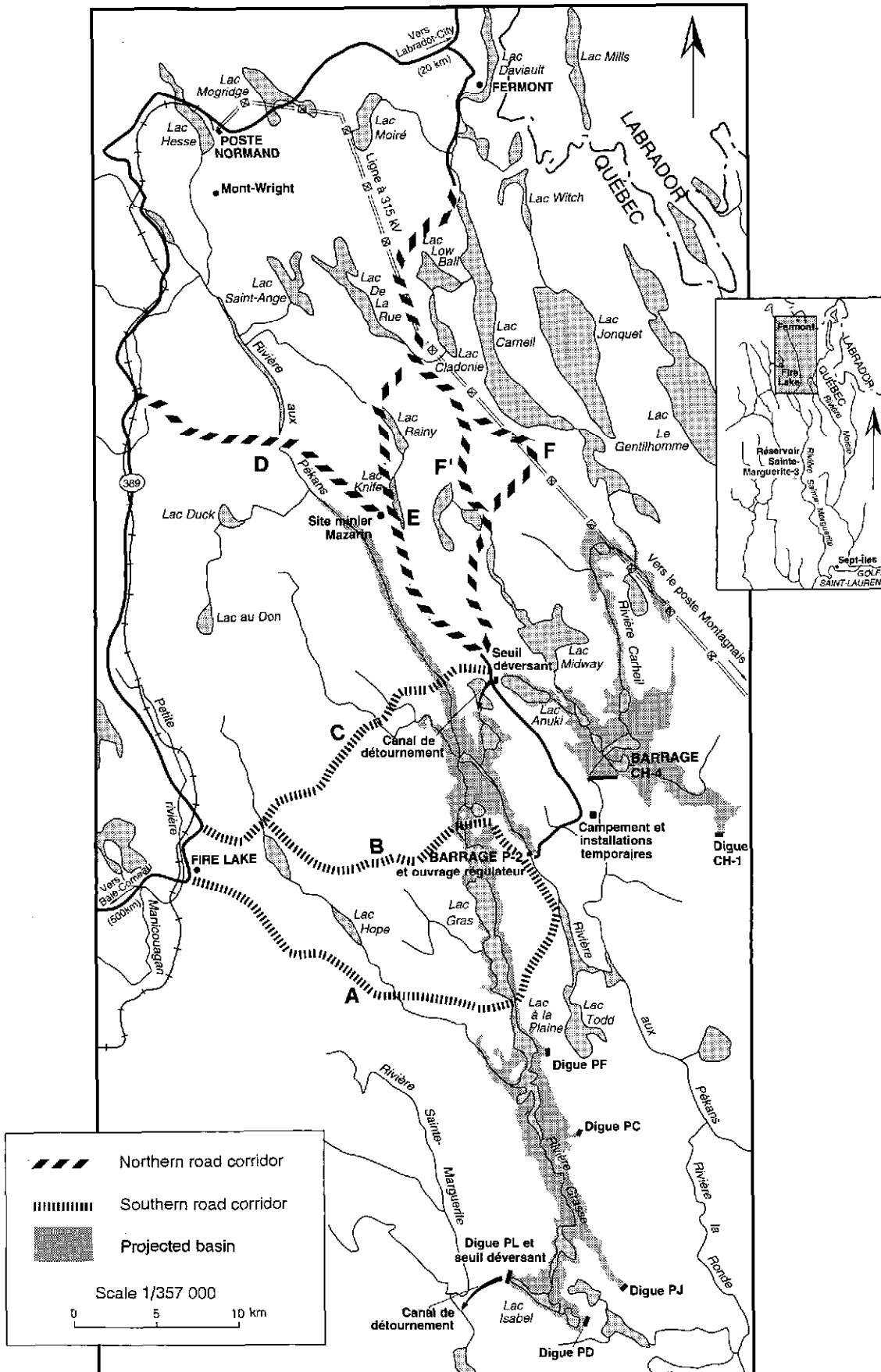
In its preliminary impact study, Hydro-Québec did not evaluate what impact the movement of its heavy equipment would have on the use of the section of Highway 389 between Fire-Lake and Fermont during the construction phase.

(Brief by the RCM of Caniapiscau, p. 17)

The RCM feels that this highway is already in poor shape and that safety problems would be aggravated by the increased use resulting from the SM-3 project.

The RCM stated that the proponent planned to limit access to the highway during the construction phase and that, when the structures were being operated, the land that would not be accessible would lose its recreational appeal because of the disturbances to the environment. As was discussed in Chapter 4, this analysis by the RCM contradicts the Hydro-Québec analysis with respect to the project's impacts.

Figure 13 Access Roads to Carheil and aux Pékans Structures



Source: Adapted from Environmental Impact Statement, Summary, Figure 10

To mitigate the impacts that it feels would be rather negative, the RCM requested a new highway be built linking Fermont and Fire-Lake. It therefore asked that another corridor, called C, be adopted in addition to corridor E as proposed by Hydro-Québec. According to the RCM, this choice would improve highway safety and allow for adequate movement of heavy machinery. This road would thus replace the existing one, which belongs to the IOC mining company, and an added advantage would be that it would shorten the distance between the Carheil site camp and aux Pékans and Baie-Comeau.

Rebuilding of SM-1 and SM-2 Dams

Hydro-Québec separated the assessment of the SM-3 project from that of the rebuilding of the SM-1 and SM-2 generating stations. However, the proponent recognizes that developing the potential of these two sites is linked to the SM-3 development, because they are located downstream from SM-3 and would receive the extra flow planned. Lastly, the SM-2 generating station would require a spillway if the SM-3 development went ahead.

The information obtained during the Panel's hearing on the SM-1 and SM-2 sites is summarized in Table 27. Development of the SM-3 project would considerably increase the hydroelectric potential at the SM-1 and SM-2 sites, which would increase by 27 MW to 159 MW with the diversion of the Carheil and aux Pékans Rivers, or by 27 MW to 125 MW if a project without a diversion were completed.

The total hydroelectric potential of the Sainte-Marguerite River, including the SM-1, SM-2 and SM-3 generating stations (Sainte-Marguerite complex), would reach a total installed capacity of 978 MW for the SM-3 project with the diversion and 738 MW for the SM-3 project without the diversion.

In addition, the impact of the management of the SM-3 reservoir on the SM-1 and SM-2 sites should not be overlooked, because the effect of the reservoir would add an annual 604 GWh with the diversion and 431 GWh without the diversion. This additional energy at the SM-1 and SM-2 sites is equivalent to approximately 15% of the power produced by the SM-3 project.

Table 27 Energy Production and Production Cost of Electricity for Different Variants

Sainte-Marguerite River Development Variants	Peak power available (MW)	Mean annual energy (GWh)	Electricity production cost (¢/kWh 92)
Existing SM-1 (being rebuilt)	8	N.D.	N.D.
Existing SM-2	19	N.D.	N.D.
SM-3 with diversion	819	4 362	3,8
SM-3 without diversion	613	3 247	4,6
Contribution of diversion to SM-3	206	1 115	1,3
Power added to SM-1 and SM-2 by SM-3			
SM-1 with diversion	44	192	N.D.
SM-2 with diversion	88	412	3,9
SM-1 without diversion	33	135	N.D.
SM-2 without diversion	65	296	5,3
Power added Sainte-Marguerite complex			
– with diversion	951	4 966	3,8
– without diversion	711	3 678	4,6
Total available peak power of the complex			
– with diversion	978	N.D.	N.D.
– without diversion	738	N.D.	N.D.
Source: Adapted from filed document A112.			

The status of the SM-1 generating station was not discussed at the hearing. The current rebuilding is not subject to the impact assessment and review procedure because the planned power is only 8 MW. However, any power increase beyond 10 MW would subject the project to it, which would be the case if the SM-3 plant were built and Hydro-Québec or any other proponent wished to make full use of the potential of the SM-1 site.

The witnesses focused more attention to the SM-2 site. Their remarks primarily concerned the annual rise and fall of the reservoir during the priming of the SM-3 reservoir, the quality of drinking water and recreation. These aspects were discussed in Chapter 4.

The SM-2 generating station is already considered by Hydro-Québec to be a medium-scale project (filed document A19). On the one hand, management of the SM-3 plant could require the addition of a spillway to the SM-2 site at a cost of \$13 million. On the other hand, the rebuilding of generating stations of over 10 MW, or those that raise power beyond 10 MW, are subject to the environmental impact assessment and review procedure. Thus to develop the added potential of the SM-1 and SM-2 sites, Hydro-Québec would have to prepare an Environmental Impact Statement and the projects could be subject to a public review.

From 1989 to 1993, Hydro-Québec prepared preliminary studies on these sites, even though they are at the moment private property. While these studies only began in 1989, Hydro-Québec could have included the SM-1 and SM-2 sites in its SM-3 project as early as 1983 (technical document 616).

Given that Hydro-Québec appears to be the prime contractor for the SM-1 and SM-2 projects, because it is directing the studies, the Panel believes that these should have been included in the assessment of the SM-3 project in order to provide an integrated vision of the management of the Sainte-Marguerite River for hydraulic purposes. Such a method of proceeding would have made it possible for the Panel and other citizens to have an overview of the river's hydroelectric potential, and to learn about all the positive and negative impacts that may occur, and thus be in a better position to assess the contribution of the various development options for the Sainte-Marguerite River in meeting Quebec's energy requirements.

An Environmental Impact Statement which remains to be completed

In conclusion, the Environmental Impact Statement appears to address roads that were not subject to the procedure. However, two components were not included in the study, one essential, the power line, and the other directly related to the SM-3 project, i.e. the development of the SM-1 and SM-2 sites.

This is not the first time such situations have occurred in the context of BAPE mandates. In 1987, for example, the panel responsible for assessing the twelfth line project at 735 kV considered that it had been faced with a *fait accompli*, because the line covered in its terms of reference had already been authorized over that part of its path located on the land covered by the James Bay and Northern Quebec Agreement. This made the panel's point of view irrelevant in the event of any disagreement on the location of the line. Likewise, the Panel responsible for examining the impacts of the continuous 450 kV Radisson-Nicolet-Des Cantons power line was in a similar situation, because approximately one year prior to the start of its term, the Council of Ministers ratified the preferred corridor at the request of Hydro-Québec. This situation made it impossible for the Panel to determine whether this indeed was the corridor with the least impact, because the proponent had not carried out a detailed study on the other corridors considered.

It is thus more than likely that future BAPE panels responsible for assessing the impacts of power lines and the development of the SM-1 and SM-2 sites will be placed in the same situation. The Panel therefore believes that Hydro-Québec should immediately complete its Environmental Impact Statement with a companion assessment of the repercussions of the 315 kV power line needed to link the SM-3 generating station to the Arnaud station. The Impact Statement should also contain an evaluation of the effects of the rebuilding work on the SM-1 and SM-2 plants. According to the Panel, such additions could be completed within a few extra months.

Once the study is completed, it would then be possible to do a thorough examination of the management of the Sainte-Marguerite River for hydroelectric purposes. The additional information on the power line, on the SM-1 and SM-2 generating stations and on the SM-3 project if changes were required would be used for supplementary purposes and added to those assessed within the context of this public hearing. The same Hydro-Québec application for authorization from the government would thus contain all the

information needed for a decision that would take the whole situation into account. It would also mean that the Minister of the Environment and the government would not have to examine and rule as many as four times on the Sainte-Marguerite River issue. Lastly, the concerns and feeling of frustration expressed by the people affected would be reduced accordingly.

Chapter 8

The Relevance of the Decision

The grounds for the decision to go ahead with the project, in particular the energy issues, were given close scrutiny by national environmental groups interested in such matters. Some appeared as witnesses before the Parliamentary Committee on the *Proposal Hydro-Québec 1993 Development Plan*.

This chapter discusses the relevance of energy, economic, technical and social issues to the development of the hydroelectric project on the Sainte-Marguerite River at this time with the scope that is currently planned for it. The discussion covers several topics considered by the Parliamentary Committee. Only those aspects of the equipment program submitted by Hydro-Québec which are most directly related to the SM-3 project decision will be examined here. These topics include demonstrating the energy needs to be met, procedures for planning energy production equipment projects, the selection of the project variant, and public involvement in energy decisions.

Uncertainty of Demand

The forecast electricity demand in the Environmental Impact Statement (Environmental Impact Statement, part 1) are taken from Hydro-Québec's *1990-1992 Development Plan*. On February 8, 1993, Hydro-Québec filed an update to its rationale for the SM-3 project (filed document A15) based on the *1993-1995 Development Plan Proposal*. The panel's review is based on the most recent of these proposals.

Demand Forecasts

Demand forecasts in Quebec (Table 28) are primarily determined on the basis of demographic, economic and energy considerations. Thus Hydro-Québec anticipates that regular Hydro-Québec electricity sales will rise from 133.6 TWh in 1992 to 197.9 TWh in 2010, an average annual increase of 2.2%. This forecast gives due regard to the long-term effects of new electricity uses and technological innovations. The forecast also assumes that trends towards increased efficiency in electricity use will continue.

Table 28 Expected increase by user sector (1992-2010)

Sector	Average growth 1992-2010 (%)	Main explanatory factor
Domestic and agricultural	1.3	- increase in number of households
General and institutional	2.2	- enlargement of and increase in the number of businesses
Industrial	2.9	- industry commitments
Other	3.3	- municipal networks, new technologies, etc.

Source: Data contained in the Hydro-Québec 1993 Development Plan Proposal.

It is the estimated industrial demand that has the greatest effect on growth and virtually 60% of it would result from existing Hydro-Québec contract commitments to the aluminum and magnesium industries. Other sectors, including sales to municipal networks, lighting and public transport, as well as new uses of electricity, which should grow at an average annual rate of 3.3%. Half of this growth is attributed by Hydro-Québec to new uses that will appear after 2005.

In its 1993 Development Plan Proposal, Hydro-Québec adopts two strategic approaches that would have an impact on the growth of its electricity sales, i.e. developing markets and energy conservation, the latter of which allows

the forecast rate of increase in regular sales to drop from 2.2% to 1.8%. Hydro-Québec recognizes that the strategic approaches have an influence on final electricity demand (Table 29).

Table 29 Change in energy needs (in TWh)

	1996	2000	2005	2010
Regular electricity sales in Quebec	156	173	185	198
Deliveries under agreements and other	7	6	6	6
Export sales	9	12	5	5
Total deliveries	172	191	196	209
Electricity losses	16	18	19	21
Needs without market development	188	209	215	230
Additional needs from				
- industrial development	0	1	3	3
- exports	0	0	9	9
Needs with market development	188	210	227	242
Power reserve required	4	4	5	6
Energy needs - sub-total	192	214	232	248
Energy efficiency	5	10	15	20
Energy needs - total	187	204	217	228

Source: 1993 Development Plan Proposal, pp. 75 and 77

Industrial Market Development

Hydro-Québec is counting on developing industrial markets by means of an electrotechnology location assistance program and a commercial approach that encourages the location of industrial projects with a high level of electricity consumption, such as non-ferrous metals smelting and refining industries, as well as iron and steel and chemical industries. For these activities, Hydro-Québec has developed a location potential of 1,900 MW from now to the year 2010, most of which would begin after the year 2000. In fact, it anticipates an increase in demand of 1.5 TWh in 2010 (1993 Development Plan Proposal, Appendix 4, p. 28).

This first approach by Hydro-Québec is supported by many participants because of the economic benefits linked to it. On the other hand, it has been criticized by a number of groups who argue that it is undesirable to develop industries that consume large amounts of electricity.

The development of Quebec on the basis of industries that consume high levels of electricity is anti-development, because these industries create very little in the way of benefits because they are provided with energy at rates that are below the production cost.

(Brief by the “Ami-e-s de la Terre de Québec”, p. 9)

For these groups, the development of industrial and export markets is treated as a strategy to justify future projects :

Market development is the other justification for the proposed development plan. The strategy to develop new markets is based on the assumption that it is financially advantageous for Hydro-Québec to increase sales both in Quebec and abroad.

(Ms. Daphna Castel, transcription, part 2, March 26, 1993, evening, p. 33)

Other briefs expressed reservations about the development of industrial markets because of problems being experienced in several major industry sectors :

Hydro-Québec's adoption of a scenario involving an average increase in demand of 2.2% a year appears to us to overestimate Quebec's current and future requirements for electrical power. Much of it is based on considerable uncertainty with respect to the location of new industries that are heavy consumers of electricity, and on export contracts. But the fact is that in the current state of our economy, there is nothing to indicate that the pulp and paper, non-ferrous metals, iron and steel and chemicals industries will undergo significant expansion or investment. On the contrary, Quebec is experiencing a great deal of difficulty in maintaining what it has, and it is even losing ground, as we know, in pulp and paper.

(Brief by Takuaikan Uashat mak Mani-Utenam and the “Conseil des Atikamekw et des Montagnais”, p. 17)

The problems in the pulp and paper sector were raised by the Goodman group (Brief by the James Bay Committee, Appendix 1, pp. 8 and 9), as was the low cost of heating water and facilities, in adjusting energy consumption forecasts downward.

In the area of technical innovations, the Goodman group believes that this element should not be included as part of the analysis of the growth in demand because new uses are as capable of encouraging conservation as they are of encouraging increased use of electricity (Brief by the James Bay Committee, Appendix, p. 10).

Hydro-Québec is also in favour of electrotechnology installations and seeks to improve the competitiveness of small and medium-sized businesses by making it easier to introduce efficient electrical technologies into the production process (*1993 Development Plan Proposal*, Appendix 6, p. 44). The Goodman group believes that it would be more appropriate to include such intentions in the forecast demand of any future development plans, which would make it possible to have a more accurate picture of this industry sector (Brief by the Comité Baie-James, Appendix, p. 10).

The Quebec Manufacturers' Association believes that even if Hydro-Québec were to decide not to go ahead with market development:

[...] it would nevertheless be necessary to bring new means of production on line. Among these, SM-3 is the most economical future project.

(Brief from the Quebec Manufacturers' Association, p. 3)

The economic partners based their support for the project on their confidence in the forecast demand contained in Hydro-Québec's *1993 Development Plan Proposal*. Thus the Quebec Manufacturers' Association indicated to the panel that the electricity growth scenario selected by Hydro-Québec was very realistic.

The Future of Exports

With respect to exports, Hydro-Québec includes long-term export contracts that are already signed (Table 30) and plans to meet 15 % to 20 % of the new long-term requirements of neighbouring American networks. According to the forecasts based on information contained in the network development

plans, the new contracts could represent 1,500 MW by the year 2004 (*1993 Development Plan Proposal*, p. 14). Compared to earlier forecasts, the proponent recognizes that expected economic growth and the attendant demand for energy in American markets have been revised downward.

Table 30 **Guaranteed export contracts already signed**

Networks	Power (MW)	Energy (TWh/an)	Term
New England Utilities	—	7	2000
Vermont Joint Owners	350	2.5	2020
New York Power Authority (signed but not approved)	800 (seasonal)	3	2018

Source: Adapted from *1993 Hydro-Québec Development Plan*

Thus the State of New York and New England networks anticipate peak demand for electricity to increase by an average of 1.2% per year until the year 2000, and by 1.4% per year for the ten years after that. In 1989, they expected increases of 1.7% and 1.5% respectively. The considerable efforts devoted to energy conservation programs are partly responsible for this decline in needs.

Several participants at the public hearing believe that Hydro-Québec is too optimistic about its forecast requirements for the US market. The groups criticizing them on this score most specifically are the environmental groups and the natives. The "Mouvement Au Courant" casts doubt on the accuracy of the predicted exports and on their profitability:

Moreover, Hydro-Québec continues to support the development of export markets when everything would indicate that it is becoming increasingly less competitive in a market where, in the medium term, there will be significant production surpluses, and where a priority is being given to conservation. The profitability of these markets is therefore increasingly uncertain. Its firm capacity and energy export

strategy is therefore extremely debatable, strictly from the financial standpoint, and it is equally difficult to defend from the economic or environmental points of view. What it involves, in fact, is the development and bringing on line of generating capacities that are not required by Quebec's internal needs.

(Ms. Daphna Castel, transcription, part 2, March 26, 1993, evening, pp. 37 and 38)

Many people doubt that the new markets that Hydro-Québec wants to develop, both in Quebec and in the United States, would be profitable. They see a link between the availability of these markets and the SM-3 project, particularly for Quebec's internal needs:

And yet, according to the 1993 Development Plan Proposal, Hydro-Québec appears to relate the need for SM-3 to this export objective: "To meet the needs that would result from a market development scenario in which there would be additional exports of 1,500 MW, the Grande-Baleine complex and Sainte-Marguerite power generating stations would have to be brought on line[...]" (p. 83). However, the Hydro-Québec representatives repeatedly stated at the hearings that the plant would still be required even without export development. It therefore appears to us that the proponent's line of reasoning is difficult to follow: on the one hand, they argue that the power from the plant would be needed for the year 2001, a time at which there are no additional electricity exports; and on the other hand, they state at the same time that it was being planned to meet the increase in requirements anticipated between 2001 and 2005. The question that must be asked, therefore, is when SM-3 would operate at peak capacity, without additional exports, leaving the factor included for the use of other plants unchanged.

(Brief by Takuaikan Uashat mak Mani-Utenam and the "Conseil des Atikamekw et des Montagnais", p. 18)

According to the Environnement Jeunesse (ENJEU) group, Hydro-Québec has not demonstrated that there is any potential market for Quebec electricity, and that the 1,500 MW objective by the year 2004 is unrealistic. ENJEU concludes that the competition and low prices that will result in American markets will make Quebec electricity an option that is not

economically interesting for American networks and that demand management programs will improve and reduce the demand growth rate to virtually zero. The National Energy Board views exports differently:

New England represents an attractive market for Quebec. Quebec in fact negotiated the sale of 500 MW of firm capacity to the Vermont Joint Owners (VJO). Quebec also negotiated a sale of 1,000 MW of firm capacity to the New York Power Authority (NYPA). The latter sale was, however, cancelled by NYPA for economic reasons and environmental concerns about the development of water resources in the Bay James area. Nevertheless, long-term firm export prospects for Quebec sales to the State of New York and New England remain. (National Energy Board, 1992, pp. 6 to 19)

The Quebec Manufacturers' Association believes that current economic conditions in the United States place Quebec in a good position to develop these markets. In fact, the Clean Air Act which is expected around the year 2000 and a strong US economic recovery should lead us all to consider that Quebec's economy would lose if the facilities were not in place on time (Messrs. Éric Meunier and Richard Le Hir, transcript, part 2, March 25 evening, pp. 184 and 196). Moreover, the association believes that it is an advantage to be able to export hydroelectricity and at the same time earn revenue and help to eliminate the acid rain problem.

But American groups that took part in the public hearing told the panel that they were opposed to Hydro-Québec's exports to New York and New England. They consider the export contracts harmful to them, for example because Quebec hydroelectric power exports could slow down the introduction of their energy conservation programs.

Energy Efficiency

For the proponent, the concept of energy efficiency revolves around the concepts of energy conservation and direct-load management. While energy conservation makes it possible to reduce overall demand for power, direct-load management spreads power consumption over time to optimize

the development and use of peak facilities (*1993 Development Plan Proposal*, vol. 2, p. 7). Hydro-Québec plans its energy conservation intentions by determining available improvements or potential:

Technical potential refers to ways of improving accessible energy efficiency that can be adapted by the consumer without regard to cost. At this stage, savings in terms of energy volume are assessed[...] Technical-economic potential refers to all the technical possibilities available on the market at a cost that is lower to or equal to the cost of future Hydro-Québec facilities.
(*1993 Development Plan Proposal*, vol. 2, p. 12)

Thus the cost of energy conservation measures is determined on the basis of the cost of the facilities that can be replaced.

In the context of the *1993 Development Plan Proposal*, potential energy conservation for all markets by the year 2000 was estimated at 27.6 TWh (Table 31).

Table 31 Energy conservation forecast to the year 2000

Markets	Technical-economic potential		Objectives	
	TWh	%	TWh	%
Residential	10.9	39,5	3,6	38,7
Business	7.4	26,8	3.0	32,3
Industrial	9,3	33,7	2,7	29,0
Total	27,6	100	9,3	100

Source: *1993 Hydro-Québec Development Plan Proposal*, Appendix 2, pp. 17-18 and 33

According to Hydro-Québec, owing to the low cost of electricity generated by hydroelectric dams, Quebec's potential, which meets Quebec cost-efficiency requirements for energy conservation measures, is limited and rather lower than US potential. Hydro-Québec's setting of a 9.3 TWh objective by the year 2000, which corresponds to 34% of the potential identified, is an economic decision:

This option aims at cost-efficient energy conservation measures for Quebec society. It makes possible an equitable sharing of the cost of the measures between Hydro-Québec and all its customers. In addition, the option appears realistic in view of customer electricity consumption characteristics[...] This makes it possible for all customers to have their rates go up as slowly as possible over the long term.
(1993 Development Plan proposal, vol. 2, p. 31)

For Hydro-Québec, this objective takes into consideration the constraints and uncertainties involved in consumer behaviour:

[...] many experts feel that a 60% participation rate marks the beginning of extreme success. This rate is considered achievable over a period of at least 20 years. More cautious players set the achievable potential at approximately 30% over 20 years. This indicates just how ambitious is the 34% objective set by Hydro-Québec over a 10-year period, particularly when consideration is given to the fact that much of the technical-economic potential envisaged has to do with "lifestyle" or "accessories". Such measures are often extremely difficult to apply.
(1993 Development Plan proposal, vol. 2, p. 31)

The Quebec Manufacturers' Association expressed its scepticism about the energy conservation objective of 9.3 TWh set by Hydro-Québec, which it believes is ambitious. They felt this way because of the experience of their members, who came to the conclusion:

[...] there are always gaps between paper forecasts and reality, and in the case of energy conservation, it has been shown that such gaps can be rather large. That is what has led us to speak out and to express our scepticism. Moreover, energy conservation only comes about when there is an economic interest in doing so.
(Mr. Richard Le Hir, transcription, part 2, March 25, 1993, evening, p. 176)

On the basis of an assessment of the technical-economic potential carried out by means of questionnaires sent to several firms, the association further prepared a list of decision-making criteria:

[...] that determined whether a firm will introduce energy conservation measures or not [...] experience has shown that optimistic scenarios do not always materialize at the rate and to the extent estimated at the outset.

(Mr. Richard Le Hir, transcription, part 2, March 25, 1993, evening, pp. 186 and 187)

Referring to the various energy conservation programs in Canada and the United States (Table 32), several of the participants criticized the proponent for not being aggressive enough in its energy efficiency program.

In its analysis, the Goodman group observed that Hydro-Québec claims to be a leader in energy efficiency by comparing its objectives with other American companies. However, the comparison of the expected reductions in percentage of sales (Table 32) shows that 8 of the 9 companies selected have objectives that are set higher than those of Hydro-Québec. Other American companies, like the Sacramento Municipal Utility District, have even higher objectives than any of the companies included (Brief by the James Bay Committee, Appendix, p. 15).

Some intervenors believe that Hydro-Québec did not take recent energy conservation experiences into consideration:

In its energy efficiency project, Hydro-Québec set 33% as an objective for its customer participation rate. To establish this rate, it based its figures on American utilities, which were most successful in the 1980s, considering a participation rate of 33% as the best that could be expected under any circumstances. Such a choice did not in any way give due regard to the cumulative experience of American utilities, some of whom now aim at higher rates.

(Brief by the "Conseil régional de l'environnement de la région de Québec", p. 4)

The "Conseil régional de l'environnement de la région de Québec" sought to demonstrate that Hydro-Québec should increase its energy efficiency objective to 50 %, based on the performance of US electrical utilities like the Sacramento Municipal Utility District and Seattle City Light (Brief by the

Table 32 **A comparison of the energy conservation objectives of ten electrical utilities in North America (to the year 2000)**

Utility	State or province	Anticipated demand (MW)	Direct-load management (MW)	Percentage reduction	Anticipated sales (TWh)	Energy conservation (TWh)	Percentage reduction
United States							
Bonneville Power	Oreg., Wash., Idaho, Montana	21,765	—	—	81.9	5.3	6.5
Central Maine Power	Maine	1,738	156	9.0	11.2	0.6	5.4
Consolidated Edison	New York	12,075	—	—	44.3	3.6	8.1
New England Power	Massachusetts	4,948	29	0.6	26.1	1.6	6.1
Northeast Utilities	Mass./Conn	5,952	90	1.5	36.1	2.5	6.9
Pacific Gas & Electr.	Californie	23,648	700	3.0	90.3	5.8	6.4
Wisconsin Electr. Power	Wisconsin	5,178	97	1.9	29.3	1.7	5.8
Canada							
Hydro- Québec	Québec	37,570	3,035	8.1	172.7	9.3	5.4
Ontario Hydro	Ontario	32,500	750	2.3	179.2	11.5	6.4
BC Hydro	C.-B.	13,451	—	—	53.3	4.3	8.1

Source: 1993 Development Plan Proposal, vol. 2, pp. 37 and 45.

“Conseil régional de l’environnement de la région de Québec”, appendix of April 18, 1993). Thus the 9.3 TWh objective would increase to 13.8 TWh, an increase of 4.5 TWh annually, which matches the expected production of the SM-3 power plant. The Conseil, like other agencies, points out that this higher objective would help to replace the energy that SM-3 would be used to produce, or at least delay the need for its construction.

In connection with the importance assigned by Hydro-Québec to energy efficiency, a number of responses referred to benefits. Some aspects of this question were raised with the panel by the representative of the MER, in reference to the Quebec energy efficiency strategy launched in December 1992 (filed document B31). This government program forecasts that the measures implemented would have significant repercussions on areas such as job creation and maintenance. The Quebec strategy states:

[...] over a period of ten years, the annual mobilization of 10 million dollars to finance government measures could lead to a total investment of 500 to 800 million dollars, and create or sustain 7,000 to 10,000 jobs (person-years).
(filed document B31, p. 15)

The jobs created would be added to the jobs created as part of the Hydro-Québec energy efficiency project, which, according to the *1993 Development Plan* proposal, would between now and the year 2000 support 35,400 direct and indirect jobs measured in person-years (*1993 Development Plan* proposal, vol. 2, p. 27).

For Hydro-Québec to go beyond the 9.3 TWh objective, a more coercive approach would be needed, and it would be necessary to assume that it would be possible to make important lifestyle changes for customers, combined with significant rate increases and stricter regulation (*1993 Development Plan* proposal, Appendix 2, p. 31). The criticisms of the limit set by Hydro-Québec refer instead to the benefits of additional jobs created by investment in energy conservation, lasting jobs, and not the temporary jobs involved in building large power dams.

The City of Baie-Comeau nevertheless cautions that such jobs would not necessarily be in the regions, whereas hydroelectric development-related jobs would be:

Energy efficiency and hydroelectricity lead to the creation of approximately the same number of jobs. However, the jobs generated

by energy efficiency are concentrated in the tertiary sector (research and development), which means primarily in the major urban centres of Quebec. On the other hand, the jobs created by hydroelectric development involve primarily the assembly and installation of electrical equipment and construction. The latter are primarily concentrated on the hydroelectric plant sites, i.e. in the regions.

(Brief by the City of Baie-Comeau, Baie-Comeau Chamber of Commerce, the “Commissariat industriel régional de Baie-Comeau” and the “Groupement québécois d’entreprises”, pp. 3 and 4)

Information Difficult to Validate

Thus the premises for the energy requirements that the SM-3 project was designed to meet were called into question. According to the “Mouvement Au Courant”:

The rationale for SM-3 is based on the assumptions contained in the new 93-95 Hydro-Québec Development Plan. This development plan, like the preceding ones, is based on two main premises: firm and continuous growth in power demand in the existing market and the development of markets both in Quebec and abroad, and secondly, on the priority given to hydroelectricity[...]

(Ms. Daphna Castel, transcription, part 2, March 26, 1993, evening, p. 35)

Referring to the effect of Hydro-Québec’s strategic approaches on changes in demand, the “Association des biologistes du Québec” noted the considerable uncertainty attributable to the changing current energy context and to the planning methodology used by Hydro-Québec:

The selection of one planning method rather than another makes it possible to reduce or increase a number of uncertainties and a number of risks associated with the instability of the energy context. In our view, Hydro-Québec’s planning method increases the risks and uncertainties associated with the energy context; for example, their method leads us to anticipate a highly fictitious demand in 10-15 to 20 years. Hydro-Québec is the only public utility to review growth in demand

upward for this period. In addition, the utility is asking us to pay for it immediately over a 10-year period, without any energy or income on these investments during the period in question.

(Brief by the “Association des biologistes du Québec”, p. 8)

According to the Association, a comparison between forecast demand in Quebec and forecast demand in Ontario and a number of American networks indicates that Quebec is the only utility to review its forecasts upward (Brief by the “Association des biologistes du Québec”, p. 2)

Several groups mentioned this difference between the forecasts, both in comparison to other Canadian provinces and to US states:

The Hydro-Québec forecasts are very much higher than those envisaged by neighbouring states and provinces, although their economies are more dynamic than Quebec’s.

(Brief by the “Mouvement Au Courant”, p. 25)

Thus Ontario Hydro has cancelled all projects to build new power plants, and the State of New York has reviewed its forecasts downward by 1.2% to 0.6% for the 1992-2010 period.

(Brief by the “Conseil central des syndicats nationaux de Sept-Îles”, p. 14)

Even though these concerns appear to be legitimate, the panel recognizes, as do the participants themselves, that they did not have the resources that would make it possible to base these concerns on detailed and properly documented economic and technical analyses. Without casting doubt on the demand methods and forecasts, the groups in question are expressing reservations about Hydro-Québec’s strategies, which contribute to increasing demand. The “Mouvement Au Courant” is the only one to treat the matter in a detailed manner, and to criticize Hydro-Québec for having overestimated demand in its last two development plans.

In order to examine this controversial aspect in greater detail, the panel questioned representatives of the MER during the public hearing about the Hydro-Québec forecasts:

[...] we have attempted to compare our forecasts with those of other forecasting agencies, including the National Energy Board, and

Energy, Mines and Resources Canada. To the year 2006, our figures match exactly, which is to say that any discrepancies are not significant, in fact less than one tenth of one per cent.

(Mr. Philippe Nazon, transcription, part 1, February 12, 1993, afternoon, pp. 74 and 75)

A paper containing the forecasts for electricity demand in Quebec, estimated by MER experts, was also filed (filed document B32).

The panel feels that a comparison with other electrical power companies shows a similar trend to the overestimation of demand. For example, Hydro-Québec recognizes that neighbouring networks now have significant surpluses, partly because of the recession. Another example is the New York Power Authority, which decided to cancel a 1,000 MW contract, primarily because of a drop in demand at the beginning of the 1990s.

As a result, the panel believes that while comparisons with the United States and neighbouring provinces may be useful, they must give due regard to the different energy and technical circumstances. Some experts, taking into consideration specific features of various situations, suggest that “it is difficult to fully share Hydro-Québec’s pessimism [forecast lower Quebec demand for electricity]” (Bernard et al., 1992). Their studies of the forecast demand in the context of the Grande-Baleine project reached conclusions that were also applicable to the SM-3 project.

There are several possible reasons to explain the discrepancies between the forecasts of different groups. In addition to the problems experienced by economists in anticipating future economic activities, strategic interventions introduce further uncertainty with respect to expected results.

There is therefore no consensus concerning Hydro-Québec’s demand forecasts. The panel believes that prudence requires that special attention be given to checking the doubts expressed. In its brief to the Parliamentary Committee in connection with the *1993 Development Plan* proposal, the CSN made such a recommendation:

[...] that the Department of Energy and Resources commission a second opinion with respect to patterns of electricity demand from 1992 to 2010[...]

(Brief by the “Conseil central des syndicats nationaux de Sept-Îles”, Appendix, p. 7)

The “Association des biologistes du Québec” made the same recommendation at this public hearing. The panel feels that it is important for these checks to be carried out independently of the proponent, and that they be transparent to the public.

Aware of the reservations expressed by certain participants, who believe that the economic recovery will not occur as quickly as expected, the panel fears that the economic context described by Hydro-Québec to justify hydroelectric projects may be too optimistic and that projected sales may not occur. In the aluminum sector, for example, the possibility of phase II for Alouette in Sept-Îles could be compromised:

In view of the current crisis in its industry sector, what are the real chances that the projected demand will occur in the years to come? It is plausible to believe that this growth in demand will never take place. Because the price of aluminum is currently low because of the enormous amount of production in the former USSR, which in turn is a consequence of enormous natural gas surpluses combined with their vital need to obtain foreign currency through exports, it is reasonable to expect that these countries will continue to burn gas and to produce aluminum at low prices in the coming years. Will Alouette continue with the massive investment required for phase II, planned for 1997, in such a context?

(Brief by the James Bay Committee, p. 6)

The question of exports illustrates another problem in analyzing the demand forecasts. The future of exports appears very uncertain and influenced by both Hydro-Québec’s strategic interventions and by external market conditions.

It appears unlikely that export markets will disappear completely as some participants have claimed. But US pressure groups could have an impact on the ultimate decisions. In addition, the reduced forecasts by the State of New York and New England networks could mean that the only export contract on the horizon, of 800 MW with the New York Power Authority, which has not yet been approved, could fail to materialize.

Lastly, the general preoccupation with respect to energy efficiency and how it relates to the assessment of the SM-3 project deserves a thoughtful discussion. In view of the criticisms about Hydro-Québec’s commitment compared to that of certain American producers, the panel notes that some

elements need to be placed in context. For example, the regulatory framework, the size and the structure of firms, as well as the sources of energy production are very different in Quebec than they are in the United States. Because of these differences, the energy efficiency and performance objectives of the programs, and ways of measuring them, cannot be compared directly from one country to the other.

The great interest shown by the participants in energy conservation and in the general demand for a firmer commitment by the proponent and the government in this matter indicate to the panel that there is a clear-cut social preference for this approach rather than for new megaprojects. The panel thus naturally encourages energy conservation programs because of the advantages they may have in terms of the creation of long-term jobs and slowing down demand. It considers that economic decision makers should explore this avenue, more specifically within regional economic recovery programs.

With such uncertainty and the many doubts about the destination of the electricity that would be produced by the SM-3 plant, the panel feels that it is important to take the time needed to check the appropriateness of beginning the construction of new equipments such as the SM-3 project in accordance with the current timetable.

The Urgency of the Project

The relatively complex planning process for production facilities requires the proponent to make choices. Although these choices were strongly criticized by groups opposed to a new hydroelectric megaproject, the public hearing on the SM-3 project did not bring to light structured and clear information. It also proved extremely difficult to extract information relevant to an understanding of the choices in question from the massive number of documents filed.

This section summarizes the various electricity production facilities available to Hydro-Québec, and analyzes in greater detail an economic ranking of the projects. This amounts to a study of Hydro-Québec's decision to carry out the SM-3 project beginning now.

Production Facility Decisions

To meet long-term power requirements, Hydro-Québec has recommended a set of measures:

[...] improving the network, promoting energy efficiency and adding new production facilities, which includes purchases from private producers (cogeneration and other sources of production).
(filed document A15, p. 6)

These measures will add supplementary capacity to the existing facilities that supply 173 TWh (Table 33). The power plants under construction as part of phase II of the La Grande complex, i.e. Brisay, Laforge-I and La Grande-I, which will be gradually brought on line beginning in 1993, will add 14 TWh to the production network by 1996. Measures to enhance the network will add approximately 2 TWh beginning in the year 2000. The energy efficiency program was treated in the previous section.

Hydro-Québec is also considering purchasing 760 MW from private producers:

Private production is a new source of additional electricity for Quebec, and should be used to meet requirements that are not met after other means are implemented[...] Production can come from hydroelectric power plants, whose installed capacity does not exceed 25 megawatts, incinerators for municipal waste or forest waste, and cogeneration facilities (combined production of steam and electricity)[...] The advantage of this source of supply is primarily that it can be effected more quickly than building major power plants. At the moment, private production that is to be linked to the network is estimated at 4 TWh for 1996, and it should reach 6 TWh somewhat later.
(filed document A15, pp. 8 and 9)

Table 33 Power and energy assessment according to the medium scenario

	Power (MW)				Energy TWh			
	1996	2000	2005	2010	1996	2000	2005	2010
Power requirements to be met	41,145	44,650	49,720	52,690	192	214	232	248
Existing and committed facilities, including:								
- existing pool and contract purchases	33,500	33,425	33,270	33,210	173	173	172	172
- plants under construction (La Grande-Phase II)	2,510	2,510	2,510	2,510	14	14	14	14
- private production	760	760	760	590	4	6	6	6
Improvements to existing network	200	340	400	400	1	2	2	2
Energy efficiency	4,005	4,910	5,700	6,705	5	10	15	20
Reserve sharing	600	600	600	600	—	—	—	—
Total of facilities identified	41,575	42,545	43,240	44,015	197	205	209	214
Additional facilities needed	—	2,010	6,480	8,675	0	5	25	33

Source: 1993 Development Plan Proposal, tables 9 and 11, pp. 77 and 80

In spite of the energy conservation programs and the planned improvements to the existing network, Hydro-Québec believes that new production facilities will have to be developed:

All of these facilities represent a total that will rise from 197 TWh in 1996 to 214 TWh in 2010, [...] This output will therefore not be enough to meet 2010 requirements, which are estimated at 230 TWh if there is no market development, 242 TWh if proposed market development is added, and 248 TWh including the required energy reserve. New production equipment will therefore have to be added gradually to meet changing demands.

(filed document A15, p. 9)

The proponent is planning to rely essentially on hydroelectricity to meet energy demand:

Major hydroelectric generating stations are defined as those whose power output exceeds approximately 100 MW. The average annual energy potential of the major rivers in Quebec is estimated at approximately 86 TWh, the development of which has neither been done nor committed, and which could produce energy at a cost that compares favourably with other production methods. These projects constitute the economically workable hydroelectricity potential.

(filed document A15, p. 8)

Hydro-Québec is also studying the possibility of building medium-sized generating stations with a power of between 25 and 100 MW. These plants represent a total possible annual production of approximately 3.5 TWh.

In view of the time required to complete such projects, the proponent expects that the Laforge-2 (1.8 TWh), Eastmain-1 (2.7 TWh) and Haut-Saint-Maurice (2.9 TWh) are the most suitable for supplying the supplementary production needed to the end of the century. After the year 2000, Hydro-Québec plans to develop further projects, one of which is SM-3.

In the *1993 Development Plan Proposal*, Hydro-Québec mentions the existence of other options to diversify its sources of production, such as wind energy, solar energy and fuel cells. Hydro-Québec is considering a variety of combinations that appear more attractive in terms of flexibility and technical, economic and environmental characteristics, some of which would use

thermal and wind energy. Hydro-Québec's thermal energy option consists of planning for purchases of 440 MW by the year 2000, which would account for a significant portion of total private purchases:

We note that all the analyzed combinations include 760 MW of private production purchases from small hydroelectric plants, plants using biomass and waste, and cogeneration plants.
(1993 Development Plan Proposal, p. 48)

As for wind energy, Hydro-Québec has adopted the following approaches:

Wind energy remains very costly in comparison to hydroelectricity production. We are nevertheless carrying out detailed studies to determine the economic value of a future wind energy contribution to our main network. The situation is different in unlinked networks, because our production costs are much higher. We therefore plan to proceed with demonstration programs in a number of unlinked networks, without compromising the dependability of these networks.
(1993 Development Plan Proposal, p. 66)

In addition to all of the above, Hydro-Québec is conducting a research program into nuclear fusion, and expects to carry out research on new sources of energy such as photovoltaic energy (1993 Development Plan Proposal, p. 71).

Hydro-Québec's options for production facilities were questioned by the participants in the hearing:

By opting for major generating stations instead of alternative sources of production such as small and medium-scale plants, gas turbines, cogeneration, or even wind energy sites, Hydro-Québec has decreased its ability to adapt more quickly to changing economic conditions. The major plants take a great deal of time to plan and build, approximately 20 years in fact. We believe that smaller production units with a life of 20 years, that could be planned and built in only a few years, represent a better solution to an uncertain economic climate like the one we are now in. Hydro-Québec and the Government of Quebec have been able to see for some time now that there has been a proliferation in cogeneration capacity (8,000 MW)

and the construction of small and medium-sized plants by private developers. Hydro-Québec rejected most of these, and we don't really know why.

These various alternatives represent a significant potential that could be developed much more quickly than projects like SM-3. (Brief by Takuaitkan Uashat mak Mani-Utenam and the "Conseil des Atikamekw et des Montagnais", pp. 18 and 19)

Some intervenors referred to the advantages of diversification in production facilities:

Greenpeace Québec believes more than anything else in the virtues of energy diversification. Basing an energy policy on a variety of production sources remains the wisest course of action, we feel. That being the case, wind energy cannot be taken lightly, as it is unfortunately now being viewed by Hydro-Québec. Hydro-Québec has never believed in wind energy potential for Quebec, even though it is genuine and considerable. Moreover, the best sites are precisely located in the Lower St. Lawrence and on the banks of James Bay and Hudson Bay. (Brief by Greenpeace, p. 3)

The Real Cost of Electricity

Hydro-Québec plans the bringing on line of required production facilities as a function of growth in demand. To determine the order in which such projects are to be completed, it considers several criteria such as rates and financial impacts, planning flexibility, environmental and social impacts, economic benefits and, above all, cost efficiency.

On these bases, Hydro-Québec sees hydroelectricity as the most economical option once the 9.3 TWh potential energy conservation savings have been effected. In the short term, Hydro-Québec sees an interest in bringing cogeneration plants into production because of the low cost of natural gas and the short startup time for such equipment. Beyond the year 2000, these plants would eventually be replaced by medium-scale hydroelectric generating stations.

Ranking options in terms of cost makes it possible for Hydro-Québec to concentrate its efforts on studying the most cost-efficient projects and determining which are the most interesting from this standpoint. The ranking is based on an assessment of project costs, with due regard for the power of the plant and its production throughout the useful life of the equipment, i.e. 50 years for a hydroelectricity generating station. The costs taken into account include construction and roads, as well as maintenance and operating costs. The project cost is then converted into cost per kilowatt/hour which makes it possible to compare the various hydroelectric projects. The SM-3 project was placed by Hydro-Québec on the schedule of projects to be implemented through this method of ranking:

Included among the major projects which could be brought on line within this time span (2001-2005), Sainte-Marguerite-3 is the project which, for the beginning of the period, represents the best option, in terms of its cost, size and the possible date at which it could be brought on line. In fact, with a cost currently assessed at 3.8 ¢/kWh (1992), the project is rated highly in terms of potential for development. As for the scale of the project, i.e. 820 MW of peak power and average energy production of 4.4 TWh per year, the SM-3 generating station could be added to the network without creating any significant surpluses. Lastly, given that the Sainte-Marguerite project has reached the stage of applying for an order to authorize its completion, it is in a better position than any of the other generating stations being considered for the same period. According to the timetable, if the work were to begin in the summer of 1993, the SM-3 plant could be brought on line in the fall of 2001.
(filed document A15, pp. 10 and 11)

Using data supplied by Hydro-Québec, the panel wanted to check ways in which the SM-3 project could be compared with other projects. Total project investment is estimated by Hydro-Québec at \$1,556,585,000 in constant 1992 dollars. At the request of the panel, Hydro-Québec supplied the detailed costs for completing the SM-3 project in 2001 dollars. The total project cost then becomes \$3,575,547 (Table 34). The difference between the two values stems from the effects of inflation and project financing costs. Investment during the period that the project is in completion would in fact be spread over ten years (Table 35).

**Table 34 Total cost of Sainte-Marguerite project
(in discounted 2001 dollars)**

Element	Cost (000 \$)
Hydroelectric generating station and other equipment	2 287 086
Lines and power transformer stations	432 189
Studies carried out prior to 1991	120 129
Telecommunications (2 %)	56 788
Miscellaneous expenses (14 %)	679 354
Total	3 575 547

Source: Data from filed documents A116 and A117.

The installed power of the SM-3 generating station, that is to say the power that is supplied by the turbines, would be 822 MW. Because of the load losses caused by water friction in the 8 km headrace tunnel towards the underground plant, the peak available power is in fact 819 MW. Annual energy production from the plant is a function of peak available power and the plant's load factor. Hydro-Québec expects to use an annual average of approximately 60% of the SM-3 plant's production capacity. The average amount of energy produced annually would be 4.4 TWh. The cost per kWh (3.8¢) at SM-3 is calculated on the basis of the energy produced throughout the useful life of the generating station (50 years), with due regard for losses along the network and the difference between the value of the current dollar and future dollars.

The panel notes that environmental factors do not enter directly into the calculation. Only the mitigating measures anticipated by Hydro-Québec have been included in construction-related investment and hence in the cost of the energy to be produced. According to a number of participants, the proponent's decision should also have included the project's environmental and social costs, or the project externalities.

Tableau 35 Investment required to complete the SM-3 project with diversion (000 \$)

	Total	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Generating station only													
1992 constant dollars	1,260,785	8,032	7,042	107,724	177,017	180,689	183,119	169,042	152,778	102,525	124,172	47,360	1,285
Current dollars (+ inflation)	1,475,542	8,032	7,042	111,494	189,625	200,333	210,133	200,769	187,803	130,440	163,511	64,547	1,813
Discounted 1992 dollars	969,948	8,835	7,042	101,358	156,715	150,513	143,524	124,662	106,010	66,937	76,279	27,374	699
Discounted 2001 dollars	2,287,086	20,833	16,605	238,998	369,526	354,902	338,422	293,946	249,966	157,833	179,862	64,547	1,648
Lines and transformer stations													
1992 constant dollars	295,800	0	0	0	1,100	800	1,600	3,900	18,600	60,800	113,400	95,600	0
Current dollars (+ inflation)	388,371	0	0	0	1,178	887	1,836	4,632	22,864	77,355	149,326	130,293	0
Discounted 1992 dollars	183,290	0	0	0	974	666	1,254	2,876	12,906	39,695	69,662	55,257	0
Discounted 2001 dollars	432,189	0	0	0	2,296	1,571	2,957	6,782	30,432	93,599	164,259	130,293	0
Generating station + lines + transformer stations													
1992 constant dollars	1,556,585	8,032	7,042	107,724	178,117	181,489	184,719	172,942	171,378	163,325	237,572	142,960	1,285
Current dollars (+ inflation)	1,863,914	8,032	7,042	111,494	190,803	201,220	211,969	205,401	210,667	207,795	312,837	194,840	1,813
Discounted 1992 dollars	1,153,238	8,835	7,042	101,358	157,689	151,180	144,778	127,538	118,916	106,632	145,941	82,631	699
Discounted 2001 dollars	2,719,276	20,833	16,605	238,998	371,822	356,474	341,379	300,727	280,398	251,432	344,121	194,840	1,648

Note: Discount rate of 10% and inflation rate of 3.5%.

Sources: Filed documents A16 and A117.

For the “Ami-e-s de la Terre de Québec”, these externalities consist of:

[...] environmental costs: vast areas of land unavailable for other possible uses, climate changes, changes in the water quality of reservoirs, loss and upset of wildlife habitats, landscapes destroyed, disturbance of whole ecosystems, volumes of water transferred from one drainage basin to another, etc [...]; social costs: illness, expropriation [...]; economic costs: tied up capital, debt creation, medical costs, pollution control costs, legal costs [...]
(Brief by the “Ami-e-s de la Terre de Québec”, p. 15)

Participants interested in the question of externalities believe that Hydro-Québec does not have the methodology required to identify real project costs. Several groups discussed this issue in detail, including the “Association des biologistes du Québec”, the ENJEU group and the QWF. The latter federation mentioned that:

At the moment, the environmental assessment process for Hydro-Québec only occurs after the decision and seeks only to mitigate the impacts of a proposed project. A more thorough evaluation of externalities would no doubt lead to more appropriate decisions and planning processes [...]
(Brief by the Quebec Wildlife Federation, p. 96)

Likewise, the “Mouvement Au Courant” felt that it showed in its brief that Hydro-Québec:

[...] does not make use of a project selection and classification process that can identify all possible solutions and select the solution with the least impact.
(Brief by the “Mouvement Au Courant”, p. 40)

The “Association des biologistes du Québec” adds that:

[...] planning based strictly on technical and economic criteria appears to us to be too reductionist to be able to effect a credible choice of the options available to Hydro-Québec. There are other costs directly involved in the project [...]
(Brief by the “Association des biologistes du Québec”, p. 17)

Moreover, the ENJEU group pointed out:

In its 1993 Development Plan Proposal, Hydro-Québec committed itself to considering the question of externalities in its next 1995 plan [...] in view of the importance of evaluating externalities in optimizing our social decisions, can we wait?

(Brief by “Environnement Jeunesse”, p. 24, translation)

In the 1993 Development Plan Proposal, Hydro-Québec recognized the existence of such costs:

Externalities are difficult to quantify. At the moment, Hydro-Québec does not include them in its calculation of the marginal cost of the various production facilities. In the United States, though, it is relatively common to assign a credit to energy conservation to give due regard in calculations to the fact that they make it possible to prevent a quantity of atmospheric emissions from thermal power plants. This credit varies between 5 and 20%. Similarly, renewable forms of energy such as hydroelectricity are generally preferred to forms of energy that use fossil fuels.

(1993 Development Plan Proposal, p. 36)

Moreover, Hydro-Québec in 1991 commissioned American consultants to carry out a study on this matter. It was filed but not commented upon by Hydro-Québec at the public hearing (filed document A99). It would appear that a number of externalities were included in the project costs, according to statements by the proponent:

Hydro-Québec, under the Environment Quality Act, does not really have a requirement to quantify its externalities, and in its planning process, considers that most externalities are included in its facilities in a manner that eliminates the cost of externalities [...] When a project is planned, and when the impact statements are prepared, we begin by including environmental costs in the project; impact studies are carried out, and measures are taken specifically to decrease such environmental impacts. For example, in the project under consideration, the controlled flows are an environmental measure.

(Mr. Patrick Arnaud, transcription, part 1, February 8, 1993, evening, pp. 88 and 89)

While the issue of externalities is of concern to MENVIQ, it does admit that the methods currently used to define them are limited:

What we can see at the moment is that if existing methods were used for a specific case, the SM-3 project for example, they would not now yield proper results. What is needed now to be able to find meaningful results in applying such methods to the development program would be to be able to examine all projects submitted to the government at the time of the approval of the capital program. We believe that proceeding in this manner would make it possible to carry out a more accurate comparison between projects, and hence to set them in order of priority to take those externalities into account. But to do so at this time only for the Sainte-Marguerite project is not, we believe, the proper way to proceed.

(Mr. Gilles Brunet, transcription, part 1, February 8, 1993, evening, pp. 101 and 102)

Although according to the “Association des biologistes du Québec”:

[...] there is no unanimously agreed upon methodology with respect to how to go about evaluating externalities and mitigating costs [...] The primary problem involved in integrating externalities is of course quantifying them and assigning a value to them.

(Brief by the “Association des biologistes du Québec”, p. 21)

Several groups, including “Lumière sur l’énergie”, suggested that:

To adapt to the new economic realities, Hydro-Québec has to consider integrated resource planning (IRP) and to develop an assessment methodology that takes externalities into consideration [...]

(Brief by “Lumière sur l’énergie”, p. 12)

The following is a summary of the principles of integrated resource planning:

The integrated resource planning methodology (IRP) was developed in the US States, which adopted legislative and regulatory measures designed to integrate all internal and external costs in cost-benefit analyses of ways to provide the required power services, hence supply-related sources and demand management.

Although there is no universally recognized definition of IRP, the features of the methodology are well known and are summarized in the next paragraph.

Our research to date leads us to define IRP as the methodology that makes it possible to identify, qualify, quantify and integrate the various technical, economic, social and environmental criteria in the planning process for a development project. Moreover, the methodology makes it possible to justify and compare a power development project to the available alternatives on the basis of the same criteria.

(Cliche, 1993)

A Choice Rather than Planning

The proponent recognizes that non-economic and environmental criteria play a role in project selection :

To schedule the projects, production cost is not the only criterion used. The degree to which studies have progressed, and facility energy production, must also be taken into account. For example, a project like Sainte-Marguerite-3, even though it is less costly than Grande-Baleine, cannot be brought on line for 1998 because of the phases that remain before it can be completed.

(Environmental Impact Statement, part 1, p. 10)

The uncertainty of the government authorization process was already mentioned in the 1990-1992 *Development Plan*, on which the Environmental Impact Statement was based on :

During the 90s, delays in project completion limited the quantity of energy that Hydro-Québec could draw from its cost-effective and environmentally acceptable potential. In fact, the time required to carry out the environmental studies, coordination with the various environments, including native communities, the formulation of appropriate mitigation measures and obtaining government

authorizations made it impossible to complete major projects prior to 1998-1999, except those already committed as part of the La Grande complex.

(Hydro-Québec, 1990)

Hydro-Québec appears to have adopted an increasingly cautious attitude on this matter. Whereas in the 1990-1992 proposal Hydro-Québec still spoke of “on line dates”, the 1993 *Development Plan Proposal* refers instead to “the earliest possible on line dates” (Table 36). In addition, Hydro-Québec is now referring to the possibility of establishing a bank of projects:

The hydroelectricity system is, however, less advantageous than others from the standpoint of authorization and construction time. It would nevertheless be possible to increase its flexibility by setting up a bank of projects for which the preliminary projects and environmental assessments had already been completed.

(1993 *Development Plan Proposal*, p. 64)

Table 36 Economically feasible hydroelectric potential

Hydroelectric plant or complex	Production cost (¢/kWh) 1992	Peak power available (MW)	Mean annual energy (TWh)	Earliest possible on line date
Eatmain-1	4.1	465	2.7	1998
Haut-Saint-Maurice	4.1	615	2.9	2000
Sainte-Marguerite	3.8	820	4.4	2001
Grande-Baleine	4.0	3,210	16.2	2001-2002
Ashuapmushuan	3.5	730	3.5	2003
La Romaine	4.6	1,610	8.3	2005
NBR	4.1	8,350	46.3	2005

Source: Adapted from filed document A15.

This new way of operating is criticized by some participants:

[...] the new “flexible” strategy advocated by Hydro-Québec in its development plan proposal [...] would enable it to create a bank of pre-approved projects without the need to justify each project individually [...]

(Brief by “Lumière sur l’énergie”, p. 4)

This led the panel to the realization that there was not necessarily a link between scheduling and project production cost except in the case of the Romaine River. Project scheduling could be reviewed as a function of the energy context. Hence the proponent states that if demand were weaker than anticipated, the Haut-Saint-Maurice project, for example, could be delayed and brought on line after SM-3:

[...] what the panel must understand very clearly is that there is nevertheless some latitude; there are projects that have not necessarily yet been decided upon that come before Sainte-Marguerite. For example, the Haut-Saint-Maurice project, which we spoke of earlier. Haut-Saint-Maurice is not yet under construction, and a decision about it will not be forthcoming until 1995, if my memory serves me correctly, within the framework of the planning. So if there ever were to be a decline in demand, there is still leeway, without necessarily shoving the Sainte-Marguerite project aside.

(Mr. Michel Lacharité, transcription, part 1, February 3, 1993, afternoon, pp. 156 and 157)

The case of the Haut-Saint-Maurice project and its implementation schedule indicates that the proponent has a degree of latitude with respect to project scheduling.

This project therefore appears to be more flexible in Hydro-Québec’s planning given the fact that its completion time of approximately 5 years would be shorter than the completion time of SM-3, which would take 9 years. Other projects to come, Grande-Baleine or Ashuapmushuan, would take 8 years and 6 years respectively and would therefore be less flexible. However, according to Hydro-Québec, complex social or environmental problems could unduly slow down the number of projects and change the planned scheduling.

The panel notes therefore that the current scheduling of the projects is not the result of an economic or technical project rationalization process. No other factor than the progression and flexibility of the projects explain the scheduling or the start of work on each project.

The only clear reason to explain why the SM-3 project is the one currently under review thus appears related to the fact that Hydro-Québec's planning is more advanced on this project, and it is farther ahead with respect to obtaining government authorizations. The project has also reached this stage because the environmental problems related to it have been deemed acceptable by the proponent.

In addition, in view of this new and not necessarily economically related approach to scheduling, the panel wonders about what real costs would be generated by the completion of the SM-3 project. For example, the item "reserves for contingencies" in the "1990 basic commitments" (filed document A21) included an amount of \$85,855,000. The panel's analysis showed that the amounts for compensation and payments could require the whole of the available budget. This reserve could also serve to compensate native people, to pay overtime for site workers, cover the cost of an additional spillway if required at SM-2, or any other unforeseen requirements during construction.

The 21 MW generating station project at Robertson Lake completed a few years after it was authorized provides a significant example of how a project concept can be modified and how this involves increases in costs down the line. In fact, Hydro-Québec explained to the Parliamentary Committee that optimizing the project by becoming more familiar with the terrain and higher standard requirements increased the costs by 30% from \$262,817,000 to \$340,675,000 between 1989 and 1992. All the budget items were reviewed upward (Hydro-Québec, 1993).

Completing the SM-3 project could prove to be even more costly if additional externalities have to be included in the forecast costs. This assumption is all the more likely if project development has to be delayed by several years.

Given that it has not been demonstrated that it is urgent to proceed with the development of the project, and that there would be a possible increase in the costs, the panel is afraid that Hydro-Québec could be tempted to place the SM-3 project in its bank of pre-authorized projects. The panel therefore believes that the validity of authorizations ought to be limited to a specified

By centering the debate around accepting the project as it was submitted or abandoning it, Hydro-Québec did not encourage the people in the region to examine all aspects of the project or to assess any interest in the different variants. This attitude reduced the project review to a simple regional choice between two alternatives: accepting the project as submitted with its potential for economic benefits, or nothing at all! Reducing the range of possible choices no doubt contributed to polarizing the debate further. For the “Association de protection de la rivière Moisie”, Hydro-Québec, from the moment they did this, placed the economy and the environment in opposition. As a result, the panel and citizens were deprived of comparative elements and data about other variants that should have been assessed by the proponent. Genuine debate on all the variants compared on their relative merits was therefore not possible.

Other problems inherent in the Hydro-Québec communications program were noted, including how the “Comité pêches” and how the “Comité scientifique montagnais” functioned. At the public hearing, it became clear that there was confusion about the terms of reference and role to be played by the “Comité scientifique montagnais”, which served instead as a “a forum for exchanges and cooperation on some scientific and technical aspects of the SM-3 project, but without any power to have a direct influence on mitigating the impacts of the project and on selecting components of the project”:

In addition, the Montagnais in the community who were present at the meetings mentioned on several occasions that everyone appeared to have been decided in advance, and that their role was limited to approving or not approving the information sent by Hydro-Québec. And yet the Hydro-Québec representatives frequently mentioned that the project could be changed to give due consideration to community concerns. But the Montagnais never felt that they were truly involved in being able to enhance the project or in any decision-making about any of the components. When faced with the highly evasive or specialized responses made by Hydro-Québec to justify its decisions, the fact that Hydro-Québec's communications efforts were so ineffective ought not to be a surprise.

(Brief by the “Conseil des Atikamekw et des Montagnais”, p. 11)

variant alone, had peak available power of 613 MW. Prior to the corrections to the hydrological data on the Sainte-Marguerite River carried out by Hydro-Québec in October 1992 (Environmental Impact Statement, companion paper 3), the power of this generating station was estimated at 544 MW, i.e. 69 MW less.

Preliminary studies carried out by the proponent (technical documents 609 and 617) nevertheless describe other variants without a diversion. These, which were examined at the beginning of the project studies, before 1985, were unfortunately not mentioned by the proponent in the Environmental Impact Statement or at the public hearing. No recent comparisons using the variants contained in the Environmental Impact Statement are available because the studies were not completed.

Two of these drew the panel's attention. The first was a single generating station with basic equipment rated at 400 MW. The second variant, owing to the overcapacity of the SM-3 plant on its own, would make it possible to reach 610 MW. At the time, these variants were considered to be among the "most cost-efficient projects" for the development of the SM-3 site (technical document 617, p. 17).

The recent update of the Sainte-Marguerite River hydrological data increased the evaluation of its natural flow by 6%. This correction would significantly increase the economic and energy ratings of these variants.

A Sainte-Marguerite Complex

The SM-1 and SM-2 sites were not considered in the Environmental Impact Statement to be part of the project submitted for review. However, during the public hearing, the panel discovered that the two sites were now being studied and that the preliminary studies were to be completed in June 1993 (filed document A112). Nevertheless, the proponent stated in 1984 that:

[...] the development of SM-3 would have a direct impact on controlling the flows in the lower Sainte-Marguerite[...] As for Gulf Power's SM-2 development, the controlled flows in winter would greatly exceed the capacity of the plant[...] the capacity of the SM-2 spillway would be perfectly adequate to meet Hydro-Québec's standards for the SM-3 river on its own, and would be approximately

400 m³/s short for the SM-3 project with the P-2C diversion [...] The possibility of developing the SM-1 and SM-2 sites was considered for both SM-3 project options [...]
(Technical document 616, pp. 24 and 25)

The SM-1 and SM-2 sites have total available power of 125 MW without diverting other rivers. This power would be added to the power of the SM-3 site, to create a complex of hydroelectric projects with the total power of 738 MW, according to Hydro-Québec data (filed document A112). The power of this complex, compared to the SM-3 project option with the diversion, which is 819 MW, leaves a power difference of 81 MW.

It would be possible to design a Sainte-Marguerite complex project without a diversion, using instead the river's total energy potential, while still meeting Hydro-Québec's cost-efficiency criteria. However, although such an option has interest, the studies would have to be completed to check feasibility, as pointed out by the CSN in its brief:

Similarly, the Conseil central recommends that Hydro-Québec carry out a precise evaluation at the earliest opportunity of the hydroelectric production capacity of the Sainte-Marguerite which gives due regard to the added energy available from the existing SM-1 and SM-2 facilities, and the plant planned for the new SM-2 site.

(Brief by the "Conseil central des syndicats nationaux de Sept-Îles", p. 22)

However, this complex of plants along the Sainte-Marguerite River, even if it were optimized in terms of cost-efficiency and energy production, would perhaps not on its own be able to reach the planned production capacity of the SM-3 project variant adopted by Hydro-Québec. Because the SM-3 generating station was designed with the diversion in mind, abandoning the diversion would technically lead to an energy shortfall of the order of somewhat less than 100 MW.

In view of the uncertainties about the energy needs underlined earlier, such a production capacity may not be needed. Another option, given the ideas suggested at the public hearing, the panel suggests studying options such as wind or hydraulic power that would make it possible to develop an optimal strategy.

The North Shore does in fact have the best wind potential in Quebec, as well as the best potential for small and medium-sized plants (Hydro-Québec, 1982). On the subject of wind power, the panel was able to familiarize itself with the contents of a document from the “Institut de recherche en électricité du Québec (IREQ)”. The document concludes as follows:

To conclude, the study that we are undertaking will make it possible for us to deal more fairly with wind energy by doing a detailed simulation of how a wind energy site functions within our own facilities. These simulations would enable us to determine how wind energy could best be integrated with our network, and what quantities could realistically be considered.
(filed document A122, p. 6)

On this topic, the “Lumière sur l’énergie” group felt that:

[...] wind energy offers a viable source of production for Quebec and asks that this area be explored further before beginning construction of the SM-3 project.
(Brief by “Lumière sur l’énergie”, p. 6)

In connection with this potential, the panel found the recommendation made by the CSN to Hydro-Québec attractive:

That the development by Hydro-Québec in the area of an alternative energy research and production centre, particularly for wind energy, would contribute to developing expertise in this area for the future, while causing less damage to the environment.
(Brief by the “Conseil central des syndicats nationaux de Sept-Îles”, p. 19)

The panel believes that this type of research centre would be perfectly consistent with Hydro-Québec’s mission.

To ensure that the other SM-3 project variants without diversions be assessed, the Quebec Minister of the Environment should request that Hydro-Québec carry out additional studies, to compare these variants in terms of available power, energy production, cost efficiency and environmental impact.

In addition, MENVIQ should ensure that the Environmental Impact Statement include the SM-1 and SM-2 plants viewed as part of a single hydroelectric complex on the Sainte-Marguerite River.

The Public Review Process

The appropriateness of the decision to undertake the SM-3 project has also been questioned to a great extent because of the shortcomings of the review process prior to coming to a decision about the project. From the beginning of its term, the panel was plunged into a deteriorating, and perhaps even conflict filled social climate in the region. The public review of the project was carried out at the same time as the Parliamentary Committee was considering Hydro-Québec's *1993 Development Plan* proposal, and at the same time as negotiations were under way with the Montagnais. The public review of the Grande-Baleine project, although the administrative framework for this was completely different, was also very much in the minds of several public hearing participants, if only because of the differences between the review processes involved in each instance.

In view of the importance assigned by the participants to the public review process for the SM-3 project, the panel noted the most useful comments and suggestions and made an effort to draw from these ideas with respect to what decision ought to be made with respect to the project, as well as with respect to the review process for future projects.

A Complex Consultation Framework

Included among Hydro-Québec's preliminary studies was a detailed "communications program" from the spring of 1987 to the spring of 1991. Some phases of the program were maintained right up until the BAPE intervention, whose information office has been opened to the public since 1989 in Sept-Îles. The purpose of the program was to involve the agencies, groups and persons concerned in the studies. Public information days and information and consultation meetings about the project in general and about some of its specific aspects enabled Hydro-Québec to reach and dialogue with most of the agencies in the community.

The program enabled Hydro-Québec very early on to feel the pulse of the social concerns of the project and to identify the main issues involved:

- *preserving the salmon and fishing and navigation conditions of the Moisie River;*
- *use of the land by the Montagnais;*
- *increase in the mercury contamination rate in the flesh of fish in the reservoirs;*
- *creation of jobs and securing of contracts*

(Environmental Impact Statement, part 10, p. 1)

Two committees were established by Hydro-Québec to study salmon, the “Comité scientifique sur le saumon de la Moisie” and the “Comité pêches” on fishing and navigation conditions. The native issue and the concerns of the Montagnais were discussed by a sector working group, and as part of the work of the joint CAM Hydro-Québec committee, called the “Comité scientifique Montagnais”. This committee, which was struck in 1987, was assigned a mandate to study the scientific and technical facets of the project, to define and give direction to the studies, as well as oversee them and ensure that they are completed, to select consultants and to make comments on the reports. The committee consisted of representatives from the CAM, from the Uashat Malinotam Band Council and from Hydro-Québec (filed document A91). According to the expectations of the CAM (filed document A45), the committee was to play a very active role in the studies concerning their land.

In the same vein as its consultation specifically on the Sainte-Marguerite project, Hydro-Québec proceeded to consult with respect to its new development plan. This exercise, in which many agencies interested in the SM-3 project took part, was held from November 1991 to October 1992. A development plan proposal was eventually examined by the Parliamentary Committee on Labour and the Economy for a four-week period beginning on February 23, 1993. The committee sat at the same time as the BAPE consultation on the SM-3 project was under way, its term having begun on January 18, 1993.

Some of the 87 briefs submitted to the Parliamentary Committee commented upon the Sainte-Marguerite project. However, a number of agencies, including the “Mouvement Au Courant”, the “Association des biologistes du Québec”, the ENJEU group and Greenpeace referred to their comments on Hydro-Québec’s 1993 *Development Plan* proposal during their presentations

on the Sainte-Marguerite project. Approximately ten participants who took part in both consultations as the public hearing was being held were among those who most often raised the energy issues surrounding the SM-3 project.

Another consultation process, this time concerning Hydro-Québec's Grande-Baleine project, was also felt at the public hearing on the Sainte-Marguerite project. In October 1992, the support team for the Grande-Baleine public review released its guidelines concerning the Grande-Baleine hydroelectric project environmental impact study. These guidelines, which were prepared as part of the process agreed to for north of the 55th parallel under the James Bay and Northern Quebec Agreement, the *Environment Quality Act* and the EARP Guidelines Order, had been the subject of public consultations by the appropriate panels and committees in early 1992. This very detailed 113-page document defined the guidelines that Hydro-Québec had to follow in assessing the environmental impact of its major hydroelectric project.

Although carried out in very different regulatory and administrative contexts, the assessments of these projects were similar in many ways with respect to the issues involved. The Sainte-Marguerite project, which is reviewed under the southern Quebec procedure, and the Grande-Baleine project, which is reviewed under the procedure for northern Quebec lands covered by agreements, were subjected to several comparisons and comments, with an emphasis on the differences in financing of participation and the role of federal agencies and departments, as well as the time allowed for public review.

Strong Polarization

The initial effect of this proliferation of consultations was to cause confusion concerning the respective roles to be played by the various agencies involved in the consultation, as the panel was able to notice, as well as with respect to decision-making mechanisms on the major projects and on the contents of the environmental assessments required. The second effect that it had was to polarize national interest groups and the people living in the region around the project's energy and economic issues. In the region itself, debates over a period of several years led to a cleavage between communities, for example between natives and the rest of the population, or between business people and those dedicated to saving the salmon and the environment. In the months prior to the public hearing, these polarizations led to confrontation between the various groups in attendance.

Parallel to Hydro-Québec's communications efforts were those being marshalled by regional, national and even international groups of agencies dedicated to defending a common position concerning the project. As was mentioned in Chapter 3, the Pro SM-3 group marshalled forces to support the project. Although there was some misunderstanding about the role and operations of the BAPE, the defenders of the projects were very active and worked together to present some 60 briefs. At the other end of the spectrum, the "Les Amis de la Moisie" coalition became the standard bearer for those opposed to the project (Brief by "Les Amis de la vallée du Saint-Laurent", Appendix "L'affrontement Hydro-Québec/Contestation Portneuf Lotbinière"), although it remained very discreet during the public hearing. The groups who held this same vision of the project proceeded independently and each carried out their own analysis and made their own suggestions about the project. Included among the members of this coalition were agencies dedicated to protecting salmon and the Moisie River, the principal representatives of the Montagnais and a considerable number of the major environmental groups in Quebec. Other interest groups were noted by the panel, in particular those related to the Nitassinan Coalition (Brief by the Nitassinan Coalition, letters of support) which obtained support for its values and the participation of peace groups (non violence) and American and Canadian groups supporting native claims.

This polarization of visions and of approaches may, in the panel's opinion, have been accentuated by a number of steps taken by Hydro-Québec during the preparation of the Environmental Impact Statement. Commenting on the controversy between the various socioeconomic groups, the "Comité de protection de l'environnement de Sept-Îles", an agency which took a stand on the project at the risk of losing the vital financial support of Sept-Îles because of diverging opinions, explained the matter as follows to the panel:

It's very easy to understand, Mr. Chairman, it is that the people here all gave Hydro-Québec their O.K.: we want this to take place as it is now! Because Hydro-Québec said: that's the way it has to be or it won't happen at all. So everyone said: It's better to take that than nothing at all[...] So I think there was something like a consensus within the region to take the project as is, that we would not risk losing it by making changes.

(Ms. Claudette Villeneuve, transcription, part 2, March 18, 1993, morning, pp. 107 and 108)

By centering the debate around accepting the project as it was submitted or abandoning it, Hydro-Québec did not encourage the people in the region to examine all aspects of the project or to assess any interest in the different variants. This attitude reduced the project review to a simple regional choice between two alternatives: accepting the project as submitted with its potential for economic benefits, or nothing at all! Reducing the range of possible choices no doubt contributed to polarizing the debate further. For the “Association de protection de la rivière Moisie”, Hydro-Québec, from the moment they did this, placed the economy and the environment in opposition. As a result, the panel and citizens were deprived of comparative elements and data about other variants that should have been assessed by the proponent. Genuine debate on all the variants compared on their relative merits was therefore not possible.

Other problems inherent in the Hydro-Québec communications program were noted, including how the “Comité pêches” and how the “Comité scientifique montagnais” functioned. At the public hearing, it became clear that there was confusion about the terms of reference and role to be played by the “Comité scientifique montagnais”, which served instead as a “a forum for exchanges and cooperation on some scientific and technical aspects of the SM-3 project, but without any power to have a direct influence on mitigating the impacts of the project and on selecting components of the project”:

In addition, the Montagnais in the community who were present at the meetings mentioned on several occasions that everyone appeared to have been decided in advance, and that their role was limited to approving or not approving the information sent by Hydro-Québec. And yet the Hydro-Québec representatives frequently mentioned that the project could be changed to give due consideration to community concerns. But the Montagnais never felt that they were truly involved in being able to enhance the project or in any decision-making about any of the components. When faced with the highly evasive or specialized responses made by Hydro-Québec to justify its decisions, the fact that Hydro-Québec's communications efforts were so ineffective ought not to be a surprise.

(Brief by the “Conseil des Atikamekw et des Montagnais”, p. 11)

Similar criticisms were made with respect to the work of the “Comité pêches”, by those who were serving on the committee:

The very fact that Hydro-Québec thought of establishing such a committee is further indicative of the fact that our provincial Crown corporation was not really familiar with the conditions governing fishing on the Moisie. In fact such a committee could only come on the scene under conditions that were satisfactory to everyone in view of the various user requirements [...] [Hydro-Québec] had just opposed users from the upper and lower ends of the river.
(Brief by the “Association de protection de la rivière Moisie Inc.”, p. 21)

A Debate About Energy

Concerns about the need to have a broad debate about energy were frequently expressed to the panel in Sept-Îles, and these concerns had surfaced elsewhere as part of Hydro-Québec’s communications program:

Several intervenors wondered about the timeliness of developing Quebec’s hydroelectric potential. Rather than rapid development, they were in favour of other measures such as energy conservation. This attitude was clearer still when the electricity in question was for export. Although only a short time ago such concerns were only expressed by environmental groups or ecologists, the energy debate and the environmental protection issue have become increasingly important in the discourse of economic interest groups.
(Environmental Impact Statement, part 10, p. 15)

This consensus on the need for broad public debate on future directions for energy was also noted by the Parliamentary Committee on Labour and the Economy:

I believe that the time has come to begin a process of deliberation that will make it possible to implement the energy policy [...] I will pay special attention to the process that will be selected to ensure not only that there is genuine democratic participation, but also that it is appropriate for the economy and for labour, and that it leads to clear collective choices that are based on the true facts.
(Closing address by the Minister Ms. Lise Bacon, Parliamentary Committee, March 24, 1993, p. 5)

Like Hydro-Québec in its own consultation process, the panel can do no more than pass on its concerns to government authorities, knowing that responsibility for energy policy and for a decision to hold a public debate on energy rests with the Government of Quebec (*1993 Hydro-Québec Development Plan Proposal*, Consultation Report, pp. 21, 55 and 60)

During various consultations, other requests were often repeated, including the need to take externalities into account. On this topic, Hydro-Québec would respond that “these proposals were used as inputs into Hydro-Québec’s deliberation process” (*Hydro-Québec 1993 Development Plan Proposal*, Consultation Report, pp. 35, 37, 55 and 57), a rather timid response that did cause some dissatisfaction among participants specifically interested in energy development planning.

It was often in reference to renewed decision-making approaches that integrate social, environmental and economic dimensions of major energy projects from both the quantitative and qualitative standpoints that a number of participants developed comparisons between the assessment and public review process as it was applied to Sainte-Marguerite and Grande-Baleine. Thus the “Association des biologistes du Québec” told the Parliamentary Committee on Labour and the Economy:

[...] we feel that it is unfair and unacceptable that two hydroelectric projects in Quebec should undergo different public assessment processes. The projects in question are Grande-Baleine and Sainte-Marguerite.

(Brief by the “Association des biologistes du Québec”, Appendix, pp. 7 and 8)

In view of this consideration, the Association asked the Parliamentary Committee:

To ensure that there are equitable and thorough reviews (integrating the social and environmental cost scenarios) for both the development plan and the various Hydro-Québec programs and projects.

(Brief by the “Association des biologistes du Québec”, Appendix, p. 8)

These requests were taken up by various groups as part of the public hearing on the Sainte-Marguerite project, including spokespersons for native organizations:

The question of the public review process appears to us to be essential. Over the past year, we wrote several letters to the ministers responsible for applying the Quebec and Canadian environmental assessment processes, to federal Departments consulted within the framework of one or other of the processes, and to the chairmen of the BAPE and the FEARO. Basically, we wanted to make sure that these processes be applied as provided under the current legislation and in accordance with recently developed standards, for example for the Grande-Baleine project.

(Brief by the “Conseil des Atikamekw et des Montagnais”, p. 12)

Criticisms sensitive to energy issues described the assessment of the SM-3 project as a “turning point between two worlds” (Brief by the “Mouvement Au Courant”, p. 1), an assessment that ought to be suspended “until such time as the Government of Quebec, in particular, has determined what impact the review of economic and energy policies will have on long-term electricity needs” (Brief by “Mouvement Au Courant”, p. 46).

Weaknesses in the Public Review Process

The brief by the “Mouvement Au Courant” described what conditions are required for an environmental assessment that gives due regard to new integrated resource planning methodologies, and recommends that “the public review of the project should be done once again, but in accordance with the processes in force for Conawapa in Manitoba and for Grande-Baleine” (Brief by “Mouvement Au Courant”, p. 46).

The panel is aware of the misgivings of various participants concerning the fact that, because of urgent requirements that remain difficult to demonstrate, the SM-3 project is not being evaluated by means of new methods that give the public the right to express its point of view about the environmental assessment and public review process. These new approaches, which allow for consultation, social planning and coordination, the analysis of social costs and the inclusion of externalities are now known and considered as

socially desirable. Thus some participants believe that the SM-3 project ought not to be evaluated on the basis of standards used earlier, because contexts have changed a great deal from the economic, social, technical and environmental standpoints:

When they were issued in May 1988, in the economic climate of the time, the guidelines could probably ensure a relatively complete environmental assessment. However, in recent years, a number of questions having to do with energy have become more important:

- integrated resource planning (IRP);*
- cumulative impacts on the environment;*
- demand side management;*
- economic, social and environmental externalities, and*
- evolution of the whole energy context*

lead us to believe that the guidelines no longer make possible a project assessment based on the best currently available knowledge.

(Brief by the “Association des biologistes du Québec”, p. 6)

The changing energy situation and the context in which decisions are made are reflected in the guidelines for the environmental impact study on the Grande-Baleine hydroelectric project. These guidelines showed the similarity of what was at stake in hydroelectric development megaprojects, even though they may have been in different locations. In both instances, the major energy strategies, as well as native rights and environmental impacts, including social and cumulative impacts, are very much in the forefront of the debates.

For the Sainte-Marguerite project, the people responsible for a social impact study carried out for Hydro-Québec broke down these issues into eight major topics, sustainable development, the economic development model, manpower training, occupying the land, allocating the benefits in the region, the question of identity, access to services, and Hydro-Québec's corporate image.

In addition, this study noted that:

The social context and the problems applicable to the Sainte-Marguerite hydroelectric project are virtually the same as those for any megaproject, whether in the area of hydroelectricity or industry. [...] It is important to emphasize that most of the issues that

we discuss in this chapter are not the immediate responsibility of Hydro-Québec but rather of regional development agencies and departments that play an economic role.
(filed document A27, p. 77)

Added to these questions concerning differences between the assessment processes used for similar hydroelectric projects were several remarks from participants pointing to weaknesses and shortcomings in the Sainte-Marguerite project environmental assessment process. The criticisms were particularly severe from environmental groups:

We believe that the institutions responsible for the SM-3 project environmental assessment did not play their respective roles and did not shoulder their responsibilities.

The federal government failed to meet its obligations, and for political reasons, refused to submit the project to the EARP.

The provincial government, through its Minister of the Environment, set the assessment process for this megaproject in motion, knowing fully well that there was no urgent need to do so, and at a time when traditional economic and energy policies were being seriously questioned.

The BAPE accepted the Minister's terms of reference, knowing that things were incomplete and that it would be impossible, for the moment, to perform a satisfactory environmental assessment of the project.

(Brief by the "Mouvement Au Courant", p. 45)

In reference to the participation of federal representatives at the public hearing, the native groups pointed out:

[...] situations that we describe as inadmissible: vague and incomplete answers from them, answers put off until later because expertise was not available, no answers about matters having to do with federal jurisdiction, etc. In particular, the problem encountered repeatedly by federal representatives in justifying or explaining the results of the initial environmental evaluation appears to us altogether irresponsible on the part of the Government of Canada.
(Brief by the "Conseil des Atikamekw et des Montagnais", p. 13)

The CAM and the Uashat-Maliotenam Band Council see in these many shortcomings a reason to oppose the project, and in the shortcomings of the public review reasons to ask for a new environmental assessment of the project under the federal process. They believe that the current review “violates the government’s legal obligations with respect to environmental assessment” (Brief by the “Conseil des Atikamekw et des Montagnais”, p. 16 and Appendix).

Federal documents, particularly the initial assessment published by the DFO, ask questions that have far-reaching implications. This document, published by the FEARO when its involvement in the public review of the project was announced, was referred to frequently during the hearing. The proponent felt it was necessary to file a document summarizing its reactions (filed document A11), in which it states that the government’s opinions were not sufficiently supported. The panel did in fact note that a number of the statements based on the scientific analysis carried out by the federal agencies did not present convincing evidence. Representatives of the DFO did not always bring to the public hearing the arguments or references they needed to support the opinions contained in their assessment document.

In particular, these opinions referred to a number of crucial elements, some of which were absent from the Environmental Impact Statement submitted by Hydro-Québec, including impacts on the estuaries and on migratory birds, and the effects of mercury on health. The panel had to rely on resource persons from federal and provincial departments to find evidence supporting statements made in the initial assessment and to collate information that was likely to shed light on the many questions raised by the federal document. As part of its investigation, the panel was thus able to obtain additional information about salmon fishing in the Atlantic (filed document B13) and about seismic risks (filed documents B37 and A102).

Reconciling the Differences

In view of the extremely tense social situation, the search for solutions that could obtain the approval of most of the participants and lead to restoring a healthy social climate in the region directly affected by the project appears to

be essential. Integrating the “psychosocial” dimension into the choices requires a sophisticated treatment of the problems that would rally the unconditional supporters of economic development and the conservationists.

In view of the many deficiencies in the review process that were raised by participants, the panel is forced to admit a number of technical, administrative, regulatory and physical shortcomings in reviewing the environmental impacts of projects of this magnitude. However, the importance assigned by the public to project evaluation and review is not only a matter of time; it depends on many other factors, both methodological and social, including the relevance of analyses and debates, the transparency of the procedures followed, the availability of information and providing opportunities for concerned citizens and groups to be heard.

Participants in the hearing suggested that the lack of effort by the proponent to simplify and summarize its studies helped to feed controversy and generate citizen mistrust. The people should have had access to technical information, particularly in areas where the public is the ultimate expert, which is to say where they live.

Likewise, the approach of Hydro-Québec’s communications program should be reviewed to correct the faults that appeared when it was applied to the Sainte-Marguerite project. After four years in the region, and a proper identification of the social concerns, the points causing the greatest conflict were not settled, and discussion of these was put off until the BAPE’s public hearing. The communications program became more than ever a “pressure sales campaign”, rather than a way of designing the project in response to requests by the community.

Lastly, in view of the social consensus that has arisen concerning the need for an energy debate and the need for a thorough and modern environmental assessment of major hydroelectric projects, the panel feels that the evaluation of the SM-3 project and other future major projects should be completed to include externalities and cumulative impacts. This consistent treatment of similar projects that involve similar issues assumes, in the case of the Sainte-Marguerite project, methodological adjustments and, especially, companion studies whose results could answer the many questions that still remain unanswered and respond to the dissatisfaction with the deficiencies of the existing Environmental Impact Statement.

The panel therefore feels that from the social standpoint, additional time to complete the Environmental Impact Statement could allow for a way to reconcile the social differences of opinion that were observed at the public hearing. Extending the due date for the decision could provide an opportunity to explore and validate ways of reconciling the positions identified by the public investigation and hearing concerning this project. It would also remove some of the pressure on the people living in the region, who were at the outset given a simple choice of accepting the project as put forward by Hydro-Québec or rejecting it. The additional time could also, with the cooperation of the partners involved, make it easier to establish harmony among diverging interests and to repair the damage to the social fabric caused by the debate on this project over a period of several years. According to citizens deeply committed to the battle against the project, such a pause is also necessary to make it possible for a complete assessment of the project to be carried out by the proponent, Hydro-Québec, the provincial Crown corporation that has been described by these exasperated people as “a monster that belongs to us, but over which we have lost all control”. (Brief by the “Association de protection de la rivière Moisie Inc.”, p. 22).

Chapter 9

The Analysis : Caution and Consultation in Considering the Risks

This chapter summarizes the analysis and the positions taken by the panel on the issues surrounding the project, as expressed in the earlier chapters. The panel then suggests an attempt to reach consensus upon which its conclusions can be based.

Shortcomings, Uncertainties and Doubts

The uncertainties concerning several aspects of the project and the many deficiencies of the Environmental Impact Statement raised doubts that the panel was able to identify and combine here under several headings.

Socioeconomic Impacts

Several aspects of the project's economic benefits remained pending or uncertain, as did the mitigating and compensation measures of the socioeconomic impacts. The panel noted, among other things, that:

- the impact of the economic benefits on the region's economy in the short and long term was not demonstrated either by the proponent or the economic partners;

- formulas for allocating skilled jobs, awarding contracts (flexibility rules, splitting) and liaison with regional players, could not be identified;
- no comparison of impacts on the North Shore economy of the various development variants was provided;
- evaluation of the regional capability to obtain benefits from an energy megaproject was not made available, making it difficult to select those measures that would guarantee a response to the considerable expectations of the people living in the region;
- the problems of river, lake and reservoir navigation for users of canoes or other craft, in particular for fishermen, were not answered with satisfactory solutions;
- agreements were not prepared and negotiations not completed on problems raised by socioeconomic impacts, whether in the case of wildlife users, mine or logging operators, recreational or tourism users, or salmon managers on the Moisie River;
- applications for compensation and restitution were many, and could require unexpected financial contributions from Hydro-Québec or other government agencies;
- Hydro-Québec's intentions with respect to supporting the regional development announced as part of the *1993 Development Plan Proposal*, and their impact on the SM-3 project, were neither developed in detail, nor confirmed, nor approved.

The Salmon of the Moisie

The component of the project that involves diverting the waters of the Moisie River basin towards the Sainte-Marguerite River, while setting aside a flow for fishing and salmon protection, was presented as an innovative solution to cohabitation on the same river of salmon fishing and energy production. The

suggestion gave rise to many objections and serious doubts, notably on the part of scientific, government and other circles, as well as from salmon harvesters. The panel's findings include the following:

- participants concerned about salmon reported a general preoccupation about the potential impacts of the project on salmon, as well as on the yield and quality of fishing on the Moisie River;
- doubts about the validity of the simulation model for habitats and about the efficiency of controlled flows as a way of preventing changes in the habitats and behaviour of salmon were raised by scientific experts consulted by the proponent, government and the panel;
- knowledge of the baseline information for measuring changes is deemed unsatisfactory to be able to predict with any reasonable degree of certainty the effects of any flow changes on salmon behaviour, on population growth in the river and on fishing success rates;
- instruments for observing and analyzing the current condition of the Moisie River were operational only during the 1992 season, whereas a six or seven-year cycle of complete studies beginning now would be needed to accurately measure this complex environment;
- managers and users of the Moisie clearly stated their objective to protect the salmon and to maintain fishing activities;
- very strong opposition to diverting the waters of the Moisie River basin came to the fore and it was largely the result of social polarization around the project;
- participants at the public hearing demanded formal guarantees from Hydro-Québec to protect the salmon and to maintain fishing activities; these guarantees, for some people, should be confirmed through a private agreement required under a government order;
- a broad consensus was reached with respect to the need to assign the task of managing the diversion structures to an independent agency separate from the proponent, representing all of the users' interests;

- measures to manage the hydraulic structures on the Moisie River tributaries, which assign priority in allocating flows for the protection of salmon, may ultimately lead to abandoning and dismantling the diversion structures, thus cancelling out completely any hoped for energy gains;
- these guarantees and future management requirements for equipment would increase the production cost for the energy supplied by the diversion and decrease accordingly the economic attractiveness of this component of the SM-3 project;
- the uniqueness of the Moisie River and its salmon population is recognized by all, and it has given the river national and international recognition;
- the proposal to protect some rivers in Quebec as heritage rivers, including the Moisie River, for example, was submitted by several regional and national groups to various authorities, and has thus far attracted a degree of attention from the government authorities;
- the development of forms of management to allow multiple uses for the North Shore salmon rivers that have feasible energy potential is undeniably of interest to Hydro-Québec in planning its future projects.

Montagnais Claims

The results of the current negotiations between governments and the Montagnais could have an influence on the decisions that need to be made concerning all hydroelectric development projects, including SM-3, in the disputed land claim area. On this subject, the panel's findings are as follows:

- negotiations under way between Quebec and the Montagnais should lead to an agreement in principle in June 1993 and to a final agreement towards the end of 1994;
- the natives and other groups who supported them asked that the decision on SM-3 not be taken until negotiations on the ancestral land affected by the project are concluded;

- the amounts to be paid to the native communities as compensation for a loss of resources related to the SM-3 project are not known and could increase the total cost of the project;
- there have not yet been any arbitrations about conditions for access to the land and for harvesting wildlife resources, and these should stem from the agreements currently being negotiated;
- native and other populations living on the land and carrying out activities there have expressed a desire to have their say in planning and development choices;
- risk management measures for environmental mercury contamination remain to be formulated in coordination with the communities most directly affected by it.

Assessment of Impacts

Several deficiencies in the contents of the impact assessments and in the methods used to carry them out were noted. Added to these missing elements is the dissatisfaction of many of the participants with the process of the project public evaluation and review itself:

- many questions remain unanswered, including those having to do with the impacts of the SM-3 project on wildlife (mammals, migratory birds and fish other than salmon);
- the impact study on the electrical power transmission line, which is an important component of the project located in the study area, has not yet been carried out;
- other components associated with the project, i.e. the construction of a new SM-2 generating station and the refurbishing of SM-1, were not evaluated in the Environmental Impact Statement, whereas their completion is envisaged in the Hydro-Québec capital plan or begun by other proponents;

- the environmental assessment did not adopt a number of methodological approaches more compatible with sustainable development, such as evaluating cumulative effects and externalities;
- the assessment of the SM-3 project was carried out in accordance with methods and standards that several participants consider not on an equal footing in comparison to other similar major projects such as the Grande-Baleine complex;
- a great deal of dissatisfaction was expressed about Hydro-Québec's communications program, concerning the manner in which various working groups operated and about the public review process for the project.

Energy Rationale

Several areas of uncertainty have marked the evolution of the energy situation in Quebec and its energy requirements, which are the very rationale for the decision whether to undertake the hydroelectric development of the Sainte-Marguerite River now or later:

- the government has not yet come to a decision about Hydro-Québec's new planning approach, which was proposed in the *1993 Development Plan Proposal*, and which intends to establish a bank of already authorized projects, or to complete projects in the order in which the required government authorizations are obtained;
- there is a growing consensus for an independent public debate about the directions to be given to the Quebec energy policy as a whole;
- the urgency of beginning the implementation of the SM-3 project in the coming months has not been demonstrated, and the "prequalification" of the project is not an important argument in favour of immediate authorization;
- doubts continue about forecasts concerning increased demand, in particular those having to do with industrial consumption and exports;

- special attention should be given to asking Hydro-Québec to make a firmer commitment to energy conservation, in particular with respect to the possible advantages of managing energy demand and efficiency to control demand and to create permanent jobs in the medium and the long term.

Reviewing the Variants

A generating station on the Sainte-Marguerite (SM-3), operated in part by the diversion of the Carheil and aux Pékans rivers (PC2) with controlled flows, is the variant adopted by Hydro-Québec as the only economically feasible option to develop the energy potential of the Sainte-Marguerite River. This firm decision by Hydro-Québec led to several questions that have not yet been answered satisfactorily, and clarification remains necessary:

- the variants envisaged at the beginning of the preliminary studies were quickly set aside without being evaluated from the technical, economic or environmental standpoints, thereby depriving citizens of points of comparison for making an enlightened choice;
- the variants for the development of the energy potential of the whole of the Sainte-Marguerite River were neither described, nor studied, nor evaluated;
- the development of the Sainte-Marguerite River, including any modifications to the existing generating stations (SM-1 and SM-2), could represent significant energy potential;
- it is not unlikely that a hydroelectric project smaller in scale than the one proposed on the Sainte-Marguerite River could be built at a competitive cost and yield equivalent economic benefits in the region;
- the lack of information about alternative solutions to the diversion of water from the Moisie River basin, even through the use of other sources such as wind energy and small or medium-sized plants, makes it impossible to come to an enlightened decision on the basis of the least environmental impact or of the production cost for the energy to be produced.

Obtaining the Good Will of Opposed Parties

The panel sought solutions that were likely to rally as many as possible of the opposing positions that it observed during the public hearing. A number of major approaches appear to the panel to be determining factors in evaluating the project and in making the most desirable decisions.

Sustainable Regional Development

The panel looked into how to manage the critical problem of the Sept-Îles and Port-Cartier economy, which was presented forcefully to the panel, and in particular, how to respond to the pressing expectations expressed by business and workers.

Completing the project would have a positive impact on the economy of the region, and it would have been reasonable to expect the proponent or the participants involved to identify and demonstrate this. However, it was not done. Even though a major hydroelectric project may help to provide relief to a regional economy that is experiencing problems, the risk however is that such relief will be well below expectations held by the people. The many requests formulated by the participants are indicative of the scale and diversity of the needs of many different economic players, and not only of Hydro-Québec.

Many of these requests are not directly linked to the development of the project and could not be met by Hydro-Québec, even within the environmental development program and any future regional development support program. These come under the responsibility of other government institutions and lie beyond Hydro-Québec's mandate, which was to produce and sell electricity.

Several of these suggestions concern government agencies, and their implementation is independent of the SM-3 project. Information obtained from various participants from the socioeconomic community nevertheless contain a good many elements that could serve as ingredients for a sustainable economic rescue plan for the region, based on experiences from elsewhere, for example Baie-Comeau.

The drift of the public hearing therefore suggests that the economic problems being experienced in the Sept-Îles and Port-Cartier region should be dealt with urgently, in a broader context than the review of a hydroelectric project or of economic development stemming from a provincial Crown corporation project. In addition to potentially being profitable for the region, the development of an economic recovery program that is independent from the SM-3 decision could also have the social consequence of cutting off the dependency reflex that the panel has observed, one which has grown along with the Hydro-Québec consultations on the project.

The Preservation of the Moisie River

The environmental acceptability of the project is very much associated with the diversion of the aux Pékans and Carheil rivers using controlled flows. Controlled or regulated flows are the method proposed to regulate the quantities of water required in the Moisie River throughout the year to protect the salmon and to maintain fishing activities. However, serious doubts have been expressed about the actual protection that controlled flows would provide in terms of maintaining both the quality and the quantity of the salmon population of the Moisie River.

As for the Sainte-Marguerite River, the panel gave due regard to the many impacts the project would have on the natural environment and on the native communities. In the past, development has used the river for energy purposes at the expense of its wildlife potential. A fact which must also be taken into consideration is that the natives consider the environmental cost that they would have to shoulder to be very high if a new hydroelectric project on the Sainte-Marguerite River were to be developed.

The Moisie River, which is outstanding because of its salmon, should be preserved from a conservation standpoint and for sustainable development. This would exclude any possible risks to such vocations. The price that has to be paid to preserve the salmon of the Moisie River is the price that will have to be paid to replace the energy shortfall that will result from optimized development of the Sainte-Marguerite River alone. Even though the alternative may be more costly, the development should be effected in a manner compatible with sustainable development, and in such a way as to meet the needs of the existing populations without prejudice to future generations.

Included among these needs, according to the populations met, are the development of the area's regions and native communities, the conservation of species that make it possible to carry out traditional hunting, fishing or recreational activities, and the meeting of Quebec's energy requirements.

A more broadly based debate about Quebec's energy approaches would make it possible to identify the basic parameters needed to make these energy decisions, by integrating economic and environmental dimensions. As for the various projects, they should be selected, formulated and evaluated with all the care and rigour needed within the framework of environmental impact assessment and public review processes, with a view to integrating the management of the economy and the environment.

Cohesiveness in the Community

The desire of the proponent to begin the project as soon as possible, or at least to obtain the required authorizations quickly, is difficult for the panel to understand, particularly in the current decision-making context, which is undergoing significant changes both in the energy and environmental sectors. If the SM-3 project were not completed in the very short term, such an approach could well make it into a pre-authorized project based on obsolete energy planning and environmental assessment methods, and could once again threaten the project with challenges and objections.

If additional time were allowed prior to taking the decision to undertake the project, the proponent would have the time needed to rigorously finish the preparation and evaluation of the project in conjunction with the other players involved. The extra time would also be needed to make it possible to do an additional verification of the urgency and necessity of the project in light of the decisions made by the Parliamentary Committee that examined Hydro-Québec's forecasts and development plans.

From the social standpoint, the extra time made available to deliberate by putting off the decision could have a positive impact on reconciling the positions that came out of the enquiry and public hearing. For example, the significance of the SM-3 project in the land negotiations with the Montagnais would be lessened and pressure would be reduced for the people in the area who now only have the choice of accepting the project as proposed by Hydro-Quebec. This extra time period could also, with the

cooperation of the various parties involved, make it easier to reconcile diverging interests, and to restore harmony in the social climate in the area, one which has been hit hard by several years of conflict surrounding the project.

A Common Sense Solution

Ms. Carole Pelletier, a citizen representing the people who participated in Sept-Îles, describes herself as a nature lover and as someone who likes sport fishing. She wrote her own analysis of the project to the panel:

We are lucky to live only a few steps away from one of the most beautiful salmon rivers in the world. It is also in excellent health, and it is perhaps one of the few in Quebec of which this can be said. The Department of Recreation, Fish and Game has invested several million dollars to reseed rivers in Quebec. We have a river that is healthy, why risk changing it? I find this illogical. I sincerely think that we have to make societal choices. We are in the environmental era. Would not a 610-megawatt dam on the Sainte-Marguerite River and a heritage Moisie River be a form of sustainable development? Economics and the environment would be bound together. I am in favour of economic development, but not at any price, and particularly not at the expense of the Moisie.

I attended the first part of the public hearings and also watched on television. I found it very interesting, but I must say that Hydro-Québec did not prove that the salmon of the Moisie would not be in danger. I also read the scientific committee's report. In my opinion, Hydro-Québec is interpreting this report, because when I read it myself, it was not so obvious that the conclusions drawn by our provincial Crown corporation were correct.

The Moisie River is outstanding because of the numbers of salmon found in it, as well as their size and weight. How would Hydro-Québec manage such a risk? I personally feel that it is a risk that I could not take, perhaps because I love the river too much. Is this a fault?

In conclusion, I thank you for your attention to my brief, which gives me the opportunity to state my personal opinion about the project[...] I would like my children and grandchildren to have the same opportunity as I have had to fish for salmon on what I believe to be the most beautiful salmon river in the world, the Moisie River.
(Brief by Ms. Carole Pelletier, pp. 1 and 2)

By concentrating on the major issues, as this summary by a participant has just illustrated, the panel sought to bring to the Sainte-Marguerite-3 hydroelectric development project a standpoint that is characterized by simplicity, common sense and an environmental conscience that is found in the positions stated by many citizens who took part in the public hearing.

Chapter 10

Conclusions : A Choice for the Environment and Energy

The panel assigned the task of studying the Sainte-Marguerite-3 hydroelectric development project was required to examine one of the largest projects in the history of the BAPE, and also one of the largest investment projects by the Quebec corporation for the near future. The task was considerable and the social responsibility towards citizens equally so.

In its conclusions, the panel wishes to shed light on these important matters in a manner that faithfully reflects the messages transmitted by the public at the public hearing.

One Precaution : Validate Demand

There are several things to strongly suggest that the need for major hydroelectric dams may be overestimated. The panel believes that it is necessary to check any uncertainties about energy demand.

First of all, the panel concluded, in view of the possibility that the demand for the energy required by this project does not come to pass, that an estimate should be carried out to validate the energy requirements that provide a rationale for the project.

The panel believes that several altogether plausible hypotheses in the current context would suffice to change the project rationale. Included among these hypotheses, which the Government of Quebec should evaluate in terms of probability before coming to a decision, the panel includes:

- the possibility that the response of citizens to the energy efficiency program lead Hydro-Québec to review its objectives upwards;
- the possibility that only one of the major industrial developments planned by Hydro-Québec not come to pass within the next five years;
- the possibility that an 800 MW export contract currently signed by Hydro-Québec and included in its forecasts not be approved by the authorities, because of pressure by the Americans to avoid the use of Quebec hydroelectric energy;
- the possibility that, with a view to diversifying the supply and the flexibility with which it is possible to adapt to demand, major but smaller scale projects (hydraulic and thermal) currently being evaluated be accepted and implemented;

All of these events could push the need for a hydroelectric megaproject beyond the year 2005, which would delay by four or five years the need for a decision on the SM-3 project.

Validating the energy needs that would justify the SM-3 project assumes a variety of short-term interventions by the proponent and the departments responsible.

Before beginning the development of any major hydroelectric generating station, including SM-3, the proponent should:

- await the government's decisions on its *1993 Development Plan Proposal*;
- await the confirmation of Quebec industrial market sales and for the authorization of exports to foreign customers.

The Department of Energy and Resources should:

- have a group of independent experts representing various approaches proceed to a verification of the Hydro-Québec energy demand growth forecasts;
- arrange to hold a public debate on Quebec's energy policy directions;
- announce government decisions concerning Hydro-Québec's strategic approaches as described in the *1993 Development Plan Proposal*, and more specifically concerning the Hydro-Québec energy conservation objectives and its contribution to regional development.

A Consensus Solution : Sainte-Marguerite Alone

The second conclusion reached by the panel stems from the demonstration of the risks that the Moisie River, an outstanding salmon river, would incur if two of its tributaries were diverted towards the Sainte-Marguerite River.

The panel concludes that it is necessary to reject the component of the project consisting of diverting the waters of the aux Pékans and Carheil rivers towards the Sainte-Marguerite River.

To begin with, the proponent has not demonstrated that the diversion variant constitutes the solution that would have the least environmental impact on the development of the energy potential of the Sainte-Marguerite River. This option is also likely to give rise to significant social conflicts that could cause the project to be completed late and at additional cost.

Abandoning the diversion variant of the project amounts, for the government authorities, to not authorizing the project as submitted, and, for the proponent, to exploring other variants.

The Quebec Minister of the Environment should:

- recommend that the project with the variant submitted be rejected;
- require that the proponent identify the solution with the least environmental impact and more acceptable socially.

The proponent should:

- redo the planning and evaluation of the project variants that use the hydraulic potential of the Sainte-Marguerite River alone.

The panel does not possess the data needed to establish that it would be possible to optimize the development of the whole of the energy potential of the Sainte-Marguerite River technically and economically. The hypothesis nevertheless deserves to be examined. What remains to be defined are the concrete procedures to develop a river that has already been harnessed by two hydroelectric dams, and to devise the equipment needed.

The panel believes that it is necessary to take the time needed to complete the environmental assessment of the Sainte-Marguerite River hydroelectric development project, of its components and its variants.

Authorization of the project should be postponed to allow Hydro-Québec to complete its project Environmental Impact Statement and hence deal with any deficiencies pointed out, including those in areas of federal jurisdiction.

Government authorizations would thus only be granted after the impact studies have been carried out, and the results of these complementary studies submitted to citizens.

Federal departments that have identified deficiencies in the environmental assessment of the project would have to make sure that these deficiencies were dealt with by the proponent:

- the DFO should verify that the project complies with its policy of no net loss of habitat;

- the Canadian Wildlife Service will have to review the assessment of impacts on migratory birds.

The period granted should enable the proponent to complete the environmental assessment of the project in accordance with the standards that now apply to energy megaprojects, and with a view to reconciling conflicting interests.

In the meanwhile, Hydro-Québec would be required to complete the following tasks with due care :

- add elements missing from the Environmental Impact Statement, in particular concerning the natural environment, cumulative effects and externalities;
- complete the assessment of the impacts and risks to human health, conditions for workers and the social fabric;
- study the impacts of project components that have not yet been assessed, i.e. the power transmission line and changes to the SM-1 and SM-2 generating stations;
- in coordination with the users concerned, develop appropriate mitigating measures for the use of the land by natives, for mining exploration and operations, for excursion tours for canoe campers, and for hunting, fishing and resort activities;
- define the procedures that would optimize the regional benefits in terms of jobs and contracts;
- clarify its intentions concerning support for regional development, by restricting its initiatives to the energy field;
- complete the process of harmonizing the project with the planning and development intentions of the communities in the area.

The departments concerned should use the extra time available to work together with the proponent and interested agencies in meeting the specific expectations expressed by the people about project-related aspects:

- the MER (mines sector) should complete the mineral exploration program for the area affected by the project;
- the Quebec Department of Forests and Rexfor should establish procedures for the disposition or marketing of wood from the deforesting of the areas required by the project;
- MENVIQ should monitor the quality of drinking water for the citizens in the Clarke area of Sept-Îles;
- the MAM should settle the dispute between the proponent and the Caniapiscau RCM concerning the land development plan;
- the MTQ should establish procedures for controlled access to the land using the roads built for the project;
- the Quebec Native Affairs Secretariat and the Canadian Department of Indian and Northern Affairs should conclude the agreements concerning compensation and rights relative to the land directly affected by the project;
- the Regional Development Secretariat should examine the various economic development proposals submitted in conjunction with the project, and which do not fall directly within Hydro-Québec's terms of reference;
- the MLCP should develop methods of managing the land and resources that are compatible with the needs and requirements of the ZECs, the fishing and hunting camps, the municipalities and the native communities;

- the DOT will have to determine, in conjunction with the agencies involved, measures to mitigate impacts on the navigability of the water courses affected by the project.

The panel wishes to ensure that the efforts expended within the current environmental assessment process for the SM-3 project not be wasted. The panel believes that the variant that would allow the optimum development of the Sainte-Marguerite River's energy potential, without any transfer of water from the Moisie River basin, could be examined without requiring an additional environmental assessment of the SM-3 dam as such if the latter did not have to be changed and assuming that the overall project assessment is completed in the meanwhile.

The panel concludes that, if the project remains necessary after the forecast energy demand validation process is completed, then the authorization of the SM-3 project should revolve around the optimal development of the energy potential of the Sainte-Marguerite River alone.

The panel has chosen this solution because it is the one that will rally the most support from citizens while maintaining for the North Shore region prospects for economic benefits comparable to those that would be obtained if the Hydro-Québec variant recommended were adopted.

The environmental impacts of a number of components of the optimal development of the Sainte-Marguerite River remain to be evaluated by the proponent and given a public review. These components include power transmission lines, redevelopment of existing generating stations, and the building of additional plants where required.

The panel believes that if authorization is granted, it should be for all of the project components, and that any modifications should be given a public review.

The proponent would thus be required to supply the further impact assessments required for the Sainte-Marguerite complex development

variant, including such things as the anticipated impacts on the development or redevelopment of the SM-1 and SM-2 generating stations, as well as the portion of the impact statement describing the power transmission line.

Decisions would be required by government authorities to proceed to the study of these additional matters:

- the Minister of the Environment would use its powers to require Hydro-Québec to complete the additional studies needed;
- there should be a public review of these studies under the regular environmental assessment and public review process which is required for the power transmission line project;
- the project authorization should be comprehensive, and included as part of a single order covering all components of the project, if the government should decide to do so.

The panel believes that time limits on authorizations for the project should be applied and subject to government order.

Concerns for the Moisie River

The panel does not deny that the concept of controlled flows is innovative and daring, and has noted that Hydro-Québec has given serious consideration to the environmental dimensions of the project. Nevertheless, the panel is convinced that the Moisie River is a poor choice for a first attempt on this scale. The panel is worried about the firm intent expressed by Hydro-Québec to maintain the variant that requires the diversion of water from the Moisie River basin at any cost, strictly for cost efficiency reasons. The proposed project does involve real environmental risks that are possibly disproportionate to the energy and economic benefits that are expected, even though a controlled flow is being planned as a mitigating measure. The panel therefore believes that the option involving diversion of water from the Moisie River basin for the purpose of producing hydroelectricity is unacceptable.

A hydroelectric development project that requires water that would normally flow to the Moisie runs counter to the conservation objectives expressed by the users of the river, who are asking that it be classified as a heritage river. Government authorities should be receptive to such a request, because it would foster the sustainable use of an internationally known salmon river, as well as the conservation for future generations of its ecological and wildlife potential and hence would be cost efficient in the long term. The panel further considers:

The management of the waters of the Moisie River basin should consist, as a priority, in protecting salmon and maintaining fishing.

This conclusion ties in with the broader problem of determining uses for the rivers of the North Shore, several of which possess energy potential and at the same time are recognized as good salmon rivers. In future, therefore, to provide a proper framework for the planning process used by Hydro-Québec for hydroelectric development projects on such rivers, the Government of Quebec will be required to take a number of decisions with respect to land use. These decisions are both specific to the Moisie River and general in relation to the uses of other rivers on the North Shore. These decisions, which would be taken through the combined efforts of several departments, including MENVIQ, the MLCP and the MER, would consist of:

- supporting the status of the Moisie River as a Canadian heritage river;
- defining a special status to protect salmon rivers and establish conditions for developing the resources of their drainage basins;
- give Hydro-Québec specific indications on rivers to be excluded from its current and future development plans.

If, in spite of the serious reservations of scientists about the effectiveness of controlled flows, and in spite of the concerns expressed by salmon specialists and fishermen, and in spite of the financial risks involved in developing the structures required to manage flows, as well as the strong resistance by a number of regional, national and international groups, the option involving the diversion of the Carheil and aux Pékans rivers were to be maintained by Hydro-Québec and authorized by governments, then extraordinary

precautions would have to be taken to give proper consideration to the high level of uncertainty resulting from the hydraulic structures required to minimize environmental risks.

It would be thus be necessary to wait a few years before authorizing the diversion works because five to seven years are needed to acquire an appropriate level of knowledge about the salmon population and how they function in the Moisie River. This time span would make it possible to obtain the data required to understand and later measure what modifications might be caused by controlling the flows on this river.

Assuming that the high risk and controversial option of diversion were retained, the panel wishes to state that no controlled flow work on the aux Pékans and Carheil rivers is to be undertaken until the ecological studies on the salmon population of the Moisie River have been completed.

This cautioning could lead the proponent to consider developing structures on the Carheil and aux Pékans rivers only at a later phase, that is to say after the construction of structures on the Sainte-Marguerite River. The studies that must first be completed prior to any intervention, concerning information about the salmon population in the Moisie River for a complete life cycle and migratory cycle would become available and could then be used as reference material for managers in monitoring the possible changes to the river and to the salmon population.

These requirements for the protection of salmon and fishing assume:

- the introduction, under the direction of independent researchers, of a program to carry out studies and research on the biology and behaviour of salmon populations in the Moisie River;
- field validation of hydrodynamic models and habitat models for a variety of conditions and locations;

- preparation of a status report to be used as a reference for monitoring the evolution of the environment, and any future changes to the salmon population in the Moisie;
- assigning an independent scientific committee the task of monitoring and observing the Moisie River and its salmon population.

The panel believes that the measures designed to protect the salmon of the Moisie and to maintain fishing activities should be coercive, if the project were to be authorized as submitted. Therefore:

Guaranteed protection for salmon and fishing activities in the Moisie River should be required by government order.

These orders would include assigning to an independent corporation representing users as well as recognized conservation and scientific agencies, the following responsibilities:

- the management of structures to regulate and allocate controlled flows;
- establish guidelines for, and supervise, independent studies to monitor the salmon and the river;
- authority to adjudicate on the nature and cause of changes observed on the salmon resource and on the river.

Proceeding in this fashion would give Hydro-Québec's commitments official status. The panel also supports the proposal by salmon harvesters on

the Moisie to the effect that these commitments be confirmed by means of a contract between the proponent, governments and the corporation responsible for managing the Moisie River.

The procedures for managing regulated flows and the monitoring program should be subject to negotiations with a future Moisie River management corporation and a tripartite convention between this corporation, Hydro-Québec and the governments.

This provision assumes that the Moisie River management corporation will be established at the regional level and at the initiative of the people concerned. The corporation would act on their behalf in the establishment of the "salmon convention" and in implementing it afterwards.

The panel notes that the ecological and wildlife monitoring of salmon and the river should at the very least include the monitoring of all parameters that would make it possible to measure any future impacts caused by the diversion of part of the water from the Moisie River Basin. If any damage or harm to salmon, to the river or to fishing could be identified and confirmed by the scientific committee, then compensation would have to be provided for in the convention at the proponent's expense and to the satisfaction of the Moisie River management corporation. The panel believes that it is essential for the management corporation and the scientific committee to be independent.

In summary, the panel has reached the conclusion that the Sainte-Marguerite-3 hydroelectric development project as proposed by Hydro-Québec, which it has examined, ought not to be authorized at this time.

The panel believes that the hydroelectric development of the Sainte-Marguerite River alone, without the diversion of Moisie River tributaries, would be acceptable socially and prove to be less of an environmental risk.

Extra time is required, however, to allow for an independent public validation of Hydro-Québec's energy forecasts, as well as to complete the Environmental Impact Statement and an overall evaluation of the modified project components.

Finally, the panel believes that the companion reports to the Environmental Impact Statement and the project modifications should be subject to a public review prior to any government authorization.

DATED AT QUEBEC CITY,

ANDRÉ DELISLE,
Panel Chairman

MURIEL BOULANGER,
Panel member

PIERRE BÉLAND,
Panel member

MICHEL GERMAIN,
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Bibliography

ARMOUR, C. et J.G. TAYLOR, 1991, "Evaluation of the Instream Flow Incremental Methodology by U.S. Fish and Wildlife Service User", *Fisheries* 16: p. 36 à 42.

BACON, LISE, 24 mars 1993, *Allocution de la vice-première ministre et ministre de l'Énergie et des Ressources*. Discours de clôture de la commission parlementaire de l'économie et de l'énergie, Québec, 8 p.

BERNARD, JEAN-THOMAS *et al.*, 1992, "La croissance réduite de la demande d'électricité au Québec: une perspective critique", *Cahier de recherche 92-01 du Groupe de recherche en économie de l'énergie et des ressources naturelles (GREEN)*, 22 p.

CHAPMAN, D. *et al.*, 1991, *Status of Snake River Chinook Salmon. Report for the Pacific Northwest Utilities Conference Committee*, February 19, 1991.

CHAREST, P., 1980, "Les barrages hydroélectriques en territoire montagnais et leurs effets sur les communautés amérindiennes". *Recherches amérindiennes du Québec*, vol. 9, n° 4.

CHAREST, P., 1993, *Préparation de la directive pour l'évaluation des impacts du projet Grande-Baleine. Impacts sociaux et méthodologie*. Mémoire présenté aux commissions et comités d'évaluation et d'examen environnementaux du projet Grande-Baleine en mars 1993.

CLICHE, D., 1993, *La planification intégrée des ressources et les externalités économiques environnementales et sociales. Résultats préliminaires de recherche*, Forum québécois pour l'examen public du complexe Grande-Baleine, février 1993, 22 p.

COLLINS, G.B. *et al.*, 1975, "The Snake River Salmon and Steelhead Crisis. Its Relation to Dams and the National Energy Crisis", *Northwest Fisheries Center Report*, Washington.

COMMISSIONS ET COMITÉS D'ÉVALUATION ET D'EXAMEN ENVIRONNEMENTAUX DU PROJET GRANDE-BALEINE, 1992, *Directive. Étude des impacts sur l'environnement du projet hydroélectrique Grande-Baleine*, 113 p.

COMMISSION ROYALE D'ENQUÊTE SUR LES PEUPLES AUTOCHTONES, 1992, *Compte rendu de la première série d'audiences rédigé pour la commission par Michael Cassidy*, Version française, 69 p.

COMMISSION ROYALE D'ENQUÊTE SUR LES PEUPLES AUTOCHTONES, 1992, *Transcriptions de la séance tenue à Uashat le 19 novembre 1992*.

CORPORATION DE GESTION DU DÉVELOPPEMENT DU BASSIN DE LA RIVIÈRE ST-MAURICE, janvier 1993, *Mémoire déposé à la commission parlementaire de l'économie et du travail*, 22 p.

COUR SUPRÊME DU CANADA, 23 janvier 1992, Jugement dans la cause: *Friends of the Old Man River Society et le ministère des Transports du Canada*.

GRIMARD, Y. et H.G. JONES, 1982, "Trophic Upsurge in New Reservoirs a Model for Total Phosphorus Concentration", *Can. J. Fish. Aquat. Sci.* 39, p. 1473 to 1483.

HYDRO-QUÉBEC, 1982, *Aménagements et potentiel hydroélectrique du Québec*. Carte thématique.

HYDRO-QUÉBEC, 1990, *Proposition de Plan de développement d'Hydro-Québec 1990-1992*, Horizon 1999, cinq documents et un document-synthèse.

HYDRO-QUÉBEC, 1992, *Pulvérisation aérienne de phytocides. Résumé du programme d'entretien des entreprises 1993-1997*, 19 p.

HYDRO-QUÉBEC, 1993, *Projet du lac Robertson*, documents déposés à la Commission parlementaire sur l'économie et le travail.

LALONDE, VALOIS, LAMARRE, VALOIS ET ASSOCIÉS INC., 1979, *La Romaine. Les retombées socio-économiques de Bersimis et Manicouagan-Outardes sur les agglomérations locales*, Hydro-Québec, Direction de l'environnement, 93 p.

LAPORTE, A., 1992, "Mise en valeur des ressources nordiques et partenariat entre les secteurs public et privé: la contribution d'Hydro-Québec", *revue Organisation*, numéro spécial, avril 1992.

NAVIGABLE WATERS ACT, R.S.C., volume VII, 1991, c. N-22.

NIELSEN, W. *et al.*, 1991, "Pacific Salmon at the Cross-Roads: Stocks at Risk from California, Oregon, Idaho, and Washington", *Fisheries* 16, p. 4 to 21.

NATIONAL ENERGY BOARD, 1992, "Examen du commerce entre les services d'électricité", *Collaboration entre les services publics d'électricité*, 277 p.

PEARSE, P.H. *et al.*, 1985, *Vers un renouveau. Rapport définitif de l'enquête sur la politique fédérale relative aux eaux*, Environnement Canada, Ottawa, 259 p.

REGROUPEMENT POUR LA PROTECTION DE L'ASHUAPMUSHUAN, 1993, *Mémoire présenté à la Commission parlementaire de l'économie et du travail lors de la consultation sur le Plan de développement 1993, proposition d'Hydro-Québec*, soirée du 4 mars 1993.

RUGGLES, C.P., 1988, "Juvenile Atlantic Salmon (*Salmo salar*) Abundance and Angling Success Before and After River Diversion", *Biological Conservation* 43, p. 279 to 294.

SECRÉTARIAT AUX AFFAIRES AUTOCHTONES, 1992, *Les amérindiens et les Inuit du Québec d'aujourd'hui*, gouvernement du Québec, 26 p.

Appendix 1

Filed Documents

Initial Register

Project notice (June 1987)

Directive from the Minister of the Environment describing the nature, extent and scope of the Environmental Impact Assessment Statement (July 20, 1988)

Admissibility analysis report (February 17, 1992)

Second admissibility analysis report (July 10, 1992)

Notice from the Department of the Environment concerning the admissibility of the Environmental Impact Assessment Statement (August 14, 1992)

Sainte-Marguerite-3 hydroelectric development project. Preliminary report (July 1991 hereinafter referred to as the Environmental Impact Assessment Statement.

The 12 parts of the Environmental Impact Assessment Statement, in 8 volumes, are as follows:

- Part 1, Project rationale
- Part 2, Development variance
- Part 3, Technical-economic studies
- Part 4, Description of the environment
- Part 5, Environmental impacts
- Part 6, Mitigating measures, residual impacts, monitoring
- Part 7, Impacts on the salmon of the Moisie and on harvesting, mitigating measures and monitoring
- Part 8, Access road to the reservoir
- Part 9, Access road to the generating station and access road to the Pékans-Carheil site
- Part 10, Communications
- Part 11, Plates and maps (hydroelectric development)
- Part 12, Plates and maps (roads)

Sainte-Marguerite-3 hydroelectric development project. Summary (July 1991)

Sainte-Marguerite-3 hydroelectric development project. Answers to MENVIQ questions (April 1992)

Sainte-Marguerite-3 hydroelectric development project. Answer to MENVIQ questions. Series 2 (July 1992)

Sainte-Marguerite-3 hydroelectric development project. Update of Sainte-Marguerite River hydrological data (letter of November 2, 1992)

Sainte-Marguerite-3 hydroelectric development project.

Request for approval of plans (letter of October 9, 1992)

Bathymetrie (letter of October 2, 1992)

Navigability and location of structures
(letter of September 21, 1992)

Hydro-Québec environmental code (May 1991)

Hydro-Québec 1993 Development Plan Proposal (October 1992)

The seven appendices to the *Development Plan* are the following:

1. Consultation report
2. Energy efficiency
3. Production facilities
4. Contribution to Quebec's economic development
5. Long-term exports and use of interconnections
6. Forecast Quebec electricity demand
7. Long-term rate trends

The five working papers for the *Development Plan* are the following:

1. Option combinations - impacts
2. Option combinations - impact analysis methodology
3. Improving the existing network
4. Environment
5. Technological progress and efficient use of electricity

Map: Issues related to the economically feasible development of Hydro-Québec potential, January 1993.

Documents Filed at the Hearing by the Proponent

- A1 Hydro-Québec, text and copies of project presentation transparencies, January 1993, 62 p.
- A2 Hydro-Québec, list of technical documents produced in support of the preparation of the Environmental Impact Assessment Statement, February 2, 1993, 13 p.
- A3 HYDRO-QUÉBEC, Transparency: *Les besoins globaux d'énergie selon le scénario moyen*, 1 p.

- A4 HYDRO-QUÉBEC, *Transparency : Bilan en énergie selon le scénario moyen*, 1 p.
- A5 HYDRO-QUÉBEC, *Transparency : Projets hydroélectriques envisagés pour combler les besoins en énergie*, 1 p.
- A6 HYDRO-QUÉBEC, *Calendrier de réalisation du projet SM-3 (update)*, 2 p.
- A7 HYDRO-QUÉBEC, *Transparency : Mesures pour maximiser les retombées économiques régionales du projet SM-3*, 1 p.
- A8 LECLERC, M. et al., «A Finite Element Model of Estuarine and River Flows With Moving Boundaries», *Adv. Water Resources*, vol. 13, n° 4, 1990, pp. 158 to 168.
- A9 LECLERC, M. et al., «Simulation hydrodynamique de l'estuaire supérieur du fleuve Saint-Laurent (Canada) avec un modèle aux éléments finis couvrant-découvrant», *Revue canadienne de génie civil*, vol. 17, n° 5, 1990, pp. 739 to 751.
- A10 LECLERC, M. et al., «Modélisation des écoulements de l'archipel de Montréal par éléments finis : aspects divers de l'application», *Revue internationale des sciences de l'eau*, vol. 3, n° 2, 1987, p. 41 to 56.
- A11 HYDRO-QUÉBEC, *Aménagement hydroélectrique Sainte-Marguerite-3, Commentaires sur l'évaluation de Pêches et Océans Canada*, December 1992, 12 p.
- A12 BOUDREAU, P. et al., «Modélisation hydrodynamique du lac Saint-Pierre, fleuve Saint-Laurent : l'influence de la végétation aquatique», in the press, *Revue canadienne de génie civil*, 64 p.
- A13 HYDRO-QUÉBEC, *Transparencies accompanying presentation for the public hearing of February 4, afternoon* 11 p.
- A14 HYDRO-QUÉBEC, *Transparencies accompanying presentation for the public hearing on Atlantic salmon (controlled flows) of February 4, evening*, 20 p.
- A15 HYDRO-QUÉBEC, *Aménagement hydroélectrique Sainte-Marguerite-3, Mise à jour de la justification du projet*, February 8 1993, 23 p.
- A16 HYDRO-QUÉBEC, *Aménagement hydroélectrique Sainte-Marguerite-3, Mise à jour des coûts*, February 8, 1993, 17 p.
- A17 FÉDÉRATION QUÉBÉCOISE DU CANOT-CAMPING INC., *Cartes-guides des rivières Moisie, aux Pékans, Carheil*, undated, 49 p.

- A18 BOUCHARD, C. et R. PERREAU, «Fermeture d'usine et santé: analyses de séries chronologiques chez les femmes de 30 à 39 ans de la région Sept-Îles — Port-Cartier», *Revue canadienne de santé mentale*, Special winter supplement 1983, pp. 101 to 105.
- A19 HYDRO-QUÉBEC, *Potentiel de centrales hydroélectriques de moyenne et de petite envergure*, Vice-President, Network Planning, March 1992, 9 p. and 5 app.
- A20 HYDRO-QUÉBEC, *Rivière Sainte-Marguerite, Mandat Environnement, Sommaire des coûts*, September 23 1992, 1 p.
- A21 HYDRO-QUÉBEC, *Projet Sainte-Marguerite (SM-3), Phase, engagements de base, début des travaux 1993, M.E.S. 2001. Sommaire des coûts*, 2 p.
- A22 HYDRO-QUÉBEC, *Présentation du classement économique des équipements de production, coûts de base des projets*, Technical information exchange group, Grande-Baleine project, 22 janvier 1993, 2 p.
- A23 HYDRO-QUÉBEC, Transparencies to accompany presentation on water quality, hearing of February 5 1993, afternoon, 6 p.
- A24 HYDRO-QUÉBEC, Transparencies and data on flows, hearing of February 5 1993, afternoon, 15 p.
- A25 CANADIAN WIND ENERGY ASSOCIATION, *Potentiel éolien au Québec*, Presentation to Hydro-Québec as part of the consultation on the Hydro-Québec development plan, January-April 1992, 56 p.
- A26 HYDRO-QUÉBEC, *Estimé des coûts d'exploitation pour la centrale SM-3*, 1 p.
- A27 URBANEX, *Projet d'aménagement de la rivière Sainte-Marguerite. Évaluation des impacts économiques et sociaux*, study carried out for Hydro-Québec, 2 volumes: final report, 253 p. and 12 app.
- A28 HYDRO-QUÉBEC, *Programme de mise en valeur de l'environnement dans le cadre des projets d'Hydro-Québec*, 1988, leaflet.
- A29 HYDRO-QUÉBEC, Transparencies to accompany presentation at the public hearing of February 8, evening on the topic «Economic benefits», 5 p.
- A30 HYDRO-QUÉBEC, Transparencies to accompany presentation at the public hearing of February 9, afternoon on the topic «health and mercury», 8 p.

- A31 HYDRO-QUÉBEC, *Étude de l'aménagement éventuel des sites SM-1 et SM-2 sur le cours inférieur de la Sainte-Marguerite et évaluation préliminaire de la production énergétique additionnelle aménageable sur le cours inférieur (SM-2 — SM-1) de la Sainte-Marguerite*, 2 p.
- A32 HYDRO-QUÉBEC, *Transparency: Prix de revient de l'énergie pour une mise en service en 2001*, to accompany presentation at the public hearing of February 9, afternoon on the topic «project rationale», 1 p.
- A33 HYDRO-QUÉBEC, *Retombées économiques du projet SM-3*, Supplementary information about indirect and induced jobs, the population, the labour market and income security recipients, 4 p.
- A34 HYDRO-QUÉBEC, *Valeur des dépenses en économies d'énergie pour réaliser 4,4 TWh au-delà du 9,3 TWh du projet d'efficacité énergétique*, 3 p.
- A35 CENTRE DE RECHERCHE ET D'ANALYSE EN SCIENCES HUMAINES, *Les impacts du projet Manic-Outardes sur le milieu humain*, research report prepared for the the Vice-President, Environment, Hydro-Québec, 1988, 130 p.
- A36 LALONDE, VALOIS, LAMARRE, VALOIS ET ASSOCIÉS INC., *La Romaine. Écologie humaine. Étude de cas comparables. Les retombées socio-économiques de Bersimis et Manicouagan - Outardes sur les agglomérations locales*, research report prepared for Hydro-Québec, 93 p. and 4 app.
- A37 HYDRO-QUÉBEC, *Analyse sommaire du risque économique du détournement en fonction du débit réservé relâché dans la rivière Moisie*, 1 p.
- A38 SNC, *Étude sommaire des aménagements SM-2 et SM-1*, final report prepared for Hydro-Québec, December 1989, 63 p. and 5 app.
- A39 Agreement on provisional measures between the Conseil Attikamek-Montagnais inc., the Government of Canada and the Government of Quebec, April 25, 1989, 10 p.
- A40 HYDRO-QUÉBEC, *Transparencies : Impact sur la facture du client résidentiel suite à la non-réalisation du détournement SM-3 et impact par ménage de la non-réalisation du détournement*, to accompany presentation at the public hearing of February 10, afternoon, 2 p.

- A41 SNC, *Étude sommaire des aménagements SM-2 et SM-1*, summary of technical studies, report prepared for Hydro-Québec, October 1990, 28 p.
- A42 SERVICE DE RECHERCHE G.L.F. INC., *Étude des impacts économiques et sociaux sur la communauté montagnaise de Uashat et Maliotenam - Complexe Sainte-Marguerite, avant-projet phase II*, preliminary, report prepared for Hydro-Québec, 1992, 251 p. and 3 app.
- A43 HYDRO-QUÉBEC, *Bilan de l'utilisation de l'eau à Carheil pour différentes périodes*, document filed in support of document A37, 1 p.
- A44 HYDRO-QUÉBEC, *Détournement de rivières*, 3 p.
- A45 Letter from Mr. Paul Charest, Director of Research for the Conseil des Atikamekw et des Montagnais to Mr. Daniel Dubeau, Vice-President Environnement Hydro-Québec, July 17 1987, 3 p.
- A46 THOMPSON, K., (Salmonids) *In Anatomy of a River: An Evaluation of Water Requirements for the Hells Canyon Reach of the Middle Snake River*, Pacific Northwest River Basins Commission, Vancouver, W.A., pp. 85 to 103.
- A47 RUGGLES, C.P. (Juvenile Atlantic Salmon), «Abundance and Angling Success before and after river Diversion», *Salmo salar*, Biological Conservation, vol. 43, 1988, pp. 279 to 294.
- A48 MICHAUD, L., *Évaluation de la valeur économique du saumon, recherche méthodologique*, final report prepared for Hydro-Québec, July 1990, 103 p.
- A49 MICHAUD, L., *Évaluation de la valeur économique du saumon, phase II, estimation des valeurs reliées aux utilisations directes*, final report prepared for Hydro-Québec, December 1990, 70 p.
- A50 HYDRO-QUÉBEC, *Historique des exportations par marché*, 1 p.
- A51 HYDRO-QUÉBEC, *Les pourvoiries dans les réservoirs*, 8 p.
- A52 HYDRO-QUÉBEC, *Retombées économiques du projet d'efficacité énergétique d'Hydro-Québec*, January 1992, 9 p.
- A53 HYDRO-QUÉBEC, *Impacts sociaux des chantiers sur les familles des travailleurs*, 3 p.
- A54 HYDRO-QUÉBEC, *Contrats à des firmes d'ingénieurs-conseils régionales pour les études techniques de l'avant-projet*, 2 p.

- A55 HYDRO-QUÉBEC, *Complément de réponse sur le saumon de la rivière Koksoak*, 13 p.
- A56 HYDRO-QUÉBEC, *Liste de références d'articles scientifiques sur les impacts de la création de réservoirs sur les animaux à fourrure et autres petits mammifères*, 3 p.
- A57 HYDRO-QUÉBEC, *Revendications amérindiennes, projet Sainte-Marguerite-3*, February 1993, 5 p.
- A58 HYDRO-QUÉBEC, Transparencies to accompany presentation at the public hearing of February 10, afternoon, on the topic « native issues », 4 p.
- A59 HYDRO-QUÉBEC, Transparencies to accompany presentation at the public hearing of February 10, evening, on the topic « Controlled flow experiments elsewhere in the world », 5 p.
- A60 HYDRO-QUÉBEC, *Réponses aux questions écrites des participants à la première partie de l'audience publique* forwarded by the panel to Hydro-Québec on February 16, 1993, 42 p. et 1 app.
- A61 HYDRO-QUÉBEC, *Croquis illustrant le barrage et le site de la centrale SM-3*, answer to the question asked by Ms. Lyne Lacombe about the visual impacts of the project, 2 p. (see document A60, p. 34).
- A62 HYDRO-QUÉBEC, *Effets environnementaux associés aux mesures d'efficacité énergétique*, analysis guide, final report, November 1991, 37 p. (see document A60, p. 4).
- A63 HYDRO-QUÉBEC, *Enquête sur la construction résidentielle au Québec: comparaison entre 1978 et 1989 et caractéristiques énergétiques de 1989*, December 1991, 94 p. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A64 HYDRO-QUÉBEC, *La construction résidentielle au Québec en 1990. Principaux faits saillants de l'enquête auprès des acheteurs de maison neuve*, September 1992, 106 p. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A65 HYDRO-QUÉBEC, *Répertoire 1992 des mesures d'économie d'énergie, marché résidentiel*, detailed records vol. 1 of 2, July 1992, 264 p. and 1 app. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.

- A66 HYDRO-QUÉBEC, *Répertoire 1992 des mesures d'économie d'énergie, marché résidentiel*, detailed records, vol. 2 of 2, July 1992, 540 p. and 1 app. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A67 HYDRO-QUÉBEC, 1990, *Comportements énergétiques des ménages québécois. Principaux résultats*, December 1990, 170 p. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A68 HYDRO-QUÉBEC, *Comportements énergétiques des ménages québécois, 1990*, volume 2: *Analyse de segmentation et de consommation*, November 1992, 279 p. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A69 HYDRO-QUÉBEC, *Attitudes des Québécois à l'égard de l'efficacité énergétique*, part 1, abridged, June 1991, 16 p. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A70 HYDRO-QUÉBEC, *Attitudes des Québécois à l'égard de l'efficacité énergétique*, part 2, abridged, 1992, 20 p. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A71 HYDRO-QUÉBEC, *Comportements énergétiques des ménages québécois*, abridged, May 1991, 20 p. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A72 HYDRO-QUÉBEC, *Recueil de statistiques commerciales*, December 1992, 145 p. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A73 TECSULT INC., *Mesures des comportements énergétiques 1992 de la petite et moyenne industrie au Québec*, progress report, phase 2, prepared for Hydro-Québec, May 1992, 58 p. et 5 app. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A74 TECSULT INC., *Mesures des comportements énergétiques 1992 de la petite et moyenne industrie au Québec*, progress report, phase 2, appendix, prepared for Hydro-Québec, May 1992, 125 p. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.

- A75 HYDRO-QUÉBEC, *Efficacité énergétique, sidérurgie, dossier sectoriel*, undated, 7 p. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A76 HYDRO-QUÉBEC, *Efficacité énergétique, fonte et affinage, aluminium*, undated, 7 p. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A77 HYDRO-QUÉBEC, *1986 et 1988. Les choix énergétiques dans les édifices commerciaux, nouvelles constructions, additions et rénovations*, December 1990, 147 p. and 2 app. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A78 HYDRO-QUÉBEC, *1990. Suivi des choix énergétiques dans les édifices commerciaux et institutionnels, nouvelles constructions, additions et rénovations*, November 1991, 152 p. and 3 app. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A79 HYDRO-QUÉBEC, *1990. Suivi des choix énergétiques dans les édifices commerciaux et institutionnels, nouvelles constructions, additions et rénovations*, abridged, March 1992, 28 p. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A80 GROUPE DE RECHERCHE EN ÉCONOMIE DE L'ÉNERGIE ET DES RESSOURCES NATURELLES, *Les effets sur la demande québécoise d'électricité de certains changements technologiques 2000-2020*, report prepared for Hydro-Québec, March 1992, 78 p. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A81 HYDRO-QUÉBEC, *Potentiel technico-économique d'amélioration de l'efficacité énergétique au Québec*, March 1992, 52 p. and 2 app. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A82 CENTRE DE RECHERCHE INDUSTRIELLE DU QUÉBEC, *Potentiel envisageable et probabilités de développement pour la période 2002-2020 des utilisations nouvelles de l'énergie*, phase 2 - R, technical records, September 1991, 59 p. (see document A60, p. 15). Document available at reference centres in Montreal, Quebec City and Sept-Îles.

- A83 HYDRO-QUÉBEC, *Liste des questions ou documents en suspens*, Sainte-Marguerite-3, public hearing, continued - part 1, 19 February 1993, 9 p. and 3 app.
- A84 HYDRO-QUÉBEC, Maps illustrating the cumulative impacts of Hydro-Québec developments on Montagnais lands, 2 p. (see document A83, point 1).
- A85 SCN-SHAWINIGAN INC., *Projet de parcs d'éoliennes de la Basse-Côte-Nord. Étude technique : estimation des économies de carburant et coûts d'implantation*, report prepared for Hydro-Québec, December 1992, 8 chapters and 4 app. (see document A83, point 5).
- A86 HYDRO-QUÉBEC, *Bibliographie et documents sur l'énergie solaire utilisés lors de la consultation publique d'Hydro-Québec concernant le Plan de développement*, November 1992, 3 documents (see document A83, point 15).
- A87 HYDRO-QUÉBEC, Supplement to table « *Estimé des coûts d'exploitation pour la centrale SM-3* », 1 p. (complément au document A26).
- A88 HYDRO-QUÉBEC, Étude sur les effets environnementaux cumulatifs du plan des installations, progress report, September 1990, 41 p. (see document A83, point 2).
- A89 MRC DE CANIAPISCAU, Copy of resolution 11-10-1991 of the Caniapiscau RCM Council concerning the notice of compliance for the SM-3 dam, October 1991, 3 p.
- A90 HYDRO-QUÉBEC, *Le chauffe-piscine solaire*, May 12, 1992, 5 p. (see document A83, point 16).
- A91 HYDRO-QUÉBEC, *Comité scientifique montagnais*, January 1993, 1 p. (see document A83, point 17).
- A92 MINISTÈRE DU LOISIR, DE LA CHASSE ET DE LA PÊCHE, *État de la pêche récréative dans les pourvoiries permissionnaires du résersée Gouin en May 1990*, March 1991, 5 p. (see document A83, point 9).
- A93 DESLANDES, J.-C. et al., *Évolution de la communauté de poissons du résersée de La Grande 2 à la suite de la mise en eau*, from the proceedings of the teaching symposium on Phase 1 of the La Grande complex, May 1991, pp. 108 to 120 (see document A83, point 4).

- A94 MSB ENERGY ASSOCIATES INC., *Incorporating Externalities into Hydro-Quebec's Power Planning Process, Research on Current Experience, Literature and Regulatory Trends in the United States*, final report, January 1991, 59 p. (see document A83, point 3).
- A95 BAKTER, R.M., «Environmental Effects of Dams and Impoundments», *App. Rev. Ecol. Syst.*, 1977, vol. 8, p. 255 à 283 (see document A56).
- A96 SOCIÉTÉ D'ÉNERGIE DE LA BAIE-JAMES, *Complexe hydroélectrique de La Grande Rivière. Comportement du castor durant la mise en eau du réservoir de La Grande 4*, August 1984, 17 p. et app.
- A97 SOCIÉTÉ D'ÉNERGIE DE LA BAIE-JAMES, *Complexe hydroélectrique de La Grande Rivière. Comportement du castor durant l'exploitation des réservoirs hydroélectriques de La Grande 2 et Opinaca*, September 1984, 88 p.
- A98 HYDRO-QUÉBEC, Transparencies to accompany presentation at the public hearing of February 11, afternoon, and February 12, evening, on the topics «Atlantic salmon» and «controlled flows», 6 p.
- A99 HYDRO-QUÉBEC, Transparencies to accompany presentation at the public hearing of February 11, evening, and February 12, afternoon, *Évolution de la demande d'électricité, comparaisons des objectifs d'efficacité énergétique et contrats de vente en cours avec les réseaux voisins*, 3 p.
- A100 HYDRO-QUÉBEC, Transparency to accompany presentation at the public hearing of February 11, evening, *Comité de liaison*, 1 p.
- A101 HYDRO-QUÉBEC, Transparency to accompany presentation at the public hearing of February 12, evening, *Profil annuel de la demande, pointes mensuelles selon certaines années*, 1 p.
- A102 HYDRO-QUÉBEC, *Évaluation des risques sismiques*, 3 p.
- A103 SNC, *Rivière Sainte-Marguerite, Énoncé d'envergure, Barrage, Batardeaux et Diques SM-3, Note technique GT-116, Géologie et Séismicité*, prepared for Hydro-Québec, January 1991, 6 chap. et 1 app.
- A104 SNC-SHAWINIGAN, *Rivière Sainte-Marguerite, Aménagement SM-3, Études hydrologiques, Actualisation des caractéristiques principales*, prepared for Hydro-Québec, September 1992, 7 chap. and appendices. Document available at reference centres in Montreal, Quebec City and Sept-Îles.

- A105 ROCHE, *Aménagement hydroélectrique de la rivière Sainte-Marguerite, Études complémentaires, Infrastructures temporaires*, Main report prepared for the Vice-President Environnement Hydro-Québec, December 1992, 59 p. Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A106 ROCHE, *Aménagement hydroélectrique de la rivière Sainte-Marguerite, Études complémentaires, Infrastructures temporaires*, Map appendix, prepared for the Vice-President Environnement Hydro-Québec, December 1992. Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A107 ROCHE, *Rivière Sainte-Marguerite, Accès nord, Inventaires fauniques*, rapport préliminaire, prepared for Hydro-Québec, December 1992, 21 p. and maps. Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A108 ROCHE LTÉE GROUPE-CONSEIL, *Aménagement hydroélectrique de la rivière Sainte-Marguerite, Études complémentaires de la contamination mercurielle de la chair des poissons, Rapport des activités de terrain*, prepared for Hydro-Québec, September 3, 1992, 7 p. and app. Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A109 ROCHE, *Aménagement hydroélectrique de la rivière Sainte-Marguerite, Études complémentaires, Aire de disposition*, prepared for Hydro-Québec, August 1992, 27 p. and maps. Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A110 MICHAUD, L., *Évaluation de la valeur économique du saumon, phase III, estimation des bénéfices ou pertes reliés à une modification des conditions de pêche*, final report prepared for Hydro-Québec, January 1992, 53 p. and 1 app.
- A111 MICHAUD, L., *Valeur économique de la pêche récréative au saumon, résumé*, prepared for Hydro-Québec, December 1992, 23 p.
- A112 HYDRO-QUÉBEC, Response to request for additional information forwarded by panel to Hydro-Québec on March 11, 1993 concerning development of the SM-1 and SM-2, 6 p.

- A113 HYDRO-QUÉBEC, Response to request for additional information forwarded by panel to Hydro-Québec on March 11, 1993 concerning the possibility of overequipping the SM-3 generating station and also the annual load factor for the plant, 3 p.
- A114 HYDRO-QUÉBEC, *Aménagement hydroélectrique Sainte-Marguerite-3, Rectifications complémentaires aux mémoires des organismes suivants: Association de protection de la rivière Moisie (APRM), Association des gestionnaires de la rivière Moisie (AGRM), Pourvoirie Moisie-Nipississ, CSN et Takuaikan Uashat Mak Mani-Utenam et Cam, audiences publiques sur l'environnement, part 2*, March 1993, 11 p.
- A115 HYDRO-QUÉBEC, *Aménagement hydroélectrique Sainte-Marguerite-3, Rectifications au mémoire de la Fédération québécoise de la faune, Audiences publiques sur l'environnement, part 2*, March 1993, 3 p.
- A116 HYDRO-QUÉBEC, Response to request for additional information from panel concerning detailed calculation of production cost of 3.8 cents/kWh, April 5 1993, 20 p.
- A117 HYDRO-QUÉBEC, Responses to questions from the panel concerning data on construction costs, the cost of materials and equipment needed for construction, updating of document A21 and the budget item for environmental monitoring program costs, April 2 1993, 7 p.
- A118 HYDRO-QUÉBEC, *Rivière Sainte-Marguerite, Étude préliminaire, Rapport d'étape, Choix du projet optimal au site SM-3 (km 90)*, Plant Engineering, Hydraulic Department, October 1983, 17 p., tables and app.
- A119 CONSULTANTS FORESTIERS DGR INC., *Récupération des essences commercialisables dans le territoire baigné par le réservoir SM-3 (Bloc 001), Bassin de la rivière Sainte-Marguerite*, prepared for Hydro-Québec, September 1989, 36 p. and app.
- A120 HYDRO-QUÉBEC, *Rectification écrite au mémoire de monsieur Raynald Vachon, porte-parole pour les travailleurs et les travailleuses autochtones du Québec auprès de la CSN Construction*, April 23, 1993, 7 p.
- A121 HYDRO-QUÉBEC, *Engagement de performance, 1993-1995*, February 1993, 61 p. Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A122 HYDRO-QUÉBEC, *Potentiel éolien du Québec et son intégration dans le réseau*, September 23, 1992, 11 p.

- A123 HYDRO-QUÉBEC, *Les enseignements de la phase I du Complexe La Grande*, Proceedings of symposium, May 22-23, 1991, 219 p. Document available at reference centres in Montreal, Quebec City and Sept-Îles.
- A124 HYDRO-QUÉBEC, Response to question from the panel concerning updating of manpower curves and person-year curves for SM-3 and Carheil/aux Pékans sites, May 11 1993, 5 p.

Documents filed at hearing by departments and resource agencies.

- B1 Opinions of departments and agencies consulted by MENVIQ.
- B2 DEPARTMENT OF INDIAN AND NORTHERN AFFAIRS CANADA, *Commentaires sectoriels concernant la recevabilité de l'étude d'impact du promoteur dans le cadre du processus provincial d'évaluation des impacts sur l'environnement*, June 5, 1992 and August 21, 1991, 6 p.
- B3 CANADIAN COAST GUARD, *Avis sectoriel sur la navigabilité*, June 4, 1992 and September 26, 1991, 4 p.
- B4 Exchange of letters between the federal and provincial governments concerning the implementation of the joint public review process for the SM-3projet, 11 p.
- B5 FORESTRY CANADA, Notice sent to Fisheries and Oceans Canada as part of the study on the admissibility of the environmental impact assessment statement, November 7, 1991, 11 p.
- B6 ENVIRONMENT CANADA, Notice sent to Fisheries and Oceans Canada as part of the study on the admissibility of the environmental impact assessment statement, September 23, 1991, May 7, 1992, October 16, 1992 and October 22, 1992, 25 p.
- B7 HEALTH AND WELFARE CANADA, Notice sent to Fisheries and Oceans Canada as part of the study on the admissibility of the environmental impact assessment statement, May 28, 1992, 2 p.
- B8 FISHERIES AND OCEANS CANADA, *Évaluation environnementale initiale, projet d'aménagement hydroélectrique Sainte-Marguerite-3, région du Québec*, October 27, 1992, 16 p.

- B9 AUDET, R., *Évaluation du potentiel de pêche sportive sur une douzaine de nouveaux plans d'eau de la ZEC Matimek*, Service de l'aménagement et de l'exploitation de la faune, ministère du Loisir, de la Chasse et de la Pêche, November 1990, 4 p. and 2 app.
- B10 MINISTÈRE DU LOISIR, DE LA CHASSE ET DE LA PÊCHE, *Sommaire de l'exploitation de 1984-1992 de la rivière Moisie*, November 19, 1992, 1 p.
- B11 CARON, F. *et al.*, *Bilan préliminaire de l'exploitation du saumon au Québec en 1992*, Direction de la gestion des espèces et des habitats, Service de la faune aquatique, ministère du Loisir, de la Chasse et de la Pêche, November 1992, 29 p.
- B12 CANADIAN ATLANTIC FISHERIES, *CAFSAC Subcommittee Report 90/8*, Scientific Advisory Committee, Subcommittee Report, St. John's, Newfoundland, April 30 - May 5, 1990, p. 19-20, p. 51-53.
- B13 COMITÉ SCIENTIFIQUE CONSULTATIF DES PÊCHES CANADIENNES DANS L'ATLANTIQUE, « *Instream Flow Incremental Methodology: An Efficient Tool for the Application of the "no net loss" Principle to Salmon Habitat* », *CSCPCA Document de recherche 90/77, Collected Papers on Fish Habitat with Emphasis on Salmonids*, Department of Fisheries and Oceans, Dartmouth, Nova Scotia, p. 3 à 8, p. 213 à 235, p. 409 à 423.
- B14 MINISTÈRE DE L'ÉNERGIE ET DES RESSOURCES, *Liste et localisation des sites mis en disponibilité en December 1990 et June 1992, Petites centrales hydroélectriques*, Government of Quebec, 2 p.
- B15 MINISTÈRE DU LOISIR, DE LA CHASSE ET DE LA PÊCHE, *Statistiques d'exploitation sportive du saumon par les différents intervenants présents sur la rivière Moisie (1984 à 1992)*, Government of Quebec, 1 p.
- B16 MINISTÈRE DU LOISIR, DE LA CHASSE ET DE LA PÊCHE, *Répartition des budgets de l'exercice 1992-1993*, Government of Quebec, 2 p.
- B17 CANADA MORTGAGE AND HOUSING CORPORATION, *Sommaire de l'analyse du mois d'October 1992 sur l'inoccupation des logements locatifs à Sept-Îles et Baie-Comeau*, 3 p.
- B18 HEALTH AND WELFARE CANADA, *Évaluation des risques à la santé*, Document filed with the panel responsible for assessing the SM-3, hydroelectric development project, February 1993, 10 p.

- B19 MINISTÈRE DU LOISIR, DE LA CHASSE ET DE LA PÊCHE, *Les activités reliées à la faune au Québec, profil des participants et impact économique en 1990*, dépliant.
- B20 MINISTÈRE DE L'ENVIRONNEMENT DU QUÉBEC, *Critères de qualité de l'eau*, extracts about mercury, Government of Quebec, October 1990, p. 257-1 and 257-2.
- B21 MINISTÈRE DE L'INDUSTRIE, DU COMMERCE ET DE LA TECHNOLOGIE, *Profil économique des régions de la Côte-Nord (09) et du Nord-du-Québec (10)*, Government of Quebec, April 1992, 71 p.
- B22 GOUVERNEMENT DU QUÉBEC, Office de planification et de développement du Québec, *Bilan socio-économique, région de la Côte-Nord*, 1990, 54 p.
- B23 MINISTÈRE DE L'ENVIRONNEMENT DU QUÉBEC, *Gestion des déchets solides (région 09)*, 1 p.
- B24 FISHERIES AND OCEANS CANADA, *Statistiques de captures du Saumon atlantique au Canada*, 5 p.
- B25 MINISTÈRE DE L'ÉNERGIE ET DES RESSOURCES, *L'électricité au Québec*, 1992 edition, leaflet.
- B26 Arrêt Sparrow, Sparrow c. La Reine [1990], R.C.S. 1075, 49 p.
- B27 MINISTÈRE DE L'ÉNERGIE ET DES RESSOURCES, Notes and comments concerning the mineral potentiel of the area affected by the SM-3 project, May 29, 1992, June 10, 1992, June 16, 1992, 7 p.
- B28 MINISTÈRE DU LOISIR, DE LA CHASSE ET DE LA PÊCHE, Transparencies to accompany presentation at the public hearing of February 11, afternoon on the topic « Atlantic salmon », 4 p.
- B29 MINISTÈRE DU LOISIR, DE LA CHASSE ET DE LA PÊCHE, *Sommaire des potentiels salmonicole et halieutique, rivière aux Rochers et ses affluents et fiche synthèse de la rivière aux Rochers*, 2 p.
- B30 MINISTÈRE DE L'ÉNERGIE ET DES RESSOURCES, *L'énergie au Québec, édition 1992*, Government of Quebec, 98 p. and 2 app.
- B31 MINISTÈRE DE L'ÉNERGIE ET DES RESSOURCES, *La stratégie québécoise d'efficacité énergétique, Orientations et plan d'action*, Government of Quebec, folder containing 1 document, 2 releases, 1 speech and 1 leaflet.

- B32 MINISTÈRE DE L'ÉNERGIE ET DES RESSOURCES, *Prévisions de la demande d'énergie au Québec après la stratégie d'efficacité énergétique (1991-2011)*, 23 p.
- B33 Responses to written questions from participants at part 1 of the public hearing forwarded by the panel to departments and resource agencies February 17, 1993, 25 p.
- B34 MINISTÈRE DU LOISIR, DE LA CHASSE ET DE LA PÊCHE, *Statistiques d'exploitation 1990-1991, ZEC Matimek*, 1 p.
- B35 MINISTÈRE DU LOISIR, DE LA CHASSE ET DE LA PÊCHE, *Évaluation du potentiel salmonicole, du nombre de reproducteurs requis et de la récolte potentielle sur la rivière Pentecôte et ses tributaires*, 1 p.
- B36 MINISTÈRE DE LA MAIN-D'ŒUVRE, DE LA SÉCURITÉ DU REVENU ET DE LA FORMATION PROFESSIONNELLE, *L'emploi au Québec*, monthly bulletin, Government of Quebec, December 1992, 28 p.
- B37 ENERGY, MINES AND RESOURCES CANADA, Response to a request for additional information concerning the seismic risks inherent in the SM-3 project, 6 p.
- B38 MINISTÈRE DES FORÊTS, Response to a request for additional information concerning forestry operations in the Baie-Comeau area 2 p. + maps (Document available at BAPE Quebec City office only).

Documents filed at hearing by public.

- C1 FÉDÉRATION QUÉBÉCOISE POUR LE SAUMON ATLANTIQUE, «Le régime juridique du Saumon atlantique», *Salmo Salar*, vol. 14, n° 2, special series (number 1), 33 p.
- C2 FÉDÉRATION QUÉBÉCOISE POUR LE SAUMON ATLANTIQUE, *Salmo Salar*, vol. 15, n° 4, December 1992, 49 p.
- C3 HARRISON, J., «Sacramento Basin Blues», *Northwest Energy News*, January/February 1993, p. 7 to 11.
- C4 ANONYME, *Statistiques sur la disponibilité des salariés selon les compétences par région de placement, région de placement Côte-Nord*, February 8, 1993, 1 p.
- C5 ASSOCIATION DE PROTECTION DE LA RIVIÈRE MOISIE INC., *Bulletin*, vol. 12, n° 1, 1992, 62 p.

- C6 ASSOCIATION DE CHASSE ET PÊCHE SEPT-ÎLIENNES INC., *Statistiques sur l'exploitation des ressources fauniques et la fréquentation de la ZEC Matimek*, 3 p.
- C7 FÉDÉRATION QUÉBÉCOISE POUR LE SAUMON ATLANTIQUE, *Salmo salar*, vol. 16, n° 1, February 1993, 40 p.
- C8 JEAN, R., *Les impacts économiques de l'efficacité énergétique*, chargé de planning and business support, Hydro-Québec, undated, 9 p.
- C9 GOODMAN, I. *et al.*, Effects of supplying electricity on employment in Quebec: the Grande-Baleine hydroelectric development project and an alternative solution based on energy efficiency, prepared for the Grand Conseil des Cris (du Québec), June 24, 1992, 48 p., tables and app.
- C10 Table on guaranteed exports filed by Mr. John Burcombe, February 10, 1993, 1 p.
- C11 ASSOCIATION DE PROTECTION DE LA RIVIÈRE AUX ROCHERS PORT-CARTIER, president's report for 1992 year, January 27, 1993, 6 p.
- C12 TOWN OF FERMONT, Copy of resolution n°: 9304-09 to request that Hydro-Québec install its temporary camp in the town of Fermont for the SM-3 project, minutes of April 13, 1993, 2 p.
- C13 MOUVEMENT AU COURANT, Correspondence concerning a request for access to the seven MENVIQ branches named in the admissibility report, 6 p.
- C14 POURVOIRIE MOISIE-NIPISSIS, Rectifications to Hydro-Québec document A114, undated, 3 p.

Other documents

- D1 POWER, G., *An analysis of the methods used to estimate the effects of flow reduction in the Moisie River on Juvenile Atlantic salmon habitat (fry and parr)*, April 23, 1993, 11 p.
- D2 ENVIRONNEMENT-JEUNESSE, Response to request for comments on report by Mr. Geoffrey Power entitled *Analyse des méthodes utilisées pour évaluer les effets de la réduction du débit de la rivière Moisie sur l'habitat des saumons Atlantique juvéniles (alevins et tacons)*, April 29, 1993, 2 p.

- D3 ATLANTIC SALMON FEDERATION, Comments concerning Mr. Geoffrey Power's notice, May 3, 1993, 3 p. (English and French versions).
- D4 CONSEIL DES ATIKAMEKW ET DES MONTAGNAIS INC., Comments concerning Mr. Geoffrey Power's notice, May 11, 1993, 5 p.
- D5 HYDRO-QUÉBEC, Comments concerning Mr. Geoffrey Power's notice submitted to the BAPE on April 23, 1993, May 11, 1993, 6 p.

Appendix 2

Public Hearing Applicants

Public Hearing Applicants

Association des gestionnaires de la rivière
Moisie inc.

Association de protection de la rivière
Moisie inc.

Coalition «Les Amis de la Moisie»

Comité Baie-James/James Bay Committee

Conseil central des syndicats nationaux de
Sept-Îles

Conseil des Atikamekw et des Montagnais

Conseil régional de l'environnement de la
région de Québec

Corporation de protection de l'environnement
de Sept-Îles inc.

Environnement Jeunesse

Atlantic Salmon Federation

Canadian Wildlife Federation

Fédération québécoise pour le Saumon
atlantique

Groupe de citoyens de Fermont

Innu Takuaitkan Uashat-mak Mani-Utenam

Les Ami-e-s de la Terre de Québec

Les Amis de la vallée du Saint-Laurent

Mouvement Au Courant

Pourvoirie Moisie-Nipississ inc.

Regroupement pour la protection de
l'Ashuapmushuan

Regroupement Pro SM-3

Appendix 3

Panel's terms of reference and formation

Le ministre de l'Environnement

Sainte-Foy, December 10, 1992

Mr. Bertrand Tétreault
Chairman
Bureau d'audiences publiques
sur l'environnement
625, rue Saint-Amable
2nd floor
QUÉBEC, Québec
G1R 2G5

Mr. Chairman,

As the Minister of the Environment, and pursuant to the powers conferred on me by sections 6.3 and 31.3 of the Environment Quality Act (R.S.Q., c. Q-2), I am giving the Bureau d'audiences publiques sur l'environnement a mandate to hold a public hearing concerning Hydro-Québec's Sainte-Marguerite-3 hydroelectric development project on the North Shore.

Let me remind you that this mandate includes a review of the effects of the project on the environment and the social repercussions directly related to these effects as they relate to matters of federal jurisdiction.

The term of the panel will begin on January 18, 1993.

Yours sincerely,

PIERRE PARADIS



Québec, December 11, 1992

Mr. André Delisle
Vice-Chairman
Bureau d'audiences publiques
sur l'environnement
625, rue Saint-Amable
2nd floor
Québec, Québec
G1R 2G5

Mr. Vice-Chairman,

The Minister of the Environment, Mr. Pierre Paradis, mandated the Bureau d'audiences publiques sur l'environnement to hold a public hearing concerning Hydro-Québec's Sainte-Marguerite-3 hydroelectric development project on the North Shore to begin on January 18, 1993.

Pursuant to the provisions of article 2 of the Rules of Procedure concerning the holding of public hearings, I am appointing chair of the panel responsible for conducting an investigation and holding a public hearing on the above-mentioned project.

Yours sincerely,

The Chairman

BERTRAND TÉTREULT

c.c.Mr. Alain Pépin



Appendix 4

Departments, agencies and individuals who contributed to the work of the panel.

During the public hearing

Quebec agencies

Commission de la construction du Québec

Mr. Jacques-Émile Bourbonnais

Ministère de l'Agriculture, des Pêcheries et de l'Alimentation

Mr. Jean-Paul Lussiaà-Berdou

Ministère de l'Énergie et des Ressources

Mr. Philippe Nazon

Ministère de l'Environnement du Québec

Mr. Gilles Brunet

Ministère des Forêts

Mr. Roger Lafrance

Ministère de l'Industrie, du Commerce et de la Technologie

Mr. Pierre Hébert

Ministère du Loisir, de la Chasse et de la Pêche

Mr. Mario St-Pierre, Mr. François Caron, Mr. Alain Gaudreault

Ministère de la Santé et des Services sociaux

Mr. Éric Dewailly

Ministère de la Sécurité publique

Mr. Roger Leduc

Ministère du Tourisme

Mr. Réjean Drouin

Secrétariat aux affaires autochtones

Mr. Yvon Laviolette

Secrétariat aux affaires régionales — Côte-Nord

Mr. Gérard Vibien

Federal agencies

Indian and Northern Affairs (Quebec)

Mr. Louis Gilbert

Environment Canada

Mr. Serge Lemieux

Canadian Coast Guard

Mr. Réjean Gélinas

Fisheries and Oceans Canada

Ms. Jacinthe Leclerc

Health and Welfare Canada

Ms. Claudette Charbonneau

Technical support

Logistics

Mr. Daniel Moisan and the Fonds des moyens de communication team

Broadcasting

Mr. Bernard Beaupré

Fonds des moyens de communication

Typing

Ms. Denise Proulx

Proulx, Béliveau

Ms. Florence Béliveau

Proulx, Béliveau

Mapping

Ms. Esther Carignan, Dendrek

Illustration

Mr. Normand Pleau, Parution

Desktop publishing

Parution

Printing

Logidec

Appendix 5

Technical documents

- ROCHE, 1992, *Accès nord. Inventaires fauniques. Rapport préliminaire*, prepared for the Vice-President Environment, Hydro-Québec, 21 p. + app.
- ROCHE, 1992, *Études complémentaires de la contamination mercurielle de la chair des poissons. Rapport des activités de terrain*, prepared for the Vice-President Environment, Hydro-Québec, 7 p. + app.
- ROCHE, 1992, *Études complémentaires de la contamination mercurielle de la chair des poissons. Rapport principal*, prepared for the Vice-President Environment, Hydro-Québec.
- 100 ANONYMOUS, 1991, *Projet Sainte-Marguerite. Comptes rendus du Comité scientifique sur le saumon de la rivière Moisie*, period from 1988 to 1991, meetings 1 to 13.
- 101 ANONYMOUS, 1991, *Projet Sainte-Marguerite. Comptes rendus des réunions de travail sur les conditions de pêche et de navigation dans la rivière Moisie*, period from 1988 to 1991, meetings 1 to 8.
- 102 BERGERON, N. ET A. BOUDREAU, 1991, *Projet Sainte-Marguerite. Problématique des eaux rouges du Mont-Wright dans le contexte du réservoir Pékans et des débits réservés pour le saumon*, Groupe Environnement Shooner inc., 34 p. + app.
- 103 BÉRUBÉ, P., 1989, *Conditions de pêche et de navigabilité dans l'estuaire de la rivière Moisie*, investigation findings (unpublished), 25 p. + app.
- 104 BOUDREAU, A., 1989, *Projet Sainte-Marguerite. Analyse de la représentativité des tronçons utilisés pour la modélisation en 1987 et 1988 par rapport à l'ensemble du cours principal de la Moisie*, rapport sectoral report prepared for Hydro-Québec, Québec. Groupe Environnement Shooner, 19 p. + app.
- 105 BOUDREAU, A., 1990, *Rivière Caopacho. Centrale à enmagasinement saisonnier. Étude des répercussions sur la population salmonicole de la Moisie*, report prepared for Hydro-Québec, Québec, Gilles Shooner et associés. 63 p. + app.
- 106 BOUDREAU, A. ET J.-F. BELLEMARE, 1989, *Projet Sainte-Marguerite. Étude des répercussions du détournement de la rivière aux Pékans sur les habitats salmonicoles de la rivière Moisie*, report prepared for Hydro-Québec, Québec, Gilles Shooner et associés and Tao Simulations, 120 p. + app.

- 107 BURT, D.W. ET J.A. MUNDIE, 1986, *Case Histories of Regulated Stream Flow and its Effects on Salmonid Population*, Can. Tech. Rep. of Fish and Aquatic Sciences n° 1477, Vancouver, Fisheries and Oceans Canada, 98 p.
- 109 DOYON, J.-F., 1991, *Projet Sainte-Marguerite. Effets des changements du régime thermique de la Moisie sur la biologie du saumon*, Groupe Environnement Shooner, sectoral report prepared for Hydro-Québec, 50 p.
- 110 DOYON, J.-F., 1991, *Projet Sainte-Marguerite. Évaluation sommaire des effets du détournement de la rivière aux Pékans sur la productivité primaire de la Moisie*, rapport présenté par le Groupe Environnement Shooner for the Vice-President Environnement d'Hydro-Québec, 31 p. + app.
- 112 GARCEAU, C. ET H. MARQUIS, 1991, *Projet Sainte-Marguerite. Caractérisation physico-chimique sommaire des eaux de la Moisie et de ses principaux affluents et impacts du détournement de la rivière aux Pékans*, Gilles Shooner et associés, report prepared for Hydro-Québec, Québec, 99 p. + app.
- 113 HYDRO-QUÉBEC, VICE-PRÉSIDENTE ENVIRONNEMENT, 1989, *Projet Sainte-Marguerite. Effet de la dérivation de la rivière aux Pékans sur la Moisie. Résumé des études sur l'habitat du saumon et les utilisateurs de la rivière (révision)*, Montréal, Hydro-Québec, 52 p. + app.
- 114 HYDRO-QUÉBEC, VICE-PRÉSIDENTE ENVIRONNEMENT, 1989, *Projet Sainte-Marguerite. Effet de la dérivation de la rivière aux Pékans sur la Moisie*, Montréal, Hydro-Québec, 48 p.
- 115 LÉVESQUE, F., 1990, *Projet Sainte-Marguerite. Analyse des caractéristiques génétiques des populations de Saumon atlantique (Salmo salar) en relation avec une diminution du débit dans la Moisie*, report prepared for Hydro-Québec, Québec, Gilles Shooner et associés, 98 p. + app.
- 116 LONG, B.-F., MR. MORISSETTE, ET J. LEBEL, 1982, *Étude du matériel particulaire en suspension et du matériel dissous des rivières Romaine et Saint-Jean durant un cycle saisonnier*, report prepared for Hydro-Québec, 54 p. + app.

- 118 PERRON, F., H. SLOTERDIJK, ET C. BLAISE, 1982, *Impacts des activités minières sur l'écologie des rivières aux Pékans et Moisie. Évaluation des incidences sur l'environnement*, report n° SPE 8-RQ-82-1F, Ottawa, Environment Canada, 100 p.
- 119 ROBITAILLE, J.-A., 1983, *Étude de la dévalaison des saumoneaux dans la rivière Moisie en 1983*, report prepared for the ministère du Loisir, de la Chasse et de la Pêche du Québec, Québec, Gilles Shooner inc., 60 p.
- 120 SHOONER, 1990, *Projet de la rivière Sainte-Marguerite. Compte rendu de l'atelier de génétique du saumon de la rivière Moisie tenu les 27 et 28 November 1990 à Montréal*, Vice-President Environnement, Hydro-Québec.
- 121 GILLES SHOONER ET ASSOCIÉS, 1987, *Fiche signalétique du saumon de la rivière Sainte-Marguerite*, Hydro-Québec, Vice-President Environnement, 33 p. + app.
- 122 TREMBLAY, G., 1989, *Projet Sainte-Marguerite. Étude de la montaison du saumon dans la Moisie en fonction des conditions hydrologiques. Études complémentaires*, report prepared for Hydro-Québec, Québec, Gilles Shooner et associés, 51 p.
- 123 TREMBLAY, G., 1990, *Projet Sainte-Marguerite. Suivi par télémétrie sur dix-neuf saumons sur la Moisie en 1989*, report prepared for Hydro-Québec, Québec, Groupe Environnement Shooner, 37 p.
- 124 TREMBLAY, G., 1991, *Projet Sainte-Marguerite. Suivi par télémétrie de quarante-trois saumons sur la rivière Moisie en 1990*, Groupe Environnement Shooner inc., companion report to comprehensive study, 42 p. + app.
- 125 TREMBLAY, G. ET A. BOUDREAU, 1989, *Projet Sainte-Marguerite. Analyse du succès de pêche et de la navigabilité de la Moisie en relation avec les conditions hydrologiques. Étude sectorielle*, Gilles Shooner et associés, report prepared for Hydro-Québec, Québec, 76 p. + app.
- 126 ZIMMERMAN, E.G., 1984, *Genetic and Physiological Correlates in Fish Adapted to Regulated Streams*, In A. Lillehammer and S.J. Saltveit (éd.), 1982, *Regulated Rivers. Proceedings of the Second International Symposium on Regulated Streams Held in Oslo, Norway, 8-12 August, 1982*, Universitets for Laget, AS, Toyen, Norway, 540 p.

- 127 GROUPE ENVIRONNEMENT SHOONER INC., 1992, *Physico-chimie des eaux de la rivière Moisie 1991. Résultats de la campagne de 1991*, vice-présidence Environnement, Hydro-Québec, 71 p. + app.
- 200a KOUTITONSKY, V.G. ET B.F. LONG, 1991, *Rivière Moisie. Étude du milieu physique de l'estuaire. Section A — Hydrodynamique*, report prepared for Hydro-Québec, Rimouski, INRS-Océanologie, 97 p.
- 200b LONG, B.F. ET V.G. KOUTITONSKY, 1991, *Rivière Moisie (estuaire). Étude du milieu physique. Section B — Morphosédimentologie*, report prepared for Hydro-Québec, Rimouski, INRS-Océanologie, 57 p.
- 200c KOUTITONSKY, V.G. ET B.F. LONG, 1991, *Rivière Moisie. Étude du milieu physique de l'estuaire. Section C — Annexes*, companion paper to hydrodynamic and morphosedimentology reports prepared for Hydro-Québec, Rimouski, INRS-Océanologie.
- 201 LALONDE, GIROUARD, LETENDRE ET ASSOCIÉS, 1990, *Régime hydrologique de la Moisie. Simulation n° 5*, report prepared for Hydro-Québec, Montréal, Lalonde, Girouard, Letendre et associés, 12 p. + app.
- 202 LALONDE, GIROUARD, LETENDRE ET ASSOCIÉS, 1990, *Rivière Moisie. Étude du milieu physique*, vol. 1: *Rapport de synthèse*, prepared for Hydro-Québec, Montréal, Lalonde, Girouard, Letendre et associés, 16 p. + app.
- 203 LALONDE, GIROUARD, LETENDRE ET ASSOCIÉS, 1990, *Rivière Moisie. Étude du milieu physique*, vol. 2: *Géomorphologie et régime sédimentaire*, report prepared for Hydro-Québec, Montréal, Lalonde, Girouard, Letendre et associés, 70 p. + app.
- 204 LALONDE, GIROUARD, LETENDRE ET ASSOCIÉS, 1990, *Rivière Moisie. Étude du milieu physique*, vol. 4A: *Régime hydraulique à surface libre*, report prepared for Hydro-Québec, Montréal, Lalonde, Girouard, Letendre et associés, 25 p. + app.
- 205 LALONDE, GIROUARD, LETENDRE ET ASSOCIÉS, 1990, *Rivière Moisie. Étude du milieu physique*, vol. 4B: *Régime glaciologique (prise des glaces)*, report prepared for Hydro-Québec, Montréal, Lalonde, Girouard, Letendre et associés, 30 p. + app.

- 206 LALONDE, GIROUARD, LETENDRE ET ASSOCIÉS, 1990, *Rivière Moisie. Étude du milieu physique*, vol. 4C: Régime glaciologique (départ des glaces), report prepared for Hydro-Québec, Montréal, Lalonde, Girouard, Letendre et associés, 4 p. + app.
- 207 MORIN, G. ET W. SOCHANSKI, 1990, *Régimes thermiques de la Moisie avant et après détournement de la rivière aux Pékans*, scientific report n° 296, Rimouski, INRS-Eau, 109 p. + app.
- 300 COMITÉ DE LA BAIE-JAMES SUR LE MERCURE, 1992, *Rapport d'activités 1990-1991*, Hydro-Québec, 16 p.
- 301 PÉRUSSE, M., 1991, *Le mercure. Aspects environnementaux relatifs aux aménagements hydroélectriques*, Hydro-Québec, service Santé environnementale, Vice-Président Environnement, 64 p. + app.
- 302 BROUARD, D., J.-F. DOYON ET R. SCHETAGNE, *En préparation. Recherches exploratoires sur le mercure, région de La Grande 2*, joint report Vice-Président Environnement, Hydro-Québec and Groupe Environnement Shooner inc.
- 303 BROUARD, D. ET AL., 1990, *Rapport synthèse. Évolution des teneurs en mercure des poissons du complexe hydroélectrique La Grande, Québec (1978-1989)*, joint report Vice-Président Environnement, Hydro-Québec and Groupe Environnement Shooner inc., 100 p.
- 304 MESSIER, D., R. ROY ET R. LEMIRE, 1985, *Réseau de surveillance écologique du complexe La Grande 1978-1984. Évolution du mercure dans la chair des poissons*, Société d'énergie de la Baie-James, direction Ingénierie et Environnement, 170 p. + app.
- 305 ROY, D., J. BOUDREAU, R. BOUCHER, R. SCHETAGNE ET N. THÉRIEN, 1986, *Réseau de surveillance écologique du complexe La Grande 1978-1984. Synthèse des observations*, for the Société d'énergie de la Baie-James, 74 p.
- 400 CSSA CONSULTANTS LTÉE, 1989, *Effets environnementaux cumulatifs. Programme d'équipement 1990-1992. Milieu estuarien*, research report, Montréal, Hydro-Québec, Vice-Président Environnement, 46 p.
- 401 HYDRO-QUÉBEC, 1987, *Aménagement hydroélectrique de la Sainte-Marguerite (Côte-Nord). Renseignements généraux*, Montréal.

- 402 HYDRO-QUÉBEC, DIRECTION ENVIRONNEMENT, 1981, *Aménagement de la rivière Sainte-Marguerite. Étude d'impact préliminaire*, prepared by A. Bériault, A. Boisvert et G. Guertin, Montréal, Hydro-Québec, 49 p.
- 403 HYDRO-QUÉBEC, DIRECTION ENVIRONNEMENT, 1984, *Aménagement de la rivière Sainte-Marguerite. Mise à jour de l'étude d'impact préliminaire de March 1981*, prepared by R. Bérubé, A. Boisvert and G. Labrecque, Montréal, Hydro-Québec.
- 405 ROCHE, 1989, *Aménagement hydroélectrique de la rivière Sainte-Marguerite. Avant-projet phase II. Étude de l'estuaire, relevés biophysiques*, report prepared for the Vice-President Environnement, Hydro-Québec.
- 406 ROCHE, 1989, *Étude environnementale. Projet rivière Sainte-Marguerite. Avant-projet phase I. Relevés additionnels*, rapport prepared for the Vice-President Environnement, Hydro-Québec, 42 p. + app.
- 407 ROCHE, 1989, *Étude environnementale. Projet rivière Sainte-Marguerite. Avant-projet phase I. Description du milieu*, Hydro-Québec, Vice-President Environnement.
- 408 ROCHE, 1989, *Étude environnementale. Projet rivière Sainte-Marguerite. Avant-projet phase I. Analyse d'acceptabilité*, report prepared for Hydro-Québec, Sainte-Foy, Roche ltée., 222 p. + app.
- 411a SOGEAM, 1988, *Centrale hydroélectrique sur la rivière Sainte-Marguerite. Accès routier. Étude d'impact sur l'environnement, partie 1 — Choix du corridor*, Montréal, SOGEAM, 198 p.
- 411b SOGEAM, 1988, *Centrale hydroélectrique sur la rivière Sainte-Marguerite. Accès routier. Étude d'impact sur l'environnement, partie 1 — Choix du corridor. Résumé*, Montréal, SOGEAM, 27 p.
- 412 ROCHE, 1990, *Aménagement hydroélectrique de la rivière Sainte-Marguerite. Avant-projet phase II. Étude de l'estuaire, relevés d'hiver (1990)*, Vice-President Environnement, Hydro-Québec, 10 p. + app.
- 413 ROCHE, 1993, *Aménagement hydroélectrique Sainte-Marguerite-3. Étude complémentaire de la qualité de l'eau (1991)*, Vice-President Environnement, 63 p. + app.

- 414 ROCHE, 1992, *Aménagement hydroélectrique de la rivière Sainte-Marguerite. Études complémentaires, aire de disposition*, Vice-Président Environnement, Hydro-Québec, 27 p. + map.
- 415 ROCHE, 1990, *Aménagement hydroélectrique de la rivière Sainte-Marguerite - accès nord*, project 8569-1111-000, Québec, 83 p.
- 416 ROCHE, 1992, *Rivière Sainte-Marguerite. Choix du corridor et étude des résistances, accès nord*, Vice-Président Environnement, Hydro-Québec, 146 p., app. + maps.
- 417a ROCHE, 1992, *Aménagement hydroélectrique de la rivière Sainte-Marguerite. Études complémentaires, infrastructures temporaires, rapport principal*, Vice-Président Environnement, Hydro-Québec, project n° 11718-000, 55 p.
- 417b ROCHE, 1992, *Aménagement hydroélectrique de la rivière Sainte-Marguerite. Études complémentaires, infrastructures temporaires, annexe cartographique*, Vice-Président Environnement, Hydro-Québec, project n° 11718-000, 6 maps.
- 500 CÉRANE, 1988, *Projet de la rivière Sainte-Marguerite. Avant-projet phase I. Étude de l'utilisation du territoire*, volume 3: *Sites d'occupation montagnais, recueil des fiches*, Hydro-Québec, direction Environnement.
- 501 CÉRANE, 1988, *Projet de la rivière Sainte-Marguerite. Avant-projet phase I. Étude de l'utilisation du territoire*, volume 1: *Analyse et synthèse*, Hydro-Québec, direction Environnement, 226 p. + app.
- 502 CÉRANE, 1988, *Projet de la rivière Sainte-Marguerite. Avant-projet phase I. Étude de l'utilisation du territoire*, volume 2: *Toponymes montagnais, recueil des fiches*, Hydro-Québec, direction Environnement.
- 503 CÉRANE, 1989, *Rivière Sainte-Marguerite. Routes d'accès au barrage et au réservoir de SM-3, inventaire archéologique*, Hydro-Québec, Vice-Président Environnement, 24 p. + maps.
- 504 CÉRANE, 1990, *Complexe Sainte-Marguerite. Mistashipu, la grande rivière. L'exploitation du saumon de la rivière Moisie jusqu'en 1950*, Hydro-Québec, Vice-Président Environnement, 129 p., preliminary.
- 505 CÉRANE, 1992, *Complexe de la rivière Sainte-Marguerite. Enquête ethnographique complémentaire 1980-1991*, Hydro-Québec, Vice-Président Environnement, vol. 2., 77 p.

- 506 CÉRANE, 1992, *Complexe de la rivière Sainte-Marguerite. Étude de l'utilisation du territoire de la rivière Moisie par les Montagnais de Sept-Îles et de Maliotenam*, Hydro-Québec, Vice-President Environnement, volume 1, 81 p., volume 2, maps.
- 507 CÉRANE, 1992, *Complexe de la rivière Sainte-Marguerite. Inventaire archéologique de la zone du barrage Sainte-Marguerite Trois, des infrastructures connexes*, Hydro-Québec, Vice-President Environnement, vol. 1, 104 p. + app. and maps.
- 508 HARVEY, B.-P. ET G. MICHEL, 1989, *La pêche des Montagnais de Uashat/Maliotenam dans la rivière Mistashipe (Moisie) en fonction de quelques conditions hydrologiques*, Sept-Îles, Conseil de bande de Uashat et de Maliotenam et Conseil des Atikamekw et des Montagnais, 15 p. + app.
- 509 SERVICE DE RECHERCHE G.L.F. INC., 1992, *Étude des impacts économiques et sociaux sur la communauté montagnaise de Uashat et Maliotenam — Complexe Sainte-Marguerite, avant-projet phase II*, report prepared for the Vice-President Environnement, Hydro-Québec, 293 p.
- 511a URBANEX, 1991, *Projet d'aménagement de la rivière Sainte-Marguerite. Évaluation des impacts économiques et sociaux*, 2 vol., final report (253 p.), chapters 5 and 6 revised (185 p. + app.) and app., Vice-President Environnement, Hydro-Québec.
- 511b URBANEX, 1991, *Projet d'aménagement de la rivière Sainte-Marguerite. Évaluation des impacts économiques et sociaux*, 2 vol., final report (253 p.), chapters 5 and 6 revised (185 p. + app.) and app. Vice-President Environnement, Hydro-Québec.
- 600a HYDRO-QUÉBEC, 1990, *Accès au réservoir de l'aménagement de la Sainte-Marguerite. Rapport d'avant-projet*, Montréal, Hydro-Québec, 2 vol.
- 600b HYDRO-QUÉBEC, 1990, *Accès au réservoir de l'aménagement de la Sainte-Marguerite. Rapport d'avant-projet*, Montréal, Hydro-Québec, 2 vol.
- 601 HYDRO-QUÉBEC, 1990, *Projet Sainte-Marguerite. Engagement de base (version définitive)*, Montréal, Hydro-Québec.

- 603 HYDRO-QUÉBEC, DIRECTION AMÉNAGEMENTS DE CENTRALES, 1989, *Aménagement Sainte-Marguerite. Nouvelle centrale, équipements électriques, rapport d'avant-projet phase 1*, Report n° T935A, Montréal, Hydro-Québec.
- 604 HYDRO-QUÉBEC, DIRECTION AMÉNAGEMENTS DE CENTRALES, 1989, *Avant-projet Sainte-Marguerite. Infrastructures et installations temporaires de chantier*, Montréal, Hydro-Québec.
- 605 HYDRO-QUÉBEC, DIRECTION AMÉNAGEMENTS DE CENTRALES, 1989, *Centrale Sainte-Marguerite. Avant-projet phase 2, étude technique relative aux équipements de commande et de téléphonie*, Montréal, Hydro-Québec.
- 607 HYDRO-QUÉBEC, DIRECTION AMÉNAGEMENTS DE CENTRALES, 1989, *Rivière Sainte-Marguerite. Aménagement SM-3, synthèse des études hydrauliques du détournement Carheil - aux Pékans*, Montréal, Hydro-Québec.
- 608 HYDRO-QUÉBEC, DIRECTION AMÉNAGEMENTS DE CENTRALES, 1989, *Rivière Sainte-Marguerite. Avant-projet phase 2, études hydrologiques*, doc. 07441-RA-89/41, Montréal, Hydro-Québec.
- 609 HYDRO-QUÉBEC, DIRECTION AMÉNAGEMENTS DE CENTRALES, 1989, *Rivière Sainte-Marguerite. Études hydrologiques, avant-projet phase 1*, document n° 07441-RA-89/20, Montréal, Hydro-Québec.
- 610 HYDRO-QUÉBEC, DIRECTION AMÉNAGEMENTS DE CENTRALES, 1990, *Aménagement de la rivière Sainte-Marguerite. Rapport sectoriel d'avant-projet phase 2, division géotechnique, conception des ouvrages de retenue en terre et en enrochement*, Montréal, Hydro-Québec.
- 611 HYDRO-QUÉBEC, DIRECTION AMÉNAGEMENTS DE CENTRALES, 1990, *Aménagement Sainte-Marguerite. Aménagement du site SM-3 et des détournements Carheil et Pékans, rapport sectoriel final: ouvrages de génie civil*, Montréal, Hydro-Québec.
- 612 HYDRO-QUÉBEC, DIRECTION AMÉNAGEMENTS DE CENTRALES, 1990, *Projet Sainte-Marguerite. Engagement de base*, Montréal, Hydro-Québec.
- 613a HYDRO-QUÉBEC, DIRECTION AMÉNAGEMENTS DE CENTRALES, 1990, *Rivière Sainte-Marguerite. Aménagement SM-3, agencement et dimensionnement des ouvrages hydrauliques*, 2 vol., Montréal, Hydro-Québec.

- 613b HYDRO-QUÉBEC, DIRECTION AMÉNAGEMENTS DE CENTRALES, 1990, *Rivière Sainte-Marguerite. Aménagement SM-3, agencement et dimensionnement des ouvrages hydrauliques*, 2 vol., Montréal, Hydro-Québec.
- 615 HYDRO-QUÉBEC, DIRECTION AMÉNAGEMENTS DE CENTRALES, 1991, *Rivière Sainte-Marguerite, Études des ondes de submersion, rupture en cascade des barrages SM-3, SM-2 et SM-1*, Hydro-Québec, Hydraulics Department Montréal, 17 p. + app.
- 616 HYDRO-QUÉBEC, DIRECTION INGÉNIERIE DE CENTRALES, 1984, *Rivière Sainte-Marguerite. Étude préliminaire, site SM-3 (km 90). Choix du projet optimal et ouvrages hydrauliques*, Montréal, Hydro-Québec.
- 617 HYDRO-QUÉBEC, DIRECTION INGÉNIERIE DE CENTRALES, 1985, *Rivière Sainte-Marguerite. Étude préliminaire*, Montréal, Hydro-Québec.
- 618 HYDRO-QUÉBEC, RÉGION MANICOUAGAN, 1991, *Urgence Barrage - Région Manicouagan, session d'information*, prepared by J. Maniez, D. Manescu and R. Bujold, 67 p.
- 619 HYDRO-QUÉBEC, V.-P. ÉQUIPEMENTS DE PRODUCTION ET ÉDIFICES, 1988, *Rivière Sainte-Marguerite. Accès à la centrale SM-3, étude des corridors*, document n° RA-88-069, 12 p., 3 fig., 28 tables, 55 p.
- 620 HYDROCOSME, 1991, *Étude des conséquences possibles de la rupture des barrages CH4 et P2 dans la rivière Moisie*, study prepared for Hydro-Québec, Montréal, 85 p.
- 622 LABORATOIRES VILLE-MARIE, 1989, *Rivière Sainte-Marguerite. Détournement aux Pékans, Investigations géologiques et géotechniques 1989*, Laval, Laboratoires Ville-Marie, 9 vol.
- 624 LALONDE, GIROUARD, LETENDRE ET ASSOCIÉS, 1990, *Rivière Moisie. Étude du milieu physique*, vol. 3A: *Régime hydrologique de la rivière Moisie en conditions naturelles et avec débits réservés*, report prepared for Hydro-Québec, Montréal, Lalonde, Girouard, Letendre et associés, 53 p.
- 625 LALONDE, GIROUARD, LETENDRE ET ASSOCIÉS, 1990, *Rivière Moisie. Étude du milieu physique*, vol. 3B: *Régime hydrologique, annexes 1 à 9*, report prepared for Hydro-Québec, Montréal, Lalonde, Girouard, Letendre et associés.

- 626 LALONDE, GIROUARD, LETENDRE ET ASSOCIÉS, 1990, *Rivière Moisie. Étude du milieu physique*, vol. 3C: *Régime hydrologique de la rivière Moisie en conditions naturelles et avec débits réservés, annexes 10 et 11*, report prepared for Hydro-Québec, Montréal, Lalonde, Girouard, Letendre et associés.
- 627 ROCHE, 1989, *Aménagement hydroélectrique de la rivière Sainte-Marguerite. Avant-projet phase 2. Impacts hydrauliques du détournement aux Pékans — Sainte-Marguerite (secteur lac aux Cèdres - tête de réservoir SM-3)*, Sainte-Foy, Roche ltée, 24 p.
- 628 SNC, 1989, *Étude d'avant-projet phase 2. Lot mécanique et électricité, rapport d'étape n° 1, revue des études antérieures et coûts estimatifs des équipements de la centrale*, Montréal, SNC.
- 629a SNC, 1989, *Rivière Sainte-Marguerite. Avant-projet phase 2. Aménagement SM-3 et détournement aux Pékans, rapport sectoriel: équipement mécanique*, Montréal, SNC.
- 629b SNC, 1989, *Rivière Sainte-Marguerite. Avant-projet phase 2. Aménagement SM-3 et détournement aux Pékans, rapport sectoriel: équipement électrique*, Montréal, SNC.
- 630 SNC, 1989, *Rivière Sainte-Marguerite. Avant-projet phase 2. Lot hydraulique, note technique n° 2*, review of phase 2 studies, Montréal, SNC.
- 631 SNC, 1989, *Rivière Sainte-Marguerite. Avant-projet phase 2. Système d'amenée, centrale et système de restitution, rapport sectoriel: génie civil*, Montréal, SNC.
- 632 SNC, 1990, *Rivière Sainte-Marguerite. Aménagement SM-3 et détournement Carheil-aux-Pékans, rapport technique d'avant-projet phase 2*, report prepared for Hydro-Québec, Montréal, SNC.
- 633 TERRATECH, 1988, *Rivière Sainte-Marguerite, site SM-3. Investigations géologiques et géotechniques 1988*, Montréal, Terratech, 6 vols.
- 634a TERRATECH, 1989, *Rivière Sainte-Marguerite, site SM-3. Investigations géologiques et géotechniques 1987-1988-1989*, comprehensive report, report n° 1352-0-01, Montréal, Terratech, summary of 8 vols.
- 634b TERRATECH, 1989, *Rivière Sainte-Marguerite, site SM-3. Investigations géologiques et géotechniques 1989*, report n° 1352-0-01, Montréal, Terratech, 8 vols.

- 635 ZANGAR, C.N., 1952, *Hydrodynamic Pressures on Dams Due to Horizontal Earthquake Effects*, Washington, United States, Bureau of Reclamation.
- 637 SNC SHAWINIGAN, 1992, *Rivière Sainte-Marguerite, aménagement SM-3. Études hydrologiques, actualisation des caractéristiques principales*, report prepared for Hydro-Québec, 7 chap. + app.
- 700 AUDET, R., 1977, *Les régions écologiques de la Moyenne et de la Basse-Côte-Nord*, Montréal, Hydro-Québec.
- 701 DRAPEAU, G., 1980, *Appréciation préliminaire de l'estuaire et du golfe du Saint-Laurent dans le contexte des aménagements de bassins des principales rivières de la Côte-Nord*, Montréal, Hydro-Québec, Vice-President Environnement, 46 p.
- 703 DRYADE, 1983, *Cartographie du couvert végétal de la Moyenne et Basse-Côte-Nord par interprétation d'images de satellites accentuées*, Montréal, Hydro-Québec, direction Environnement, 36 p.
- 704 DRYADE LITÉE, 1978, *Les écotones riverains: leur processus d'évolution sur les réservoirs du Québec*, Société d'énergie de la Baie-James, direction Environnement, 161 p.
- 705 DUCRUC, J.-P., 1985, *L'inventaire du Capital-nature de la Moyenne et Basse-Côte-Nord*, Environnement Québec, Environment Canada, Hydro-Québec, natural resources inventory series, n° 6, 192 p.
- 707 LAMOTHE, P., 1978, *Étude préliminaire des rivières de la Côte-Nord. Description de la sauvagine de la Moyenne et de la Basse-Côte-Nord*, Montréal, Hydro-Québec, 19 p.
- 709 THÉRIEN, N., 1991, *Étude des enjeux environnementaux associés à l'effet de serre suite à la création de réservoirs hydroélectriques*, report prepared for Hydro-Québec, Vice-President Environnement, Montréal, 209 p.
- 710 THERRIEN, J. ET L. BELZILE, 1989, *Réseau de suivi environnemental du complexe La Grande, phase I (1988)*, étude des rendements de pêche (secteur ouest du territoire), report submitted by Gilles Shooner et associés inc. of the Public health and environmental research department Vice-President Environnement, Hydro-Québec, 70 p.

Appendix 6

Hearing participants

Participants in part 1 (in attendance)

Ms. Paulette Blanchette	Pourvoirie Moisie-Nipissis
Ms. France Boisvert	Conseil central des syndicats nationaux de Sept-Îles (CSN)
Mr. Alain Bouchard	Équipements Nordiques
Mr. Denis Bouchard	Corporation de protection de l'environnement de Sept-Îles inc.
Ms. Suzanne Bouchard	Ville de Sept-Îles
Mr. Carol Boudreault	Chambre de commerce de Port-Cartier
Mr. René Boudreault	Conseil de bande de Uashat-Maliotenam
Mr. Raymond Boyer	Fédération québécoise de canot-camping inc.
Mr. Denis Brassard	Conseil des Atikamekw et des Montagnais
Mr. John Burcombe	Mouvement Au Courant
Mr. Jean Cadoux	Systèmes Stabine inc.
Ms. Isabelle Calderon	Corporation de protection de l'environnement de Sept-Îles inc.
Ms. Daphna Castel	Mouvement Au Courant
Mr. Paul Charest	Conseil de bande de Uashat-Maliotenam
Mr. Bernard Cleary	Conseil de bande de Uashat-Maliotenam
Mr. Denis Clemens	Corporation de promotion industrielle et commerciale de Sept-Îles
Mr. André Cormier	
Mr. Daniel Danis	Fonds régional d'exploration minière de la Côte-Nord
Mr. Gilles Dechamplain	Commissariat industriel de Sept-Îles
Mr. Octave Deraps	Cégep de Sept-Îles
Mr. Antony Detroio, Maire	Ville de Port-Cartier

Mr. Luc Dion	Chambre de commerce de Sept-Îles
Mr. Jean-Marc Dion, Maire	Ville de Sept-Îles
Mr. Mario Dugas	Corporation de développement économique de la région de Port-Cartier
Mr. Philippe Dunsky	Environnement Jeunesse
Mr. Paul-Émile Fontaine	Conseil de bande de Uashat-Maliotenam
Mr. Serge Gaudreau	Cogemat
Mr. Bernard Gauthier	Ville de Port-Cartier
Mr. Michel Gignac	Chambre de commerce de Port-Cartier
Mr. Denis Gill	Conseil des Atikamekw et des Montagnais
Mr. Alain Gingras	Conseil des Atikamekw et des Montagnais
Mr. Daniel Girard	Association de protection de la rivière Moisie inc.
Mr. Georges Girard	Fédération des travailleurs et travailleuses du Québec
Ms. Anet Henrikso	Comité Baie-James
Mr. Alain Imbeault	Association des entrepreneurs du comté de Duplessis
Mr. René Jalbert	Fédération des travailleurs et travailleuses du Québec
Mr. Paul-Émile Jourdain	Conseil de bande de Uashat-Maliotenam
Mr. William Jourdain	Conseil des Atikamekw et des Montagnais
Mr. Guy Landry	Corporation de développement économique de la région de Port-Cartier
Mr. Réjean Langlois	Conseil central des syndicats nationaux de Sept-Îles (CSN)
Mr. André Legendre	Association chasse et pêche sept-îlienne inc.
Mr. Pierre Lessard	Chambre de commerce de Sept-Îles
Mr. Ghislain Lévesque	Chambre de commerce de Sept-Îles

Mr. Bernard Lynch	Association des gestionnaires de la rivière Moisie
Mr. Gilles Marquis Mr. Carol Martin	Chambre de commerce de Sept-Îles
Mr. Georges-Henri Michel	
Ms. Yvette Michel	Coalition pour Nitassinan
Mr. Daniel Nadreau	Corporation de développement économique de Caniapiscou
Mr. Rock Pelletier	Chambre de commerce de Sept-Îles
Mr. Allan Penn	Conseil des Atikamekw et des Montagnais
Mr. Michel Perreault	Peri-Communication enr.
Mr. Denis Perron	Député de Duplessis
Mr. Serge Quenneville	
Mr. Conrad Reid	Fédération québécoise de la faune
Mr. André Rioux	Corporation de promotion industrielle et commerciale de Sept-Îles
Mr. Denis Ross	Fédération des travailleurs et travailleuses du Québec
Mr. Louis-Ange Santerre, Maire	Municipalité de Gallix
Mr. Pierre Tremblay	Fédération québécoise pour le Saumon atlantique
Mr. Richard Tremblay	Association des trappeurs indépendants de Sept-Îles
Mr. Pierre Trudel	Fédération québécoise du canot-camping inc.
Mr. François Turmel	Association des constructeurs de Duplessis
Mr. Daniel Vanier	Fédération québécoise de la faune
Ms. Claudette Villeneuve	Corporation de protection de l'environnement de Sept-Îles inc.
Mr. Aylmer Whittom	Conseiller municipal
Mr. Fred Whoriskey	Fédération du Saumon atlantique

Part 2 briefs and presentations

A - Environmental groupes from the region

M-A-1 L'Association de protection de la rivière Moisie inc.

Appendices to brief

- L'ASSOCIATION DE PROTECTION DE LA RIVIÈRE MOISIE INC., *Reconnaissance de la rivière Moisie en tant que rivière du patrimoine canadien*, brief to the Canadian Heritage Rivers Board, September 1989, 37 p. and 2 app.
- *Projet d'aménagement de la Sainte-Marguerite, études environnementales de la rivière Moisie*, meeting held at the Mingan Hotel in Sept-Îles on July 8, 1989, 34 p.
- HYDRO-QUÉBEC, *Les études environnementales sur le saumon de la Moisie et ses utilisateurs dans le cadre du projet d'aménagement de la rivière Sainte-Marguerite, sur la Côte-Nord*, Information meeting with the L'A.G.R.M., L'A.P.R.M, C.A.M., F.Q.S.A. and F.S.A., April 7, 1990, 63 p.
- GILLES SHOONER ET ASSOCIÉS, *Projet Sainte-Marguerite. Avant-projet phase I. Étude des répercussions du détournement de la rivière aux Pékans sur la saumon de la rivière Moisie*, rapport sectoriel II prepared by Hydro-Québec, May 1988, 238 p. + app.
- DESCHÊNES, L., D. FRANCŒUR et B. LYNCH, *Pêche sportive — apport économique*, Sept-Îles, 1980, 93 p. + app.
- HYDRO-QUÉBEC, *Projet Sainte-Marguerite, Effet de la dérivation de la rivière aux Pékans sur la Moisie, Résumé des études sur l'habitat du saumon et les utilisateurs de la rivière*, June 1989, 52 p. + app.
- LES AMIS DE LA MOISIE, *La Moisie et ses géants: une ressource à conserver*, Sept-Îles, May 1989, 6 p.
- DELISLE, C.-E., M.-A. BOUCHARD, et L. LAUZON, eds., *L'énergie à l'heure des choix*, Proceedings of the 15th annual congress of the Association des biologistes du Québec, Sainte-Foy, November 1990, Université de Montréal, 1992, volume 13, 346 p. + summary.
- L'ASSOCIATION DE PROTECTION DE LA RIVIÈRE MOISIE INC., *Mémoire pour la Commission parlementaire sur l'énergie électrique au Québec*, April 1990, 12 p.
- Press release issued by the Conseil de la conservation et de l'environnement concerning an opinion about the salmon of the Moisie River, January 31, 1990, 2 p.
- Video production about the Sainte-Marguerite River development project.

- Video production about the Parliamentary Committee on Labour and the Economy question period with respect to electrical energy in Quebec, May 1990.
- Photos, 2 p.
- Transparencies presented at public hearings, 4 p.
- Bulletins from the l'Association de protection de la rivière Moisie inc., eight issues, 1984 to 1991.
- Lettres accompanying the submission of the annual report for the years 1991 and 1992 by Mr. Jean Masse, President of the dent of the A.P.R.M.
- Unaudited financial statements and other financial information from the Association de protection de la rivière Moisie inc., 1987 to 1992.
- Audited financial statements, Moisie River ZEC, 1989 to 1992.
- Annual Report of the Association de protection de la rivière Moisie inc., 1987 to 1990.
- Les débits dans l'estuaire avec débit réservé, 2 p.
- Moisie River ZEC, daily flows before and after diversion, June 1991, 1 p.

M-A-2 Corporation de protection de l'environnement de Sept-Îles inc.

M-A-3 Association des gestionnaires de la rivière Moisie

M-A-4 Le Comité de protection de la santé et de l'environnement de Gaspé inc.

B - Environmental groups from outside the region

M-B-1 Les Amis de la vallée du Saint-Laurent

Appendices to brief

- UNION QUÉBÉCOISE POUR LA CONSERVATION DE LA NATURE, *La proposition de plan de développement 1993-1995 d'Hydro-Québec, L'urgence d'un virage sans demi-mesure*, brief, February 1993, 27 p.
- Presentation by the Amis de la vallée du Saint-Laurent at the 15th congress of the Association des biologistes du Québec, November 1990, 8 p.
- GAUVIN, P., *L'affrontement, Hydro-Québec / Contestation Portneuf Lotbinière*, Éd. Paulymedia, 1992, 366 p.

M-B-2 Natural Resources Defense Council (NRDC)

M-B-3 Sierra Club Atlantic Chapter

M-B-4 Massachusetts Audubon Society

M-B-5 Canadian Wildlife Federation

M-B-6 Greenpeace

Appendices to brief

- GELLER, H., J. DECICCO et S. LAITNER, *Energy Efficiency and Job Creation: The Employment and Income Benefits from Investing in Energy Conserving Technologies*, The American Council for An Energy-Efficient Economy, October 1992, 46 p.
- TENNIS, M.W., *Employment Impacts of Energy Development in New York State*, The Goodman Group, April 22, 1991, 30 p. + app.
- JACCARD, M. et D. SIMS, *Employment Effects of Electricity Conservation: The Case of British Columbia*, 14 p.
- Various articles about energy, 10 p.

M-B-7 Les Ami-e-s de la Terre de Québec

Appendices to brief

- List of references and selected supplementary documents clarifying proposals discussed when brief was being presented, April 5, 1993, 156 p.
- AMI-E-S DE LA TERRE DU QUÉBEC, *Mémoire*, Hydro-Québec, Plan de développement 1993, February 1, 1993, 12 p.
- Various articles about electricity, 88 p.

M-B-8 Fédération québécoise de la faune

M-B-9 Massachusetts Save James Bay Action, Inc.

M-B-10 Conseil régional de l'environnement de la région de Québec

Appendices to brief

- PAQUIN, G., Note concerning energy efficiency objectives of some U.S. electricity producers, April 18, 1993, 3 p.
- REGROUPEMENT NATIONAL DES CONSEILS RÉGIONAUX DE L'ENVIRONNEMENT, *Mémoire, Plan de développement 1993 d'Hydro-Québec*, February 5, 1993, 11 p.
- REGROUPEMENT NATIONAL DES CONSEILS RÉGIONAUX DE L'ENVIRONNEMENT, *Éléments de réflexion sur les moyens de production, les industries à forte consommation d'électricité et l'efficacité énergétique*. Hydro-Québec consultation concerning its 93-94 development plan, May 28, 1992, 7 p.

- Extracts from 1993 development plan about wind energy, 3 p.
- Formule British Columbia Hydro, «Industrial Rate Proposal», *Business Development*, November 3, 1991, 11 p.
- SACRAMENTO MUNICIPAL UTILITY DISTRICT, *1993-2011 Economic Outlook Update*, December 1992, 31 p.
- SACRAMENTO MUNICIPAL UTILITY DISTRICT, *Load Forecast - Pead, Energy, Sales, Customers*, December 1992, 40 p.
- SACRAMENTO MUNICIPAL UTILITY DISTRICT, *Business Plan for Achieving Energy Efficiency Goals, 1992-2000*, April 8, 1992, 105 p. + 3 app.
- SACRAMENTO MUNICIPAL UTILITY DISTRICT, *Serving the community 1991*, Sacramento Municipal Utility District Annual Report.
- SEATTLE CITY LIGHT, *Energy Resources Strategy 1992*, May 1992, 71 p.
- SEATTLE CITY LIGHT, *Energy Resources Strategy Appendix*, May 1992, 10 app.
- SEATTLE CITY LIGHT, *Conservation Implementation Plan 1993-2003*, 16 November 1992, 48 p.
- SEATTLE CITY LIGHT, *Annual Report 1991*, 40 p.

M-B-11 Le Comité Baie-James

Appendix to brief

- THE GOODMAN GROUP, *Review of the 1993 Hydro-Quebec Development Plan*, prepared for The Grand Council of the Crees (of Quebec) as part of their submission to The Parliamentary Commission on the Economy and Employment, March 11, 1993, 19 p.

M-B-12 Vermont Sierra Club

M-B-13 Lumière sur l'énergie

M-B-14 Mouvement Au Courant

Appendices to brief

- BONNEVILLE POWER ADMINISTRATION, *Pacific Northwest Electric Power Planning and Conservation Act with Index*, August 1981, 40 p. + index.
- Additional information about energy conservation, shared-risk and -benefits contracts, wind energy, controlled flows and the mandate from the Department of Energy and Resources.

- Policy for the protection of shores, the coastline and plains suitable for flooding, *droit québécois de l'environnement*, 9 p.
- MINISTÈRE DE L'ENVIRONNEMENT DU QUÉBEC, *Complexe Grande-Baleine. Analyse de la nécessité de maintenir un débit minimum en aval d'un ouvrage de dérivation*, Direction des évaluations environnementales, September 1985, 9 p. + app.
- Additional information concerning the rationale for the SM-3 project and greenhouse effect gases.

M-B-15 Environnement Jeunesse (ENJEU)

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- ENJEU ET ENVIRONNEMENT JEUNESSE INC., *Rapport d'Environnement Jeunesse sur la proposition de Plan de développement 1993 d'Hydro-Québec*, Commission parlementaire de l'économie et du travail, January 25, 1993, 98 p. + app.
- ASSOCIATION CANADIENNE DE L'ÉNERGIE ÉOLIENNE, *Mémoire présenté à la Commission de l'économie et du travail de l'Assemblée nationale, Consultation générale sur la proposition de Plan de développement 1993-1995 d'Hydro-Québec*, February 1993, 69 p.
- *Response to Ms. Boulanger's request for Canadian Embassy Report noted in Environnement Jeunesse's Report on proposed SM-3 Hydroelectric project*, March 30, 1993, 19 p.
- *Response to Mr. Germain's question regarding the source of Enjeu's estimated cost of the non diversion P2-C*, March 30, 1993, 4 p.
- *A supplement to Environnement Jeunesse's Report on the Proposed SM-3 Hydroelectric Project*, April 5, 1993, 7 p.
- Supplementary note to Environnement Jeunesse report on Sainte-Marguerite-3 project, April 20, 1993, 4 p.
- Supplementary note to Environnement Jeunesse report on Sainte-Marguerite-3 project, April 21, 1993, 4 p.

M-B-16 Conseil des femmes sur l'environnement

M-B-17 James Bay Defense Coalition - New York Chapter

C - Association de chasse et pêche, ZEC, pourvoiries, trappeurs

M-C-1 Association provinciale des trappeurs indépendants inc.
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Appendices to brief

- NADON, L., *Captures et relocalisations des castors lors des opérations anti-déprédation en 1992*, Association des trappeurs du Saguenay — Lac-Saint-Jean, February 1993, 18 p. + app.
- NADON, L., *Mise en place d'un service anti-déprédation au Saguenay — Lac-Saint-Jean. Étude de pré faisabilité*, Association des trappeurs du Saguenay — Lac-Saint-Jean, February 1993, 10 p. + app.
- «Des visiteurs impromptus se réfugient sous les emprises», *Le trappeur québécois*, February 1993, 1 p.
- Sections 67 and 68 of bill C-61.

M-C-2 Pourvoiries Moisie-Ouapetec, Moisie-Eau-Doré inc. et Haute-Moisie inc.

M-C-3 Association chasse et pêche sept-îlienne inc.

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- Map identifying locations of resort cottages in the Matimek ZEC, 1 map.
- ASSOCIATION CHASSE ET PÊCHE SEPT-ÎLIENNE, *Analyse des inconvénients et pertes pour la ZEC Matimek*, May 3, 1993, 4 p.

M-C-4 Les pourvoyeurs Lac Holt inc.

M-C-5 Atlantic Salmon Federation

Appendices to brief

- ATLANTIC SALMON FEDERATION, *Atlantic Salmon Journal*, summer 1993, vol. 42, n° 1, 52 p.
- ATLANTIC SALMON FEDERATION, *Salar* vol. 12, n° 1, February 1993, 8 p.

M-C-6 Pourvoirie Moisie-Nipississ inc.

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- Transparencies used at Sept-Îles public hearing March 19, 1993, 25 p.
- Addition to brief on controlled flows, 6 p.

M-C-7 Fédération québécoise pour le Saumon atlantique

Appendix to brief

- SHOONER, G. and S. ASSELIN. *Le développement du Saumon atlantique au Québec: connaître les règles du jeu pour réussir*, Colloque international de la Fédération québécoise pour le Saumon atlantique, Québec, December 1992, Collection *Salmo Salar*, n° 1, 201 p.

D - Représentants des groupes autochtones (Conseil de bande, CAM)

M-D-1 Coalition pour Nitassinan

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- Letter from Ms. Elizabeth E. May of Cultural Survival (Canada) to the Bureau d'audiences publiques, March 23, 1993, 1 p.
- Letter from Mr. Heather Hamilton of the Sierra Club of Canada to the Bureau d'audiences publiques, March 24, 1993, 1 p.

M-D-2 Wabanaki Nations

M-D-3 Conseil des Atikamekw et des Montagnais

Appendices to brief

- PENN, A., *Rapport d'avant-projet sur l'aménagement SM-3: la problématique du méthylmercure et l'analyse des répercussions des détournements*, memo to Denis Brassard of the CAM, September 2, 1991, 9 p.
- PENN, A., *Methyl Mercury and the Ste-Marguerite project*, memo to Paul Charest and Denis Brassard of the CAM, October 4, 1992, 3 p.
- PENN, A., *Supplementary questions for Hydro-Quebec on the Impact assessment of the Ste-Marguerite project*, memo to Denis Brassard and Paul Charest, November 21, 1992, 2 p.
- PENN, A., *Ste-Marguerite hydro-electric project suggestions for intervention on mercury*, memo to Denis Brassard, March 22, 1993, 6 p.
- PENN, A., *Sources of background information on methyl mercury in the environment with particular reference to hydro-electric development*, memo to Denis Brassard of the CAM, March 31, 1993, 4 p.
- PENN, A., *L'aménagement hydro-électrique Sainte-Marguerite, Contamination du poisson par le méthylmercure, implications pour la santé humaine*, February 8, 1993, 3 p.

M-D-4 Innu Takuaikan Uashat mak Mani-Utenam

M-D-5 Takuaikan Uashat mak Mani-Utenam and Conseil des Atikamekw et des Montagnais

E - Native citizens

M-E-1 Mr. Armand Mckenzie

Appendices to brief

- CLÉMENT D., *La zoologie des montagnais*, Ph.D. thesis to the École des gradués de l'Université Laval, Faculté des sciences sociales, Université Laval, October 1991, 2 volumes, 657 p.

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M-F-6 MRC de Sept-Rivières

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- MRC DE SEPT-RIVIÈRES, *Le schéma d'aménagement*, effective June 23, 1988, 82 p. + app.

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 - ASSOCIATION DES MANUFACTURIERS DU QUÉBEC, *Mémoire présenté à la Commission de l'économie et du travail dans le cadre de la consultation générale sur la proposition de plan de développement 1993-1995 d'Hydro-Québec*, February 1993, 27 p.
 - BERNARD, J.-T., D. BOLDUC, Y. GINGRAS ET P. RILSTONE, *Les effets sur la demande québécoise d'électricité de certains changements technologiques 2000-2020*, Groupe de recherche en économie de l'énergie et des ressources naturelles (G.R.E.E.N.), Université Laval, March 1992, 78 p.
 - Tableaux tirés de la publication *L'ÉNERGIE AU QUÉBEC*, 1992 edition, 4 p.
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- DELISLE, C.-E., M.-A. BOUCHARD et L. LAUZON, eds., *L'énergie à l'heure des choix*, Proceedings of the 15th annual congress of the Association des biologistes du Québec, Sainte-Foy, November 1990, Université de Montréal, volume 13, 1992, 346 p.

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