COMMENTS OF

MAKIVIK CORPORATION

TO ENVIRONMENTAL COMMITTEES

REGARDING "DRAFT GUIDELINES

FOR THE ENVIRONMENTAL IMPACT

STUDY OF THE GREAT-WHALE

HYDROELECTRIC PROJECT

APRIL 30, 1992"

26 JUNE, 1992

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1. INTRODUCTION

This document presents the comments of Makivik Corporation ("Makivik"), on behalf of the affected Inuit communities of northern Quebec, on the **Draft Guidelines** issued on 30 April, 1992, by the federal and provincial bodies (the "Committees") charged under Sections 22 and 23 of the James Bay and Northern Quebec Agreement (the "JBNQA" or the "Agreement") and the EARP Guidelines Order with assessing and reviewing Hydro-Québec's proposed Great Whale Hydroelectric Project (the "Project").

1.2 REVIEW OF THE DRAFT GUIDELINES

These comments review certain important features of the Draft Guidelines in light of the best current practice. Starting with Makivik's brief of 19 March 1992, the review was performed by representatives of the affected Inuit communities of Nunavik (including Kuujjuaraapik, Umiujaq, Inukjuak and Chisasibi, with contributions from Povungnituk, Akulivik and Ivujivik), by Makivik's own scientific and legal representatives, and by Makivik's external technical advisors.

In order to facilitate a comparative analysis by the Committees, these comments are structured in the same way as our brief of 19 March, 1992. Thus, Part II presents specific concerns expressed by Inuit individuals and groups from the most directly affected communities of Nunavik.

Part III presents methodological issues raised by the **Draft Guidelines**. It is based principally on analyses by Makivik's own scientific and legal staff and advisors, although parts of it, including Section 3.2.2, were influenced by certain of the technical advisors.

Finally, Part IV addresses technical issues derived from the comments and suggestions of some 21 external technical advisors, whose names and affiliations appear in Annex 1 to Part IV hereof.

The objective of all the preceding analyses was to determine whether the **Draft Guidelines** had satisfactorily addressed the issues raised in our brief of 19 March, 1992.

1.3 EVALUATION OF THE DRAFT GUIDELINES

We recognize that the **Draft Guidelines** incorporate a significant number of the recommendations contained in our brief of 19 March, 1992.

We are confident that these comments will receive the same close attention.

PART II

COMMUNITY CONCERNS

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2.1 INTRODUCTION

The present section of our comments presents the specific concerns expressed by individual Inuit of the affected communities of Northern Quebec with regard to the **Draft Guidelines.** They were inspired by the following documents: the English version of the **Draft Guidelines** and Makivik's summary thereof; the Inuktitut version of the **Draft Guidelines** and Makivik's summary thereof.

The concerns of the communities were recorded during a series of meetings:

in Umiujaq on 2 June, 1992;

in Kuujjuaraapik on 3 June, 1992, and during the week of 22 June, 1992. Representatives of the Inuit population of Chisasibi attended the former meeting. Although Makivik does not represent the community of Sanikiluaq in these assessment proceedings, a representative of Sanikiluaq was invited, as a matter of courtesy, to the former meeting. Representatives of Umiujaq and Inukjuak attended the meeting in Kuujjuaraapik on 23 June, 1992;

in Inukjuak on 4 June, 1992, including representatives of Povungnituk, Akulivik and Ivujivik.

In addition, the Inuktitut version of the **Draft Guidelines** was read aloud over the community radio in Kuujjuaraapik, and the comments of callers were recorded.

The following subsections reproduce the concerns of the Inuit communities essentially *verbatim.* Some editorial changes have been made, but otherwise the comments are

reproduced in their entirety. Although some concerns relate to issues already addressed in the **Draft Guidelines**, it was felt important to provide the Committees with the full range of comments expressed in the Inuit communities.

2.2 CONCERNS FROM KUUJJUARAAPIK

2.2.1 Concerns of the Community Council

The following concerns were communicated by Mr. Myva Niviaxie:

1. Study Methodology

- Field studies have already impacted the wildlife. There must be ways to minimize such impacts, such as using canoes instead of helicopters.

2. Impacts on the social structure of Kuujjuaraapik

- Influxes of large numbers of workers may create lots of single mothers and create or increase health problems.
- The Project may induce changes in our diet, because we may not be able to get all the same animals as before or eat them if they are available.
- The contamination of food sources by mercury and the associated dangers to human health must be studied.

3. Studies by Hydro-Québec

- Are the studies being done by Hydro-Québec adequate? Do they tell the real story?

4. Offshore

- The Environmental Impact Statement must cover a large coastal area, roughly from Cape Jones to Inukjuak as far as the Inuit are concerned. It must include all animals, because the marine environment will be impacted and we are a coastal people.

5. Information to the Inuit

- Separate committees should be set up to pass on information on specific subjects, such as health, education, and business opportunities, to the Inuit.

6. Climate

- How is the climate going to be affected by the Project? What will be its effects on the Inuit?

7. Remedial and Compensatory Measures

- Remedial and compensatory measures for the Inuit in relation to the Project should continue throughout its life. There should be emergency measures in place in case there is a disaster in the future, such as a dam-failure.

8. Community Infrastructure

- Upgraded community infrastructure should be built for Kuujjuaraapik as soon as possible, regardless of whether the Project proceeds. The Guidelines should address this topic.

9. Land

- Outstanding land issues affecting areas north of Cape Jones have to be resolved, on the basis of Inuit land use and occupancy.

2.2.2 Concerns Expressed on the FM Radio, 23 June, 1992

The following concerns were recorded by Ms. Louisa Fleming:

Caller 1 — Caller 1 felt that everything was included in the **Draft Guidelines**. He felt that everything had already been done in the way of studies, except that the results of those studies were never presented to the community. If more studies should go on, only those studies that are absolutely necessary should be undertaken, one example being studies to the Inuit way of life and economy, in order to determine what impacts might occur, how they might be mitigated, and what the community needs to survive.

Caller 2 — Caller 2 talked about the access road to GB1. If no guard rails or other safety measures are installed along the road, there will be many accidents. The road should be as low as possible or have protection along its edges, so as to prevent accidents resulting from vehicles going off the road.

Caller 3 — Caller 3 thought that it is difficult to think what else has to be studied when no results ever come back to the community. If studies continue they will disturb the animals in the area and spoil the hunting of the Inuit. That would mean that the Inuit have to buy food from the stores and the prices will be pushed up. There should be a study of the variety, quality, and cost of store-bought food.

Caller 4 — Caller 4 asked about the helicopters that are flying around at present: what are they doing? The Inuit should be given priority for jobs associated with the Project. The salaries paid to the Inuit should be the same as those for other people, irrespective of education. The Inuit should get priority, because the animals that they hunt are going to be impacted.

Caller 5 — Caller 5 said that the new nursing station should be built before any construction associated with the Project starts. The new nursing station should be big enough to handle all emergencies that might arise, and it should be properly equipped. More than one ambulance should be available to the community, so that no one has to wait for the plane. The Project might result in new forms of illness that require individuals to eat a special diet. If so, there should be a fund to help them buy the necessary food.

Caller 6 — Caller 6 said that the Inuit should be told very clearly if the graves of their relatives or ancestors are going to be covered by the flood waters, since if this is true, it may cause impacts upon the people and make them uneasy.

Caller 7 — Caller 7 commented that the access road and airstrip would need good security and policing at all times, so as to prevent accidents. There should be strict regulations on their use, and these regulations must be enforced at all times.

Caller 8 — Caller 8 commented that there have been many studies over the years, but no results are ever presented to the Inuit. In the 1980s, there were studies of possible impacts on spawning areas, but the studies themselves caused impacts on the spawning areas. These spawning areas affected were supposed to be replaced, but were they? The Inuit must be kept informed at all times.

Caller 9 — Caller 9 expressed the fear that people may get different types of diseases as a result of the Project and the access road. There should be some measures to help both non-Native and Native people know what they can do to avoid contracting such illnesses. These measures should be drafted now and passed on to all the employers and other concerned persons.

Caller 10 — Caller 10 stressed the need for good regulations governing the access road. The road should be well-designed and well-built. In that way, people would not be able to blame others for accidents that might happen on the road.

Caller 11 — Caller 11 pointed out that the price of everything, including hunting equipment, canoes, and other essential supplies, is very high in the North. In order to compensate for that, he suggested that the price of electricity should be lowered for Inuit organisations and businesses. He also proposed that housing rental-rates be lowered to compensate for destruction of hunting grounds. He suggested that the impacts of the Project would include a reduction in household incomes and an increase in prices. He asked that these topics be addressed in the Guidelines.

2.2.3 Concerns Expressed on the FM Radio, 24 June, 1992.

The following concerns were recorded by Ms. Louisa Fleming:

Caller 1 — The school has a limited budget and is not organized as it should be. Proper funding should be given to the school, if it is to prepare young people for the job-opportunities that the Project will offer.

Caller 2 — Graduates are sent down south and there are many drop-outs. There are no jobs for the young people. To help them, jobs have to be created.

Caller 3 The tank farm was built by the Royal Canadian Air Force. It has to be replaced, whether the Project proceeds or not. If the Project goes ahead, there will be a lot of activity in the community: more people and vehicles. The gasoline distribution facility near the Coop should be relocated to a safer place. The airport will also be used more. The filling station should be improved and made safer. Road access is another concern. Many people have died on the road from Chisasibi to La Grande. The new road should be designed to be very safe, and a security committee should be set up. Security fences or barriers will be needed at every dangerous turn and place.

Caller 4 After the hydro-electric project, the mining companies will start to come. Such Project-induced developments have to be considered in the Guidelines.

Caller 5 The Project will create a need for more social workers and for a daycare centre. The daycare centre that we had closed for lack of funding. These issues should not be forgotten in the Guidelines.

Caller 6 There are many studies, but we never see any results.

Caller 7 Proper planning has to take place, so that, in the future, the people will not turn against the planners. The job has to be done very well, so that, in the future, the young people will not have to struggle the same as we do.

Caller 8 I am the President of the Youth Committee. The Youth Committee is in the process of being legally incorporated, and, in the near future, Hydro-Québec will have to listen to us. We will voice our concerns.

Caller 9 I am the President of the Women's Association. A daycare facility is urgently needed in the community. We need funding immediately.

2.2.4 Concerns Expressed on the FM Radio, 25 June, 1992.

The following concerns were communicated by Ms. Louisa Fleming:

Caller 1 — I am from the Alcohol and Drug Committee. The road access will have impacts on our children. We need a building where we can have meetings and where our young people can come. In that way we can help them.

Caller 2 — What is the expected life-span of the Project?

Caller 3 — Once the reservoir is completed, is it going to be maintained? What type of work is Hydro-Québec going to do on it? Will the reservoirs ever dry up? If they do, what will Hydro-Québec do with them?

Caller 4 — After construction of the Project, will Hydro-Québec maintain it? What other projects will follow the Great Whale Project? The Environmental Impact Statement must evaluate whether burning garbage and clearing reservoirs will contribute to the ozone layer problem.

Caller 5 — The Environmental Impact Assessment should evaluate the impacts of the Project on the supply of drinking water at Kuujjuaraapik and should, if appropriate, identify appropriate remedial measures.

Caller 6 — The Guidelines should require Hydro-Québec to get a good understanding of the Inuit way of life.

2.3 CONCERNS FROM UMIUJAQ

2.3.1 Concerns Summarized by Mr. Noah Inukpuk at a Meeting held in Kuujjuaraapik on 23 June, 1992

1. Monitoring Programme

- The La Grande experience should not serve as the exclusive guide for studies to be done in Inuit territory, since the Inuit are different from the Crees. For example, the Inuit rely much more on the marine environment than do the Crees.

- We feel that monitoring committees should be organized in collaboration with the Inuit of Umiujaq, Kuujjuaraapik, and Inukjuak. Those committees should include experts from outside and from the communities.

- Richmond Gulf should be a major part of the study area.

2. Social Impacts

- The Inuit do not feel that they should be compared with the Cree, because they are very different. Predictions and monitoring of social impacts must be based on studies within our communities, because it is the first time that such a large project comes to our immediate vicinity.

- Our experience with other development projects has not been good.

3. Wildlife

- Hydro-Québec met with us in the past on this issue. Information has been released to us, but all that we have are recordings of the sounds made by belugas and seals. That is very nice, but such information will not help us to influence the future of the animals. We need more detailed studies.

- The Guidelines must require Hydro-Québec to identify where on the land, lakes, and rivers the animals will be affected and when the impacts will occur. The Guidelines must require the Environmental Impacts Statement to identify the types and quantities of flesh we can eat without any fear of mercury poisoning. In other words, the Environmental Impact Study must identify what animals are going to be affected by methyl- mercury and which will be safe to eat.

4. Sewage

- The Guidelines must require Hydro-Québec to identify in the Environmental Impact Statement where sewage from its camps is going to go once it is dumped, and which animals are going to eat and drink from the water likely to be affected by that sewage.

5. Great whale River Spillway

- The Guidelines should require Hydro-Québec to investigate the possibility of recycling water from the spillway into the reservoir rather than putting it in the river.

- The Guidelines should require Hydro-Québec to state in the Environmental Impact Statement what types of animals we can expect to find, whether living or dead, in the tailrace and what animals will eat them.

- The Guidelines should require Hydro-Québec to investigate the possibility of diverting water from the tailrace into a reservoir or into a river already affected by the Project.

6. Electricity Sales

- The Environmental Impact Statement should specify what is the responsibility of future buyers of electricity from the Project for problems arising from the Project.

7. Spills of Oil and Gas

- The Environmental Impact Statement should propose controls on planes landing on lakes, so as to prevent oil and gas spills and other types of pollution.

- The Guidelines should require a commitment from Hydro-Québec to remove empty barrels and old trucks, starting immediately with a spring cleanup this year.

8. Future Phases of the Project

- The Guidelines should require Hydro-Québec to identify any future phases of the Project.

9. Health

- When there is a major undertaking, such as the Project, the Inuit should have the right to first-class health care.

10. Relocation of Animals

- If animals are lost because of the Project, Hydro-Québec should try to relocate members of the same species from other places in Nunavik.

- The health of animals should be monitored throughout the lifetime of the Project.

11. Offshore

- Studies of every aspect of wildlife, including their habitats, must be carried out in the offshore, regardless of questions of territorial jurisdiction.

12. Airports

- The Inuit of Kuujjuaraapik should have the priority for contracts to build and maintain any airports needed by the Project, if authorized.

13. Employment with Hydro-Québec

- Inuit should have priority for employment opportunities with Hydro-Québec.

- There should be Inuit Counsellors on each work site to improve relations between the employers and the Inuit employees and to report to the communities.

14. Soapstone

- Studies should be done on where soapstone can be found, and equipment should be provided to interested Inuit to give them access to that soapstone and to allow them to transport it to the communities.

15. Cumulative Impacts

- The communities of Umiujaq and Inukjuak should be included in the study area for cumulative impacts.

16. Gravel and Borrow Pits

- The Draft Guidelines are too narrow in their coverage of borrow pits. They should require borrow pits to be as far apart as possible, perhaps 50 miles, so as to minimize their possible impacts on the land.

2.3.2. Concerns Summarized by Mr. Isaac Anowak

1. Around Reservoirs

- There should be no dumping of toxic wastes or garbage near the reservoirs.

- Non-native camps should be prohibited near reservoirs, as they may disrupt hunting and disturb animals.

2. Culverts

- In many places, bridges would be preferable to culverts, because culverts collect debris, and they also clog up.

3. Reservoir Cleanup

- Reservoirs should be cleaned on a yearly basis, to prevent contamination and to provide additional employment opportunities.

4. Rules

- Who is going to be enforcing the rules and regulations that apply to Hydro-Québec during construction and operation of the Project?

2.3.3. Concerns Expressed at a Meeting held in Umiujaq on 2 June, 1992.

Richmond Gulf

- Further studies have to be done on Richmond Gulf, since the current flows in and out of it.

- The current in Hudson Bay flows north. If water from GB1 flows into Manitounuk Sound, it too will surely flow north, which will take it into Richmond Gulf. That water will have an impact on the animals, vegetation, and birds that live in the Gulf. Inuit who hunt in the Gulf will also be affected, as will be their economy.

- The populations of fish, whales, birds, and other animals, as well as the vegetation in the Gulf, must therefore be studied. Such studies should address, among other things, how much of the food of the people of the Inuit communities on Hudson Bay comes from the Gulf during all seasons of the year. There must also be studies of how many fish go up the river in winter, since any change in their number as a result of the Project might have an impact on those fish that stay in the lakes all year, as well as on other animals, such as marine mammals, and endangered species such as the freshwater seals. The fish and other species that stay in the Gulf year-round should also be studied. Finally, more studies have to be done on tides, currents and ice conditions in every part of the Gulf, and on the aquatic and terrestrial vegetation in and surrounding the Gulf.

Clearwater Lake and River

- More studies have to be done on Clearwater Lake and River, including the estuary. The fish, birds, animals, including freshwater seals, and vegetation should be included in the studies. The possibility that Project-induced changes in the numbers of fish that migrate up the River to winter in the Lake might have an impact on the animals, birds, fish and vegetation, including endangered species such as the freshwater seal, that stay year-round in Clearwater Lake must be investigated. Further studies are also needed on the rivers that might flow into Clearwater Lake or River, and on those that might flow into them as a result of the Project.

- The post-Project monitoring and the pre-Project baseline studies should include water quality in the River and the Lake and in the rivers and lakes that feed them.

Garbage

- The effect of garbage in rivers and lakes and on land should be included in the studies. Preventive measures, monitoring, and cleanup programmes in all the areas where Hydro-Québec will be active should be required in the Environmental Impact Statement.

Animal Health

- Animal health should be monitored before, during, and after the Project. Measures to prevent sickness and contamination should also be included in the studies.

Duck and Nastapoka Islands

- The Duck and Nastapoka Islands should be included in the studies. Their biological productivity, currents, tides, ice conditions, and use by the Inuit as hunting grounds must be evaluated, since they might be impacted by the altered currents from the GB1 tailrace. That current will flow towards the Manitounuk Islands, and into Hudson Bay, where it will join the north-flowing current.

Ptarmigan

- Ptarmigan are not migratory. Studies of their habitat, nesting, staging and feeding behaviour and of their use by the Inuit both on the coast and inland should be undertaken. Special attention should be devoted to increases in hunting pressure attributable to the opening-up of the territory to southern hunters as a result of the Project.

2.4 CONCERNS FROM INUKJUAK

2.4.1. Concerns Expressed at a Meeting in Inukjuak on 4 June, 1992

The following concerns were summarized by Mr. Shaomik Inukpuk:

- In general, we agree with the content of the Draft Guidelines, but we have a few questions and comments.

Section 4.2.1.

- We would like to see some clarification of where Hydro-Québec would use culverts and where it would use bridges.

Section 4.3.1.

- We would like the type of material for road-construction to be described. We wish them to be made of asphalt, not gravel.

Overall Studies

- The Inukjuak area should be included in the study area for all purposes.

- We would like to explore the idea that studies in the Inukjuak area be carried out by organizations other than Hydro-Québec, such as universities.

Section 3.4.1.

- A history of Inukjuak should be included.

PART III

METHODOLOGICAL ISSUES

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3.1 INTRODUCTION

3.1.1 Background This part of our comments addresses certain items raised in our brief of 19 March, 1992 that were not adequately reflected in the **Draft Guidelines**. We recognize that the Committees made a considerable effort to incorporate many of the recommendations in our brief into the **Draft Guidelines**. This part of our comments presents the outstanding issues that we consider particularly important.

Whenever used herein, terms such as "environment" and "ecosystem" must be understood to refer to their social, cultural, and biophysical components.

3.1.2 Comprehensiveness of the Draft Guidelines This part of our comments addresses less than one-quarter of the issues raised in Part III of our brief of 19 March, 1992. For example, we do not deal with such issues as the valued-ecosystem-component approach or the explicit consideration of the ethical arguments for and against the Project. That is not to say, however, that we no longer consider those and other issues to be unimportant. Rather, our choice of issues to address has been influenced by the approach of the Committees set forth in the second paragraph of Section 1.1.0 of the **Draft Guidelines**:

> These preliminary draft guidelines are not exhaustive; they outline the minimum work that the Proponent must complete. They provide a framework for the preparation of the environmental impact statement (EIS). It is sole responsibility [sic] of the Proponent to produce an EIS that is complete - that is, provides sufficient data and analyses to allow expert evaluation of the projected impacts and their consequences.

We agree with that approach, which corresponds to the recommendation made in Part G of Section One of Part III of our brief of 19 March, 1992. On the basis of it, we have not repeated many of the points raised in our above-cited brief that were not reproduced *verbatim* in the **Draft Guidelines**. That approach is, of course, predicated on the

assumption that Hydro-Québec will give a serious and professionally responsible interpretation to the provision in question. In particular, it assumes that Hydro-Québec will make use of the briefs and the presentations to the Committees' scoping meetings when preparing its Environmental Impact Statement.

The Environmental Assessment Panel reviewing certain military flying activities in Labrador and Québec considered it worthwhile to draw to the attention of the proponent of that project its expectation that the proponent would draw upon the written submissions of the intervenors in preparing its revised environmental impact statement:

> The present Deficiency Statement takes into account, among other things, the written comments of the Technical Specialists, government agencies, and the public. **The Panel encourages the Proponent to make use of those comments.**
> (Environmental Assessment Panel, December 1991, emphasis added)

> ***Recommendation 1*** *THAT the Committees add a sentence at the end of the second paragraph of Section 1.1.0 of the* ***Draft Guidelines*** *encouraging the Proponent to consider, among other things, the submissions to the Committees' scoping meetings when preparing its Environmental Impact Statement.*

3.1.3 **Accuracy and Clarity of the Draft Guidelines** Although we have not conducted systematic analyses, it is clear that the accuracy and clarity of both the French and the English texts of the **Draft Guidelines** leave something to be desired. Given the short delays available to the Committees to produce the **Draft Guidelines**, inadequacies are understandable. Many of the shortcomings identified are no more than errors of spelling or grammar, but others render important parts of the text unclear. For example, the meaning of "inaccessibility" in the last paragraph of Section 1.4.0 is uncertain, as are several parts of Section 1.5.0, including the final phrase of the second paragraph.

> ***Recommendation 2*** *THAT the Committees undertake a comprehensive review of the accuracy and clarity of the French and English texts of the Guidelines.*

3.1.4 **Conformity of French and English Texts of the Draft Guidelines** We have not conducted thorough and systematic comparisons of the French and English texts of the **Draft Guidelines**. Nevertheless, it is clear that there are important differences between them. For example, Subsection 5.1.1.3 in the English text seems to correspond to Subsection 5.1.2 in the French text. The latter consists of three paragraphs, but the third paragraph has no counterpart in the English. Once again, such discrepancies are understandable, given the relative haste with which the texts had to be prepared.

> ***Recommendation 3*** *THAT the Committees take the necessary steps to ensure the full conformity of the French and English texts of the Guidelines.*

3.2 SUBSTANTIVE ISSUES

3.2.1 **Introduction** The following subsections summarize Makivik's principal concerns with the **Draft Guidelines** in relation to Part III of its brief of 19 March, 1992.

3.2.2 **Project Justification and Structure of the Environmental Impact Statement** The final sentence of the first paragraph of Section 2.1.0 of the **Draft Guidelines** states that "Justification also relates to the nature, extent and distribution of the environmental, economic and social costs and benefits associated with the proposed project." The preceding issues are, of course, extremely important, and we addressed them at Subsection F of Section Two of Part III of our brief of 19 March, 1992. We do not believe, however, that they should be discussed as part of the justification of the Project. Rather they should be considered among the potential impacts of the Project that may influence the decision whether to authorize it, even if it is justified in strict market terms.

Including the nature, extent, and distribution of the costs and benefits of a project in the consideration of its justification creates the real danger that its economic spin-offs will become a major criterion for deciding whether it is justified. At one extreme, a proponent might propose a particular option or variant as the best solution simply because it creates the largest number of jobs, for example. The economic spin-offs of the Project should be considered in the context of its impacts, but they are not relevant to its justification. The justification of the Project should be substantiated on the basis of the future demand for electricity and cost comparisons of various demand and supply side solutions.

> ***Recommendation 4a*** *THAT the questions of the nature, extent, and distribution of the environmental, economic and social costs and benefits of the Project referred to in the final sentence of the first paragraph of Section 2.1.0 of the* ***Draft Guidelines*** *be addressed in Section 5 of the* ***Draft Guidelines.***

It is, nevertheless, appropriate to consider at an early stage of the Environmental Impact Statement environmental considerations to the extent that they may influence the choice of demand or supply-side options. One way of achieving that objective would be to present a gross comparison of the social, economic, and environmental impacts of the options that appear most attractive on purely economic grounds, as determined in Chapter 2. The level of detail in this comparison would not, of course, be as detailed as that described in Chapter 5, but it would be sufficiently detailed to permit a ranking of options on the basis of the above criteria. The option thus retained would then be subjected to more detailed analysis.

> ***Recommendation 4b*** *THAT the* ***Draft Guidelines*** *explicitly require the EIS to present a gross comparison of the social, economic and environmental impacts of the main demand/supply options that appear most attractive on the basis of the economic analysis referred to in Chapter 2, in order to identify the preferred option to be subjected to more detailed analysis.*

Given that the **Draft Guidelines** call for an Environmental Impact Statement that is focused, we find it surprising that the chapter entitled "Description of the Biophysical and Social Environments" precedes that entitled "Project Description".

One excellent way of focusing the Environmental Impact Statement would be to describe only those components of the environment that are likely to be directly or indirectly affected by the actions associated with constructing and operating the Project. Logically, those components cannot be identified, even in a preliminary way, until the Project itself and the associated actions have been described.

> ***Recommendation 4c*** *THAT the Guidelines require the Proponent to describe only these components of the environment likely to be directly or indirectly affected by the actions associated with constructing and operating the Project.*
>
> ***Recommendation 4d*** *THAT, in order to encourage the production of a focused Environmental Impact Statement, the order of the present Chapters 3 and 4 of the* ***Draft Guidelines*** *be reversed.*

3.2.3 **Level of Analysis of Variants** We interpret the **Draft Guidelines** as requiring an equally detailed level of analysis for each of the possible scenarios and variants of the Project throughout the Environmental Impact Statement. For example, the first paragraph of Section 5.1.0 directs the Proponent to "...carry out a comparative analysis of the different social and environmental implications **for each of the possible scenarios and variants within the project proposal.**" (emphasis added)

Paragraph 4 of Subsection III of Schedule 3 to Section 23 of the Agreement is relevant here:

> When justified by the nature of the project, there should be **a section** which explores and objectively assesses the impact on the Native people and on the environment of reasonable site alternatives of the project in the Region and/or of reasonable alternatives to certain elements of the proposed project. These alternatives should be considered with a view to optimize as much as reasonably possible the positive effect of the development of the environment,

> taking into account environmental, socio-economic and technical considerations and to minimize negative impacts including impacts on the affected population, as reasonably as possible. Where the gross impact of alternative actions differs significantly, the analysis should be sufficiently detailed to permit the comparative assessment of the costs, benefits, and the environmental risk to the different interested populations between the proposed project and the available options. (emphasis added)

Section 23 of the Agreement requires a detailed assessment only of the project variant for which a proponent is seeking approval. The variants of the Project should, at an early stage of the assessment, be evaluated on the basis of a gross comparison of their environmental, socio-economic and technical aspects. This comparison should lead to the selection of the preferred variant, preferably by means of the type of economic and environmental optimization required by Section 4.1.0 of the **Draft Guidelines.** Thereafter, the variant retained should be subjected to thorough assessment.

Such an approach would also contribute to achieving Makivik's and the Committees' common objective that the Environmental Impact Statement be focused rather than encyclopedic.

> ***Recommendation 5a*** *THAT only the Project variant retained by the Proponent on the basis of a preliminary optimization be presented in the chapter of the Environmental Impact Statement on project description and be subjected to detailed assessment and review.*

At the other extreme, the **Draft Guidelines** do not provide the Proponent with clear direction as to the level of analysis expected in the EIS for the preferred variant, although it is clear from Section 4 that it must be very detailed. Paragraph 23.3.30 of the Agreement contains important guidance in this regard. It provides that

> The Québec Administrator, in collaboration when necessary with the EQC [Kativik Environmental Quality Commission], shall ensure that the plans and specifications for construction of the development and the operation thereof conform to the terms and conditions, if any, established by the assessment process.

That means that information as detailed as that normally found in engineering plans and specifications should not form part of an environmental impact statement. If it did, proponents might invest very considerable sums of money in engineering work for projects that were not subsequently approved. Assessment bodies would also be faced with unmanageably voluminous environmental impact statements.

> *Recommendation 5b THAT the Guidelines clarify that the Proponent is not expected to include engineering plans and specifications in its Environmental Impact Statement.*

A central feature of the environmental assessment processes established by Sections 22 and 23 of the Agreement is the special status and involvement of the Native people. It is essential that that special status and involvement extend throughout every phase of a given assessment,including the analysis of engineering plans and specifications.

> *Recommendation 5c THAT, if the Project is authorized, the Inuit of Nunavik, represented by Makivik, be fully involved in the environmental assessment and review of the relevant engineering plans and specifications, in conformity with paragraph 23.2.2 c) of the Agreement.*

3.2.4 Sustainable Development Section 1.7.0 of the **Draft Guidelines** establishes the concept of sustainable development as a principal standard for evaluating the impacts of the Project. We support that initiative.

Section 1.7.0 provides some insights into the Committees' understanding of the meaning of the term "sustainable development", but they do not constitute an unambiguous definition. The contributors to the volumes edited by Saunders (1990) and Jacobs and Sadler (undated) have highlighted the many interpretations that can be given when a normative, global concept such as sustainable development has to be applied in a specific context.

Makivik Corporation (1986) explored in a preliminary way how the concept of sustainable development must be interpreted in the context of Nunavik, stressing the importance of a decision-making role for the Inuit in its application.

> ***Recommendation 6a*** *THAT the Guidelines contain a clearer definition of what they mean by sustainable development.*
>
> ***Recommendation 6b*** *THAT, in formulating the preceding definition, the Committees pay particular attention to the cultural, economic, and ecological characteristics of Nunavik and to the relevant literature (e.g. Makivik Corporation, 1986; Le Conseil de la conservation et de l'environnement, 1990).*

A related concern is that the Guidelines should indicate the Committees' expectations as to how the Proponent should operationalize the concept of sustainable development. The need for such guidance arises in part from the ambiguity in the definition of the term and from inherent difficulties in using environmental impact assessment as a tool to implement it (Elder and Ross, 1990; Holtz, undated).

The World Conservation Union *et al.* (1990) identified eight principles of sustainability, which include, for example: limiting human impacts on the biosphere to a level that is within carrying capacity; maintaining the stock of biological wealth; aiming for an equitable distribution of the benefits and costs of resource use and environmental management; and promoting and supporting cultural values compatible with sustainability.

In line with the requirement of the **Draft Guidelines** (e.g. 3., paragraph 4; 5.1.0, paragraph 8) that the Environmental Impact Statement must proceed by testing hypotheses, we suggest that the eight principles of sustainability, together possibly with the associated sub-principles, might be reformulated as hypotheses, to be tested during the preparation of the Environmental Impact Statement, so as to permit informed judgments as to the compliance of the Project with the principle of sustainable development.

> ***Recommendation 7*** *THAT the Guidelines provide the Proponent with clear guidance about the Committees' expectations as to how the Proponent should operationalize the concept of sustainable development in preparing its Environmental Impact Statement.*

3.2.5 **Assessment of Significance** The first paragraph of Section 1.6.0 of the **Draft Guidelines** directs the Proponent to "...present the perceptions of the Native populations relative to the impacts of the project. The Proponent shall integrate the Native perception of environmental and social impacts into the assessment of the proposed project." Section 1.6.0 bears the title "Consultation", and the precise import of the preceding quotation is, therefore, not entirely clear.

Section 1.6.0 may have been influenced by Paragraph K of Section Two of Part III of Makivik's brief of 19 March, 1992. We continue to feel, however, that the Proponent requires clearer guidance in this area.

> ***Recommendation 8a*** *THAT a section dealing explicitly with significance assessment be inserted in Section 1 of the Guidelines.*

We also reiterate the substance of two of the recommendations contained in Paragraph K.

Recommendation 8b *THAT the Guidelines direct the Proponent to include in the Environmental Impact Statement a comparison of the significance of the impacts identified, based on its own criteria of significance and those of the Native peoples.*

Recommendation 8c *THAT the Guidelines direct the Proponent to explain and justify why it retained one system of values for assessing the significance of the impacts identified, if such proves to be the case.*

Finally for this section, we refer again to the discussion at page 27 of Makivik's brief of 19 March, 1992, of the methodological difficulties of comparing the significance of different kinds of impacts. While the **Draft Guidelines** require the Proponent to address all the types of impacts that the Project might cause, they give little guidance as to acceptable methods of comparing their significance.

Recommendation 8d *THAT the guidelines require the Proponent to address the methodological difficulties of comparing the significance of different types of impacts on the basis of a review of the literature, of prior experience elsewhere with environmental assessment, and on the basis of its own experience.*

3.2.6 Expectations of the Committees The last two paragraphs of Section 1.4.0 attempt to clarify the expectations of the Panels with respect to the quality and detail of data and methodologies. In particular, they address situations in which complete data are not available. Nevertheless, the expectations of the Committees are not always clear. For example, can the three-dimensional mathematical model of Manitounuk Sound referred to in Section 5.10.4 be omitted from the Environmental Impact Statement in virtue of the paragraphs cited above? If not, can it be based on existing data, in which case it might be incomplete, or is data-collection in the field an absolute requirement?

We attempted to deal with this issue in Paragraph G of Section Three of Part III of Makivik's brief of 19 March, 1992, by suggesting that "...the guidelines...contain a list of the field and other studies that the Proponent **must** undertake." (emphasis added)

> ***Recommendation 9*** *THAT the guidelines should indicate clearly where the Environmental Impact Statement can be based on existing data and where field or laboratory studies must be conducted.*

Part 1 of Schedule 3 to Section 23 of the JBNQA offers some guidance here. Having specified that a preliminary environmental and social impact statement should be based "...on existing information from reconnaissance or survey studies," it goes on to state that

> The final or detailed environmental and social impact statement of the retained alternative would be based on a much deeper knowledge of the environmental and social implications of the development.

3.2.7 **Subsequent Stages of the Assessment** As explained in Paragraph C of Section One of Part III of our brief of 19 March, 1992, it is difficult to comment confidently on certain parts of the **Draft Guidelines** in the absence of a clearer knowledge of the form and procedures of the subsequent stages of the review process. Section 23 of the Agreement sets out the general framework of an environmental assessment, but it is silent on some important matters of process and procedure.

> ***Recommendation 10*** *THAT the form and procedures of the assessment be clarified by the Committees after appropriate consultation with the intervenors.*

3.2.8 **Non-Cooperation in Research** Paragraph E of Section Two of Part III of Makivik's brief of 19 March, 1992, gave our reasons for believing that the Guidelines should direct the Proponent how to proceed in the event that needed cooperation was not forthcoming. It

suggested that the Proponent inform the Committees, which in turn instruct the Proponent how to proceed.

> ***Recommendation 11*** *THAT the Guidelines establish a mechanism for settling problems of non-cooperation in research by incorporating the features referred to in Paragraph E of Section Two of Part III of Makivik's brief of 19 March, 1992.*

3.2.9 **Consultation** Section 1.6.0 of the **Draft Guidelines** is entitled "Consultation", but it does not in fact contain the Committees' expectations as to the programme of consultation to be undertaken by the Proponent while preparing the Environmental Impact Statement. There are also other references to consultation, including Paragraph 2 of Subsection 3.4.1, Paragraph 9 of Subsection 4.3.2.1, and Paragraph 2 of Section 4.4.0. Even taken collectively, however, the preceding do not constitute guidance as to a programme of consultation.

> ***Recommendation 12*** *THAT the Guidelines contain guidance to the Proponent on the scope of consultation that would be deemed acceptable during the preparation of the Environmental Impact Statement.*

Makivik's position in this matter is described in Paragraph G of Section Two of Part III of our brief of 19 March, 1992.

3.2.10 **Comparing Future Environments with and without the Project** It is an integral part of environmental assessment that future states of the environment with and without a planned development be compared. Such comparisons can derive only from a knowledge of the functioning of ecosystems, from which probabilistic predictions of their future states can be derived. The foregoing may be implicit in the **Draft Guidelines**, but we believe that it ought to be an explicit requirement.

Recommendation 13 *THAT the Guidelines require that the Environmental Impact Statement compare the future states of the relevant ecosystems and ecosystem components with and without the Project.*

3.2.11 Cumulative Impacts Sections 5.13.4 and 5.13.5 make it clear that the **Draft Guidelines** require the Proponent to study the cumulative impacts only of hydroelectric developments.

Recommendation 14 *THAT the Guidelines require the Environmental Impact Statement to address the cumulative impacts of the Project and all forms of existing developments, whether hydroelectric or other, affecting the Inuit or the Territory.*

In our brief of 19 March, 1992, we recommended that the EIS address the cumulative impacts of known and reasonably probable hydroelectric developments in the Hudson Bay/James Bay Bioregion. It goes without saying that the treatment of cumulative impacts will take into account the level of detail of information available for all such developments.

3.2.12 Raw Data and Computer Programmes Our reasons for requesting access to raw data and some computer programmes were explained in Paragraph C of Section Three of Part III of Makivik's brief of 19 March, 1992.

Recommendation 15 *THAT the Guidelines require the Proponent to make available at a single, central location a copy of all the raw data summarized in the EIS and of computer programmes that are not generally available commercially to the general public.*

3.2.13 Use of Inuit Toponyms Using Inuit toponyms is more than a matter of courtesy. Its principal purpose is to ensure that those potentially most affected by the Project can recognize the places identified in the Environmental Impact Statement and thereby have the fullest possible opportunity to participate in the assessment of the Project.

Recommendation 16 *THAT the Guidelines require the relevant maps in the Environmental Impact Statement to use Inuit place-names.*

3.2.14 **Inuktitut Translation** The **Draft Guidelines** provide in the final paragraph of Section 1.5.0 that "Translations in Inuktitut and Cree shall be provided in conformity to the aforementioned MOU." Section 4 of the Memorandum of Understanding states, however, that it is the responsibility of the Committees to determine which documents will be made available in Inuktitut.

Recommendation 17 *THAT the Guidelines require that, without prejudice to other requirements, a comprehensive and detailed summary of the Environmental Impact Statement be made available in Inuktitut.*

We draw the attention of the Committees to the recent recommendation of the Commission de l'aménagement et des équipements (9 April, 1992, p. 56) that "...proponents devote particular attention to the summaries of environmental impact statements, in order to render them more accessible to the general public." (our translation)

3.2.15 **Climate Change** The following section reproduces in its entirety the text of a letter of 22 May, 1992, from Professor Bhawan Singh of the Department of Geography, Université de Montréal, to Makivik.

> It is now established in the scientific community that global warming due to the build-up of greenhouse gases in the atmosphere will very likely occur within the next 50 to 100 years. The timing of the highly probable global warming coincides with the time frame of the foreseeable future of the Project, that is 25, 50 or 100 years (Page 6, Sec. 1.5.0, Para 5 Draft Guidelines). Several studies have shown that global warming will result in climate change, with attendant impacts on hydrological variables. Hydroelectric power production is fuelled by water flow and is therefore dependent on water availability.

Since climate change will most certainly involve changes in the intensity and seasonality of precipitation, evaporation and river flow, Hydro Québec must analyze its potential impacts in its Environmental Impact Statement. Hydro Québec should also examine shifts in the demand for electricity in the more southerly populous market areas.

Recent, highly-authenticated studies using the high resolution version of the Canadian Climate Centre (CCC) General Circulation Model (GCM) show that average air temperature is expected to increase by about 8° C in winter and by about 4° C in summer in the Great-Whale area.

Precipitation is expected to increase by about 5 to 10 percent annually. Our calculations show that, for the La Grande Basin, for which data is available and which is close to the area of concern, annual evaporation would increase by about 7 percent and this would translate into a decrease in Net Basin Supply (NBS) or potential river flow of close to 3 percent annually. This in turn would lead to a decrease in hydroelectric power production of approximately 110,970 KW annually.

Also, these changes in climate are expected to lead to significant decrease in the demand for electricity for heating in the winter and an increase in the demand for electricity for cooling in the summer. The seasonality of river flow is also expected to change, with peak flow arriving earlier in the spring. Also very low flow levels are projected for the summer.

It is evident from the above that hydroelectric power production is extremely sensitive to climate and climate change. A significant climate change deriving from greenhouse emissions is projected in the foreseeable future, that is within the next 100 years. It is, therefore, unthinkable that the Environmental Impact Statement for a significant hydroelectric project such as the one planned for the Great-Whale basin, would more or less completely ignore the question of climate change. The Draft Guidelines pay what amounts to lip service to the question of climate change and global warming (Page 3, section 1.3.0, Para 6: page 13, section 2.2.1, para 2.10; page 17, section 2.3.1; page 19, section 2.4.3; page 20, section 2.4.4, page 29, section 3.2.1; page 97, section 5.13.5, para 2.3 and 2.4).

Recommendation 1

That one or more plausible scenarios of global warming including sea level rise, deriving from a CO2-induced climate change, be integrated into the planning of the Great Whale hydroelectric project, focusing on the engineering and economic impacts of modified river flows and shifts in the demand for

electricity.

Recommendation 2

That section 2.4.4 should direct the Proponent to predict different scenarios in river flow in the future based on global warming deriving from a CO2-induced climate change.

Recommendation 3

That the Guidelines direct the Proponent to address in its Environmental Impact Statement the scenarios pertaining to sea level rise deriving from global warming since such rises would impact upon the hydraulic head of evacuation channels downstream of dams and would cause flooding of coastal estuaries and modify intrusions of salt water into low-lying coastal soils.

3.3 LITERATURE CITED

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33 USC 1251-1376. **Clean Water Act.**

42 USC 9601. **Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended.**

PART IV

TECHNICAL ISSUES

TABLE OF CONTENTS

4.1 INTRODUCTION

Part IV of these comments suggests amendments to the **Draft Guidelines** on technical matters. These suggestions derive from comments from 21 technical advisors, identified in Annex 1, most of whom also contributed to Makivik's brief of 19 March, 1992.

The structure of this part of our comments corresponds to that of Part IV of our brief of 19 March, 1992. Where appropriate, our comments on each technical issue are grouped under two headings: an "overview" which gives general comments on the treatment of each issue; and "specific suggestions", which deal with deletions, additions, or other modifications relevant to the text of the **Draft Guidelines.** Suggested changes are accompanied by references to the relevant section and paragraph of the **Draft Guidelines.** Discrepancies between paragraph numbers in the text of the English and the French versions of the **Draft Guidelines** have been indicated where appropriate.

4.2 RELIEF, BEDROCK GEOLOGY AND SURFICIAL DEPOSITS

4.2.1 Overview

In general, Section 3.1.2 does not address the issue of geology in a very comprehensive manner. The bedrock geology of the area needs to be documented with reliable baseline data. The relationship between bedrock geology and the probability of accumulation of potentially toxic trace elements in water bodies must also be evaluated.

The discussion of bedrock geology and surficial deposits does not reflect an understanding of the various time scales on which geomorphic and geologic processes operate. Low-frequency, high-magnitude events, such as earthquakes, landslides, and major floods, tend

to occur during periods of adjustment that lead to the establishment of new equilibria. Anticipating changes of such a scale requires a clear understanding of the natural linkages between all the physical processes in operation.

4.2.2 Specific Suggestions

4.2.2.1 Section 3.1.2, para. 2.

Add at the end of the paragraph: "with a detailed description of rocks and minerals known to have high levels of potentially toxic trace elements (cadmium, mercury, lead, arsenic, antimony and uranium), and mapping of faults and fractures;"

4.2.2.2 Section 3.1.2, para. 5.

This paragraph should be replaced by the following: "evaluation of the seismicity of the area through mapping of neotectonic features."

4.2.2.3 Section 3.1.3, para. 1.

The last sentence should be replaced by the following: "The Proponent shall map the distribution of the morphological and sedimentological units and clearly explain the evolution of the landscape."

4.2.2.4 Section 3.1.3, para. 2.

The word "developed" in the first sentence should be deleted.

4.2.2.5 Section 3.1.3, para. 5.

The present text should be replaced by "identify and map the areas prone to erosion, and establish the principal processes of soil movement;".

4.2.2.6 Section 3.1.3, para. 6.

The present text should be replaced by "identify and map sites that warrant preservation."

4.3 SOILS AND PERMAFROST

4.3.1 Specific Suggestions

4.3.1.1 Section 3.1.4, para. 5.

Add "and classification" after "distribution".

4.3.1.2 Section 3.1.4, para. 7.

The following sentence should be inserted at the end of the present text: "This explanation should include maps of permafrost, showing types, distribution, thickness of active layers and distribution of permafrost features, and should discuss predicted changes in the thickness of the active layer and other permafrost variables in response to the creation of reservoirs, the construction of roads and buildings, and the other actions associated with building and operating the Project."

4.4 GEOCHEMISTRY

4.4.1 Overview

It is important to have a section dealing with geochemistry. The type of baseline data requested in Section 3 of Part IV of Makivik's brief of 19 March, 1992 is essential for a thorough assessment of the environmental impacts of the Project, as well as for evaluating the economic mineral potential of the area to be flooded.

4.5 FRESHWATER ECOSYSTEMS

4.5.1 Specific Suggestions

4.5.1.1 Section 3.2.1, para. 5.

A new paragraph should be inserted after paragraph 5, to read as follows: "the number, location, and physical characteristics of each set of rapids;".

4.5.1.2 Section 3.2.1, para. 5.

The following statement should be added to paragraph 5: "the types of breakup, types and locations of ice jams, and extent of flooding associated with ice jams, and the relationship between coastal ice and river ice."

4.5.1.3 Section 3.2.2, para. 9.

Specify "chlorophyll a" in the English version.

4.5.1.4 Section 5.10.1, para. 1.

The following sentence should be added at the end of the present text: "The Proponent shall indicate precisely the number and locations of rapids that would be eliminated under each scenario."

4.6 ESTUARINE AND MARINE ECOSYSTEMS

4.6.1 Specific Suggestions

4.6.1.1 Section 3.2.4.1, para. 1.

Add the following sentence after "without ice cover.": "The suspended sediment load and bed

load at the mouths of estuaries as a function of the river flow and the state of the tide shall also be determined."

4.6.1.2 Section 3.2.4.1, para. 2 (English version), para. 3 (French version).

The words "type of sediment" should be replaced by "distribution and acoustic stratigraphy of the post-glacial deposits".

4.7 MERCURY

4.7.1 Overview

The **Draft Guidelines** are generally adequate with respect to the mercury issue.

4.7.2 Specific Suggestions

4.7.2.1 Section 3.2.5, para. 2.

The phrase "physical and chemical" should be replaced by "physical, chemical and biological....".

4.7.2.2 Section 3.2.5, para. 5.

The **Draft Guidelines** require measurements of methylmercury only "where possible", and then only in soils. The measurement of inorganic mercury requires the same high level of analytical competence and instrumentation as does that of methylmercury. Therefore, wherever inorganic mercury has to be measured, methylmercury should also be measured.

4.7.2.3 Section 3.2.5, para. 6.

The phrase "current knowledge of the toxicity" should be replaced by "current knowledge of bioaccumulation and the toxicity..."

4.7.2.4 Section 3.2.5, para. 8.

The term "mathematical" should be replaced by "empirical and dynamic".

4.7.2.5 Section 3.2.5, para. 8.

The words "predicting and, if appropriate," should be added after "models that will be suitable for".

4.7.2.6 Section 3.2.5, para. 8.

The final sentence should read as follows: " The Proponent shall explain and justify its choice of one or more models."

4.7.2.7 Section 3.2.5, last para.

The evaluation of analytical methods must also consider the validity of previous mercury studies in the region, as well as the validity of the data used to formulate predictions and to describe the biogeochemical cycle of mercury. Furthermore, the tissues selected for analysis must be relevant to the issue of human consumption. They must, therefore, be representative of all the tissues consumed by the inhabitants of the region. Consistent with the preceding comment, estimates of rates of bioaccumulation should be based on all the species of fish and all the tissues eaten by the local populations, rather than on "two piscivorous and two non-piscivorous species" (see para. 7).

4.7.2.8 Section 5.2.0, para. 1.

The last sentence should be replaced by the following: "It shall determine the duration of the contamination, taking into account all known contributing or regulating factors, including, if appropriate, all sources of leachate, such as soil and vegetation."

4.7.2.9 Section 5.2.0, third last para.

After "women of child-bearing age", add the following sentence: "Special attention must be given to the impact of different scenarios of decrease in fish-consumption on total body-

loading of methylmercury in pregnant women and on foetal exposure."

4.8 UPLAND AND WETLAND ECOSYSTEMS

4.8.1 Specific Suggestions

4.8.1.1 Section 3.3.1, para. 1

The following sentence should be added at the end of this paragraph: "Attention should be paid to the dwarf willow (*Salix spp.*) stands used by ptarmigan in winter for feeding and shelter.

4.8.1.2 Section 3.3.1, para. 4.

The following sentence should be added at the beginning of this paragraph: "The Proponent shall describe the age-structure of representative samples of the region's forest ecosystems."

4.8.1.3 Section 3.3.2, para. 1.

Add the following at the end of the paragraph: "Special attention must be given to the factors most likely to affect the distribution of animals in the Great Whale region, such as snow depth, the timing of and fluctuations in runoff, the presence of rapids, and the presence of old, large trees."

4.8.1.4 Section 3.3.5, para. 1.

Add the following statement after the first paragraph : "For caribou and other key species of birds and mammals, the Proponent shall provide estimates of the following: body condition, age and sex ratios, habitat use, age of maturity, reproductive rates and success, mortality factors and rates of mortality, and parasites, including rates of infection. Key species shall be identified on the basis of, among other things, their abundance and their importance to the Native harvest.

4.9 AVIAN ECOLOGY

4.9.1 Specific Suggestions

4.9.1.1 Section 5.8.6, para. 1.

After the sentence that reads "The Proponent shall estimate the value of lost nesting, staging, feeding and rest areas for avifauna in general and for waterfowl in particular.", add the following sentence: "The number, areas, and locations of shallow wetlands with the potential to accommodate breeding Black scoters and Surf scoters within the total area under development shall be determined, and the number, areas, and locations of those to be flooded shall be identified."

4.10 FISHERIES ECOLOGY

4.10.1 Overview

The issue of fisheries ecology is generally not addressed in the **Draft Guidelines** in a manner that is sufficiently focused. The sub-section on the description of fish populations should be centred on species of interest to Natives. It is also surprising that the impacts of the Project on fish are not dealt with under a specific heading, in the same way as for birds and whales. Most fish topics are included in one place or another, but it might have been useful to group the questions addressed to the Proponent.

4.10.2 Specific Suggestions

4.10.2.1 Section 3.2.3, after para. 6.

The seven points listed should be replaced by the following list:

"- Growth in length and weight;

- Length-weight relationships;

- Population age structure and sex ratios by age group;
- Age at maturity, fecundity, seasonal reproductive cycle;
- Migration patterns, including locations of spawning and rearing sites, feeding areas and overwintering areas;
- Trophic relations of each species;
- Parasites and predators, as well as interspecific relations that control abundance and fish community."

4.11 THREATENED SPECIES

4.11.1 Overview

Sections 3.3.5.4 and 5.8.3 are generally adequate. As pointed out in Section 10 of Part IV of Makivik's brief of 19 March, 1992, reference should be made to the classification system employed by the *Convention on International Trade in Endangered Species* (CITES).

4.12 PORT FACILITIES

4.12.1 Overview

Considering that quays, jetties and dredging activities are only addressed in the Draft Guidelines under specific sub-variants or associated with the construction of airports, we must reiterate the request at Section 12 of Part IV of Makivik's brief of 19 March, 1992. Port facilities and dredging activities should be addressed under section 4.2.1 of the **Draft Guidelines.**

4.13 CLIMATOLOGY

4.13.1 Overview

Given the importance of this issue, we have presented our substantive comments at Section 3.2.16 of Part III of this document.

4.13.2 Specific Suggestions

4.13.2.1 Section 5.9.2, para. 1.

The present paragraph should be replaced by the following: "The Proponent shall examine the impacts of the Project on local and regional climate and hydrology, including: changes in precipitation; changes in evaporation/evapotranspiration due to surface modification; changes in river flow and lake levels; changes in soil moisture and the spatial distribution of vegetation; changes in the timing and extent of freeze-up and break-up."

4.14 ARCHAEOLOGY AND HERITAGE RESOURCES

4.14.1 Overview

The **Draft Guidelines** address questions of archaeology quite adequately, but the following merit further attention: the cultural heritage values attached by the Inuit to the landscape along the major rivers, their tributaries, and other water courses; mapping and description of traditional sites and intangible cultural heritage resources.

4.14.2 Specific Suggestions

4.14.2.1 Section 3.4.3, para. 2.

Replace "overall assessment" by "comprehensive, critical overview".

4.14.2.2 Section 3.4.3, para. 2.

Add the following sentence at the end of the paragraph: "All provisions hereof pertaining to the protection and preservation of archaeological and cultural heritage resources apply equally to the collector system."

4.14.2.3 Section 3.4.3, para. 8.

Add after "methods" the following statement: "and to verify the archaeological potential of the zones inventoried."

4.14.2.4 Section 3.4.3, para. 10.

Add the following sentence at the end: "The results of all analyses carried out to date shall also be presented."

4.14.2.5 Section 3.4.3, para. 11.

Add ", including the criteria used in their selection," after "sites already excavated".

4.14.2.6 Section 3.4.3, para. 12.

Insert "traditional sites, intangible cultural heritage resources, and" after "related to".

4.14.2.7 Section 6.1.0, after para. 29.

Insert the following paragraph after the 29th paragraph: "assessment and salvage of uninventoried archaeological sites identified or disturbed during construction or maintenance work;".

4.14.2.8 Section 7.2.0, after para. 33.

Insert the following paragraph after the 33rd paragraph: "The archaeological follow-up programme shall be defined on the basis of explicit policies for archaeological resource-management and shall include the monitoring of important archaeological sites susceptible to disturbance after completion of construction work."

4.15 ECONOMY / PROJECT JUSTIFICATION

4.15.1 Specific Suggestions

4.15.1.1 Section 2.1.0, para. 4, item 1.

The first sentence should be replaced by: "the demand for additional energy and peak power;".

4.15.1.2 Section 2.1.0, last para.

The information provided by Hydro-Québec should cover at least the period from 1992-2020. The proposed period for future analysis (1992-2006) is too short. The regular export contracts negotiated with Vermont or those that may be negotiated with other clients, as well as risk-sharing agreements with certain major industrial consumers, such as aluminum plants, cover a longer period. Furthermore, the hypothetical start-up date for the NBR project is set well beyond the year 2006.

4.15.1.3 Section 2.2.0, para. 2.

In conformity with the changes suggested for Chapter 2 in Part III of these comments, the last sentence ("The social, economic and environmental implications, etc.") should be deleted.

4.15.1.4 Section 2.2.1, para. 9.

The section on industrial-sector forecasts should contain the following request for information: "an estimate of the impact of risk-sharing contracts on the in-service date of all Hydro-Québec equipment (production, transmission and others) from 1984 to 2010 or later, as the case may be."

4.15.1.5 Section 2.2.1, last para.

The following sentence should be added at the end of the paragraph: "Forecasts of annual quantities of surplus electricity for the period covered shall be provided, as well as sales strategies for those surpluses according to various scenarios, and annual forecasts of sale price/kWh and cost price/kWh of that surplus electricity."

4.15.1.6 Section 2.2.2, para. 2.

The last sentence should be replaced by: "The Proponent shall analyse the effect of the cancellation of the current firm energy export commitments and firm energy and power export commitments on the scheduling of the Project."

4.15.1.7 Section 2.2.2, last para. of the French version[1].

The sentence "l'analyse coûts-avantages détaillée des exportations actuelles;" in the French version of the **Draft Guidelines** should be replaced by the following paragraph: "An overall analysis of the profitability of current export commitments. This analysis should include: a) a forecast, in present value, of total revenues and all export costs (cost of bringing forward the in-service date of equipment and of advancing the other costs associated with exports, including the transmission reliability program); b) a forecast of the level of internal profit that those exports generate for Hydro-Québec; c) an estimate of the period required to recoup the investment costs entailed by those exports; d) a description and justification of all assumptions and parameters underlying the calculations, especially with regard to exchange and discount rates; e) a sensitivity analysis of profitability indicators concerning changes in the various assumptions underlying the calculations, in order to measure the level of risk for Hydro-Québec.

[1] This paragraph is missing in the English version of the **Draft Guidelines**. Consequently, changes suggested here are additons to Section 2.2.2 of the English version.

4.15.1.8 Section 2.2.3.2, after the last para.

The following text should be added: "Comparison of Hydro-Québec's demand-side management program with those of other large North American utilities."

4.15.1.9 Section 2.3.3.2, after the last para.

The following text should be added: "annual forecasts of cost/kWh of imported electricity by Hydro-Québec according to various scenarios (sources, annual amounts, etc.), explaining and justifying the underlying assumptions; in particular, Hydro-Québec should compare the annual purchase cost of its imports with the sales cost of its exports, in present value."

4.15.1.10 Section 2.4.4, before the first para.

The following text should be added: "Annual changes in reserves in kWh and reservoir filling rates, between 1990 and 2006, according to various scenarios (changes in run-off, demand increase hypotheses, supply forecasts, etc.), explaining all the underlying assumptions; Hydro-Québec should indicate how it intends to protect itself during long phases of low run-off, such as have existed since 1984. In particular, Hydro-Québec should provide the following information": (the three paragraphs of the original text of Section 2.2.4 remain unaltered).

4.15.1.11 Section 2.5.1, para. 2.

"the year 2010" should be replaced by "the year 2020."

4.15.1.12 Section 2.5.2, para. 1

After "provide all detailed information" insert the following text: ", especially with regard to the assumptions and the methods of calculation,".

4.15.1.13 Section 2.5.2, after the last para.

The following text should be added: "Hydro-Québec should indicate the impact of its resource additions on annual changes, between 1992 and 2020, of the total real levelized cost

per kWh of electricity sold within Québec and outside the Province ($1992)."

4.15.1.14 Section 2.6.0, second-to-last para.

The following text should be added after "costs": "as a function of the successive changes in the main assumptions underlying the calculations: inflation, wage increases, basic cost of each project, etc."

4.15.1.15 Section 2.7.3, after the last para.

A new paragraph should be added: "impact of risk-sharing contracts on annual increases in Hydro-Québec's regular rates for the total period of these agreements, according to various scenarios and explaining all assumptions."

4.16 HEALTH

4.16.1 Overview

Health issues are addressed comprehensively in the **Draft Guidelines.** However, the emphasis on mercury contamination should not lead the Proponent to overlook the levels of contamination in fish and marine mammals from other contaminants such as cadmium, lead and organochlorine compounds. These considerations should be addressed under sections 3.2.4.2 and 3.2.4.3.

Section 3.4.4 should also direct the Proponent to measure biological exposure (hair, blood and maternal milk) of local populations to heavy metals and chlorinated compounds over the last ten years. The results should be compared with those from other populations and evaluated in relation to known risks to human health.

A new section should be added to the present Chapter 3, outlining the baseline data required on the diet of the Inuit. A synthesis of knowledge concerning the nutritional

benefits derived from traditional foods is also needed. Special attention must be given to the role of selenium as an antitoxic agent for mercury and of the polyunsaturated fatty acids as protective agents against ischemic diseases. A profile of Inuit habits concerning breast-feeding should also be drawn up.

Finally, the mitigative measures related to health and diet should include a programme to promote the consumption of traditional foods, together with a permanent communication programme on the risks and benefits associated with their consumption.

4.16.2 Specific Suggestions

4.16.2.1 Section 5.3.0, para. 3

After "anthropological", add "and epidemiological".

4.16.2.2 Section 5.3.0, third last para.

Replace "and the concerns that have been expressed" by the following: "and exposure scenarios for concerned populations. A forecast of exposure levels of populations to electric and magnetic fields created by transmission lines and transforming equipment must be undertaken."

4.16.2.3 Section 5.5.3 para. 1

After "the quality of drinking water", add "using physico-chemical, bacteriological and organoleptic parameters."

4.17 MONITORING

4.17.1 Overview

Section 7 of the **Draft Guidelines** does not adequately reflect the conditions that prevail during the construction of a major project, in particular the practical constraints in implementing programmes of monitoring, follow-up, and audit conceived at the planning stage of a project.

It would be appropriate to deal separately in the Guidelines with monitoring ("surveillance") and follow-up ("suivi").

Monitoring is the series of activities that permits the systematic, dynamic and integrated control of the environmental quality of decisions and actions throughout the life of a project. "Long-term management", as contemplated at Section 7.4.0 of the **Draft Guidelines**, is not distinct from monitoring, but is rather its result or manifestation. In drawing an apparent distinction between monitoring and long-term management, the **Draft Guidelines** run the risk of creating confusion or leading the Proponent to cut short the monitoring activities on which long-term management depends. On the contrary, the Guidelines must indicate clearly that monitoring must be conceived and implemented at the stages of final design, construction, and operation of the Project. Its purpose must be stated clearly to be to ensure that remedial measures adapted to the Project and taking into account the special features of the Project, Hydro-Québec's Environment Code, the results of public consultation, the Proponent's specific undertakings to third parties, and the conditions contained in the Project authorization are conceived and implemented. In particular, the monitoring programme must facilitate control of the manner in which remedial measures are incorporated into the plans and specifications for the Project in a manner that binds contractors and others.

Monitoring must also be conceived so as to permit the control of biophysical and social remedial measures during construction and operation of the Project, including those measures required contractually from contractors.

The Guidelines must require the Proponent to illustrate clearly the dynamic linkages that it proposes to create between its monitoring and follow-up activities, since the latter will be responsible for fulfilling the research needs identified by the former. The ability of monitoring to contribute to the integrated management of impacts presupposes the existence of feedback mechanisms that permit immediate adjustments to unforeseen situations and events. As noted in Section 4.19, the monitoring of social impacts must receive at least as much attention as that of biophysical impacts.

The Guidelines should require the Environmental Impact Statement to identify the methodologies that will be employed during monitoring and the organizational structures that will be put into place to ensure satisfactory monitoring throughout the life of the Project. Budgetary estimates must also be provided. The advantages and disadvantages of assigning responsibility for monitoring to an independent third party should be identified. Finally, the desirability of and mechanisms for involving representatives of the Inuit communities must be discussed in the Environmental Impact Statement.

4.18 EMPLOYMENT

4.18.1 Overview

Concerns associated with the potential negative impacts of employment on Inuit individuals and communities have not been addressed. Both members of the communities and social scientists have raised this point, and we believe that it deserves special consideration under Section 5.7.2 of the **Draft Guidelines**, possibly along the lines suggested at Paragraph 18 of Part IV of Makivik's brief of 19 March, 1992.

4.19 SOCIAL IMPACT ASSESSMENT

4.19.1 Overview

The innovative nature of those parts of the **Draft Guidelines** that address social impacts merits recognition. In spite of the fact that social change is addressed comprehensively, however, the **Draft Guidelines** do not adequately justify the need to understand the potential impacts of the Project on the social and cultural life of the Inuit, because they do not define those concepts. The definition of "ecosystem" in Paragraph D of Section One of Part III of Makivik's brief of 19 March, 1992, still offers useful guidance in that respect.

Section 1.7.0 of the **Draft Guidelines** specifically mentions that the use of the concept of sustainable development presupposes an approach that would "meet the needs and aspirations of local communities..." In accordance with Recommendation 7 in Part III of these comments, community and individual research will be needed to form the necessary understanding of the needs and aspirations of the Inuit.

Given that the **Draft Guidelines** propose the concept of alienation as a framework for the study of social change, it would be useful to propose specific hypotheses that might assist the Proponent in applying that framework. The capacity of Inuit institutions to adapt to the social changes induced by the Project, including the possibility of creating new institutions, should also be addressed.

Section 1.6.0 calls, correctly in our opinion, for consideration of the so-called "traditional" knowledge of the Native people. Later stages of the **Draft Guidelines**, however, fail to clarify why that knowledge is needed, or how it will be used. We suggest that the **Draft Guidelines** refer explicitly to ethnoscience. Such a reference would be particularly appropriate given the emphasis that the **Draft Guidelines** already give to methodological matters. Ethnoscience is a recognized and defined discipline. It does not limit itself to the past, but rather constitutes a means of continually updating cultural knowledge.

An ethnoscientific approach, rather than one based on perception, would facilitate comprehension of the collective representation of the Inuit of the environment and of the Project's place in it. The hierarchical approach favoured by the Committees would concurrently be facilitated. The concept of collective representation could be integrated conveniently into Paragraph 5.1.1.1.

The **Draft Guidelines** should also explicitly require a qualitative synthesis of the social and cultural data that would permit a clear understanding of their interrelationship with other types of data. Such a request might be added to Section 5.1.1.

Chapters 6 and 7 of the **Draft Guidelines** pay insufficient explicit attention to the mitigation and monitoring of social impacts. In fact, less than 20% of the mitigative measures suggested in Chapter 6 concern social impacts. The social monitoring program outlined in Chapter 7 is still inadequate. The Proponent should be specifically requested to monitor fundamental aspects of social and cultural life, such as changes in family structure, values, inter-generational relations, and languages.

ANNEX I

LIST OF TECHNICAL ADVISORS

M. Bruno d'Anglejan, Ph.D., Université McGill
Oceanographer

M. Louis Azzaria, Ph.D., Université Laval
Geochemist

Mr. John W. Berry, Ph.D., Queens University
Cross-Cultural Psychologist

Mr. Ian C. Badgley, Ph.D., Avataq Cultural Institute Inc.
Archaeologist

Mr. Roger Bider, Ph.D., McGill University
Biologist (large mammals)

M. Serge Bouchard, Ph.D.
Consulting Anthropologist

M. Paul Charest, Ph.D., Université Laval
Social Anthropologist

Mr. Eric Dewailly, Ph.D., Département de santé communautaire,
Centre Hospitalier de l'Université Laval
Physician, Environmental Health

Mr. Jacob Kalff, Ph.D., McGill University
Limnologist

M. Pierre Lamonde, Ph.D., I.N.R.S. Urbanisation
Energy Economist

M. Raynald Marcoux, M.Sc.
Consultant in Environmental Sciences and Monitoring

Mr. Peter Martini, Ph.D., University of Guelph
Sedimentologist

Mr. Robert J. Payne, Ph.D., School of Outdoor Recreation, Parks and
Tourism, Lakehead University
Specialist in Aesthetic and Wilderness Values

Mr. Wayne Pollard, Ph.D., McGill University
Geomorphologist

Mr. Geoffrey Power, Ph.D., University of Waterloo
Fisheries Biologist

Mr. Douglas J. Ramsey, M.Sc., Agassiz North Associates Ltd
Specialist in Mercury Methylation Processes

Mr. David E. Sergeant, Ph.D.
Consulting Biologist (marine mammals)

Mr. Bhawan Singh, Ph.D., Université de Montréal
Climatologist

M. François Thérien, M.Sc., Département de santé communautaire, Hôpital Sainte-Justine
Specialist in Public Health

Mr. Rodger D. Titman, Ph.D., McGill University
Ornithologist

Mr. James B. Waldram, Ph.D., University of Saskatchewan,
Social Anthropologist