



Government
of Canada

Gouvernement
du Canada



ENVIRONMENTAL IMPACT STATEMENT GUIDELINES

Lower Churchill Hydroelectric Generation Project

Newfoundland and Labrador Hydro

**Issued by the Government of Canada and
the Government of Newfoundland and Labrador**

July 2008

PREFACE

On November 30, 2006, Newfoundland and Labrador Hydro (the Proponent) submitted a Project Registration/Project Description for the Lower Churchill Hydroelectric Generation Project (the Project), in Labrador. The proposal is to develop hydroelectric generating facilities with interconnecting transmission lines on the lower section of the Churchill River. Generation facilities with a combined capacity of approximately 2,800 MW are proposed at Gull Island and Muskrat Falls, which are approximately 100 km and 30 km southwest of Happy Valley-Goose Bay, respectively. Interconnecting transmission lines are proposed between these generating sites and Churchill Falls.

On January 26, 2007, the Proponent was advised by the Minister of Environment and Conservation that an Environmental Impact Statement (EIS) is required for the Project under the Newfoundland and Labrador *Environmental Protection Act* (EPA). The Project is also subject to the *Canadian Environmental Assessment Act* (CEAA). On June 5, 2007 the Minister of the Environment announced that the Project will undergo a federal environmental assessment by an independent review panel.

Canada and Newfoundland and Labrador intend to conclude a Joint Review Panel Agreement to ensure that the respective requirements of the EPA and the CEAA that apply to the Project are met in an effective and timely manner. As a first step toward that objective, the two governments have agreed that a single set of EIS Guidelines is the most efficient and effective way to guide the Proponent in preparing an environmental assessment that will provide the type and quality of information and conclusions on environmental effects required to satisfy their respective legislative requirements.

These Guidelines are intended to assist the Proponent in its preparation of the EIS. The purpose of the EIS is to identify alternatives to the Project, alternative methods for carrying it out, the environment that will be affected, the important environmental effects associated with the Project, measures that are required to mitigate against any adverse effects and the significance of residual environmental effects.

The EIS is expected to contain a review of all available pertinent information as well as such additional new information or data as provided by the Proponent or requested by Canada or Newfoundland and Labrador. Component Studies shall address baseline data requirements to support the evaluation of environmental effects and/or develop mitigation measures as well as monitoring and follow up programs. The Guidelines include the information required under Section 57 of the EPA, and the information necessary to address the factors set out in subsections 16(1) and 16(2) of the CEAA, both of which are included in **Appendix A**. As more specific information is provided and as additional baseline information is gathered, Canada and/or Newfoundland and Labrador and/or the Joint Review Panel may require other concerns and potential effects to be considered by the Proponent.

The EIS will be used by the Joint Review Panel in carrying out subsequent public hearings and making recommendations to the governments of Canada and Newfoundland and Labrador on the outcomes of the environmental assessment process.

The draft Guidelines were subject to a public consultation period from December 19, 2007 to February 27, 2008. After consideration of the comments received from Aboriginal

groups and the public during the consultation period, the Guidelines were finalized and submitted to the federal Minister of the Environment and to the Newfoundland and Labrador Minister of Environment and Conservation for approval. The Guidelines were subsequently issued to the Proponent by the two ministers.

TABLE OF CONTENTS

PREFACE	2
SECTION 1 – BACKGROUND.....	6
1.1 Purpose of the Guidelines	6
1.2 Proposed Project.....	6
1.3 Environmental Assessment Process	7
SECTION 2 – GUIDING PRINCIPLES	8
2.1 Environmental Assessment: A Planning Tool	8
2.2 Aboriginal and Public Participation.....	8
2.3 Aboriginal Traditional and Community Knowledge	8
2.4 Sustainable Development.....	9
2.5 Precautionary Principle	9
SECTION 3 – PREPARATION AND PRESENTATION OF THE EIS.....	11
3.1 Study Strategy and Methodology	11
3.2 Presentation of the EIS	11
SECTION 4 – OUTLINE OF THE ENVIRONMENTAL IMPACT STATEMENT	13
4.1 Executive Summary	13
4.2 Introduction	13
4.2.1 Identification of the Proponent.....	13
4.2.2 Overview of the Project	13
4.2.3 Purpose of the EIS.....	14
4.2.4 Relationship to Legislation, Permitting, Regulatory Agencies and Policies	14
4.2.5 Land Claim Agreements and Interim Agreements	14
4.2.6 Previous Registration and Environmental Assessment	14
4.2.7 Other Registrations	14
4.3 The Proposed Undertaking.....	15
4.3.1 Need, Purpose and Rationale of the Project.....	15
4.3.2 Alternatives	15
4.3.2.1 Alternatives to the Project.....	15
4.3.2.2 Alternative Means of Carrying Out the Project	16
4.3.3 Project Description.....	18
4.3.3.1 Spatial and Temporal Boundaries	18
4.3.4 Construction.....	19
4.3.5 Operation and Maintenance	22
4.3.6 Decommissioning	23

4.4	Environment	23
4.4.1	Identification of Issues and Selection of Valued Environmental Components (VECs).....	23
4.4.2	Study Areas	24
4.4.3	Previous Development	24
4.4.4	Description of the Existing Environment.....	25
4.4.4.1	Atmospheric Environment	26
4.4.4.2	Aquatic Environment	26
4.4.4.3	Terrestrial Environment.....	27
4.4.4.4	Land and Resource Use	28
4.4.4.5	Cultural Heritage Resources	28
4.4.4.6	Communities.....	29
4.4.4.7	Economy, Employment and Business.....	30
4.4.5	Component Studies	31
4.4.6	Data Gaps.....	32
4.4.7	Future Environment without the Project	32
4.5	Environmental Effects	32
4.5.1	General.....	32
4.5.2	Accidents and Malfunctions.....	34
4.5.3	Cumulative Effects.....	35
4.5.4	Renewable Resources	35
4.5.5	Effects of the Environment on the Project	36
4.6	Environmental Protection.....	36
4.6.1	Mitigation.....	36
4.6.1.1	Compensation	38
4.6.2	Emergency Response / Contingency Plans	38
4.6.3	Rehabilitation.....	38
4.6.4	Monitoring and Follow-up Programs.....	39
4.7	Residual Effects and Determination of Significance	40
4.8	Consultation with Aboriginal Groups and Communities	40
4.9	Public Participation.....	41
4.10	Environmental Protection Plan.....	41
4.11	References Cited.....	42
4.12	Personnel.....	42
4.13	Copies of Reports.....	42
	BIBLIOGRAPHY.....	43
	APPENDIX A.....	45
	APPENDIX B.....	47

SECTION 1 – BACKGROUND

1.1 PURPOSE OF THE GUIDELINES

The purpose of this document is to identify for the Proponent and interested parties, the nature, scope and extent of the information and analysis required in the preparation of the EIS. The Proponent will prepare and submit an EIS that will identify alternatives to the Project, alternative methods for carrying it out, the environment that will be affected, the important environmental effects associated with the Project, measures that are required to mitigate against any adverse effects and the significance of residual environmental effects.

1.2 PROPOSED PROJECT

The Proponent proposes a project consisting of hydroelectric generating facilities at Gull Island and Muskrat Falls, and interconnecting transmission lines to the existing Labrador grid. The proposed Project includes the following components¹:

The Gull Island facility would consist of a generating station with a capacity of approximately 2,000 MW that includes:

- A dam 99 m high and 1,315 m long; and
- A reservoir 215 km² in area at an assumed full supply level of 125 m above sea level (asl).

The dam is to be a concrete-faced rockfill dam. The reservoir is to be 230 km long, and the area of inundated land is to be 85 km² at full supply level. The powerhouse is to contain five Francis turbines.

The Muskrat Falls facility would consist of a generating station with a capacity of approximately 800 MW that includes:

- A concrete dam with two sections on the north and south banks of the river, and
- A 100 km² reservoir at an assumed full supply level of 39 m asl.

The north and south dams will be constructed of roller compacted concrete. The north section dam is to be 32 m high and 432 m long, while the south section is to be 29 m high and 125 m long. The reservoir is to be 60 km long and the area of inundated land is to be 41 km² at full supply level. The powerhouse is to contain four propeller or Kaplan turbines, or a combination of both.

Interconnecting transmission lines would consist of:

- A 735 kV transmission line between Gull Island and Churchill Falls; and
- Two 230 kV transmission lines between Muskrat Falls and Gull Island.

The 735 kV transmission line is to be 203 km long and the 230 kV transmission lines are to be 60 km long. Both lines will likely be lattice-type steel structures. The location of the transmission lines is to be north of the Churchill River; the final route is the subject of a route selection study that will be included in the EIS. The lines between Muskrat Falls and Gull Island will be combined on double-circuit structures.

¹ All measures are approximate

1.3 ENVIRONMENTAL ASSESSMENT PROCESS

Under section 5 of the CEEA, an environmental assessment is required for this Project because Fisheries and Oceans Canada may issue a permit or license under subsection 35(2) of the *Fisheries Act* and Transport Canada may issue an approval under paragraph 5(1)(a) of the *Navigable Waters Protection Act*. Because of these regulatory roles, Fisheries and Oceans Canada and Transport Canada are responsible authorities for the environmental assessment.

The responsible authorities recommended that the Minister of the Environment refer the Project for assessment by a review panel. They are of the opinion that the Project is likely to cause significant adverse environmental effects over a large area and to a number of Valued Environmental Components (VECs). The Minister of the Environment accepted this recommendation and has referred the Project to a review panel.

This Project is also being assessed by the Government of Newfoundland and Labrador under Part X of the EPA, pursuant to sections 34(1)(a) and 34(1)(d) of the *Environmental Assessment Regulations*.

Canada and Newfoundland and Labrador intend to conclude a Joint Review Panel Agreement to ensure that the respective requirements of the CEEA and EPA that apply to the Project are met in an effective and timely manner.

SECTION 2 – GUIDING PRINCIPLES

The EIS shall demonstrate adherence to the basic principles of environmental assessment as set out below.

2.1 ENVIRONMENTAL ASSESSMENT: A PLANNING TOOL

Environmental assessment is a planning tool that enables consideration of the potential effects of a project before actions are taken to allow that project to proceed. It is a process for identifying a project's potential interactions with the environment, predicting environmental effects, identifying mitigation measures and evaluating the significance of residual environmental effects. If the project proceeds, the environmental assessment process also provides the basis for setting out the requirements for monitoring and reporting to verify compliance with the terms and conditions of approval and the accuracy and effectiveness of predictions and mitigation measures.

2.2 ABORIGINAL AND PUBLIC PARTICIPATION

Aboriginal and public participation is a central objective of an environmental assessment process and a means to ensure that a proponent considers and responds to Aboriginal and public concerns. In preparing the EIS, the Proponent shall inform and consult with the affected Aboriginal and local communities, interested regional and national organizations and resource users.

Meaningful public involvement can only take place if Aboriginal groups and the public have a clear understanding of the nature of the proposed Project as early as possible in the environmental assessment process. Therefore, it is recommended that the Proponent:

- Continue to provide up-to-date information to Aboriginal groups and the public and especially to the communities likely to be most affected by the Project;
- Involve the main interested parties in determining how best to deliver that information, that is, the type of information required, format and presentation methods, as well as the need for community meetings; and
- Explain the results of the EIS in a clear and direct manner to make the issues comprehensible to the widest possible audience.

2.3 ABORIGINAL TRADITIONAL AND COMMUNITY KNOWLEDGE

Populations living in proximity to the Project may have substantial and distinct knowledge, which may be essential to the assessment of the effects of the Project, and their mitigation. Aboriginal traditional and community knowledge of the existing environment shall be an integral part of the EIS, to the extent that it is available to the Proponent.

In environmental assessment, Aboriginal traditional and community knowledge may be regarded as the knowledge, understanding and values that residents of Aboriginal and local communities have in relation to the environment and the potential environmental effects of the Project and proposed mitigation measures. This knowledge is based on personal observation, collective experience and/or oral transmission.

Aboriginal traditional and community knowledge assists in understanding, including the inter-relationships, among such matters as:

- Ecosystem function;
- Resource abundance, distribution and quality;
- Social and economic well-being; and
- Use of the land and resources.

It also informs the development of adequate baseline information, identification of key issues, prediction of effects, and assessment of their significance, all of which are essential to the EIS and its review.

2.4 SUSTAINABLE DEVELOPMENT

Sustainable development seeks to meet the needs of present generations without compromising the ability of future generations to meet their own needs.

The objectives of sustainable development are:

- The preservation of ecosystem integrity, including the capability of natural systems to maintain their structures and functions and to support biological diversity;
- The respect for the right of future generations to the sustainable use of renewable and non-renewable resources; and
- The attainment of durable and equitable social and economic benefits.

Promotion of sustainable development is a fundamental purpose of environmental assessment, and the Proponent shall include in the EIS consideration of:

- (a) The extent to which biological diversity is affected by the Project;
- (b) The capacity of renewable resources that are likely to be significantly affected by the Project to meet the needs of present and future generations; and
- (c) The extent, distribution and duration of social and economic benefits.

The Proponent shall strive to integrate these factors into the planning and decision-making process for the Project, including seeking the views of interested parties, and report on the results in the EIS.

2.5 PRECAUTIONARY PRINCIPLE

One of the purposes of environmental assessment is to ensure that projects are considered in a careful and precautionary manner before action is taken in connection with them in order to ensure that such projects do not cause significant adverse environmental effects.

Principle 15 of the 1992 Rio Declaration on Environment and Development states that “Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”

In applying the precautionary approach, the Proponent shall:

- (a) Demonstrate that the proposed Project is examined in a careful and precautionary manner;

- (b) Outline the assumptions made about the effects of the Project and the approaches to prevent and minimize these effects;
- (c) Identify where scientific uncertainty exists in the predictions of the environmental effects of the Project; and
- (d) Identify any follow-up and monitoring activities planned, particularly in areas where scientific uncertainty exists in the prediction of the effects of the Project.

SECTION 3 – PREPARATION AND PRESENTATION OF THE EIS

3.1 STUDY STRATEGY AND METHODOLOGY

The Proponent shall explain and justify all methods used in the preparation of the EIS. In describing its overall approach, the Proponent shall explain how it used scientific, engineering, Aboriginal traditional and community knowledge. All hypotheses and assumptions shall be clearly identified and justified. All data collection methods, models and studies shall be documented so that the analyses are transparent and reproducible. The degree of uncertainty, reliability and sensitivity of models used to reach conclusions shall be indicated.

All conclusions regarding the receiving environment and predictions as well as the assessment of environmental effects shall be substantiated. The Proponent shall support all analyses, interpretation of results and conclusions with a review of the appropriate literature, providing all references required and indicating the public availability of all works consulted. Any contribution based on Aboriginal traditional and community knowledge shall be specified and the sources identified.

The EIS shall identify all significant gaps in knowledge and explain their relevance to key conclusions drawn. The Proponent shall indicate the measures applied to address these gaps. Where the conclusions drawn from scientific and technical knowledge are inconsistent with the conclusions drawn from Aboriginal traditional or community knowledge, the Proponent shall present the various points of view as well as a statement of the Proponent's conclusions.

3.2 PRESENTATION OF THE EIS

The EIS and all associated reports and studies shall use System International (SI) units of measure and terminology. The Proponent shall present the EIS in the clearest language possible. However, where the complexity of the issues addressed requires the use of technical language, a glossary defining technical words and acronyms shall be included.

The EIS should be presented in the sequence outlined in these Guidelines or the Proponent may decide that the information is better presented following a different sequence. For clarity and ease of reference, the EIS shall include a Table of Concordance that cross-references the EIS Guidelines so that information requirements identified in the Guidelines are easily located in the EIS. The EIS shall refer to rather than repeat information already presented in other sections of the document. A key subject index is to be provided giving locations in the text by volume, section and sub-section. Lines in the EIS shall be numbered in the margin at appropriate intervals.

The Proponent shall provide charts, diagrams and maps wherever useful to clarify the text, including a depiction of what the developed Project sites would look like from an aerial perspective. Maps shall use a limited number of common scales to allow for comparison and overlay of mapped features. Maps shall indicate common and accepted local place names. The Proponent shall present information, where technically feasible, using a standard Geographic Information System (GIS) mapping (digital) format with maps geo-referenced.

Throughout the preparation of the EIS, the Proponent should freely cite experiences from other environmental assessments, with emphasis on Newfoundland and Labrador and other Canadian examples, to support the methodology and value of the information provided, or as reasons in support of the selection of a preferred alternative.

An initial requirement for seventy-five (75) paper copies of the EIS and sixty (60) electronic copies may be sufficient. They shall be written in English and printed or copied on two sides of recycled *Environmental Choice* and/or *Forest Stewardship Council*-certified paper. The paper choice shall be conspicuously stated. Where possible, maps and other attachments should be scaled to fit on standard size papers to facilitate copying. The electronic version of the EIS shall be submitted in a format so that it may be posted on the internet and in a manner which shall facilitate downloading and printing in part or in whole.

To facilitate the identification of the documents submitted and their coding in the Canadian Environmental Assessment Registry, the title page of the EIS and its related documents should contain the following information:

- (a) Project name and location;
- (b) Title of the document, including the term “environmental impact statement”;
- (c) Subtitle of the document;
- (d) Name of the Proponent;
- (e) Names of the consultants, as appropriate; and
- (f) Date.

SECTION 4 – OUTLINE OF THE ENVIRONMENTAL IMPACT STATEMENT

4.1 EXECUTIVE SUMMARY

The Executive Summary shall include identification of the Proponent, a brief project description, predicted environmental and socio-economic effects, mitigation measures, residual effects, follow-up and monitoring programs, an outline of the component studies, and a summary of the fundamental conclusions of the EIS. The Executive Summary shall also include a review of Aboriginal concerns about the Project and the key findings of the Aboriginal consultation activities undertaken by the Proponent.

The Executive Summary should be written in terms understandable to the general public and in such a manner as to allow reviewers to focus on items of concern.

4.2 INTRODUCTION

4.2.1 Identification of the Proponent

This section shall introduce readers to the Proponent by providing pertinent corporate information, including the following:

- (a) Name of corporate body and mailing address;
- (b) Chief Executive Officer;
- (c) Principal contact person for purposes of environmental assessment
- (d) Ownership of rights and interests in the Project and associated natural resources;
- (e) Corporate accountability for management of environmental and socio-economic effects and operational arrangements and corporate and management structures, including the linkage of these factors between the Proponent, its parent companies and any other organizations with operational or ownership rights;
- (f) Environmental and community relations policies; and
- (g) Key elements of the Proponent's environment, health and safety management system and how the system will be integrated into the Project.

In addition the Proponent shall describe its history in Canada's hydroelectricity industry, with specific reference to the existing hydroelectric generation project at Churchill Falls.

4.2.2 Overview of the Project

The intent of this section is to provide an overview of key components rather than a detailed description of the Project, which will follow under Section 4.3 – The Proposed Undertaking.

The Proponent shall briefly summarize the Project, by presenting the project components, associated activities, scheduling details, the timing of each phase of the Project and other key features. If the Project is part of a larger sequence of projects, the Proponent shall outline the larger context and present the relevant references, if available.

4.2.3 Purpose of the EIS

The purpose of the EIS shall be described.

4.2.4 Relationship to Legislation, Permitting, Regulatory Agencies and Policies

The EIS shall identify and discuss all relationships between the Project and relevant legislation, regulations and policies (municipal, provincial, and federal). Pertinent government policies, such as land and water resources development and use policies that may influence environmental management in the project area, and the Project's compliance with respect to these policies are to be addressed. The EIS shall describe how project siting, design and management have been influenced by compliance with legislation and policies.

The Proponent shall provide a comprehensive list of anticipated permits and regulatory approvals required for the undertaking. The list shall include the following details:

- (a) Activity requiring regulatory approval;
- (b) Name of permit or regulatory approval;
- (c) Name of legislation applicable in each case; and
- (d) Regulatory agency responsible for each permit of approval.

4.2.5 Land Claim Agreements and Interim Agreements

The EIS shall identify any publicly available agreements or arrangements, including the *Interim Forest Agreement (2003)* and the *Labrador Inuit Land Claims Agreement*, entered into between the Proponent and/or the Government of Canada and/or the Government of Newfoundland and Labrador and/or Aboriginal group(s) in the context of land claims, and address how they may affect or be affected by the Project.

With respect to the *Labrador Inuit Land Claims Agreement* (the Agreement), the EIS should include a determination of whether the Project may be reasonably expected to have adverse environmental effects on the Labrador Inuit Settlement Area for the purpose of determining the applicability of the Agreement.

4.2.6 Previous Registration and Environmental Assessment

The Proponent shall describe their previous registrations of proposed hydro developments on the Lower Churchill River, environmental assessment(s), the outcome of the assessment(s), and the reasons the proposals presented in those previous registrations did not commence.

4.2.7 Other Registrations

The Proponent shall indicate whether any other registrations are to be submitted for environmental assessment in the future as a result of this Project.

4.3 THE PROPOSED UNDERTAKING

4.3.1 Need, Purpose and Rationale of the Project

The “need for” the Project is defined as the problem or opportunity the Project is intending to solve or satisfy. The “need for” will establish the fundamental rationale of the Project.

The “purpose of” the Project defines what the Proponent hopes to accomplish by carrying out the Project.

“Need for” and “Purpose of” the Project should be established from the perspective of the Proponent and provide a context for the consideration of alternatives to the Project.

This section of the EIS shall provide a comprehensive explanation of the need, purpose and rationale for the Project. The statement of the Project’s justification shall be presented in both energy and economic terms, shall provide a clear description of methodologies, assumptions and conclusions used in the analysis, and shall include an evaluation of the following:

- (a) Current and forecasted provincial electricity supply and demand;
- (b) Current and forecasted provincial electricity conservation;
- (c) Current and future provincial transmission line network;
- (d) Current exports by the Proponent to markets outside the Province;
- (e) Export market opportunities, forecasts and expected evolution;
- (f) Current energy and water management regimes;
- (g) Risks to the Project, in-stream flow variability, market prices and schedule delays, interest rates and other risk factors relevant to the decision to proceed with the Project;
- (h) Projected financial benefits of the Project (including their distribution) as measured by standard financial indicators; and
- (i) Relationship with the Newfoundland and Labrador’s 2007 Energy Plan.

4.3.2 Alternatives

4.3.2.1 Alternatives to the Project

The alternatives to a project are defined as functionally different ways of addressing the need for the project. The EIS shall contain an analysis of alternatives to the Project, including the following:

- (a) Management of electricity demand through utility-based energy efficiency and conservation initiatives;
- (b) Alternative generation sources to the Project (e.g., hydrocarbons, wind, other hydro projects such as run-of-river projects);
- (c) Combinations of alternative generation sources with hydroelectricity (e.g., hydro-wind);
- (d) The addition by the Proponent of more capacity at existing generation facilities; and
- (e) Status quo (no Project).

Among the alternatives to the Project to be considered, the Proponent shall pay close attention to how they would be integrated within Newfoundland and Labrador's 2007 Energy Plan.

The analysis of alternatives to the Project is to include clearly described methods and criteria for comparing alternatives, and sufficient information for the reader to understand the reasons for selecting the preferred alternative and for rejecting others. This shall include a description of the conditions or circumstances that could affect or alter these choices, such as market conditions, regulatory changes and other power developments, either prior to construction or during the life of the Project.

The EIS shall include a comparative analysis of the environmental effects and technical and economic feasibility of alternatives that led to the choice of the selected Project alternative. The comparative analysis shall indicate how the Proponent took into account the sustainable development objectives outlined previously in these Guidelines in determining criteria for selecting the preferred alternative. The Proponent shall include an evaluation of the thresholds for economic viability of the Project and considerations respecting the timing of phases and components of the Project. The Proponent shall also indicate under what circumstances a change in economic conditions may influence its selection of the preferred alternative.

4.3.2.2 Alternative Means of Carrying Out the Project

Alternative means of carrying out the Project, which are technically and economically feasible, and the environmental effects of any such alternative means shall be discussed.

The EIS shall describe design and siting alternatives for dams/reservoirs, generating stations, transmission facilities and ancillary facilities (such as roads and temporary infrastructure). The preferred alternatives shall be identified, with the selection based on clearly described methods and criteria. An explanation shall be included of how environmental factors affect the design and consideration of alternatives.

The Proponent shall provide the rationale for selecting Project components and shall discuss the state of the art of the various technologies being proposed. The Proponent shall indicate the known experience with, and the effectiveness and reliability of these techniques, procedures and policies, particularly under arctic or subarctic conditions, in Canada and elsewhere, and their relation to best practice in Canada. This discussion shall also show how design, engineering and proposed procedures are compatible with the environment and the local communities and shall minimize adverse environmental and social effects.

The EIS shall analyze and compare the design alternatives for the Project in relation to their environmental and social costs and benefits, including those alternatives which cost more to build and/or operate but which result in

reduced adverse environmental effects or more durable social and economic benefits.

Alternatives for the pace and scale of the project shall be discussed, and the chosen alternative justified. The Proponent shall also indicate under what circumstances a change in economic conditions may influence its selection of preferred alternative means.

Alternative means of carrying out the Project shall include the following as discussed below:

(a) Reservoir Preparation

Flooding shall remove access to the forest resources and other terrestrial vegetation within the newly formed reservoirs. Inundation of vegetation is of concern with respect to aesthetics, resource and recreational use of the waterway and valley, recovery of wood fibre, the sequestration and release of carbon dioxide, mercury uptake, and habitat loss. A selection of reservoir preparation strategies is necessary to address these concerns, including economic, technical and environmental considerations which are to be evaluated in order to select and justify the proposed mitigation measures.

(b) Transmission Line Route Selection

The Proponent is to undertake a Route Selection Study which identifies the alignment for transmission lines proposed between Gull Island and Muskrat Falls and from Gull Island to Churchill Falls. The study shall involve the selection of a study corridor, approximately 1.0 km in width, within which various engineering, social and environmental constraints are identified. A preferred alignment and one or two alternative alignments shall be selected for evaluation, as appropriate.

(c) Facility Layout and Siting

The Proponent shall evaluate facility layout and locations, including access roads, quarries, borrow pits and camps, based on a variety of engineering and environmental considerations. For access roads, the EIS shall consider alternative locations of stream crossings and types of crossing structures. Where such facilities are yet to be located, a site selection process and evaluation process shall be described to demonstrate how potential environmental effects will be avoided or mitigated.

(d) Generation Stations Optimization

The Proponent shall outline generation station optimization alternatives (e.g., number of turbines, type of turbines, head, capacity, intakes, spillway design and associated operating regimes). These optimization studies are to consider technical and economic feasibility, and environmental considerations.

(e) Construction Sequence

The EIS shall consider alternative construction sequence for all described facilities (e.g., Gull Island or Muskrat Falls first).

(f) Construction Labour Force Accommodation

The EIS shall describe alternative labour force accommodation strategies (e.g., number and location of camps, in-community housing). These evaluations are to consider economic, social and worker conditions (including health and hygiene) as well as any other relevant community, including Aboriginal community, considerations and environmental factors.

(g) Reservoir Management

The EIS shall consider a selection of reservoir management strategies, including consideration of scheduling/timing of filling, rate of flow release and proposed mitigative measures (e.g., identification of suitable fish refugia areas, provision of minimum flows).

4.3.3 Project Description

The Proponent shall describe the scope of the Project for which the EIS is being conducted.

To facilitate the understanding of the Project by the public, the Proponent shall produce a scale model and/or appropriate audiovisual materials describing the Project.

4.3.3.1 Spatial and Temporal Boundaries

A precise description of the spatial boundaries of the Project shall be presented accompanied by map(s) of appropriate scale showing the entire Project area with the proposed principal structures and related works. The Proponent shall provide aerial images that illustrate representative habitats within each study area (see Section 4.4.2 – Study Areas).

The proposed principal structures and related works to be described include but are not limited to the following:

- (a) The Gull Island and Muskrat Falls generating stations, including intakes, intake canals, dams, dykes, tailrace channels and spillways associated with each of these sites;
- (b) The transmission terminal facilities and transmission lines linking the two stations and interconnecting with Churchill Falls Station;
- (c) The reservoirs and their management; and
- (d) Related works and activities including all temporary facilities required for the construction and operation of the previously mentioned facilities, in particular:
 - (i) Temporary control structures and diversion works;

- (ii) Work camps;
- (iii) Permanent and temporary access roads;
- (iv) Bridges and watercourse crossings;
- (v) Infrastructure for wastewater treatment & waste management;
- (vi) Energy supply for camps and worksites;
- (vii) Drinking water supply;
- (viii) Borrow pits and quarries;
- (ix) Management and disposal of excavated material; and
- (x) Construction worksites and storage areas.

The temporal boundaries of the Project shall cover all phases of the project: construction, operation, maintenance, foreseeable modifications and abandonment and decommissioning of works and the rehabilitation of the sites affected by the Project. If the Proponent does not believe the full temporal boundaries should be used for a phase of the Project, the report shall identify the boundaries used and provide a rationale for the boundaries selected.

4.3.4 Construction

The EIS shall show the construction and commissioning schedules for Project elements, based on the most current information available. In addition, the approach, details, materials, methods, locations and security measures of all planned construction activities related to the physical features, including site preparation, permanent and temporary infrastructure and site rehabilitation shall be presented, including estimates of magnitude or scale where applicable. This shall include the following:

(a) Reservoir Preparation

Describe the work required and schedule for reservoir preparation, including volume of merchantable and non-merchantable wood within the flood zone, location of cleared areas, clearing/harvesting strategy and methods (e.g., labour requirements, transportation to processing facilities) and methods for eliminating wood debris.

(b) Dams, Reservoirs and Generating Stations

- (i) Describe the methods for construction and creation of all permanent facilities, including the main dams, reservoirs and generating stations.
- (ii) Provide the main specifications for all permanent facilities, including volume of the dams, water intake, spillways, diversion facilities and tailraces.
- (iii) Provide the main parameters for the reservoirs, including total area, land area flooded, total volume, live storage, bathymetry, scheduling of initial flooding and duration of filling period.
- (iv) Provide the main specifications of the generating stations.

(c) Access Infrastructures

- (i) Describe the permanent and temporary access infrastructures (including road, air and water) to be constructed, as well as existing infrastructures to be utilized.
- (ii) Describe new access roads and corridors (including locations, anticipated traffic, technical characteristics and general road construction standards such as maintenance, useful life, ditches, bridges and culverts and use of dust-control and de-icers) and any modifications and/or upgrades required to existing access infrastructures.
- (iii) For the Goose Bay airport, specify the current traffic and the expected changes during construction and operation of the Project.
- (iv) For the Goose Bay port, specify the current traffic and the expected changes during construction and operation of the Project.

(d) Borrow Pits, Quarries and Spoil Areas

- (i) Identify the source, quantity and end use of all rock and aggregate materials to be used.
- (ii) Identify the source, quantity and proposed disposal location of all excavated materials.
- (iii) If quarrying/excavating/using rock with the potential for acid generation, provide an assessment of the potential for and the impacts of metal leaching and acid rock drainage (ML/ARD).

(e) Transmission Facilities

- (i) Describe the construction methods for transmission facilities, including crossings of water bodies, access roads and modifications to existing facilities.
- (ii) Describe the routing, type of line and interconnection points of the transmission lines.
- (iii) Describe the volume of wood (e.g., merchantable and non-merchantable) within right-of-way and clearing/removal methods.

(f) Personnel Requirements

- (i) Present the estimated size of projected workforce by month over the construction phase, indicating occupations by National Occupation Classification (NOC) Codes, skills, entry requirements and duration of work.
- (ii) Describe the anticipated working schedule for Project construction activities.

(g) Temporary Structures and Infrastructure

- (i) Describe camp locations; drinking water supply sources; methods of managing wastewater and discharge areas; location, capacity and operating conditions of solid waste disposal sites; power

supply; and management of any other installations (including fuel storage depots) required for the camps to function properly and safely.

- (ii) Provide the scope and location of any communication and telecommunications systems required by the Project (e.g., transmission towers, access roads, energy sources).
- (iii) Identify and quantify the use, management and production of dangerous products and hazardous waste generated by the Project during the construction phase.
- (iv) Describe the type, location and management of river diversion and control structures (e.g., cofferdams, diversion tunnels), including those intended for the management of minimum flows and frazil ice.
- (v) Identify the location, capacity and access to material and fuel receiving, handling and storage areas.
- (vi) Describe the location, capacity and access to disposal and recycling sites for domestic and construction waste, including those developed during construction and existing sites to be used for the Project.
- (vii) Identify and describe potential landing areas for wood piles or wood storage sites.
- (viii) Provide an inventory of equipment and materials required for the Project, including hazardous materials.
- (ix) Describe any storage or use of explosives.

(h) Mitigation and Compensation Works

Describe any physical works proposed as mitigation or compensation measures (e.g., reservoir access, sedimentation control).

(i) Demobilization

- (i) Describe the approach and conceptual plans for demobilizing all structures used or created during construction that are of a temporary nature.
- (ii) Identify, within the limits of the Proponent's knowledge and control, how the operation, use, development, possible rebuilding and eventual dismantling and demobilization of certain installations shall be handled in consideration of other uses.
- (iii) Specifically note, to the extent possible, whether some installations, including all of the access infrastructures, may be used as they are, or may be converted or salvaged for other purposes by other proponents or communities, or if they must be dismantled and demobilized at the end of their useful life. The proposed means of rehabilitation of any areas to be abandoned shall be described.

4.3.5 Operation and Maintenance

All aspects of the operation and maintenance of the undertaking shall be detailed in this section of the EIS. This shall include the following:

(a) Operating Regime

Describe the following elements of the Project operating regime:

- (i) Water management (turbine flows, ecological flows², reservoir head, maximum and minimum operating levels, operation of structures) for different hydrological conditions (low and high flows including flows lower than the ecological flows);
- (ii) The time of year, frequency and amplitude (maximum and minimum levels) of water level fluctuation ranges for all water bodies;
- (iii) Flow rates (maximum, minimum and average) and velocities in the sections of the river affected with detailed maps showing the areas affected, and seasonal and daily variations in water levels;
- (iv) The maximum and minimum surface areas, total volume, live storage, and bathymetry of reservoirs, with detailed maps and residence time of water masses;
- (v) Changes in water temperature and oxygen regimes upstream and downstream of dams;
- (vi) Velocity of water at intake structures and outlets of spillways and tailrace canals;
- (vii) Changes in management of lakes or reservoirs upstream and downstream of the Project area;
- (viii) Changes in flow rates, velocities, temperature and oxygen regimes at the mouths of major tributaries to the Lower Churchill River;
- (ix) The control and management of sedimentation and erosion;
- (x) Maintenance plan for structures (dams) and facilities; and
- (xi) Management of ice, including frazil ice.

(b) Access Roads and Transmission Facilities

- (i) Describe roads and transmission facilities maintenance (e.g., vegetation management, dust control, de-icing).
- (ii) Indicate electromagnetic fields.

(c) Personnel Requirements

- (i) Present the estimated size of projected workforce by month over the operation and maintenance phase, indicating occupations by National Occupation Classification (NOC) Codes, skills, entry requirements and duration of work.
- (ii) Describe the anticipated working schedule for Project operation and maintenance activities.

² Ecological flow is defined as the minimum flow required to protect fish and fish habitat

(d) Fuel and Dangerous and Hazardous Products and Waste

- (i) Identify and quantify the use, management and production of dangerous and hazardous products and waste generated by the Project during the operation and maintenance phase.
- (ii) Describe material and fuel receiving, handling and storage areas and provision for management and disposal of waste and discarded equipment.

(e) Operating Requirements

Describe, in addition to permits and authorizations, all other requirements to operate the Project, including leases, water rentals and insurance.

4.3.6 Decommissioning

The EIS will present an approach for the decommissioning phase of the Project, which sets out a commitment to address:

- Environmental planning and mitigation measures;
- Socio-economic mitigation measures; and
- Public health and safety procedures.

4.4 ENVIRONMENT**4.4.1 Identification of Issues and Selection of Valued Environmental Components (VECs)**

To help focus the environmental assessment, the Proponent shall identify and justify, based on a clearly defined set of criteria, those components of the biophysical and socioeconomic environment that are most valued and/or sensitive, and which have a meaningful potential to be affected by the Project (the “Valued Environmental Components” or VECs).

It is understood that the process for defining VECs is iterative and that the list of VECs can be modified during the environmental effects analysis phase. The VECs can be revised and adjusted in relation to the information acquired during the environmental assessment process.

For information purposes, the following are factors that could prove relevant in the choice of VECs:

- Aboriginal and public concerns related to the component;
- Economic significance;
- Protected status of the component;
- Regulatory requirements;
- Rarity or special status of the component;
- Preservation of biodiversity;
- Sensitivity of the component to disturbances or pollution;
- Human health;

- Importance of the component ecological role; and
- Cultural heritage³ or social significance of the component.

In considering VECs, the Proponent shall recognize that:

- The value of a component not only relates to its role in the ecosystem, but also to the value placed on it by humans;
- Culture and way of life of those using the area affected by the Project may also be considered as VECs; and
- Functional relationships within the environment may also be considered as VECs.

4.4.2 Study Areas

For the purpose of describing the existing environment and assessing the Project's anticipated effects on the biophysical and socio-economic environments, the Proponent shall determine study areas specific to each VEC. Each study area should be inclusive of the landscape necessary to predict the environmental effects of the Project on each VEC. For the purposes of assessing the Project's effects on the socio-economic environment, the study areas shall take into consideration the landscape used to support contemporary and historic Aboriginal and non-Aboriginal land use.

The delineation of the study areas is crucial to scope the extent of the environmental assessment. The rationale used to delineate the boundaries of the study areas shall be provided.

The mapping and description of the study areas for each VEC may include the following information:

- The main ecological constraints of the environment;
- Land use;
- Local communities; and
- The environmental significance and value of the Lower Churchill River Area.

4.4.3 Previous Development

Hydroelectric generation projects have been occurring on the Churchill River, since the 1960's. As such, understanding how the effects of past hydroelectric generation projects have been mitigated and/or managed is of interest where those environmental effects have the potential to overlap with those of the Project or

³ For the purpose of this environmental assessment, "cultural heritage" includes but is not limited to a human work or a place that

(a) either

- (i) gives evidence of human activity;
- (ii) has spiritual and/or cultural meaning; or
- (iii) gives evidence of human activity and has spiritual and/or cultural meaning;

and

(b) that has heritage value.

would provide lessons that could be applied to the environmental assessment of the Project. The EIS should include a concise discussion of past hydroelectric generation projects on the Churchill River, the environmental effects that have occurred as a result, where overlapping environmental effects are anticipated, and the measures that have been taken to mitigate or manage these overlapping environmental effects. Discussion of overlapping environmental effects should include consideration of the degree to which those mitigation measures have been successful. Any long-term monitoring or follow-up programs of relevance to these overlapping environmental effects and the key results should also be described. This information will help interested parties to understand the potential environmental effects of the Project and how they may be addressed.

4.4.4 Description of the Existing Environment

The EIS shall identify the study area for each VEC and include a description of the existing biophysical and socio-economic environment and the resources within it that will be affected or that might reasonably be expected to be affected, directly or indirectly, by the Project.

The EIS shall describe relevant aspects of the existing environment in the study area for each VEC prior to development of the Project, which constitutes the reference state of the environment. This description of the environment must reflect Aboriginal traditional and community knowledge, as well as social, cultural and economic activities and values related to the described components.

Where appropriate and possible to do so, the Proponent shall present a time series of data and sufficient information to establish the averages, trends and extremes of the data that are necessary for the evaluation of potential environmental and cumulative effects of the Project. For each VEC, the Proponent should consider and justify how far back in time and how far into the future the environmental assessment should be conducted. The Proponent will identify any deficiencies in information, and how these deficiencies will be addressed.

Using qualitative and quantitative surveys, the EIS shall describe the components of the biophysical and human environments likely to be affected by the Project. If the information available from government or other agencies is insufficient or no longer representative, the Proponent shall complete the description of the environment with current surveys.

Components of the environment must be described and shall include the necessary data and the required information to understand, interpret and address the confidence levels of these data (e.g., methods; survey dates and times; weather conditions; location of sampling stations) and shall employ appropriate methods to identify, understand, analyze and assess the environmental effects of the Project.

In addition, the EIS shall describe environmental interrelationships and sensitivity to disturbance. If the study results or data have been extrapolated or otherwise manipulated to depict environmental conditions in the study area modeling methods and equations shall be described with calculations of margins of error and/or confidence limits.

A description of the existing environment shall be developed for each alternative drawing specific reference to the VECs. References are attached at the end of these Guidelines to provide direction to the Proponent. Detailed discussions shall be developed and VECs described for the following environmental components.

4.4.4.1 Atmospheric Environment

The Proponent shall describe the relevant components of the atmospheric environment within the study area of the VECs, including the following:

- (a) Climate and meteorology;
- (b) Indication of recent climate change observations;
- (c) Emissions of greenhouse gases (e.g., CO₂, CH₄) in the context of provincial and regional emissions and targets and federal objectives;
- (d) Existing ambient air quality, including current substantive sources of emissions of conventional air contaminants (PM, SO₂, NO_x, VOCs); and
- (e) Existing ambient noise level.

4.4.4.2 Aquatic Environment

The Proponent shall describe the relevant components of the aquatic environment within the study area of the VECs, including the following:

- (a) Hydrological features such as lakes and streams/ivers, watershed boundaries, river hydrology and hydraulics, bathymetry, surface water flow, flood zones, lake and river ice formation, dynamics and melt patterns, salinity, tides, freshwater mixing zones and delta formation;
- (b) Geomorphology, including erosion, sedimentation, channel dynamics and sediment supply;
- (c) Water quality and quantity from both surface and groundwater sources, including any saltwater intrusion up the Churchill River or into aquifers;
- (d) Sediment quality of watercourse;
- (e) Important habitats found along the shoreline, banks, wetlands and floodplain;
- (f) Aquatic and riparian vegetation;
- (g) Biological diversity, composition, abundance, distribution, population dynamics and habitat utilization of aquatic species, including fish, semi-aquatic species and marine mammals such as ringed seals;
- (h) Mercury concentrations, mobility and fate within the ecosystem to be affected by the Project, including in water, fish and fish-eating wildlife at representative levels of the food chain as determined in an ecological risk assessment that includes freshwater and marine fish and fish-eating wildlife;
- (i) Species of special interest or conservation concern (including their habitat), with an emphasis on rare, vulnerable or threatened

species (e.g., species listed in the *Endangered Species Act* or the *Species at Risk Act*); and

- (j) Human-environment interactions.

4.4.4.3 Terrestrial Environment

The Proponent shall describe the relevant components of the terrestrial environment within the study area of the VECs, including the following:

- (a) Bedrock and surficial geology, terrain and soil conditions;
- (b) Regional seismicity (natural and reservoir-induced) and relevant geological structures (lineaments, faults, joints);
- (c) Reservoir-induced seismic activity of the neighbouring regions;
- (d) Pertinent physical and chemical properties of sediment and rock, that might be affected by or have an effect on the Project;
- (e) For areas that will be flooded, the levels of mercury and other potentially toxic metals in the soils, in particular for soils with high organic content and indurated soils (ortstein);
- (f) Areas of potential reservoir shoreline erosion and potential ground instability such as slumping or landslides;
- (g) Groundwater movement and aquifer recharge zones;
- (h) Permafrost conditions including areas of discontinuous permafrost, high ice content soils, thaw sensitive slopes and stream banks;
- (i) Composition, abundance, distribution, population dynamics and habitat utilization of terrestrial fauna, including mammals, avifauna (e.g., migratory birds, raptor, waterfowl and passerine/songbird surveys) and herpetiles;
- (j) Composition, distribution and abundance of terrestrial flora, including forest inventories and ecological land classifications;
- (k) Existing patterns of habitat and ecotype alteration, disruption and destruction;
- (l) Composition, distribution and abundance of medicinal herbs and plants harvested by affected Aboriginal communities;
- (m) Composition, distribution and abundance of wetlands as classified using the Canada Wetland Classification System, and further characterized in terms of a functional analysis (e.g., habitat, water flow regulation, groundwater recharge);
- (n) Migratory patterns/river crossings;
- (o) Mercury concentrations, mobility and fate within the riparian ecosystem, with an emphasis on representative species at various levels of the food chain as determined in an ecological risk assessment;
- (p) Species of special interest or conservation concern (including their habitat), with an emphasis on rare, vulnerable or threatened species (e.g., species listed in the *Endangered Species Act* or the *Species at Risk Act*); and
- (q) Human-wildlife interaction (e.g., bear management plans).

For the terrestrial environment, some key indicator species/species assemblages were selected to focus the environmental assessment. The

species selected are reflective of different phyla, orders, families or guilds of species that represent key components of the terrestrial environment. These species were selected as being representative of species groups, importance in the food web (e.g., top predator), and their importance from socio-cultural and economic perspectives. The following is the list of these key indicators:

- (a) Beaver;
- (b) Marten;
- (c) Porcupine;
- (d) Caribou;
- (e) Moose;
- (f) Black bear;
- (g) Harlequin duck;
- (h) Early breeding waterfowl (including Canada goose);
- (i) Late breeding waterfowl (including Scoters);
- (j) Upland game birds;
- (k) Osprey; and
- (l) Passerine/song birds (including Water thrush).

4.4.4.4 Land and Resource Use

The Proponent shall describe relevant land and resource use within the study area of the VECs, including the following:

- (a) Present and potential timber resource logging and utilization (commercial and domestic);
- (b) Current use of land and resources (including aquatic resources) by Aboriginal persons for traditional purposes, including location of camps, harvested species and transportation routes;
- (c) Current use of land and resources (including aquatic resources) by other land users;
- (d) Other rural land and resource use including existing and potential recreational and commercial fishing and hunting, gathering of country food and collection of plant propagules;
- (e) Current navigation (e.g., vessel/boat traffic) and winter travel on the river;
- (f) Location and description of unique sites or special features, including any candidate sites for ecological or cultural heritage preservation and conservation, Environmentally Sensitive Areas, reserves or protected areas, conservation agreement lands and habitat enhancement projects; and
- (g) Landscapes, including aesthetic quality and effects on river aesthetics.

4.4.4.5 Cultural Heritage Resources

The Proponent shall describe relevant cultural heritage resources in the study areas of the VECs, including the following:

- (a) Cultural heritage sites;
- (b) Historic and archaeological resources;
- (c) Paleontological resources; and

- (d) Architectural resources.

4.4.4.6 Communities

The Proponent shall describe relevant community elements in the study areas of the VECs, including the following:

- (a) Demographics;
- (b) Community services and infrastructure
 - Health services and social programs (e.g., drug addiction, delinquency);
- (c) Human health
 - Occurrence and trends in chronic diseases (e.g., diabetes, cardiovascular disease, chronic pulmonary disease and cancer), infectious disease, mental illness, addictions and quality of life
 - Dietary changes that could lead to health risks from methylmercury (MeHg)
 - Drinking water sources and quality;
- (d) Community health;
- (e) Family life;
- (f) Safety;
- (g) Culture;
- (h) Education and Training;
- (i) Housing and accommodation; and
- (j) Property value and land use, including within and adjacent to planned future reservoirs.

As the Project is likely to result in an increase in mercury (Hg) concentrations in fish, the Proponent shall assess the human health risk associated with mercury exposure.

This assessment should consider the presence of contaminants in fish (for each species of interest for human consumption) in the study area, including the variations based on fish size and weight, as well as representative fish consumption data for the consumers affected by the Project. The Proponent shall identify the species of fish and specific portions of the fish that are consumed by humans and determine baseline mercury concentrations in the species and tissues expected to be consumed by humans. The Proponent shall also take into account the recommended consumption standards. It is recommended that the Proponent use recognized toxicological reference values. The calculation of mercury exposure should take into account the possible contribution of other local sources, in particular traditional food (e.g., predators of contaminated fish or waterfowl) and discuss the cumulative effect of the contribution of these other sources.

In addition, the Proponent shall:

- (a) Characterize the current fishing patterns, including fishing location, frequency, and variability in consumption between communities and within a single community and determine

whether this pattern may change following the construction of the dams;

- (b) Develop a baseline of MeHg exposure of the local human population in general and of groups at risk, in particular children and toddlers, and women of childbearing age, which can be accomplished through dietary surveys and human hair sampling;
- (c) Present and justify the period deemed adequate to reduce the quantity of mercury ingested and consider the toxicological risk, on sensitive human populations, associated with the consumption of large quantities of fish (e.g., during a weekend of fishing);
- (d) Discuss the views of local human populations regarding mercury and its influence on the changes observed in their diet and consequently on their health in general;
- (e) Review the results of the research undertaken in the region as relevant. This review shall outline current knowledge and contribute to a better understanding of the evolution of mercury exposure among local human populations; and
- (f) Present the health effects of very long-term exposure to mercury at concentrations that are generally below those producing noticeable effects and discuss existing consumption standards.

The collection of baseline data of MeHg exposure of the local human population should be completed, including a review by Aboriginal groups and appropriate government agencies, before the Proponent changes the conditions of the Churchill River in any way that could affect mercury concentrations.

4.4.4.7 Economy, Employment and Business

The Proponent shall describe relevant economy, employment and business elements in the study areas of the VECs, including the following:

- (a) Economy of Upper Lake Melville, Labrador and the Province
 - Taxes and royalties;
 - Effects on gross domestic product;
- (b) Employment in Upper Lake Melville, Labrador and the Province;
- (c) Skilled and unskilled labour supply in Upper Lake Melville, Labrador and the Province;
- (d) Expenditures in Upper Lake Melville, Labrador and the Province;
- (e) Availability of skilled and unskilled labour;
- (f) Employment equity and diversity including under-represented groups (e.g., women, persons with disabilities, Aboriginal groups);
- (g) Business capacity;
 - Goods and services;
- (h) Agriculture;
- (i) Outfitting;

- (j) Eco-tourism;
- (k) Trapping;
- (l) Forest Resources Harvesting; and
- (m) Mining and Mineral Exploration.

4.4.5 Component Studies

Component studies shall be prepared for at least the following VECs:

- (a) Large mammals;
- (b) Furbearers;
- (c) Avifauna;
- (d) Species at risk;
- (e) Fish and fish habitat (plankton, benthos, marine mammals);
- (f) Water (quality and quantity);
- (g) Hydrology (including ice dynamics, sedimentation, salinity and salt water intrusion);
- (h) Mercury (both in terms of increased concentrations in ecosystems and in humans);
- (i) Cultural heritage resources;
- (j) Timber resources;
- (k) Socio-economics; and
- (l) Air quality.

Where new information becomes available as a result of baseline studies, additional component studies may be required.

Component studies generally have the following format:

- (a) Rationale/Objectives

In general terms, the rationale for a component study is based on the need to obtain additional data to determine the potential for significant effects on a VEC due to the proposed undertaking, and to provide the necessary baseline information for monitoring programs.

- (b) Study Area

The boundaries of the study area shall be defined depending on the characteristics of the VEC being investigated.

- (c) Methodology

Methodology shall be proposed by the Proponent, in consultation with resource agencies, as appropriate. The methodologies for each component study shall be summarized in the EIS.

(d) Study Outputs

Study outputs shall be proposed by the Proponent. Information and data generated shall be sufficient to adequately predict the effects on the VEC and determine monitoring and follow-up requirements.

4.4.6 Data Gaps

Information gaps from a lack of previous research or practice shall be described indicating baseline/information which is not available or existing data which cannot accurately represent environmental conditions in the study area(s) over four seasons. If background data has been extrapolated or otherwise manipulated to depict environmental conditions in the study area(s), modeling methods and equations shall be described and shall include calculations of margins of error and/or confidence limits.

4.4.7 Future Environment without the Project

The EIS shall describe the predicted future condition of the environment within the expected life span of the Project, if the Project were not to proceed. The predicted future condition of the environment shall help to distinguish project related effects from environmental change due to natural processes and shall include a discussion of climate change.

The socio-economic environment to be described is undergoing substantial change regardless of the Project. The analysis shall consider the likely trends in the area in the absence of the Project given available information about other planned major projects or social, economic, or institutional changes in the zone of influence within the time frame of the Project.

4.5 ENVIRONMENTAL EFFECTS**4.5.1 General**

The EIS shall contain a comprehensive analysis of the predicted environmental effects on the VECs of each project alternative. If the effects are attributable to a particular phase of the Project (construction, operation and/or maintenance) then they should be designated as such.

Predicted environmental effects (positive and negative, direct and indirect, short and long-term) shall be defined quantitatively and qualitatively for each project alternative and for each VEC. Environmental effects predictions shall be explicitly stated and the theory or rationale upon which they are based shall be presented in terms of the following parameters, as appropriate:

- Nature;
- Magnitude (qualitative and quantitative);
- Geographic (spatial) extent;
- Timing, duration and frequency;
- Degree to which effects are reversible or mitigable;

- Ecological context;
- Cultural heritage and social context;
- Level and degree of uncertainty of knowledge;
- The capacity of renewable resources that are likely to be significantly affected by the Project, to meet the needs of present and future generations;
- The extent to which biological diversity is affected by the Project; and
- Environmental protection goals and objectives as set out in applicable legislation, regulations, policies, plans and programs.

The Proponent shall prepare a table of the proposed Project's anticipated effects, which shall enable the reader to review and consider those effects.

Among the effects of the Project to be assessed on the biophysical environment, effects on fish and fish habitat (e.g., fish mortality from construction and operation through gas bubble disease or entrainment), greenhouse gases emissions and navigation and navigability should be considered. Effects from mercury and climate change implications should also be considered.

With respect to greenhouse gases, the Proponent shall describe and analyze greenhouse gas emissions from the Project (including methane). This shall include provision of a greenhouse gas budget for emissions from all phases of the Project, including reservoir impoundment and operation, a description of specific greenhouse gas emissions that the Project will or could offset, the necessary conditions for that offset occurring, and a quantitative net estimate of potential greenhouse gas reductions or increases.

With respect to effects of the Project on navigation and navigable waters, the Proponent shall describe effects on the navigability and the navigation patterns of all waters existing, altered or created by the Project. Impacts on traditional (e.g., hunting, fishing) and current recreational and commercial waterway use should be identified and assessed. Particular attention should be paid to traditionally-used patterns to and from Mud Lake and throughout the watercourse. Surface hydrological modelling (i.e. flow dynamics) of impacts resulting from the Project, including for the upstream footprint limit of the reservoir and downstream of Muskrat Falls to Goose Narrows, should also be included.

The assessment of the beneficial and adverse effects of the Project on the socio-economic environment shall consider how the Project may affect various segments of the local populations (e.g., youth, elders, men, women, Aboriginal groups, harvesters, existing workforce including professionals). The following should be taken into account when assessing effects of the Project on the socio-economic environment:

- (a) Demographics;
- (b) Human health;
- (c) Social and cultural patterns (particular attention shall be given to the comparative adverse and beneficial effects of a major base of employment away from the communities, rotational work schedules,

- and the presence of large, temporary work forces and contractors in the region);
- (d) Services and infrastructure (including road transportation of workers and materials);
 - (e) Cultural heritage sites;
 - (f) Land and resource use;
 - (g) Local, regional and provincial economy;
 - (h) Employment, education and training;
 - (i) Governments;
 - (j) Aboriginal issues; and
 - (k) Experience gained from previous large developments in Labrador.

In considering the local social and economic effects of the Project, the Proponent shall have due regard for the attitudes, beliefs and perceptions of local residents, and how these are grounded in their culture, social organizations and historical experience.

4.5.2 Accidents and Malfunctions

The Proponent will identify and describe the potential accidents and malfunctions related to the Project, including an explanation of how those events were identified, potential consequences (including the potential environmental effects), the worst case scenarios and the effects of these scenarios. The Proponent will explain the potential quantity, mechanism, rate, form and characteristics of the contaminants and other materials likely to be released into the environment during the malfunction and accident events.

Potential accidents and malfunctions may include those associated with the following occurrences:

- Dam failure;
- Fires;
- Waste management and disposal;
- Use, handling or spills of chemicals and hazardous materials on-site; and
- Any other project components or systems that have the potential, through accident or malfunction, to adversely affect the natural environment.

The Proponents shall pay special attention to the sensitive elements of the environment (e.g., communities, homes, natural sites of interest, areas of major use) that may be affected in the event of an accident or a major malfunction.

The Proponent shall assess the likelihood of occurrence of the accidents and malfunctions.

Detailed plans, measures and systems to reduce the potential occurrence of an accident or malfunction shall be provided by the Proponent. They shall indicate how they will reduce the effects or consequences of an accident or malfunction, should it occur.

4.5.3 Cumulative Effects

The Proponent shall identify and assess the Project's cumulative environmental effects. Cumulative effects are defined as changes to the environment due to the Project where those overlap, combine or interact with the environmental effects of other existing, past or reasonably foreseeable projects or activities.

In the cumulative effects assessment, the Proponent shall consider guidance provided by the Canadian Environmental Assessment Agency in its Cumulative Effects Assessment Practitioners Guide (1999) and other literature and experience with environmental assessment in Canada or elsewhere that it finds helpful in framing the cumulative environmental effects analysis.

The Proponent shall:

- (a) Identify and justify the VECs that will constitute the focus of the cumulative effects assessment. The Proponent's assessment should examine the likelihood, nature and extent of the predicted cumulative effects of each Project alternative for each VEC. It may be appropriate, during the course of the environmental assessment, to refine the definition of the VECs selected for cumulative effects assessment;
- (b) Present a justification of the spatial and temporal boundaries of the cumulative effects assessment. The boundaries for the cumulative effects assessment will again depend on the effects being considered (e.g., will generally be different for different effects). These cumulative effects boundaries will also generally be different from (larger than) the boundaries for the corresponding Project effects;
- (c) Describe and justify the choice of projects and selected activities for the cumulative effects assessment. These shall include past activities and projects, those being carried out and future projects or activities likely to be carried out;
- (d) Describe the mitigation measures that are technically and economically feasible and determine the significance of the residual cumulative effects; and
- (e) Assess the effectiveness of the measures applied to mitigate the cumulative effects. In cases where measures exist that are beyond the scope of the Proponent's responsibility that could be effectively applied to mitigate these effects, the Proponent shall identify these effects and the parties that have the authority to act. In such cases, the Proponent shall summarize the discussions that took place with the other parties in order to implement the necessary measures over the long term.

4.5.4 Renewable Resources

The Proponent shall determine, based on the results of their assessment, whether the Project is likely to cause significant environmental effects on renewable resources and therefore compromise their capacity to meet present and future needs.

Renewable resources are defined as resources that can be renewed on a regular basis, either naturally or by human action. While the emphasis is placed on living

renewable resources such as fish, wildlife and forest, the analysis of the effects on renewable resources should also consider non-living renewable resources such as water.

The Proponent shall briefly describe the renewable resources that may be affected by the Project. The Proponent shall clearly establish, taking into account the result of their impact assessment, whether these renewable resources are likely to be significantly affected following the implementation of proposed mitigation measures (residual significant environmental effects). Should this be the case, the following points shall be addressed:

- (a) A brief description of the Project's environmental effects on the renewable resource;
- (b) An indication as to the way in which the capacity of this resource was measured or evaluated;
- (c) An indication of the temporal and geographic boundaries used to assess the capacity of the affected resource;
- (d) A determination of the capacity of the resource to meet current needs;
- (e) A determination of the capacity of the resource to meet future needs;
- (f) A description of any other appropriate mitigation measures;
- (g) A determination of the significance of the residual effects on the renewable resource and its capacity to meet the needs of current and future generations; and
- (h) An identification of the risks and uncertainties that remain and the description of the next steps, if any, that will be required to address this effect.

4.5.5 Effects of the Environment on the Project

The environmental effects that may occur as a result of the environment acting on the Project shall be assessed.

Environmental changes and hazards that may occur and may affect the Project shall be described (e.g., wind, currents, waves, storm surges, severe precipitation events, flooding, extended dry periods, ice, earthquakes). The EIS shall take into account the potential influence of climate change scenarios (e.g., sea level rise, increased severity and frequency of storms and flooding). The influence that these environmental changes and hazards may have on the Project shall be predicted and described.

4.6 ENVIRONMENTAL PROTECTION

4.6.1 Mitigation

The EIS shall identify and discuss the proposed mitigation measures that are technically and economically feasible and that would mitigate the significant adverse effects of the Project and enhance beneficial effects, including the interaction of these measures with existing environmental management plans. Under the CEAA, mitigation is defined as the elimination, reduction or control of the adverse environmental effects of the Project, and includes restitution for any damage to the environment caused by such effects through replacement,

restoration, compensation or any other means. The rationale for and effectiveness of the proposed mitigation and enhancement measures should be discussed and evaluated. The Proponent, where possible, should refer to similar situations where the proposed mitigation has proven to be successful. Mitigation failure should be discussed with respect to risk and severity of consequence. The discussion should include failure of dam/control structures.

The Proponent shall identify who is responsible for the implementation of these measures and the system of accountability, including the obligations of all its contractors and subcontractors.

Mitigation measures shall be described for the construction, operation and maintenance phases and shall include:

- (a) Procedures that would be used to avoid environmentally sensitive areas or periods of the year;
- (b) Contingency plans and procedures to respond to accidents, malfunctions and emergencies;
- (c) Fish habitat compensation strategies;
- (d) A description of the approach to determine, develop and maintain minimum flow requirements when describing mitigation measures for the construction, reservoir filling and operation phases of the Project, including fish habitat maintenance and fish passage such as the fish passage facility in the causeway across the Churchill River associated with the Trans Labrador Highway Phase III;
- (e) Methods to control and manage sediment action and shoreline stability;
- (f) Measures to ensure continued unrestricted and safe access and passage on land and sea for harvesting and travel by Aboriginal and non-Aboriginal local residents, and the alternatives to be provided in the event of disruption;
- (g) Methods of soil and vegetation preparation employed to mitigate the release of mercury and MeHg from flooded soils and vegetation;
- (h) Measures which would be taken to reduce or offset adverse effects of increased mercury and MeHg concentrations in fish, fish-eating wildlife, and human consumers of fish and fish-eating wildlife;
- (i) Mitigation measures which would be taken to reduce or offset adverse effects on communities affected by the Project;
- (j) Mitigation measures which would be taken to reduce or offset adverse effects on local businesses most directly affected by the Project;
- (k) Measures to enhance any beneficial environmental effects, such as economic benefits to businesses affected by the Project; and
- (l) Measures to maximize labour market opportunities, including Aboriginal labour, and address labour challenges with an emphasis on strategies to enhance recruitment and retention and increase employment and participation. To this end, the Proponent must minimally describe a human resources plan that includes a description of objectives and strategies to address labour force availability, skilled trades recruitment, diversity in recruitment, training and employment equity. This plan should also minimally identify employment objectives and targets for women and other labour force groups if applicable.

Other mitigation measures, if any, which were considered shall be identified, and the rationale for rejecting these measures shall be explained. Trade-offs between costs and predicted effectiveness of the mitigation measures shall be justified.

The Proponent shall discuss the application of the Precautionary Principle in the identification of mitigation measures. The Precautionary Principle is defined in Section 2.5. The best available technology and best management practices shall be considered. Avoidance of environmental effects through implementation of scheduling and siting constraints and pollution prevention opportunities shall also be taken into account.

4.6.1.1 Compensation

The Proponent shall describe, in general terms, compensation programs and arrangements as follows:

- (a) Any compensation programs for damage caused by the Proponent's activities to the environment, to property, business operations, or to the land and resources of others. The Proponent shall describe any existing or proposed compensation programs for losses relating to property, use, access, harvests, added harvesting effort and costs that may be incurred by users of the land and its resource (e.g., tourism operators, trappers, subsistence hunters). A comparison with compensation programs for other projects and other resource development activities shall be provided.
- (b) Any compensation arrangements for local, public or private providers whose burdens and costs are increased or who incur losses as a result of the Project.

4.6.2 Emergency Response / Contingency Plans

The Proponent shall describe its Environmental Management System (EMS) and Safety, Health and Environmental Emergency Response Plans (SHERP) to provide an overall perspective on how potentially adverse environmental effects shall be managed over time. The EMS shall include various plans (e.g., emergency response plans, contingency plans, environmental protection plans, waste management plans, hazardous spill plans, monitoring plans) and developed in a manner consistent with the International Organization for Standardization (ISO) 14001 program. It shall show how the Project is consistent with sustainable development efforts in the region. Appropriate government agencies, Aboriginal groups and local communities shall be involved in the development of the plans.

4.6.3 Rehabilitation

A plan of proposed rehabilitation measures is required to address areas disturbed by temporary activities (e.g., access roads, off-loading facilities, construction camp(s), land clearing prior to inundation). The plan shall discuss the rationale, objectives and procedures for proposed rehabilitation measures. A schedule for carrying out the work (e.g., seasonal requirements) shall be included in the plan. Appropriate materials (e.g., plant species, soils) shall be indicated.

4.6.4 Monitoring and Follow-up Programs

The EIS shall describe the environmental and socio-economic monitoring and follow-up programs to be incorporated into construction, operation and maintenance activities.

Monitoring programs will ensure that the Project is implemented as proposed, that the mitigation or compensation measures proposed to minimize the Project's environmental effects are effectively implemented, and that the conditions set at the time of the Project's authorization and the requirements pertaining to the relevant laws and regulations are met. The monitoring program will also make it possible to check the proper operation of works, equipment and facilities. If necessary, the program will help reorient the work and possibly make improvements at the time of construction and implementation of the various elements of the Project.

The purpose of the follow-up program is to verify the accuracy of the predictions made in the assessment of the effects as well as the effectiveness of the mitigation measures. The duration of the follow-up program shall be as long as is needed to evaluate the effectiveness of the mitigation measures.

If either of these programs identifies unforeseen adverse environmental effects, the Proponent shall commit to adjust existing mitigation measures, or, if necessary, develop new mitigation or compensation measures. The Proponent shall describe how the results of monitoring and follow-up programs will be used to refine or modify the design and implementation of management plans, mitigation measures and Project operations. This section shall also discuss the ways in which holders of Aboriginal traditional and community knowledge, including elders, women and youth, shall be involved in any monitoring and follow-up programs. The Proponent shall distinguish as appropriate between monitoring (compliance) and effects follow-up programs.

The proposed approach for monitoring shall be described and shall include:

- (a) The objectives of the monitoring program and a schedule for collection of the monitoring data required to meet these objectives;
- (b) The sampling design, methodology, selection of the subjects and indicators to be monitored, and their selection criteria;
- (c) The frequency, duration and geographic extent of monitoring, and justification for the extent;
- (d) The application of the principles of Adaptive Environmental Management;
- (e) Reporting and response mechanisms, including criteria for initiating a response and procedures;
- (f) The approaches and methods for monitoring the cumulative effects of the Project with existing and future developments in the Project area;
- (g) Integration of monitoring results with other aspects of the Project including adjustments to operating procedures and refinement of mitigation measures;
- (h) Experience gained from previous and existing monitoring programs;

- (i) The advisory roles of independent experts, government agencies, communities, holders of Aboriginal traditional and community knowledge and renewable resource users;
- (j) Procedures to assess the effectiveness of monitoring and follow-up programs, mitigation measures and recovery programs for areas disturbed by the Project; and
- (k) A communications plan to describe the results of monitoring to interested parties.

The Proponent shall explain how the public shall continue to be involved, including participation in the design and implementation of environmental management and monitoring and follow-up programs.

The Proponent shall describe plans to maintain communications and working relationships with the affected communities, Aboriginal organizations, municipalities and government agencies throughout the life of the Project. The intent of these plans is to involve those groups in monitoring and follow-up programs, including in the identification and work towards the reduction of adverse physical, biological or socio-economic effects, and the enhancement of beneficial effects.

To design complete and comprehensive program proposals, the Proponent shall prepare and submit these documents subsequent to the completion of the environmental assessment, but before the initiation of the Project itself.

4.7 RESIDUAL EFFECTS AND DETERMINATION OF SIGNIFICANCE

Residual effects are those adverse environmental effects which cannot or will not be avoided or mitigated through the application of environmental control technologies, best management practices or other acceptable means.

The EIS shall list and contain a detailed discussion and evaluation of residual effects, including residual cumulative effects, which shall be defined in terms of the parameters outlined in sections 4.5.1 and 4.5.3.

The EIS shall contain a concise statement and rationale for the overall conclusion relating to the significance of the residual adverse environmental effects. The EIS will, for ease of review, include a summary table of the environmental effects, proposed mitigation and residual adverse effects.

4.8 CONSULTATION WITH ABORIGINAL GROUPS AND COMMUNITIES

The EIS shall demonstrate the Proponent's understanding of the interests, values, concerns, contemporary and historic activities, Aboriginal traditional knowledge and important issues facing Aboriginal groups, and indicate how these will be considered in planning and carrying out the Project. The Aboriginal groups and communities to be considered include, in Newfoundland and Labrador, the Innu Nation, the Labrador Métis Nation and the Nunatsiavut Government and, in Quebec, the Innu communities of Uashat Mak Mani-Utenam, Ekuanitshit, Nutaskuan, Unamen Shipu, Pakua Shipi and Matimekush-Lake John.

To assist in ensuring that the EIS provides the necessary information to address issues of potential concern to these groups, the Proponent shall consult with each group for the purpose of:

- (a) Familiarizing the group with the Project and its potential environmental effects;
- (b) Identifying any issues of concern regarding potential environmental effects of the Project; and
- (c) Identifying what actions the Proponent is proposing to take to address each issue identified, as appropriate.

If the Proponent is not able or should not address any particular issue(s), the EIS should include supporting reasons.

The results of those consultations are to be presented in a separate chapter of the EIS with individual section for each of the affected Aboriginal groups. The Proponent must refer readers to the relevant sections of the EIS, as appropriate.

4.9 PUBLIC PARTICIPATION

Public consultation meetings are required of the Proponent to present the proposal and to record interests and concerns, including those received in response to the Registration. These concerns shall be addressed in a separate chapter of the EIS.

The Proponent shall describe the activities and information sessions that it will hold or that have already been held within the context of the Project at the local, regional and national levels, where applicable. The Proponent shall indicate the methods used and their relevance, the locations where information sessions were held, the persons and organizations attending, the concerns voiced and the extent to which this information was incorporated in the design of the Project as well as in the EIS. Moreover, the Proponent shall describe how issues were recorded and addressed through the use of tables of concordance. Any outstanding issues shall be clearly identified.

Protocol for this meeting shall comply with the legislation and with the Newfoundland and Labrador's Department of Environment and Conservation's Environmental Assessment Division's policy (as amended) on advertisement requirements for public meetings/information sessions included in **Appendix B**.

As a minimum, public meetings must be held in the communities of Happy Valley-Goose Bay, Northwest River, Mud Lake, Rigolet, Churchill Falls, in the region of Labrador West and St-John's.

4.10 ENVIRONMENTAL PROTECTION PLAN

The Proponent shall prepare an Environmental Protection Plan (EPP) for each main construction site and have them approved by the regulatory authorities before starting construction. They shall be stand-alone documents that shall target the site foreperson, the Proponent's occupational health, safety and environmental compliance staff, as well as government environmental surveillance staff. The EPPs shall address construction, operation and modification phases of the Project. A proposed Table of Contents and an annotated outline for the EPPs is to be presented in the EIS which shall address the major

construction and operational activities, permit requirements, mitigation measures and contingency planning as follows:

- (a) Proponent's environmental policies;
- (b) Objectives and voluntary commitments;
- (c) Relevant human resource management plans;
- (d) Environmental compliance monitoring;
- (e) Environmental protection measures;
- (f) Mitigation measures;
- (g) Permit application and approval planning;
- (h) Contingency planning for accidental and unplanned events;
- (i) Statutory requirements; and
- (j) Revision procedures and contact lists.

4.11 REFERENCES CITED

All references used during the preparation of the EIS shall be cited in the text and listed in this section.

4.12 PERSONNEL

The names and qualifications of all key professionals responsible for preparing the EIS and supporting documentation shall be included.

4.13 COPIES OF REPORTS

The Proponent shall prepare a complete and detailed bibliography of all studies used to prepare the EIS. Supporting documentation shall be referenced in the EIS and submitted in separate volumes or attached as an Appendix to the EIS.

BIBLIOGRAPHY

- Beanlands, G.E. and P.N. Duinker, 1983. An Ecological Framework For Environmental Impact Assessment in Canada. Institute for Resource and Environmental Studies, Dalhousie University and Federal Environmental Assessment Review Office. ISBN 0-7703-0460-5.
- Department of Fisheries and Oceans. 2002. Practitioners Guide to Habitat Compensation. Internet: http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/policies-politique/operating-operation/compensation/index_e.asp
- Department of Fisheries and Oceans. 1998a. Habitat Conservation and Protection Guidelines. Internet: <http://www.dfo-mpo.gc.ca/Library/240756.htm>
- Department of Fisheries and Oceans. 1998b. Decision Framework for the Determination and Authorization of Harmful Alteration, Disruption or Destruction of Fish Habitat. 23 pages.
- Department of Fisheries and Oceans. 1986. Policy for the Management of Fish Habitat. Internet: http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/policies-politique/operating-operation/fhm-policy/index_e.asp
- Environment Canada. 2004. Environmental Assessment Best Practice Guide for Wildlife at Risk in Canada. Prepared by Pauline Lynch-Stewart for the Canadian Wildlife Service, Ottawa. 72 pages,
- Environment Canada. 1998. Wetlands Environmental Assessment Guideline. By Robert Milko, Biodiversity Protection Branch, Canadian Wildlife Service. Ottawa. 20 pages. Internet: http://www.cws-scf.ec.gc.ca/publications/eval/wetl/index_e.cfm
- Environment Canada. 1998. Migratory Birds Environmental Assessment Guidelines. By Robert Milko, Biodiversity Protection Branch, Canadian Wildlife Service. Ottawa. Internet: http://www.cws-scf.ec.gc.ca/publications/eval/mig/index_e.cfm
- Environment Canada. 1997. Guide for Impact Assessment on Birds. By Serge Lemieux, editor, Environmental Assessment Branch and Canadian Wildlife Service, Quebec Region. 50 pages and appendices. Internet: <http://www.qc.ec.gc.ca/faune/faune/pdf/guidebirds.pdf>
- Environment Canada, 1991. Federal Policy on Wetland Conservation.
- Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment. 2003. Incorporating Climate Change Considerations in Environmental Assessment – General Guidance for Practitioners. Internet: http://www.ceaa-acee.gc.ca/012/014/climatechange_e.pdf
- Health Canada, 2004, Canadian Handbook on Health Impact Assessment, Volume 1 to 4. Internet: http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/index_e.html
- Hegmann, G., C. Cocklin, R. Creasey, S. Dupuis, A. Kennedy, L. Kingsley, W. Ross, H. Spaling and D. Stalker. 1999. Cumulative Effects Assessment Practitioners. Prepared by AXYS Environmental Consulting Ltd. and the CEA Working Group for the Canadian Environmental Assessment Agency, Hull, Quebec. Internet: http://www.ceaa-acee.gc.ca/013/0001/0004/index_e.htm
- Lemmen, D.S., Warren, F.J., Lacroix, J., and Bush, E., editors (2008): From Impacts to Adaptation: Canada in a Changing Climate 2007; Government of Canada, Ottawa, ON, 448 p. Internet: http://adaptation.nrcan.gc.ca/assess/2007/index_e.php
- Wright, D.G. and G.E. Hopky. 1998. Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters. Can. Tech. Rep. Fish. Aquat. Sci. 2107. Internet:

http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/guidelines-conseils/guides/explosguide/pdf/explos_e.pdf

APPENDIX A

Requirements of an Environmental Impact Statement under the *Environmental Protection Act* (Section 57) and Assessment by a Review Panel under the *Canadian Environmental Assessment Act* (Section 16)

Environmental Protection Act

Section 57 - Environmental Impact Statement

57. An environmental impact statement shall be prepared in accordance with the guidelines, and shall include,

- (a) a description of the undertaking;
- (b) the rationale for the undertaking;
- (c) the alternative methods of carrying out the undertaking, and the alternatives to the undertaking;
- (d) a description of the
 - (i) present environment that shall be affected or that might reasonably be expected to be affected, directly or indirectly, by the undertaking, and
 - (ii) predicted future condition of the environment that might reasonably be expected to occur within the expected life span of the undertaking, if the undertaking was not approved;
- (e) a description of
 - (i) the effects that would be caused, or that might reasonably be expected to be caused, to the environment by the undertaking with respect to the descriptions provided under paragraph (d), and
 - (ii) the actions necessary, or that may reasonably be expected to be necessary, to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment by the undertaking;
- (f) an evaluation of the advantages and disadvantages to the environment of the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking;
- (g) a proposed set of control or remedial measures designed to minimize any or all significant harmful effects identified under paragraph (e);

- (h) a proposed program of study designed to monitor all substances and harmful effects that would be produced by the undertaking; and
- (i) a proposed program of public information as required under section 58.

Canadian Environmental Assessment Act

Section 16 - Factors to be considered

16. (1) Every screening or comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of the following factors:

- (a) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;
- (b) the significance of the effects referred to in paragraph (a);
- (c) comments from the public that are received in accordance with this Act and the regulations;
- (d) measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project; and
- (e) any other matter relevant to the screening, comprehensive study, mediation or assessment by a review panel, such as the need for the project and alternatives to the project, that the responsible authority or, except in the case of a screening, the Minister after consulting with the responsible authority, may require to be considered.

Additional factors

(2) In addition to the factors set out in subsection (1), every comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of the following factors:

- (a) the purpose of the project;
- (b) alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means;
- (c) the need for, and the requirements of, any follow-up program in respect of the project; and
- (d) the capacity of renewable resources that are likely to be significantly affected by the project to meet the needs of the present and those of the future.

APPENDIX B

**Department of Environment & Conservation
Environmental Assessment Division**

**ADVERTISEMENT REQUIREMENTS FOR PUBLIC MEETINGS /
INFORMATION SESSIONS**

Purpose: To clarify for staff, proponents, public interest groups, etc. the types, timing, number, notification requirements, etc. for public consultations in relation to undertakings required under the *Environmental Protection Act, SNL 2002 cE-14.2*, (Section 58) to prepare an Environmental Impact Statement (EIS) or required under the *Environmental Assessment Regulations, 2003* (Section 10) to prepare an Environmental Preview Report (EPR).

1. The Proponent is not required to conduct public meeting(s) (information sessions) under an EPR process unless specifically required to do so in the project Guidelines. This requirement shall be at the Minister's discretion, based upon advice from the Assessment Committee (AC) as provided by the Chairperson, taking into account the level of expressed public interest.
2. The Proponent is always required to conduct public meeting(s) (information sessions) under an EIS process as specified in the Legislation. This requirement shall be specified in the project Guidelines.
3. When required, a public meeting shall normally be held in the largest local population centre within the project area. This shall be the minimum requirement. In addition, when demonstrated public interest or concern warrants, additional meetings may be required. This may take the form of additional meetings to be held in major regional or provincial population centres, or possibly additional meetings within the original community. Such requirements are at the discretion of the Minister based on consensus advice from the AC Chairperson, and based upon public interest as evidenced by public submissions received.
4. The requirements for the location of public meetings may be modified for projects proposed within areas where there is an assertion of potential Aboriginal or treaty rights, excluding projects located entirely within municipal boundaries. In such cases, a public meeting may specifically be required in an appropriate Aboriginal community which has a direct interest in the land claim. Such a meeting may be required in addition to others required under #3 (above). The Proponent may be required to provide appropriate translation services for such meetings. This provision is subject to alternate direction relating to dealings with Aboriginal groups which may be imposed by government under special circumstances.
5. The format of the public meeting may be flexible, and the Proponent is free to propose a suitable format for approval by the AC. The format may

range from formal public meetings chaired by the Proponent or representative with presentations followed by questions and answers, to a less formal open house forum where the public may discuss the proposal with the Proponent or representatives. Other formats may be considered by the AC. The purpose of the public information session is to 1) provide information concerning the proposed undertaking to those who may be affected, and 2) to record the concerns of the local community regarding the undertaking. Any format must meet these objectives.

6. The Proponent must ensure that each public meeting is advertised in accordance with the following specified public notification requirements, which shall form part of the project Guidelines when appropriate:
 - Minimum information content of public advertisement - (Proponent to substitute appropriate information for italicised items):

<p>PUBLIC NOTICE</p> <p>Public Information Session on the Proposed</p> <p style="margin-left: 40px;"><i>Name of undertaking</i></p> <p style="margin-left: 40px;"><i>Location of undertaking</i></p> <p style="margin-left: 40px;">shall be held at</p> <p style="margin-left: 40px;"><i>Date and Time</i></p> <p style="margin-left: 40px;"><i>Location</i></p> <p style="margin-left: 40px;">This session shall be conducted by the Proponent, <i>Proponent name and contact phone number,</i> as part of the environmental assessment for this Project.</p> <p style="margin-left: 40px;">The purpose of this session is to describe all aspects of the proposed Project, to describe the activities associated with it, and to provide an opportunity for all interested persons to request information or state their concerns.</p> <p style="text-align: center;">ALL ARE WELCOME</p>

- If translation services are to be provided as per #4 (above), then the ad should specify this fact and the languages to be used for the session.
- Minimum newspaper ad size: 2 columns wide.
- Minimum posted ad size: 10 cm x 12 cm.
- Minimum newspaper ad frequency (to be run in newspaper(s) locally distributed within each meeting area or newspaper(s) with the closest local distribution area):
 - For dailies, the weekend between 2 and 3 weeks prior to each session and the two consecutive days prior to each session, OR
 - For weeklies, in each of the two weeks prior to the week in which the

session is to be held.

- Minimum posted ad coverage: In the local Town or City Hall or office, and the local post office, within the Town or City where the meeting is to be held, to be posted continually for not less than 15 days prior to each session.
- Any deviation from these requirements for any reason must receive the prior written approval of the Minister.
- The Proponent must provide the Chairperson of the AC with copies of advertisements and public notices.