

# Report of the Joint Review Panel

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Lower Churchill Hydroelectric Generation Project  
Nalcor Energy  
Newfoundland and Labrador



Joint Review Panel established by Canada's Minister of the Environment,  
the Minister of Environment and Conservation for Newfoundland and Labrador,  
and the Minister for Intergovernmental Affairs for Newfoundland and Labrador

**REPORT OF THE JOINT REVIEW PANEL**

**LOWER CHURCHILL HYDROELECTRIC GENERATION PROJECT  
NALCOR ENERGY  
NEWFOUNDLAND AND LABRADOR**

**August 2011**

Report of the Joint Review Panel - Lower Churchill Hydroelectric Generation Project

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## EXECUTIVE SUMMARY

### INTRODUCTION

Nalcor Energy is proposing to develop two hydroelectric generation facilities on the lower Churchill River in central Labrador with a combined capacity of 3,074 megawatts (MW) and at a cost of approximately \$6.4 billion. The Project would consist of two dams located at Muskrat Falls (824 MW) and Gull Island (2,250 MW), two reservoirs, and transmission lines connecting Muskrat Falls, Gull Island and the existing Churchill Falls hydroelectric facility. Additional facilities would include access roads, temporary bridges, construction camps, borrow pits and quarry sites, diversion facilities and spoil areas. For the purposes of this assessment, transmission lines to carry the power to markets were not included in the Project.

The provincial and federal governments agreed to a joint review panel to ensure that the environmental assessment satisfied their respective legislative requirements – the Newfoundland and Labrador *Environmental Protection Act* and the *Canadian Environmental Assessment Act* – in an effective and efficient manner. The provincial and federal governments will make the final decisions regarding Project approval. The joint review panel is providing advice to the governments by means of this report.

The joint review panel (“the Panel”) was appointed by the Newfoundland and Labrador Minister of Environment and Conservation and the Minister for Intergovernmental Affairs, and the federal Minister of the Environment. The Terms of Reference issued by the Ministers required the Panel to assess the environmental effects of the Project, including:

- consideration of the need for and purpose of the Project;
- alternatives to the Project and alternative means of carrying out the Project;
- the environmental effects of the Project, including accidents and malfunctions and cumulative effects, and the significance of these effects;
- measures to reduce adverse effects and enhance beneficial effects; and
- monitoring and follow-up.

The Panel reviewed extensive information provided by Nalcor and other participants during the course of the review, and held a 30-day public hearing in nine locations in Newfoundland and Labrador and in Quebec from March 3 to April 15, 2011. The public hearing provided the Panel with an opportunity to gather information relating to its Terms of Reference, and to hear from Aboriginal persons and groups, the public, governments and other interested parties about their ideas, interests, positions and concerns associated with the Project.

The Panel reviewed the information and views provided by Nalcor and other participants and then applied criteria according to guidance published by the Canadian Environmental Assessment Agency to determine the significance of adverse environmental effects after all reasonable mitigation measures, including those recommended by the Panel, had been applied. The Panel also identified likely Project benefits.

The Panel received information about potential and established Aboriginal rights or title in the Project area and about whether the Project might adversely impact them. This information is included in Chapter 10 of the report. Aboriginal groups involved in the review process included Innu, Inuit and Inuit-Metis living in Labrador, and Innu and Naskapis living in Quebec. Innu Nation has negotiated an Impacts and Benefits Agreement with Nalcor and Newfoundland and

Labrador in order to support its involvement in the Project during construction and to implement a royalty regime.

## **THIS SUMMARY**

This summary highlights some of the recommendations made by the Panel, to be applied if the Project is approved. The Panel made no assumption about whether or not the Project would proceed. The reader is encouraged to consult the full list of recommendations.

The Panel has determined that the Project would have several significant adverse environmental effects on the aquatic and terrestrial environments, culture and heritage and, should consumption advisories be required in Lake Melville, on land and resource uses. The Panel does not make the final decision about the Project. Government decision makers will now have to weigh all effects, risks and uncertainties in order to decide whether the Project is justified in the circumstances and should proceed in light of the significant adverse environmental effects identified. Therefore, the Panel has provided further advice to help answer the question of whether and how the Project would contribute to sustainability.

## **PROJECT NEED AND ALTERNATIVES**

### *Need, Purpose and Rationale*

Nalcor stated that the Project was needed to address the future demand for electricity in Newfoundland and Labrador, develop the province's hydroelectric resources in accordance with the provincial energy policy, secure a renewable future, and generate long-term revenues for the Province. Many participants questioned why the hydroelectric resources of the Churchill River had to be developed, arguing that there were other, more economically and environmentally beneficial ways of meeting domestic energy demand. Questions were also raised about how Nalcor would gain transmission access to export markets and the ability of the Project to deliver the projected long-term financial benefits.

For the purposes of this review, the Panel did not accept that developing the hydroelectric potential of the lower Churchill River was a "need", and that therefore the Project should be compared to reasonable alternatives that addressed the future demand for electricity, and delivered a renewable energy future and long-term revenues for the Province. The Panel further concluded that because Muskrat Falls and Gull Island are subject to separate sanction decisions, the Panel would assess them separately with respect to alternatives, justification in energy and economic terms, and where possible, with respect to other considerations.

Nalcor's position was that up to 800 MW of energy from the Project would be required to meet provincial demand, and that there are market opportunities for energy export that would exceed the output of the Project by a factor of eight during the Project's planning horizon. Opportunities exist in Ontario, the Maritime Provinces and New England, based primarily on the need in those markets to replace aging infrastructure and to displace higher greenhouse gas emitting sources such as coal. Nalcor presented cash flow analysis and financial statements showing a projected return on equity for the Project as a whole in the order of 14 percent, and projected annual net financial benefits to the Province in the order of \$1.1 billion by 2050.

In light of the separate sanction decisions, the Panel considered the Project as a whole and as separate generating facilities. The Panel questioned whether the Project would be the best alternative to meet domestic demand and whether timely transmission access would be available to deliver energy to unknown export markets. Nalcor's proposal includes exporting part of the power generated at Muskrat Falls via a planned subsea transmission line towards the

Maritime Provinces; however, it was uncertain how and when the much larger energy output from Gull Island could be transmitted to markets.

Because of this, the Panel concluded that Nalcor had not demonstrated the justification of the Project as a whole in energy and economic terms, and that there are outstanding questions related to both Muskrat Falls and Gull Island regarding their ability to deliver the projected long-term financial benefits to the Province, even if other sanctioning requirements were met. The Panel therefore recommended that the Government of Newfoundland and Labrador carry out separate formal financial reviews before sanctioning either Muskrat Falls or Gull Island to confirm whether the component being considered for sanction would in fact deliver the projected long-term financial benefits.

### Alternatives to the Project

Nalcor considered a list of potential alternatives and concluded that none were economically or technically feasible compared to the Project and none could meet the stated need to develop the hydroelectric potential of the Churchill River. Nalcor also said that Muskrat Falls was the best way to meet domestic demand and, compared to continuing to burn oil at the Holyrood thermal generating facility, the Muskrat Falls option would save \$2.2 billion over a 50-year period (2017 to 2067).

However, the Panel concluded that Nalcor's analysis, showing Muskrat Falls to be the best and least-cost way to meet domestic demand requirements, was inadequate and recommended a new, independent analysis based on economic, energy and environmental considerations. The analysis would address domestic demand projections, conservation and demand management, alternate on-Island energy sources, the role of power from Churchill Falls, Nalcor's cost estimates and assumptions with respect to its no-Project thermal option, the possible use of offshore gas as a fuel for the Holyrood thermal generating facility, cash flow projections for Muskrat Falls, and the implications for the province's ratepayers and regulatory systems.

The Panel also recommended consideration of Integrated Resource Planning as a better planning approach compared to the traditional approach of forecasting loads and then finding the lowest cost solution for meeting them.

### Alternative Means – Construction Sequence and Pace, and Reservoir Preparation

Nalcor considered a number of alternate means of carrying out the Project; the Panel focused on construction sequence and pace, and reservoir preparation.

Nalcor's preferred option is to construct the Muskrat Falls generating facility and related interconnecting transmission lines first, followed by the Gull Island generating facility with an overlap in construction periods. However, because there are separate sanction decisions, there could be a delay in constructing Gull Island. The Panel considered this uncertainty when carrying out its review and in some cases recommended that lessons learned from the construction of Muskrat Falls be specifically factored into decisions regarding Gull Island. If for any reason Gull Island were to be constructed first, the same principle should apply.

Nalcor evaluated several options for reservoir preparation – minimal clearing, partial clearing and full clearing. Nalcor's 'partial clearing' alternative would involve clearing trees in only the ice and stick-up zones around the perimeter of the reservoirs and only where this could be carried out within Nalcor's safety, economic, and environmental operating parameters. Otherwise, the trees would be left standing. Nalcor's 'full clearing' alternative also involved clearing wood in the flood zone but again only where this could be carried out within those same parameters.

The stated purpose for the reservoir preparation plan was to reduce the amount of trash and debris that could affect turbine operation after impoundment. Nalcor maintained that, since most of the trash and debris would come from the ice and stick-up zones, there would be no difference between the 'full' and 'partial' clearing options in that regard. It also stated there would be little difference between the two options in terms of navigation hazards, the amount of mercury released, or greenhouse gas emissions. However, there would be huge differences in costs and 'full clearing' would delay the construction schedule, costing Nalcor at least \$200 million. Therefore Nalcor preferred the 'partial clearing' option.

Many participants recommended that more timber be cleared from the reservoir areas, in order to reduce methylmercury and greenhouse gas emissions or not to waste the resource. They suggested that technologies such as manual harvesting with chainsaws and cable-logging could harvest larger volumes.

The Panel concluded that for reservoir preparation purposes, the two reservoirs should be considered differently because of their different characteristics. The Panel recommended applying the 'full clearing' option to the Muskrat Falls reservoir because it would be technically and economically feasible and would not negatively affect the construction schedule.

The Gull Island situation is different because the reservoir area is much larger, the terrain more difficult and the stands of timber less dense, and therefore less economic to harvest. Therefore, the Panel recommended that Nalcor learn from its experience in clearing the Muskrat Falls reservoir and endeavor to maximize clearing in the Gull Island reservoir. The Panel also recommended that Nalcor be responsible for ensuring that all timber harvested from the reservoirs, together with all merchantable timber salvaged by the trash and debris removal program, be utilized because of the socio-economic and environmental benefits.

## **ATMOSPHERIC ENVIRONMENT**

The Project would affect air quality because of emissions from quarry operations, concrete work, and related construction activities. The Project would produce greenhouse gases related to construction activities and deforestation associated with reservoir clearing and impoundment, but would also have the potential to reduce a much larger quantity of greenhouse gases provided the power produced is used to shut down greenhouse gas intensive generation facilities elsewhere.

The Panel concluded that with appropriate mitigation, including use of best available technology, air pollution and noise would be localized and temporary in nature. While the exact markets for much of the power are not yet known, the power produced by the Project would very likely displace more greenhouse gas emissions than the Project would cause. Moreover, the Panel recommended that Nalcor make all reasonable efforts to ensure that power from the Project would be used (a) to back-up wind power and other intermittent renewable sources of energy, (b) to displace energy from high greenhouse gas emission sources, and (c) not to displace conservation and demand management or power from renewable sources.

## **AQUATIC ENVIRONMENT**

The main focus of the assessment for the aquatic environment was on fish and fish habitat. Issues of concern included how and when filling of the reservoirs would occur, changes in water quality during the long period of time it would take for the new shorelines to stabilize, damaging effects on fish that might go through the turbines, how methylmercury – a by-product of new reservoirs – would accumulate in fish, loss of fish habitat through flooding and to what extent it

could be replaced successfully, and the effects of all these on the fish community that would inhabit the new reservoirs and the river below them.

In addition, there was considerable debate over how far the effects of the Project, including mercury, would travel downstream – not everyone agreed with Nalcor that the effects would not be measurable past the mouth of the river into Goose Bay and Lake Melville.

### Reservoir Impoundment and Operating Regime

To fill each reservoir, Nalcor would need to reduce flows downstream of the dams for a few weeks. Nalcor indicated that it would plan to fill each reservoir in the late summer to early fall – the best time because it would avoid the spawning period for most fish species. Nalcor would ensure that the downstream flow was at least 30 percent of the mean annual flow and would rescue and relocate any fish that would become stranded as a result of the lower flows. However, Nalcor also stated that it needed flexibility to fill the reservoirs at a different time if demanded by the construction schedule. Other participants told the Panel that the risks of filling at a different time were too great because this could harm the most vulnerable life stages of a number of fish species. The Panel concluded that these risks should be avoided and recommended that Nalcor be required to fill the reservoirs between mid-July and the end of September.

In order to operate the reservoirs as efficiently as possible, Nalcor would keep the water levels at a fixed level for most of the year, avoiding the big changes that people have been used to seeing in the Smallwood Reservoir. Natural rivers however, show much more flow variability and this can play an important role in maintaining healthy ecosystems. The idea behind “environmental flows” is that when there are competing uses of a river system, water should be formally allocated for ecosystem purposes. The Panel recommended that the Province develop environmental flow standards to be applied to the Lower Churchill Project.

### Water Quality Effects in the Reservoirs

Water quality in the reservoirs, and to a lesser extent, downstream from them, would go through a long transition. Nalcor predicted 20 years for water quality to return to its original condition; Fisheries and Oceans Canada said it could take longer. Flooded soils and new, eroding shorelines would increase the amount of sediment suspended in the water. Suspended solids can decrease the amount of light that penetrates the water, and also smother fish habitat when they settle. This effect would likely be much more pronounced in the Muskrat Falls reservoir, and the increase in suspended solids would greatly exceed water quality guidelines intended to protect aquatic life. However, Nalcor stated that turbidity in the Churchill River is already very variable and fish have adapted to this situation. Underwater decomposing vegetation would also add additional nutrients which could promote fish growth.

Nalcor would be able to take steps to avoid erosion and siltation during the construction period but once the reservoirs are filled, no further mitigation would be possible. The Panel considered these probable changes in water quality when considering how all aspects of the Project would affect fish and fish habitat, and the potential for conditions to favour some fish species and stress others, possibly changing the composition of the final fish community.

### Entrainment Effects on Fish Populations

Fish going through turbines (entrainment) or down spillways could be killed or injured. The rate at which this would happen depends on the size of the fish (smaller fish would be less vulnerable), the distance the water drops, and the turbine design. Nalcor predicted higher rates

of mortality and injury at the Gull Island turbines because of the larger drop and the type of turbine proposed. However, as fish surveys had shown that there were no large-scale movements of fish in this area, Nalcor estimated that overall, not many fish would be affected and also committed to manage water flows to minimize use of spillways and to use adaptive management techniques to deter fish from approaching intakes.

The Panel noted that even if fish losses due to entrainment were not high, they would continue through the life of the Project. Also, killed or injured fish contribute to the transfer of methylmercury from the reservoirs to the river downstream, as they are eaten by other fish. Fisheries and Oceans Canada indicated that there were some possible measures to keep fish away from the turbine intakes but these would be specific to a given fish species. This means they could not be applied until monitoring showed which species were more likely to be killed or injured by entrainment. Some participants stated that they were uncertain about the number of fish that might pass through the turbines and the potential effects on fish populations.

The Panel recommended that Nalcor carry out additional sampling before the Gull Island dam sanction decision to confirm the low numbers of fish movements and develop a detailed adaptive management strategy.

#### *Fate of Mercury in the Reservoirs*

There was general agreement that Nalcor's predictions for the amount of methylmercury that would be released, and how it would concentrate through the different levels of the food web in the reservoirs, were reasonable. The Panel heard no evidence that suggested that the health of the fish themselves would be harmed by the mercury in their bodies. Nalcor's position was that there was no feasible way to substantially reduce the formation of mercury in the reservoirs and that any risks to people who might eat the fish could be handled through consumption advisories. Natural Resources Canada challenged this, and recommended that Nalcor consider removing both vegetation and part of the soil layer around the new shorelines of the reservoirs. The Panel recognized that there were still many questions about this proposed mitigation measure but agreed that hydroelectric developers have a responsibility to find ways to reduce mercury at source if at all possible, and recommended that Natural Resources Canada and Nalcor collaborate to pilot test this approach.

#### *Fish Habitat Loss, Alteration and Compensation*

Nalcor told the Panel that while a large area of fish habitat (740 hectares in the Muskrat Falls reservoir, 4,300 hectares at Gull Island) would be destroyed or altered by flooding when the reservoirs were filled, this habitat would be replaced, either by constructing new habitat areas or simply through the creation of much larger water bodies. Nalcor proposed to create or enhance delta areas, re-vegetate disturbed shoreline areas, remove vegetation and grade access roads around the edge of reservoirs in preparation for flooding, enhance spawning shoals at Gull Lake, and create the Gull Island plateau. However, the Panel noted that Nalcor's proposed compensation works would only be able to create slow velocity habitat leading to a net loss of faster flowing habitats, especially in the tributaries.

Nalcor analyzed the types of habitat that would be lost in terms of how they were used by certain life stages of certain fish species. The design of the proposed habitat compensation works would then focus on making sure that there was adequate habitat available for these particular fish. Nalcor's analysis showed that very high percentages of habitat, over 90 percent in some cases, would be removed for one or more life stages of some species, particularly in the Muskrat Falls reservoir. Other participants expressed concern that so much would be riding on the success of Nalcor's compensation strategy and indicated that it was very difficult to

engineer new habitat that would be as productive and complex as habitat formed naturally over many years. They also questioned the track record of habitat replacement and of its monitoring and government oversight.

In the event compensation proved ineffective, Nalcor would consider habitat enhancement sites outside the flood zone in consultation with Fisheries and Oceans Canada.

The Panel concluded that Nalcor's compensation strategy, if successful, would likely address most of the habitat needs of the resident fish species; however, many uncertainties remain, particularly with respect to how the different species would interact and whether the new habitats would stabilize. The Panel noted that Nalcor agreed that repairing or reconstructing the habitats would be difficult after the reservoirs were filled.

### Final Fish Assemblage

Nalcor described how the combined effects of reservoir filling and operation, water quality changes, and habitat alteration and replacement would affect the fish community, both during the transitional stage and after the reservoirs had stabilized. Nalcor estimated that the existing species would all survive and in more or less the same proportions. Other participants were less certain, given the extent of the changes that would occur in transforming a river into two reservoirs.

The Panel concluded that the make-up of the final fish community could not be predicted with certainty and that there would be a risk that one or more species, particularly valued from community and Aboriginal perspectives, could be lost or considerably reduced in numbers, because of the wide scale water quality and habitat changes and inherent uncertainties.

Therefore the Panel concluded that the Project would result in significant adverse environmental effects to fish habitat and the final fish assemblage in both reservoirs.

### Effects Downstream of Muskrat Falls

Based on studies in Lake Melville carried out for an earlier version of the Project and the fact that, unlike some other hydroelectric projects, the Project would not reduce the amount of water flowing downstream from Muskrat Falls, Nalcor had concluded that the Project would not have effects on the downstream environment past the mouth of the Churchill River and consequently did not extend the Assessment area beyond this point. This was challenged by a number of participants, and particularly the Nunatsiavut Government. The possibility of mercury moving downstream in sufficient quantities to contaminate fish and seal, and eventually require consumption advisories, was a particular concern. Participants also questioned whether subtle changes in suspended solids, nutrients or water temperature might, over the long-term, change the productivity of the river's estuary.

Fisheries and Oceans Canada presented some recently released research showing that mercury from the Churchill Falls project was measured in several fish species in Lake Melville over 300 km away, but Nalcor maintained that mercury and other Project effects would be "not measurable" and within natural variability.

The Panel acknowledged that it is difficult to accurately predict downstream effects because there are very few long-term ecological studies of hydroelectric projects in northern environments. However, this underscores the need for a precautionary approach, particularly because Nalcor did not identify any feasible way to reverse either long-term adverse ecological changes or mercury contamination in the ecosystem.

The Panel concluded that Nalcor did not carry out a full assessment of the fate of mercury in the downstream environment, including the potential pathways that could lead to mercury bioaccumulation in seal and the potential for cumulative effects of the Project together with the effects of other sources of mercury. The Panel also concluded that downstream effects would likely be observed in Goose Bay over the long term, caused by changes in sediment, nutrient supply and water temperatures. Therefore, the Panel recommended that Nalcor carry out a comprehensive assessment, with third-party review, of downstream effects before impoundment begins. The Panel also noted that, while Nalcor has committed to make its monitoring data public, often lessons learned from environmental effects monitoring of large projects are obscured because the results are not fully analyzed and remain difficult to access in the “gray literature”. Therefore the Panel recommended that Nalcor undertake to publish what it learns about possible long-term downstream effects.

### Monitoring, Follow-up, Adaptive Management

Nalcor committed to carry out an extensive aquatic monitoring program to verify its predictions and identify whether adaptive management would be needed. The Panel concluded that effective monitoring would be challenging because of the need for good baseline data, enough resources to support the needed level of effort over many years, and setting appropriate thresholds to trigger further action. The Panel recommended involving Aboriginal groups, stakeholders and independent experts in designing the program.

## **TERRESTRIAL ENVIRONMENT**

The assessment addressed Project effects on upland, riparian, wetland and ashkui ecosystems, rare plants, caribou, birds and other wildlife. Seismic and geotechnical effects were also addressed. Many of the terrestrial species were noted to be of particular importance to Aboriginal communities, including various caribou herds, small game, medicinal plants and berries.

Nalcor stated that Project construction and the creation of the two reservoirs would physically disturb 161 square kilometres of land, but predicted that the loss of habitat would not affect the sustainability of key indicator species at the population level. However, the Panel concluded that in light of the scale of terrestrial habitat that would be inundated by the Project and the permanence of the effect, the overall loss of terrestrial habitat would be a significant adverse effect. The Panel also observed that the effects to the terrestrial ecosystem might be further compounded by future resource extraction projects and shifting climate change patterns.

### Riparian and Wetland Habitat

Nalcor noted the importance of wetland habitat, including riparian marsh, for several key indicator species by providing foraging, nesting and breeding habitat for several types of large mammals, furbearers, herpetiles and birds. Wetlands were noted as widespread and common in the lower Churchill River watershed. Nalcor indicated that approximately 60 percent of riparian habitat in the Project area would be inundated and that 98 percent of this habitat would be the riparian marsh ecotype.

Participants were concerned about how this loss would affect a number of species, particularly wetland sparrows. Nalcor committed to re-create lost riparian habitat through a compensation strategy and cited successful habitat compensation in other projects in North America. However, there were concerns that Nalcor had underestimated the challenges involved in engineering ecosystems and that there would be a net loss of riparian habitat. The Panel noted that wetland and riparian habitat play important roles in ecosystem health and agreed that compensation



plans are vital. However, the Panel questioned Nalcor's certainty that riparian and wetland habitat would re-establish and concluded that the residual adverse effect of the Project on these habitats, even with the proposed compensation strategy, would be significant.

### Rare Plants

No listed plant species under federal or provincial regulations were found within the footprint of the Project, although the Panel noted that information on rare plants in Labrador is limited. Eight regionally uncommon plant species were found in the Project area and several participants noted the importance of these species. During the public hearing, participants and Aboriginal groups stated that they were concerned about rare plants in the inundated area, especially common wood sorrel and mountain maple, and medicinal plants such as the Canada yew. Nalcor stated that if sufficient numbers of these species were not identified outside of the footprint, any plants found inside the flooded zone would be relocated.

The Panel concluded that, with appropriate mitigation, the adverse effects of the Project on rare plant species would not likely be significant.

### Wildlife

The EIS assessed effects of the Project on selected species, including moose, black bear, beaver, marten, porcupine, caribou and birds. Nalcor chose these key indicator species based on their sensitivity to Project interactions, their ability to indicate effects on larger components of the environment, their economic, recreational or cultural importance to stakeholders, and population status and vulnerability.

Nalcor did not predict significant adverse effects for most species because the Project would not flood a large percentage of their primary habitat. Participants were particularly concerned about the six species of wildlife designated as being at risk. The federal and provincial governments are required to develop recovery strategies for these species that must identify critical habitat. The Panel concluded that the Project would not be likely to have significant effects on listed species other than the Red Wine Mountain caribou herd. However, the lack of recovery strategies and identification of critical habitat for some of these species makes a final significance determination premature. The Panel recommended that governments make all reasonable efforts to put recovery strategies in place before making final decisions about the effects of the Project on listed species.

The timing of impoundment recommended for the protection of fish would also be optimal for most terrestrial species, and therefore, with this mitigation, the Panel concluded that the recommended timing of impoundment would not have significant adverse effects on terrestrial species.

### Caribou

The Red Wine Mountain caribou herd is considered threatened under the provincial *Endangered Species Act* and the Canadian *Species at Risk Act*. The George River caribou herd is in decline but not considered threatened and hunting is legal within permitted seasons. The Lac Joseph caribou herd is also known to occur in the Project area; however, Nalcor did not include this herd in its assessment.

Nalcor concluded that there would be significant cumulative effects on the Red Wine Mountain herd because some caribou habitat would be lost. However, Nalcor stated that hunting and predation have been identified as limiting factors for this herd, rather than habitat. Therefore, the

herd would likely continue to decline with or without the Project and the effects from the Project alone would not be significant.

Participants noted that development affects caribou both directly and indirectly and that indirect effects, such as the presence of roads and changes in predator-prey dynamics, were not adequately assessed.

The Panel agreed that the recovery of the Red Wine Mountain caribou herd would be uncertain with or without the Project but concluded that any adverse effect of the Project on individual animals within the Red Wine Mountain caribou herd would result in significant adverse effects.

Nalcor stated that the Project would not adversely affect the George River and Lac Joseph caribou herds because the Project footprint would only overlap with a small portion of their ranges. Participants noted that the George River herd is in rapid decline but there was very limited information available about the possible causes. The Panel concluded that the effects of the Project on the George River caribou herd in isolation would not likely be significant, but could not make a determination about cumulative significance because a proper cumulative effects assessment for the herd was not carried out. The Panel recommended that the provinces of Quebec and Newfoundland and Labrador, together with Environment Canada and interested Aboriginal communities, initiate a joint management program for the George River caribou herd.

### Birds

Nalcor assessed Project effects on Canada goose, surf scoter, osprey, ruffed grouse, wetland sparrows, harlequin duck and other species of concern such as the rusty blackbird, grey-cheeked thrush, olive-sided flycatcher and the common nighthawk. Several listed bird species were found in the Churchill River valley. Nalcor stated some primary habitat of birds in the Project area would be flooded but enough habitat was available outside the impoundment area. Government experts agreed. Nalcor noted that the wetland sparrow was an exception because of its dependence on riparian habitat but habitat compensation plans would reduce the impact.

The Panel concluded that adequate alternate primary habitat would still be available and that there would likely not be significant adverse effects on birds, although no final determination could be made for the listed bird species because recovery strategies were not in place.

Ashkui are areas in rivers and lakes where open water appears earlier in the spring than elsewhere, and they are important habitat for several bird species. Nalcor predicted that existing ashkui on the lower Churchill River would re-form at a higher elevation after the reservoirs are created. Participants challenged this prediction but Environment Canada stated that if the ashkui did not reappear, there would be sufficient open water habitat elsewhere to support waterfowl such as surf scoter. The Panel concluded that loss of ashkui would be a loss in habitat for waterfowl, but would likely not be significant given the abundance of alternate habitat.

Environment Canada stated that under the *Migratory Birds Convention Act*, no disturbance of eggs, nests and young may occur between May 1 and July 31 of any given year and that this would mean that Nalcor should not carry out reservoir clearing during this period. Nalcor committed to comply with the Act but also said that it would need to harvest timber throughout the summer season. The Panel recommended that Nalcor and Environment Canada negotiate an agreement to ensure that harvesting activities would be carried out in a manner consistent with the Act, and compliance with the Act would not unnecessarily delay clearing.

### Vegetation

Nalcor stated that vegetation management of the transmission lines' right-of-way would include removal of trees and control of fast-growing shrubs. Vegetation management would begin three to four years after construction and would occur every 8 to 10 years thereafter. The quantities of chemicals used would depend largely on terrain, as well as quantity and type of vegetation. Vegetation management would comply with provincial regulations.

Participants were concerned about the use of chemical herbicides and their impacts on humans and animals. While the Panel concluded that there is a reasonable regulatory process in place for the use of herbicides, it recommended that all non-chemical vegetation control alternatives be explored first and their use maximized before use of herbicides would be approved.

## **LAND AND RESOURCE USE**

Land and resource use topics included Project effects on harvesting activities (hunting, trapping, fishing, and berry picking), cabins, winter travel, navigation and forestry and other resource-based activities (mining, agriculture and ecotourism).

### Harvesting Activities

Nalcor indicated that the area to be affected by the Project was not a prime destination for harvesting activities. Nalcor also did not expect the Project to increase harvesting activities in the area because employees would not be allowed to harvest anything, most of the roads needed for construction would be made inaccessible afterwards, and Nalcor would build construction camps and implement transportation policies.

Because of the loss of riparian, wetland and upland habitat, and possibly ashkui, there would likely be some adverse effects on moose, small game and migratory birds. However, potential loss of wildlife would be balanced to a certain extent if mitigation measures to replace riparian and wetland habitat were successful.

Construction activities could temporarily disturb the George River caribou herd, which might lead some animals to avoid certain areas and cause hunters to adapt their hunting strategies, but no further disturbances would occur during the operation period. However, the future of the herd could be threatened by the possible cumulative effects of a large number of small changes in the herd's total range and caribou hunting could be adversely affected as a result. Therefore, it would be important to monitor how the herd interacts with the Project and any changes caused by the Project to the way in which caribou are hunted in the area.

Because of the various changes the Project would cause in the Churchill River's main stem, some species preferred for fishing could be less abundant in the reservoirs while others might increase in numbers. In addition, consumption advisories would likely be required because of methylmercury accumulation in fish. However, the Panel concluded effects on fishing in the Churchill River would not be significant because most people already prefer to fish in other locations. Nalcor also committed to investigate remediation of the saltwater intrusion in Grand Lake as part of its fish compensation strategy and this could provide additional fishing opportunities outside of the area that would be affected by methylmercury contamination.

In Goose Bay and Lake Melville, the Panel concluded that it was still uncertain whether methylmercury would bioaccumulate in fish and seal to levels that would require consumption advisories, especially considering the lack of baseline information. Recognizing the dietary and cultural importance of fishing and seal hunting in this area, the Panel concluded that there would

be significant adverse effects on fishing and seal hunting in Goose Bay and Lake Melville should consumption advisories be required for that area.

Nalcor indicated that most trapping now occurs close to home communities rather than in the Project area. To the extent that the riparian habitat compensation program would be successful, this could provide some replacement trapping opportunities. The Panel concluded that the Project would not have significant adverse effects on trapping, but recommended that Nalcor modify its proposed trapping compensation program to reduce the requirement for proof of ten years' continuous use.

Conditions of the leases of cabins located in the flood zone enable the Province to cancel them without compensation. However, the Panel was not provided with enough information to conclude whether any legitimate cabin owners outside the flood zone would be unfairly inconvenienced during either the construction or the operations period. Any aggrieved owner would, however, be able to access a complaints resolution process recommended by the Panel.

### Winter Travel

Nalcor predicted that thickness and stability of the ice below Muskrat Falls would not change as a result of the Project, but freeze-up would be delayed by two weeks, or up to three weeks under climate change scenarios. Nalcor would provide alternate transportation to Mud Lake residents, but only if adverse changes to winter travel conditions could be directly attributed to the Project. The Panel concluded that uncertainty about how adverse changes to the ice bridge would be mitigated would be a destabilizing and stressful factor for the community of Mud Lake, especially since these changes would be permanent. The Panel recommended that Nalcor and the Province negotiate an agreement with the Mud Lake Improvement Committee and that Nalcor assume responsibility for providing alternate transportation if the time the residents are unable to cross the river during freeze-up or break-up exceeds two weeks, without requiring proof that the Project has caused the problem.

The Panel concluded that ice on Lake Melville would be unlikely to be adversely affected by the Project, however ice conditions and the timing of freeze-up and break-up should be monitored by Nalcor.

### Navigation

Restricted river travel during the impoundment period could present a temporary problem for Mud Lake residents needing to cross the river by boat. Nalcor committed to provide alternative transportation during this period if required. Trees remaining in the reservoirs' stick-up zones would be a navigational hazard and would make access to the shorelines problematic, particularly for those travelling by canoe. The Panel was not confident that all of the trees in the stick-up zones would be sheared off by ice or waves as quickly as predicted. It was also not possible to determine whether the Project would cause navigational hazards downstream of Muskrat Falls. The Panel recommended that Nalcor develop a navigation monitoring and mitigation plan for both reservoirs, involving river users, and addressing issues such as management of the stick-up zones, boat launches and portages, and navigational hazards.

### Forestry

The Panel concluded that allocating the Allowable Annual Cut of Forest Management District 19A to the Project's flood zone would minimize competition with other forestry operations. The Panel's recommendations to maximize utilization of the wood cut in the flood zone and allow

local forestry operators free access to areas that would not otherwise be cleared could also help to develop a more viable forestry industry in Labrador.

## **CURRENT ABORIGINAL LAND AND RESOURCE USE FOR TRADITIONAL PURPOSES**

The Panel was required to specifically consider Project effects on current use of lands and resources for traditional purposes by Aboriginal persons. Information available to Nalcor, submissions by Aboriginal groups and testimony during the public hearing suggested that current use of the Project area (deemed by the Panel to be within the last 20 years) for traditional purposes is generally intermittent and sporadic relative to use of other areas that would not be affected by the Project.

Some Aboriginal persons suggested that there has been some decline in the intensity and extent of traditional land and resource use activities in recent time due to societal and economic changes. Nevertheless, the Panel recognized the importance, common to all Aboriginal persons, of practicing traditional activities within the entire extent of their traditional territory and the fact that for many groups, any effect from the Project on their practice of traditional activities would act cumulatively with impacts caused by the development of the earlier Churchill Falls project.

### Labrador Innu

The Panel observed that the Project would have an adverse impact on the land and resource use activities of the Labrador Innu by flooding harvesting and camping areas, including three ashkui locations in the proposed Muskrat Falls reservoir, as well as others in the vicinity of the Gull Island site. However, the Project area covers only a small portion of the traditional territory of the Labrador Innu and traditional activities currently practiced by Labrador Innu do not seem to be confined to the Churchill River valley. Furthermore, the Panel expected Innu Nation's interests regarding land and resource use to have been considered in the *Tshash Petapen* Agreement. Therefore, the Project effects on Labrador Innu land and resource users would likely not be significant, though the Panel recognized that some individual members might still experience negative effects. The Panel recommended mitigation to address noise and dust effects on Innu cabins and camps, and collaborative measures to address the relocation of Canada yew medicinal plants.

### Inuit

The Nunatsiavut Government and Inuit participants stated that the Project would adversely affect their traditional land and resource use activities in Lake Melville and on land and water within the Labrador Inuit Settlement Area as well as land and water identified in Schedule 12-E of the Labrador Inuit Land Claim Agreement. They were particularly concerned about the potential for methylmercury contamination because of the importance of harvesting activities in that area for the continuation of their traditional lifestyle. Should consumption advisories be required in Goose Bay and Lake Melville, the Panel concluded that the Project would have significant adverse effects on the pursuit of traditional harvesting activities by Labrador Inuit, including the harvesting of country food.

### Inuit-Metis

The NunatuKavut Community Council indicated that it was only able to provide limited information about current land and resource use activities for traditional purposes by Inuit-Metis because of its injunction application and the lack of time and financial resources to provide detailed hearing submissions. Most information was received from individual Inuit-Metis

participants, rather than from the organization, and affiliation of participants could not always be confirmed.

The Panel concluded that, based on information identified through the environmental assessment process, there were uncertainties regarding the extent and locations of current land and resource use by the Inuit-Metis in the Project area. The Panel recognized that additional information could be forthcoming during government consultations. To the extent that there are current uses in the Project area, the Panel concluded that the Project's impact on Inuit-Metis land and resource uses, after implementation of the mitigation measures proposed by Nalcor and those recommended by the Panel, would be adverse but not significant.

The Panel also observed that many land and resource use locations reported to be frequented by Inuit-Metis are outside of the Project area and would remain unaffected and accessible. Measures considered to mitigate the effects of the Project on trapping activities and to compensate for losses of trapping income, property or equipment attributed to the Project may also be particularly relevant for Inuit-Metis.

### Quebec Aboriginal Groups

Limited information was received regarding current land and resource use activities for traditional purposes in the Project area by Aboriginal persons living in Quebec due, in part, to unsuccessful attempts by Nalcor and most groups to sign consultation agreements to gather information. Time constraints during the public hearing did not allow the Panel to visit each community and therefore community representatives had to attend community hearing sessions held in Sept-Iles. They informed the Panel that the information provided was incomplete, and that insufficient time and resources were available to provide a more complete picture. The accuracy and completeness of the information provided by Nalcor was also challenged. Beside caribou hunting, any other current land and resource use activities for traditional purposes in the Project area by Aboriginal persons living in Quebec appear to be seasonal, sporadic and of short duration, including incidental harvesting along the Trans Labrador Highway.

The Panel concluded that, based on information identified through the environmental assessment process, there were uncertainties regarding the extent and locations of current land and resource use by Quebec Aboriginal groups in the Project area. The Panel recognized that additional information could be forthcoming during government consultations. To the extent that there are current uses in the Project area, the Panel concluded that the Project's impact on Quebec Aboriginal land and resource uses, after implementation of the mitigation measures proposed by Nalcor and those recommended by the Panel, would be adverse but not significant.

The Panel also observed that many land and resource use locations reported to be frequented by Aboriginal persons living in Quebec are outside of the Project area and would remain unaffected and accessible.

The Panel recommended that Nalcor involve all Aboriginal groups in the design and implementation of its proposed community land and resource use monitoring program and include Traditional Knowledge.

## **CULTURE AND HERITAGE**

Nalcor assessed Project effects on historical and archaeological resources, sites of spiritual and cultural importance and changes to the river landscape.

Nalcor assessed effects of the Project in those areas where Project components would cause physical disturbance. Nalcor developed its archaeological program and proposed mitigation measures in compliance with the provincial *Historic Resources Act*. All historic and archaeological sites identified to date that could potentially be disturbed or lost as a result of the Project would be excavated or documented before any ground disturbance activities occur. Measures would also be implemented to address the discovery of previously unknown sites and artifacts during construction. Nalcor committed to make use of best practice archaeological interpretation and analysis methods and to engage local communities in the development of commemoration initiatives.

Participants recommended that investigation, documentation and commemoration of historic and archaeological resources be undertaken before flooding begins so that irreversible losses might be offset and ancestors of all origins and their harvesting heritage recognized and honoured. Participants also requested that Nalcor's commemoration commitment ensure that intangible resources – trails, portages, customs and stories – be recorded. They also indicated that local heritage organizations could benefit by receiving funding to undertake part of this work and to implement youth education programs.

The Panel acknowledged that Nalcor has been proactive in surveying historic and archaeological potential, and has worked extensively with Innu Elders to address their cultural concerns. The resources Nalcor has and would apply to studying, identifying and documenting historic and archaeological sites and artifacts would enable considerable investigation in the history of the region that might otherwise not happen. The Project would also provide opportunities for Aboriginal persons to obtain training and experience in archaeology. However, it would be unlikely that all sites and artifacts of cultural importance or meaning would be located. The Panel recommended that Nalcor involve all affected groups in searching for, documenting and commemorating historic and archaeological resources.

The Panel noted in particular that the creation of the Smallwood Reservoir resulted in losses of culturally and historically important sites and artifacts, with no consultation, acknowledgement or commemoration.

Three sites of spiritual and cultural importance to the Labrador Innu would be lost because of flooding. Nalcor's mitigation measures consisted of documenting their significance and minimizing disturbances through alternate facility layout and construction methods. Nevertheless, Innu Elders felt that animal spirits could retaliate in response to being disturbed and that efforts should be made to appease them. The Panel acknowledged the importance of recognizing, accepting and respecting the cultural beliefs of the communities to be affected. The Panel also recommended that the Province develop an approach to assign place names in consultation with Aboriginal communities for any new Project-related landscape features.

Many participants talked about their deep emotional connection with the Churchill River, which has strong historical, cultural and spiritual significance for them because of their own travels on the river or because of family or community connections. The creation of the two reservoirs would result in the disappearance of valued river features, including fast flowing water, rapids and falls, shallow delta areas, islands, varying water levels and associated river shoreline. The Panel concluded that the Project would cause significant adverse effects on culture and heritage after mitigation, particularly with respect to the "loss of the river" as a highly valued cultural and spiritual landscape. This effect would apply to a large proportion of the river between Churchill Falls and Goose Bay, would be irreversible, and would last for the duration of the Project.

## ECONOMY, EMPLOYMENT AND BUSINESS

### Economic Impacts

The Project has a capital budget of \$6.4 billion (\$2.5 billion for Muskrat Falls and \$3.9 billion for Gull Island), with construction activities being carried out over a 11 to 12 year period. Nalcor predicted significant benefits to people from construction employment and for businesses from the provision of goods and services. Direct employment was estimated at 15,600 person years, approximately 5,600 person years for Muskrat Falls and 10,000 person years for Gull Island. Nalcor estimated that 65 percent of those requirements can be supplied by the province, 40 percent from the Island of Newfoundland and 25 percent from Labrador. It is also estimated that between \$500 million and \$1 billion would be spent on goods and services from Newfoundland and Labrador.

Many participants questioned, based on their experiences with other projects, whether or not the projected employment and business opportunities would be realized. The Panel noted that Nalcor's Benefits Strategy addresses a number of these concerns. As well, the Impacts and Benefits Agreement between Nalcor, the Government of Newfoundland and Labrador, and Innu Nation includes specific provisions regarding employment and goods and services. The Panel concluded that during the construction period, there would be substantial potential economic benefits for all areas of the province, especially Labrador and the Upper Lake Melville area.

For the long term, operating employment, though modest, would be a notable benefit, as are the trained and experienced workforce and the strengthened business capability gained during the construction period. Similarly, the availability of power for new industry or general development is a staple of further economic development, benefiting the whole province and the Upper Lake Melville area particularly because of its proximity.

The Panel focused its attention on what Nalcor stated as the principal long-term economic benefit, i.e. the net financial benefits to the economy of the province that would be generated primarily from the sale of power. Those benefits were estimated by Nalcor to be in excess of \$1 billion (in 2010 dollars) annually after debt repayment (2050); of this, \$300 million was attributed to Muskrat Falls and \$700 million to Gull Island. As already indicated, the Panel concluded that considerable uncertainty exists regarding the Project's ability to deliver financial benefits to the Province in the order of magnitude projected by Nalcor. There are also questions as to how any such benefits might be distributed by the Government of Newfoundland and Labrador.

Many different views were expressed with respect to the extent that high levels of construction activity would result in in-migration to the Upper Lake Melville area. The Panel concluded that, while it did not expect much in-migration of Project workers from outside Labrador, there could be substantial in-migration to Happy Valley-Goose Bay from other Labrador communities.

Some participants expressed concern that the Project would result in some local businesses experiencing adverse impacts in the form of employee retention problems and threats to economic viability because of the necessity to pay higher wage rates. The Panel concluded that any such impacts would occur primarily in Happy Valley-Goose Bay and would not be significant.

The Panel notes that, while the statistical data was separated for Muskrat Falls and Gull Island, most of the benefits discussion was based on the Project as a whole. The fact that Gull Island is a completely separate sanction decision from Muskrat Falls leads to uncertainty regarding the time lag between the two and this has economic implications.



### Enhancing Employment and Business Opportunities

The Panel concluded that Nalcor's Benefits Strategy and monitoring and mitigation commitments would contribute to the enhancement of employment benefits from the Project, ensuring meaningful employment experiences, and enhanced benefits to local and provincial businesses from the supply of goods and services to the Project. However, there are a number of further enhancement measures that should be taken by Nalcor. At the same time, the Panel notes that prospective workers or businesses would also carry some responsibility to ensure that local benefits were realized.

The Panel's recommendations to enhance employment benefits included: early candidate selection and training, workplace attachment for apprenticeship graduates, providing training to 'journey person' level in community of residence, orientation to assist prospective employees prepare for participation in wage economy, continuation of the Labrador Aboriginal Training Partnership, and an employment outreach program to Aboriginal communities in Quebec.

The Panel's recommendations relating to business opportunities included quantitative targets for goods and services, an enhanced supplier development program, and a transparent bidding process. The Panel also recommended modifying the Benefits Strategy to ensure that the various statistical reports are available publically and that the established employment and business targets cannot be changed at the Minister's discretion.

## **FAMILY AND COMMUNITY LIFE, AND PUBLIC SERVICES**

### Communities and Families

Nalcor stated that both positive and adverse effects to community life would occur as a result of the Project. The Panel heard many concerns about the health of Upper Lake Melville residents, and particularly in Sheshatshiu, where participants described their community as being particularly vulnerable, citing the numbers of children in care and the high rate of youth suicide as indicators. Project-related risks would include the potential for high incomes from wage employment to increase alcohol and drug use, with subsequent effects on mental health, family well-being, community stability, and loss of the traditional way of life. Without adequate mitigation, the Panel concluded that the Project would cause significant adverse effects on the health and welfare of children and youth, particularly in Sheshatshiu. If the measures recommended by the Panel were applied, these adverse effects could be avoided.

Nalcor noted that the *Tshash Petapen* Agreement would provide resources that could address any increases in community stresses in the Sheshatshiu population. While the Panel observed that the financial security offered by such an agreement would place the community in a better position to address existing social problems, in the absence of detailed information, the Panel cannot assume that these adverse effects would be fully mitigated. The Panel therefore recommended that Innu Nation, the provincial and federal governments and Nalcor develop a Memorandum of Understanding to determine how each party could bring appropriate resources to developing appropriate mitigation of Project-related social effects in Sheshatshiu.

The Panel was told that similar social effects would likely occur in Happy Valley-Goose Bay, but observed that such effects would likely be somewhat less severe. The Panel was not provided with baseline data regarding the existing levels of alcohol and drug abuse and related sexual assault and family violence in Happy Valley-Goose Bay because much of this information was not available. However, women's groups indicated that they already see many unaddressed problems and would expect more if the Project proceeded.

The Panel concluded that there is the potential for adverse effects resulting from high wage employment, including increased substance abuse, and sexual assault, family violence and adverse effects on women and children in Happy Valley-Goose Bay. These effects would be difficult to monitor because of the lack of data and because, by nature, the effects are often hidden. For this reason, the Panel concluded that mitigation must include a research element. The Panel recommended that the provincial Department of Health and Community Services, in consultation with Aboriginal groups, and government and community agencies, conduct a social effects needs assessment, including participatory research, to provide recommendations for social effects mitigation measures and monitoring.

The Panel also made recommendations regarding the provision of substance abuse counselling at the work sites for Project employees, and provision of a variety of work schedules to increase participation in the workforce by women and Aboriginal persons.

The Panel concluded that the Project would also provide family and community benefits in the form of increased employment, higher incomes, opportunities for young people, and resources to support traditional activities.

### Community Services

Nalcor indicated that health and social services in Upper Lake Melville were near or at capacity, but said that the Project would not significantly add to the demand for services because its accommodation and transportation policies would reduce the likelihood of in-migration and Nalcor would provide some health and social services to Project workers at the construction camps.

The Labrador-Grenfell Regional Health Authority stated that the regional health centre in Happy Valley-Goose Bay did not have the resources to address existing health and addictions needs in the communities. Both Nalcor and the Province agreed that it was the provincial government's responsibility to address any service shortfall, though the Panel also heard other views.

Participants also expressed concerns that the Project could result in people moving away permanently from coastal communities because of the challenges associated with travel, new employment opportunities opening up in Happy Valley-Goose Bay, or simply wanting to take advantage of services and recreational opportunities in a larger centre.

The Panel concluded that in-migration levels would exceed Nalcor's predictions as people moved into the community to fill job openings caused by people leaving to take higher-paid employment with the Project. The Panel therefore recommended that the provincial Department of Health and Community Services make a formal commitment to provide the human resources to address any Project-related increase in demand for mental health, addictions and other health and social services, with financial contributions from Nalcor as required.

### Community Infrastructure

Nalcor indicated that the Project would require use of infrastructure within the community of Happy Valley-Goose Bay, mainly during the construction period, including roads, the landfill site, the port, the airport and industrial and commercial land. Nalcor committed to work with the Town of Happy Valley-Goose Bay on planning and infrastructure issues but, since the Project would be located outside town boundaries, it would not be making payments to the Town by way of taxes or grants in lieu. The Town told the Panel that, while there was enough infrastructure capacity to deal with existing demand, Project-related increases would be problematic and the Town's budget was not sufficient to address the issue.

The Panel noted that several provincial government departments have a role in ensuring that the increased need for infrastructure and municipal services is met. The Panel also recommended that the Province and Nalcor negotiate a capacity agreement with the Town to provide financial resources to increase the Town's capacity to respond to additional administrative demand.

Many participants expressed concerns regarding the existing housing shortage in Happy Valley-Goose Bay, and particularly the resulting pressures on low-income families. The private market might not fully respond to what could be a fairly short-term "housing boom". A number of participants suggested that the unused housing stock at 5 Wing Goose Bay Military Base could provide a solution.

The Panel concluded that the Project and higher than predicted levels of in-migration would have adverse effects on the availability of low-income housing in Happy Valley-Goose Bay. The Panel therefore recommended that the Town of Happy Valley-Goose Bay, supported by Nalcor and relevant government departments and housing agencies, develop a low-income housing strategy with measurable targets.

#### Human Health, Country Food and Mercury

The consumption of country food contaminated with methylmercury poses risks to human health, particularly in pregnant women and young children. Consumption advisories may effectively mitigate this risk by dissuading people from eating certain food from certain sources, but can also have the effect of reducing confidence in all country food, which can also lead to negative health effects.

Nalcor predicted that consumption advisories would likely apply to fish caught in the main stem of the Churchill River, but not downstream in Goose Bay and Lake Melville. Through the course of the review, the Panel concluded that this prediction was less certain, because of new information regarding the downstream extent of mercury impacts from the Churchill Falls project and concerns raised about the lack of baseline information on existing mercury body burdens. The Panel recommended further assessment of this issue and concluded that consumption advisories, if required in Goose Bay and Lake Melville as a result of elevated mercury in fish or seal, would constitute significant adverse effects on the residents of the Upper Lake Melville communities and Rigolet. The Panel did not make a similar determination for the main stem of the river because of evidence that few people currently fish there.

As a result, the Panel also recommended that Nalcor be required to enter into negotiations with parties representing resource users in Goose Bay and Lake Melville regarding further mitigation, where possible, or compensation measures, including financial redress if necessary, should consumption advisories be required in this area.

The Panel made related recommendations regarding implementation of consumption advisories, monitoring of human health and mercury, country food dietary surveys and research about mercury in a complete range of country food.

#### Panel Observations on Other Key Community Concerns

The Panel noted a number of additional concerns emerging from evidence provided at community hearings and has made some observations for the information of government decision makers on the following issues:

- electrical power for communities on the coast;

- disparity in financial benefits;
- Churchill Falls redress; and
- consultation with Aboriginal communities.

## **ACCIDENTS AND MALFUNCTIONS**

Participants' main concern was with the possibility and outcome of a major dam failure which could be caused by water overtopping a dam because of an extreme weather event or by a breach in the dam structure.

A dam failure at Muskrat Falls would result in a warning time of approximately two hours, which Nalcor said would be sufficient to avoid loss of life. A dam failure at Gull Island would result in longer warning time and would likely trigger a failure at Muskrat Falls. A failure at the Smallwood Reservoir, which would likely trigger failures of the dams downstream, would have a considerably longer warning time. Dam failure would result in complete inundation of Mud Lake and partial inundation of the lower areas of Happy Valley-Goose Bay. Should that occur, Nalcor predicted economic losses in the order of \$250 million for property in the communities and over \$6 billion for loss of Nalcor's own infrastructure.

Nalcor indicated that the dams would be designed and constructed according to the current standards of the Canadian Dam Association and that it would ensure that the appropriate preventive and mitigation measures, including Emergency Preparedness and Emergency Response Plans, are implemented.

Participants expressed concern about the resources required to prepare effective warning and evacuation strategies, about potential financial losses should a dam failure occur, and the stress of ongoing worry about such an event.

The Panel concluded that dam failure would result in significant adverse effects but would be unlikely to occur. The Panel recommended, however, that Nalcor should assume liability for all personal and financial losses that would be incurred downstream in the unlikely event that one or more dams failed, regardless of the specific cause.

## **ENVIRONMENTAL MANAGEMENT**

Environmental management issues – mitigation, monitoring, follow-up, adaptive management and community and regulatory oversight – were discussed throughout the EIS and the review process. Nalcor made extensive mitigation and monitoring commitments, as listed in the full report. Participants raised concerns regarding Aboriginal and stakeholder involvement, reporting, financial commitments, both by Nalcor and other parties involved in monitoring, and adherence to terms and conditions attached to release from the environmental assessment.

The Panel made a number of recommendations regarding:

- an authorizing regulation that would list all environmental management commitments and require Nalcor and relevant provincial government departments to implement them;
- a joint federal-provincial regulatory plan, with annual reporting on compliance;
- long-term funding commitments for environmental management from Nalcor and the provincial and federal governments;
- a monitoring and community liaison committee, appointed by the Province, with sufficient resources to provide oversight of mitigation and monitoring;
- how monitoring and adaptive management should be carried out; and

- a complaints resolution process.

In addition, the Panel recommended that, should construction of the second generation facility be delayed beyond a certain length of time, the environmental release should expire, and an additional environmental review be required.

### Decommissioning

Nalcor stated that it had no plans to decommission the Project; components would be refurbished as required to continue operation. Should decommissioning be required at some point in the future, the environmental impacts and mitigation requirements would be assessed at that time. Nalcor noted that decommissioning would have substantial environmental implications, particularly relating to the possible release of sediments downstream and reconfiguration of the river shorelines.

The Panel concluded that Nalcor should take responsibility for the possibility of decommissioning and recommended that Nalcor be required to demonstrate how it would do this – this could include insurance, a bond or creation of a dedicated fund.

## **CUMULATIVE EFFECTS**

The Panel concluded that Nalcor's approach to cumulative effects assessment was less than comprehensive and that participants had raised valid concerns that contributed to a broader understanding of the potential cumulative effects of the Project. The Panel recognized the challenges involved, including limited information about past projects such as the Churchill Falls project, and the built-in disincentive for proponents to identify adverse cumulative effects when they are perceived as a potential threat to project approval.

The Panel recommended that government agencies support regional processes to ensure a broader based, more integrated approach to cumulative effects assessment, and also that the Province move ahead with the Protected Areas Strategy to increase the percentage of land under protection in Labrador, with the goal of eventually reaching 10 to 15 percent of Labrador's total area, defined by the Strategy as the desirable amount for adequate conservation purposes.

## **PANEL'S CONCLUDING COMMENTS**

The Panel offered concluding comments to help government decision makers with the task of determining whether the Project would make an overall contribution to sustainability. The Panel was guided by the following principle:

**The effects, risks and uncertainties of the Project should be fairly distributed among affected communities, jurisdictions and generations, and the Project should result in net environmental, social and economic benefits.**

When trying to determine if there would be net benefits, the Panel looked at the residual adverse effects and the predicted Project benefits separately for biophysical issues and socio-economic issues. In other words, the Panel did not make the assumption that adverse biophysical effects could be automatically compensated by economic benefits.

The Panel asked seven questions:

*Would there be net economic benefits?*

Positive benefits would include employment and business benefits, particularly during construction, and – for Innu Nation – the revenues and business opportunities associated with the *Tshash Petapen* Agreement. Other long-term economic opportunities would include those related to increased business capacity, a training legacy, additional lower-cost power in Labrador, energy security and price stability, and provincial revenues for the life of the Project. Uncertainties and risks related to the viability of the Muskrat Falls component and market access uncertainties for Gull Island and the effect of both on long-term benefits. The Panel made recommendations to address and resolve these uncertainties. Once the required further financial assessments have been carried out, decision makers would be able to determine whether the Project, under the various scenarios contemplated by Nalcor, would have a net economic benefit and at what scale. If the whole Project proceeds, the Panel had reasonable confidence that the adverse economic effects and risks would be outweighed by the potential for large-scale economic benefits.

*Would there be net social and cultural benefits?*

Benefits would include training, employment and increased incomes during construction. Adverse effects would include the risk of increased drug and alcohol problems and their effects on families, the effects of the housing shortage, possible inflation of the cost of goods and services, changes to country food and traditional activities, and loss of valued cultural sites, including the “loss of the river”. The Panel noted that information on current land and resource use by some Aboriginal groups is not yet complete. Other uncertainties included whether and how mitigation would be carried out, and how individuals and community leaders choose to respond to the Project. The Panel concluded that it is possible but uncertain whether the Project as proposed by Nalcor would result in net social benefits. However, there are clearly opportunities to enhance this possibility.

*Would there be net biophysical benefits?*

Biophysical benefits would mainly derive from the greenhouse gases displaced by sale of the Project’s renewable power. The Panel did not have sufficient information to know exactly how large this effect would be but made recommendations as to how it could be maximized. The adverse biophysical effects would include – among others – the loss of fish, riparian, wetland and terrestrial habitat, and the risk to the Red Wine Mountain caribou herd. The Panel acknowledged the difficulty of comparing a benefit that accrues at a much wider, North American (and potentially global) scale with adverse effects that are experienced locally in Labrador. The Panel concluded the Project would not result in net biophysical benefits, although it is possible that the adverse effects could be offset to a certain extent by a commitment to permanently protect other land and rivers in Labrador.

*Would there be net benefits to future generations?*

Future benefits would include energy security (although in the context of Newfoundland and Labrador, this is already assured by the availability of Churchill Falls power in 2041), and potentially long-term provincial revenues. Innu Nation would also realize long-term financial benefits. Adverse future effects would include the “loss of the river” and cultural sites, and also the risk that some of the predictions about Project effects may turn out to be inaccurate. The Panel concluded that there is uncertainty regarding this question.

*Would there be net benefits to Newfoundland and Labrador?*

The Panel concluded that the Project might deliver net economic benefits to the Province as a whole, depending on the results of the recommended studies regarding long-term benefits and alternatives. The residual environmental effect for Labrador would likely be adverse. Whether there would be net social and economic benefits for Labrador would depend on whether enough of the revenues generated by the Project were re-invested in Labrador.

*Would there be net benefits beyond Newfoundland and Labrador?*

Overall, the Panel believed that there would be net benefits beyond the province in the form of employment and business opportunities, greenhouse gas reduction, and energy stability. Adverse effects might be experienced to a certain degree by Aboriginal communities in Quebec.

*Would there be net benefits to individual communities?*

Happy Valley-Goose Bay would experience a range of effects, positive and negative. On balance, with appropriate mitigation, the Panel concluded that net benefits would result.

In Sheshatshiu, the situation would be complex and uncertain. The *Tshash Petapen* Agreement would clearly deliver many resources and opportunities, including increased self-government. On the other hand, the Panel was told of the many social and cultural challenges in the community. On balance, the Panel believed net benefits are possible in Sheshatshiu.

In Mud Lake, North West River and Rigolet, net benefits appear less likely. Whether the overall effect would be neutral or adverse, would depend on the degree to which residents obtain employment and whether downstream consumption advisories are required. Mud Lake would also be more vulnerable to adverse Project effects on transportation across the river, and the risk of a dam failure event, even if very unlikely. The Panel concluded the effect in Nain and Cartwright would likely be neutral, with some opportunities but also some risk of out-migration.

The Panel concluded that the Project would be unlikely to deliver benefits to Aboriginal communities in Quebec. The Panel was unable to determine whether there would be adverse effects on land and resource use or rights and title. This should be addressed through ongoing government consultation.

*Concluding Thoughts on the Final Project Decision*

The Panel concluded that if the recommended economic and alternatives studies show that there are alternative ways of meeting the electricity demands of the Island over the medium term in a manner that is economically viable and environmentally and socially responsible, the Muskrat Falls portion of the Project should likely not be permitted to proceed for purposes of meeting Island demand.

If market access for Gull Island were resolved based on reasonable transmission costs and the Gull Island facility were to be developed first, or a joint sanction decision were to be made, the Panel believed the situation would be different. The Gull Island facility would produce more power at a lower unit cost and therefore would offer much greater potential to provide lower cost power to Newfoundland and Labrador and generate revenues for the Province.

The effect of the Project on Aboriginal rights and title as well as the effect on current land and resource use by Aboriginal communities has yet to be fully understood and agreements have yet to be reached with affected communities on how any impacts would be addressed. These

issues could be addressed together in the context of the *Federal Aboriginal Consultation Framework for the Lower Churchill Hydroelectric Generation Project*.

Finally, the Panel wants to thank everyone who participated in the review process, including individuals, organizations, government representatives, and Nalcor. Your hard work, persistence, and willingness to share experience, knowledge, ideas and aspirations with the Panel was invaluable. The Panel writes the report but the environmental assessment as a whole is truly a collective effort. It is our hope that all participants in this environmental assessment feel that they have both contributed to the conclusions and recommendations reached and have learned from other participants during the course of the process.



### 4.2.3 Panel Conclusions and Recommendations

In reaching its conclusions on Alternatives to the Project, the Panel considered the following factors to be particularly relevant:

- Nalcor's position that it considered a list of potential alternatives and concluded that none were economically or technically feasible compared to the Project and none could meet the stated need of developing the hydroelectric potential of the Lower Churchill river (and in so doing generate 3,074 MW of energy);
- the Panel's conclusion respecting Project need in Section 4.1;
- separate sanction decisions for Muskrat Falls and Gull Island leading to separate consideration of alternatives to each;
- Nalcor's information regarding the distribution of Muskrat Falls production;
- Nalcor's analysis and conclusion that there is no lower cost alternative to Muskrat Falls to meet the province's domestic demands;
- questions raised by participants with respect to Nalcor's analysis;
- alternatives suggested by participants to meet domestic demand, including a detailed outline of a proposed 800 MW wind farm on the Avalon; consideration of a more aggressive demand management program (with incentives to curtail electric base board heating); a combination of small hydro and other renewables; and, utilizing natural gas from offshore to replace oil-fired Holyrood;
- information on cash flows, conservation and alternate energy sources (Panel's March 21<sup>st</sup> letter to Nalcor and Nalcor's response); and
- questions related to the cash flow stream for Muskrat Falls and implications for island rate payers and the regulatory system.

As noted in Section 4.1, it is the Panel's position that Nalcor's inclusion of developing the hydroelectric potential of the lower Churchill River as a Project need led to an inadequate consideration of alternatives to meeting its other stated needs.

With regard to alternatives to the Project, the Panel has focused its attention on Muskrat Falls, on Nalcor's contention that it is the best way to meet domestic demand, and on consideration of potential alternatives to meet that demand. In response to Panel requests, Nalcor has presented considerable detail on the cost of Muskrat Falls power delivered to the Island, on its cash flow and on the assumptions used. That information is summarized in Section 4.1.1 and the Panel raised a number of related questions in Section 4.1.3.

Nalcor has also provided a comparison of Muskrat Falls to its No Project option, where the Island's demand would be met by significant expenditures to upgrade or replace Holyrood and to build new generating capacity, including a combination of new thermal, wind and hydro projects on the island. Nalcor's assessment is that the Muskrat Falls option offers ratepayers a \$2.2 billion benefit compared to its thermal alternative. The comparison period was over a 50 year period, 2017 to 2067. The Panel can also report that this topic generated a significant level of interest, concerns, questions, comments and detailed suggestions from participants as outlined in the evidence presented earlier in this Chapter.

At the same time the Panel acknowledges that Nalcor has significant knowledge regarding details of the Island's grid system, its strengths and limitations, constraints related to dispatchable power requirements, etc., that the Panel and participants generally do not have.

Nevertheless, there are many outstanding issues and these remain despite the considerable attention given to this subject through relevant information requests and at the hearing, including the Panel's March 21<sup>st</sup> letter to Nalcor, Nalcor's response dated April 1<sup>st</sup>, and the special hearing session on April 13<sup>th</sup> to address both. In summary, these include: the significance of several different domestic demand projections; widely different views regarding the potential contribution of energy conservation and demand management to reduce overall energy demand; criticism of current efforts in this province compared to other jurisdictions regarding conservation and demand management; potential contributions of alternate on-Island energy sources; the significance, in energy cost comparisons to 2067, of available Churchill Falls power in 2041 and recall power currently available; Nalcor's cost estimates and assumptions with respect to its no Project thermal option; the economics of offshore gas as a potential less costly option than burning oil at Holyrood; cash flow projection assumptions for Muskrat Falls and implications for Provincial ratepayers and regulatory systems.

It is the Panel's view that all of this should be addressed by commissioning an independent analysis of alternatives. Based on what participants said, such an analysis would provide needed credibility and would be beneficial to both Nalcor and the Government of Newfoundland and Labrador. Further, without the independent analysis, matters regarding the Muskrat Falls income stream, implications for ratepayers, and what electricity rates might otherwise be, cannot be determined.

An appropriate question for the analysis to address is "What would be the best way to meet domestic demand under the No Project option, including the possibility of a Labrador-Island interconnection no later than 2041 to access Churchill Falls power at that time, or earlier, based on available recall?" An independent analysis of this question would provide alternatives that could then be compared to Muskrat Falls and Nalcor's primarily thermal option which was based on complete upgrading and replacement of Holyrood.

The 'best way' to meet domestic demand is not just the least cost. Environmental considerations should be taken into account. For example, without the Project, could some of the emissions from Holyrood be partially or completely displaced by on-Island renewable energy sources?

**The Panel concludes that Nalcor's analysis that showed Muskrat Falls to be the best and least cost way to meet domestic demand requirements is inadequate and an independent analysis of economic, energy and broad-based environmental considerations of alternatives is required.**

#### **RECOMMENDATION 4.2 Independent analysis of alternatives to meeting domestic demand**

The Panel recommends that, before governments make their decision on the Project, the Government of Newfoundland and Labrador and Nalcor commission an independent analysis to address the question "What would be the best way to meet domestic demand under the 'No Project' option, including the possibility of a Labrador-Island interconnection no later than 2041 to access Churchill Falls power at that time, or earlier, based on available recall?" The analysis should address the following considerations:

- why Nalcor's least cost alternative to meet domestic demand to 2067 does not include Churchill Falls power which would be available in large quantities from 2041, or any recall power in excess of Labrador's needs prior to that date, especially since both would be available at near zero generation cost (recognizing that there would be transmission costs involved);

## 16 CUMULATIVE EFFECTS

This chapter reviews Nalcor's approach to assessing the cumulative effects of the Project and the overall findings. Other chapters cover cumulative effects on specific valued ecosystem components and key indicators of the biophysical and socio-economic environments. Cumulative effects are defined in the EIS Guidelines 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.

### 16.1 NALCOR'S VIEWS

Nalcor carried out an assessment of the cumulative environmental effects of the Project as required in the EIS Guidelines. In its cumulative effects assessment, Nalcor employed a screening process that considered all relevant past, present and reasonably foreseeable projects and activities where biophysical and socio-economic effects could potentially overlap, both temporally and spatially, with effects of the Lower Churchill Project. The following projects and activities were identified and assessed:

- Voisey's Bay project;
- Labrador West mining;
- additional transmission lines (including transmission lines to the Island);
- upgrades to the Trans Labrador Highway;
- commercial forestry;
- cultural and recreational land use;
- infrastructure projects and economic development in Upper Lake Melville (including 5 Wing Goose Bay Military Base remediation project); and
- military training (North Atlantic Treaty Organization Special Forces Training).

A number of projects and activities were considered but not assessed because they either took place in the past and effects were determined to be reflected in baseline conditions (such as the Churchill Falls development), or they were not reasonably foreseeable (such as mining of mineral sands, aluminum smelter and uranium mining). Nalcor gave the following reasons for excluding the latter group of projects from its cumulative effects assessment:

- mineral sands mining is hypothetical and regulatory authorities would address any requirements for environmental management;
- aluminum smelter is hypothetical and environmental assessment planning and regulatory authorities would ensure that adverse effects would be minimized; and
- uranium mining would be physically removed from the Project, without the possibility of overlapping biophysical effects, and relevant planning and regulatory authorities would ensure proper planning and management for infrastructure, social services, fish and wildlife.

In response to concerns from participants regarding the remediation of contamination at 5 Wing Goose Bay Military Base, Nalcor stated that this project had undergone an environmental assessment which concluded that there would be no work undertaken in the Churchill River and no risk of contaminants entering the river because groundwater flows are minimal. Nalcor predicted that there would be no interaction with the Lower Churchill Project.

Nalcor used the following approach for its cumulative effects assessment. The cumulative effects of past and present projects and activities were considered to be captured in the baseline conditions of the existing environment and hence, were incorporated in the assessment of Project effects and mitigation measures. Temporal boundaries did not track environmental changes over time because again, past effects were considered to be captured in baseline conditions. For reasonably foreseeable future projects or activities, Nalcor relied on experience and expert opinion for a largely qualitative assessment of cumulative effects. Spatial boundaries for the assessment of cumulative effects were generally the same as those used for Project effects. Nalcor did not address the potential for cumulative effects resulting from induced development. It stated that induced development could not be predicted with any certainty and that any new projects would be subject to government approval and environmental assessment, including assessment of cumulative effects.

Using this approach and the same significance criteria as for Project effects, Nalcor determined that cumulative effects for most valued ecosystem components and key indicators would be adverse but not significant, with the exception of the following:

- Red Wine Mountain Caribou – adverse and significant;
- aquatic environment – neutral; and
- economy and employment – positive and significant.

In response to participant concerns, Nalcor stated the following:

- the cumulative effects relating to all valued ecosystem components and key indicators of the biophysical and socio-economic environments were considered appropriately, in accordance with the EIS Guidelines;
- the spatial and temporal boundaries and baseline conditions used to predict Project effects were adequate for assessing cumulative effects; and
- its predictions of residual environmental Project and cumulative effects were precautionary, based on conservative assumptions, professional judgment, and effective proposals for mitigation, monitoring, follow-up and adaptive management.

## 16.2 PARTICIPANTS' VIEWS

Participants raised several issues pertaining to Nalcor's approach to cumulative effects assessment, including the following:

- spatial and temporal boundaries for the cumulative effects assessment were not sufficiently broad;
- the notion of reflecting past and present projects and activities in baseline conditions did not give an understanding of past changes, particularly changes to the lower Churchill River resulting from the Churchill Falls development; and
- environmental management measures undertaken for the Project would not respond to the cumulative effects of other projects and activities.

Participants commented that Nalcor's approach varied from the EIS Guidelines and from guidance provided in the *Practitioners Guide for Cumulative Effects Assessment* published by the Canadian Environmental Assessment Agency, which states the following:

- cumulative effects boundaries will generally be different from (larger than) the boundaries for the corresponding Project effects; and
- past actions often become part of the existing baseline conditions; however, it is important to ensure that the effects of these actions are recognized.

Participants noted potential interactions with the fuel remediation project and also expressed concerns regarding the exclusion of future projects, such as mineral sands mining, uranium mining, future hydroelectric development, aluminum smelter and other potential induced developments, from Nalcor's cumulative effects assessment.

In particular, participants had concerns about potential cumulative effects relating to many valued ecosystem components and key indicators of the biophysical and socio-economic environments covered in other chapters of the report, including the following:

- effects of climate change and reservoir creation on water temperature, fish growth and spawning (Chapter 6);
- downstream effects below Muskrat Falls, in Goose Bay and in Lake Melville (Chapter 6);
- riparian habitat loss as a result of the Churchill Falls and Lower Churchill projects (Chapter 7);
- effects of any increased stress on the Red Wine Mountain and George River caribou herds (Chapter 7);
- changes in Aboriginal and non-Aboriginal land and resource use and local perceptions about the safety of country food as a result of methylmercury contamination from the Churchill Falls and Lower Churchill projects (Chapters 6, 8, 9 and 13);
- changes in the timing of ice formation and break-up because of the combined effect of climate change and the Project (Chapter 8);
- effects on Aboriginal lifestyle of hydro-related flooding, transmission lines, increased regional access and the increased presence of other Aboriginal and non-Aboriginal land and resource users (Chapter 9); and
- socio-economic effects due to the Project, the Labrador-Island Transmission Link and various potential future development projects (housing shortage in Happy Valley-Goose Bay, labour shortage, loss of employees to construction jobs, effects of in-migration on families and community infrastructure and services) (Chapters 12 and 13).

### **16.3 PANEL CONCLUSIONS AND RECOMMENDATIONS**

The Panel considered the cumulative effects assessment information submitted by Nalcor and participant concerns regarding its adequacy. Through information requests and the public hearing, the Panel sought further information regarding the effects of the Churchill Falls development, downstream effects, and justification for assessment boundaries and cumulative effects assessment methodology. At the end of this process, it is the view of the Panel that Nalcor's approach to cumulative effects was less than comprehensive and that participants raised valid concerns that contributed to a broader understanding of the potential cumulative effects of the Project.

Participant input regarding the residual effects of the Churchill Falls development highlighted the limitations of Nalcor's approach of including the effects of past projects in baseline conditions, without clearly acknowledging these effects. Generally, Nalcor's approach illustrates the limitation of project-specific cumulative effects assessment, namely that the end result is the potential for incremental decline in the biophysical and socio-economic environments with each successive development.

It is the view of the Panel that the cumulative effects assessment process for this Project is an example of the poor track record of project-based cumulative effects assessment. The Panel also recognizes that there are some inherent limitations to a project-based approach to cumulative effects assessment. These include the following:

- limited information about the effects of past projects, such as the Churchill Falls development, that occurred prior to the advent of environmental assessment; and
- the disincentive for proponents to identify adverse cumulative effects when they are perceived as a potential threat to Project approval.

Given that resource development is likely to continue in Labrador and that it is difficult to ensure that cumulative environmental effects will be recognized and addressed through individual project environmental assessments and management programs, the Panel believes that there is a role for government agencies to support regional processes to ensure a broader, more integrated approach to cumulative effects assessment. This could include the addition of cumulative effects considerations to the mandate of the Northern Strategic Plan or a Strategic Environmental Assessment of hydroelectric and other industry development.

**RECOMMENDATION 16.1 Regionally integrated cumulative effects assessment**

The Panel recommends that, if the Project is approved, the provincial Department of Environment and Conservation, in collaboration with the provincial Department of Labrador and Aboriginal Affairs and other relevant departments, identify regional mechanisms to assess and mitigate the cumulative effects of current and future development in Labrador.

Protected areas can play an important role in limiting the cumulative adverse environmental effects of development in Labrador over time. The Panel was informed that the process of establishing protected areas is underway by the Province. However, limited areas are currently under protection in Labrador. In light of recent and expected future development, adequate protection of wilderness areas should be made a priority. It is critical for the effectiveness of protected areas that their selection be based on ecological considerations rather than based on which areas have the least development potential.

**RECOMMENDATION 16.2 Establishment of protected areas**

The Panel recommends that, if the Project is approved, the provincial Department of Environment and Conservation commit resources to advance the Protected Areas Strategy process by working towards the following goals and reporting annually on progress:

- identify priority candidate areas for provincial protection in Labrador in order to bring the total protected area (federal and provincial) up to the national average (approximately 8.5 percent) before any additional major development is approved in Labrador;
- identify additional candidate areas in Labrador needed to bring the total protected area up to the level identified in the Protected Areas Strategy as desirable for adequate conservation purposes (10 to 15 percent);
- through this process, address preservation of representative areas of all ecozones, mitigation of habitat fragmentation, especially for migratory wildlife, and protection of selected rivers; and
- establish a schedule to ensure that priority candidate areas are protected.

## 17 PANEL'S CONCLUDING COMMENTS

### 17.1 INTRODUCTION

The Panel was appointed to meet the environmental assessment requirements of the Project under provincial and federal environmental assessment legislation. It is generally recognized that the purpose of environmental assessment is to ensure that projects contribute to sustainable development.

Under the *Canadian Environmental Assessment Act*, the goal of contributing to sustainable development is set out in the purposes of the Act. This goal is met in part through the requirement that a project that is likely to cause significant adverse environmental effects can only proceed if federal decision makers conclude that these effects are justified in the circumstances. Provincial decision makers have broader discretion to determine whether a project should proceed in light of the results of the environmental assessment process.

The Panel has:

1. determined that the Project would be likely to have significant adverse effects in the following areas:
  - fish habitat and fish assemblage;
  - terrestrial, wetland and riparian habitat;
  - the Red Wine Mountain caribou herd;
  - fishing and seal hunting in Lake Melville should consumption advisories be required;
  - culture and heritage (the "loss of the river").
2. identified a range of potential Project benefits; and
3. identified crucial additional information required before the Project should proceed in the areas of long-term financial returns, energy alternatives to serve Island needs and reducing uncertainty about downstream environmental effects.

For the Panel's approach to determining significant adverse effects, the reader is directed to Chapter 3.

Both federal and provincial decision makers will now need to determine whether the Project should proceed, in light of the significant adverse effects, risks and uncertainties identified in this report. The Panel report will inform the provincial decision under section 67 of the Newfoundland and Labrador *Environmental Protection Act* and the federal decision under section 37 of the *Canadian Environmental Assessment Act*. In both cases, the report of the Panel is the only source of information for decision makers identified in the legislation.

This chapter is intended to provide assistance to decision makers based on the Panel's lengthy and detailed involvement with the proposed Project over the past two and a half years, and invaluable experience in being able to engage in a dialogue with the Nalcor and a wide range of review participants during the hearing.

To address the complex task of providing advice as to whether and how the Project would contribute to sustainability, the Panel has been guided by the following principle

**The effects, risks and uncertainties of the Project should be fairly distributed among affected communities, jurisdictions and generations, and the Project should result in net environmental, social and economic benefits.**

The Panel's Terms of Reference mandate it to consider a broad range of social, cultural, economic and biophysical adverse effects and benefits of the Project, and to consider the need and purpose of the Project and potential alternatives. These are all issues that go beyond the identification of significant adverse environmental effects.

Before the hearings, the Panel developed a draft sustainability framework and invited comments. At the hearing, the Panel scheduled a topic-specific hearing on cross-cutting issues that included the topic of sustainable development. The framework was then further developed by Panel member Meinhard Doelle with input from other Panel members, and is included in Appendix 8. The Panel made use of this document in developing the analysis in this chapter. The Panel believes that the federal and provincial decision makers may also find it useful in reaching a final decision about the Project.

In the remainder of this chapter, the Panel, to the best of its ability and within the constraints of available information, presents the Panel's key findings with respect to the major components of the assessment, when considering whether the Project would be likely to result in overall benefits, whether the outcome is uncertain, or whether the effect of the Project would likely be negative.

It is worth noting that in contrast to much of the assessment, which focused on the important task of understanding potential adverse effects, the sustainability assessment focuses on whether and how the Project could deliver net benefits. A net contribution to sustainability could be the basis for determining under the *Canadian Environmental Assessment Act* whether significant adverse effects are justified in the circumstances, and whether, under the provincial environmental assessment process, the Project should proceed in light of the Panel's significance findings.

The Panel hopes that the following observations will assist government decision makers in reaching their respective Project decisions.

## **17.2 WOULD THE PROJECT PROVIDE NET ECONOMIC BENEFITS?**

The construction and operation phases of the Project would be very different. During construction, jobs, business opportunities, spin-off opportunities, taxes, and wood utilization opportunities would be among the key economic benefits. For the operation phase of the Project, there would be more limited job opportunities, though these would still likely be important to the local economy. Other long-term economic opportunities would include increased business capacity, opportunities related to the training legacy of the Project and, with the availability of additional lower-cost power in Labrador, opportunities associated with energy security and price stability, and provincial revenues for the life of the Project.

For Innu Nation, there would be considerable economic opportunities associated with the settling of its land claim and the associated control over its economic future. Innu Nation would also receive considerable revenues for the life of the Project, and members of Innu Nation would have training and employment opportunities. Innu Nation companies and joint ventures would have opportunities worth many millions of dollars associated with servicing the needs of the Project.



Adverse economic effects and risks of the Project are moderate, and largely centered around the uncertainties and risks surrounding the viability of the Muskrat Falls facility, and the uncertainty about market access for Gull Island power. If the Muskrat Falls facility were to proceed by itself because market access could not be resolved in a manner that makes Gull Island economically attractive, there is a risk that the Project would not generate sufficient revenues to cover the various mitigation and compensation commitments and needs associated with the Project, or the revenues for the Province necessary to ensure long-term economic benefits, and that it would result in higher power rates for the Island of Newfoundland than would be the case without it. The Panel has therefore recommended a formal financial review and an independent alternatives assessment to resolve these uncertainties and allow for a more accurate assessment of the economic risks.

Other adverse economic effects and risks include the potential challenges associated with existing businesses retaining employees in Happy Valley-Goose Bay, the stress of the Project on some local infrastructure, and the risk of adverse effects associated with a potential economic downturn at the end of the construction phase of the Project. On balance, the risk of these adverse economic effects is moderate.

If the whole Project proceeds, the Panel has reasonable confidence that the adverse economic effects and risks would be outweighed by the potential for large-scale economic benefits. Economic benefits during construction would be centered on jobs and business opportunities, while the dominant economic benefit during operation would arise from the potential revenues the Project would generate for the Province. The financial review recommended by the Panel (Recommendation 4.1) should give government decision makers a better understanding of whether these net economic benefits would materialize.

The results of the alternatives assessment recommended by the Panel (Recommendation 4.2) may affect whether a government decision to permit the Muskrat Falls facility to proceed should be made on the basis of a separate sanction decision by Nalcor, or whether other options, which might include commitments by Nalcor to a Gull Island only or a joint sanction decision for Muskrat Falls and Gull Island, should be considered.

The Panel believes that only after the financial review and alternatives assessment have been completed would government decision makers be in a position to carefully consider whether the Project, under the various scenarios contemplated by Nalcor, would have a net economic benefit, and at what scale.

### **17.3 WOULD THE PROJECT PROVIDE NET SOCIAL AND CULTURAL BENEFITS?**

Jobs, training and education, while offering economic benefits discussed in the previous section, also offer social benefits. In addition, the Project would offer gender equity opportunities and benefits to disadvantaged groups. Mitigation programs, both those proposed by Nalcor and those recommended by the Panel may provide additional social value.

The details of the agreements negotiated between Innu Nation, Nalcor, and federal and provincial governments were not available to the Panel; however, it is reasonable to expect that these agreements would be a catalyst for social and cultural opportunities for the Innu Nation. The Project would provide more opportunity to engage in a wage way of life, including the associated potential social benefits. The Project would also have the potential to result in a better appreciation and commemoration of the cultural heritage of the area.

Increased wages would clearly offer social benefits, but also have a history of contributing to social problems. A key concern among the potential adverse social effects would be the risk of increased drug and alcohol abuse resulting from an influx of money into Labrador communities. This in turn would lead to a range of adverse social consequences.

Individual members of communities in the vicinity of the Project who would not directly benefit from the Project in terms of jobs or increased business but would be affected by adverse social consequences such as increased cost of housing and services, would also be likely to experience some negative social effects. Out-migration from coastal communities would be beneficial to individuals who make this choice, but would have a negative impact on those communities.

The Project would have some negative effect on the culture of Aboriginal communities. Most notable among these effects would be the impact on the reliance on country food. Some of these effects would be direct impacts in the form of displacement of sources of food. Others would be indirect, such as the effect of food advisories, and the perception that country food is contaminated. Other cultural impacts on Aboriginal communities include the cumulative threats to their traditional way of life, the "loss of the river", the loss of sites of cultural importance to Aboriginal communities, and the effect of the Project on Aboriginal elders who are particularly attached to traditional values.

There are reasonable opportunities to reduce adverse social impacts and enhance benefits, but this outcome is not guaranteed based on the current mitigation commitments by Nalcor and the Government of Newfoundland and Labrador. A key question is whether the resources and a sustained effort would be put into assisting interested Labrador communities into a future that supports both a traditional way of life and a wage economy, and does so in a way that allows communities to choose their own path and offers social harmony.

The Panel notes that respect for traditional belief systems and the culture of affected Aboriginal communities by Nalcor and all governments involved would be important in ensuring the healing of the relationship with Aboriginal communities. The efforts made in this regard, in turn, would affect the ability of the Project to deliver net social and cultural benefits.

The Panel also notes that it has limited information on current use of land and resources for traditional purposes. In particular, the Panel is not in a position to assess how complete the information available on use of the Project area by members of NunatuKavut and by Aboriginal communities in Quebec is, making it difficult to conclude on the social and cultural impact of the Project on these communities. Furthermore, the Panel does not have a mandate to assess the strength of claims to Aboriginal rights and titles.

Clearly, the Project has the potential to result in social benefits to residents of Newfoundland and Labrador. Among these benefits are employment opportunities, energy security, improved infrastructure and social services. At the same time, the Project is likely to result in adverse social impacts, in particular to the communities of Happy Valley-Goose Bay and Sheshatshiu, the scale of which would in part, be determined by the commitment to, and success of mitigation measures.

The Panel notes that it is inherently difficult to predict the social and cultural consequences of this Project, as it depends on the choices made by community leaders and individuals within affected communities. Key to a positive social and cultural outcome, therefore, would be an ongoing commitment from all involved to address social issues, conduct careful monitoring, and provide the resources necessary to respond to the unexpected.

The Panel concludes that it is possible but uncertain that the Project as proposed by Nalcor would result in net social benefits. However, there are clearly opportunities to put in place measures on a sustained basis to mitigate negative social effects and enhance social benefits sufficiently so that the Project has the potential to result in net social benefits. Effectively implementing the recommendations in this report would go a long way to achieving this.

#### **17.4 WOULD THE PROJECT HAVE NET BIOPHYSICAL BENEFITS?**

The Panel's conclusion with respect to the key biophysical benefits of the Project is addressed in some detail in the Chapter on the Atmospheric Environment, mainly due to the focus on greenhouse gas emission displacement. The key biophysical benefit of the Project would be the displacement of other energy sources that would otherwise produce greater adverse effects. This means that the assessment of the biophysical benefit is linked to an understanding of whether the Project would displace coal, oil, gas, wind, hydro, nuclear, or energy conservation and efficiency efforts.

The quantification of the biophysical effects displaced by the Project is challenging. To reach a firm conclusion, the Panel would have to have accurate information on the sources of energy the Project would displace. Because this information was not available, the Panel can only make general comments about how large-scale hydro projects generally compare with major other sources of electricity. As a starting point, because all other sources of energy have some adverse biophysical effects associated with them, it is safe to conclude that the Project will displace some adverse biophysical effects elsewhere.

From a greenhouse gas emissions perspective, the Project would offer significant advantages over fossil fuel-based energy sources, and be generally comparable to wind, other hydro and nuclear power. Conservation and efficiency measures would rate better than the Project. From a general biophysical perspective, large-scale hydro again tends to rate better than fossil fuel based energy, but does not rate as well as wind or conservation and efficiency measures.

All this means that in order to avoid a net biophysical deficit the Project would have to maximize the displacement of fossil fuel based energy sources, and avoid the displacement of wind and conservation and efficiency measures. For the Island of Newfoundland, the independent alternatives assessment should allow government decision makers to better determine what energy sources the Project would displace. For other markets, the Panel did not receive sufficient information to determine displacement of fossil fuels by the Project but recognized that there would likely be ample opportunity.

Contrary to the uncertainty around potential biophysical benefits, the key adverse biophysical effects are reasonably well understood and assessed in some detail in the Aquatic and Terrestrial Chapters. The Panel in particular made a number of significance findings with respect to fish and fish habitat loss, terrestrial habitat loss, riparian habitat loss, and the risk to the threatened Red Wine Mountain caribou herd. A number of other adverse biophysical effects of the Project were noted in these chapters.

Only in case of displacement of fossil fuel-based power would there be any basis for concluding that the Project would result in a net biophysical benefit. Having said this, it is important to acknowledge the difficulty of comparing the significant adverse effects on the local environment against the concept of displacing greenhouse gas emissions and unspecified biophysical harm elsewhere.

As proposed, the Panel cannot conclude that the Project would result in net biophysical benefits. However, there are opportunities to minimize the biophysical deficit created by the Project. If care is taken to ensure the adverse effects are reduced through the additional mitigation measures proposed, careful monitoring and a commitment of the resources necessary to implement the inevitable adaptive management measures needed to respond to unanticipated consequences, the biophysical deficit can be significantly reduced. If in turn, additional measures are taken to ensure that the power from the Project displaces only fossil fuel based power, and most importantly does not displace renewable energy sources and conservation and efficiency, the Project could result in net biophysical benefits.

Finally, if it is not possible to create net biophysical benefits within the boundaries of the Project, the Panel suggests that consideration be given to compensating for the biophysical deficit through other measures designed to improve environmental protection in Labrador. Among measures that have been suggested to the Panel that deserve some consideration in this regard are a firm commitment to a comprehensive protected areas network in Labrador, and the protection of rivers in Labrador that are as close to the Churchill River as possible in terms of their biophysical characteristics.

### **17.5 WOULD THERE BE NET BENEFITS TO FUTURE GENERATIONS?**

Long-term energy security would be among the key benefits to future generations. The Panel observes that because of the existing Churchill Falls project, the long-term energy security for the province is already secure after 2041, so the main benefit to future generations in this regard would accrue to the rest of North America. Another potential benefit to future generations would be the predicted large-scale provincial revenues. Whether and at what scale these would be realized would depend on a number of factors, including whether the whole Project proceeds, whether economic access to markets can be realized, and the future of electricity demand and supply.

For Innu Nation, the Project offers the opportunity to control its own future. However, at the same time, part of its traditional lands would be flooded and it would lose part of its heritage in the form of the "loss of the river", along with a number of culturally important sites. The "loss of the river" is also generally a loss to future generations, well beyond Innu Nation.

Finally, and perhaps most importantly, future generations bear the risk and uncertainty that the predictions made about the benefits and adverse effects of the Project could turn out to be overly optimistic. The Panel has concluded that there are considerable uncertainties in the predictions about biophysical, social, cultural and economic effects of the Project. There are also considerable uncertainties about the effectiveness of mitigation measures.

The Panel has sought to make recommendations to reduce these uncertainties and risks, but many remain. Furthermore, the track record of full implementation of mitigation measures, monitoring and adaptive management commitments as a result of environmental assessments is mixed. All this leaves considerable uncertainty about the effect of the Project on future generations. Only a firm commitment to mitigation, monitoring and active adaptive management can serve to reduce this uncertainty.

### **17.6 WOULD THERE BE NET BENEFITS TO NEWFOUNDLAND AND LABRADOR?**

The effect of the Project on the province has been a primary focus of the overall report. The economic, social and environmental effects, risks and uncertainties are summarized in the

respective sections above. The realization of net benefits to the province of Newfoundland and Labrador would largely depend on large-scale economic benefits, and the effective mitigation of social and environmental impacts. The overall social impacts would likely be mixed, and a large-scale persistent effort would be needed to avoid a significant biophysical deficit to the province.

Net benefits to Labrador are even more dependent on a large-scale mitigation and adaptive management effort with respect to adverse social and biophysical effects expected for a long time to come. Labrador has the potential to benefit from the availability of power from the Project. While the social effects could likely be fully mitigated given adequate resources and time and could be expected to diminish after the construction period is over, the residual environmental effect, though much reduced, would still be negative for Labrador.

It is not clear based on the evidence before the Panel whether the Project would generate sufficient surplus revenues to cover the cost of this long-term mitigation and adaptive management effort, particularly with respect to the Muskrat Falls only scenario. The formal financial review should enable government decision makers to confirm whether this is a valid concern. A related concern expressed by many participants was that there is no firm financial commitment by either Nalcor or the Province to ensure sufficient resources are allocated to this effort over the long term, an issue that is addressed in the Panel recommendations. The Panel also heard much about the uneven distribution of costs and benefits between the Island of Newfoundland and the Labrador mainland.

The full Project would likely deliver net benefits to the Province. Whether it would also deliver net benefits to Labrador depends on whether enough of the revenues generated from the Project are re-invested in Labrador to ensure a net benefit.

If Muskrat Falls only proceeds on the basis that it would be needed to meet Island energy needs, then it is much less clear that the Project will result in net benefits to the Province as a whole or to Labrador. The financial and alternatives assessments would go a long way to confirming whether a net benefit is likely under such a scenario.

In case of a delay with the Gull Island component, the Panel has concluded that the benefits would generally be less and the adverse effects greater than the preferred scenario with overlapping construction. The overlapping construction scenario is therefore preferable from a net benefits perspective.

## **17.7 WOULD THERE BE NET BENEFITS BEYOND NEWFOUNDLAND AND LABRADOR?**

The Panel notes that the effects of the Project would extend beyond the province of Newfoundland and Labrador. There would be job opportunities for workers in the rest of Canada and beyond and opportunities throughout North America to use the power from the Project to reduce greenhouse gas emissions and other adverse impacts of other sources of energy. There are significant business opportunities beyond the province of Newfoundland and Labrador, and the Project has the potential to contribute to price stability and energy security in other jurisdictions.

There is also potential for the Project to have adverse effects beyond the province. Most notably, Aboriginal communities in Quebec are concerned that their use of land and resources, and their rights and title may be adversely affected by the Project. Finally, other economic opportunities elsewhere may be foreclosed if the Project proceeds.

Overall, the Panel is of the view, based on the information available to it, that the Project is likely to offer net benefits to jurisdictions beyond the province of Newfoundland and Labrador.

## 17.8 WOULD THERE BE NET BENEFITS TO INDIVIDUAL COMMUNITIES?

The Panel considered the effects, risks and uncertainties for individual communities in some detail throughout the report. Appendix 5 includes a summary of what the Panel heard at the various community sessions. The Panel's assessment and conclusions on community effects and benefits are discussed in Chapters 8, 9, 12 and 13. The following is a summary of the Panel's key findings for Happy Valley-Goose Bay, the Innu communities in Labrador, other Labrador communities, and Aboriginal communities in Quebec.

The community of Happy Valley-Goose Bay would likely be among the communities most directly affected by the Project, both positively and negatively. On the positive side, Happy Valley-Goose Bay would have every opportunity to ensure it received a major share of the economic benefits from the construction phase of the Project.

The ability to turn this economic benefit into a long-term benefit would depend on a number of factors. It would depend on whether the whole Project proceeds, and whether there would be an overlap in construction between the two components. It would also depend on the future of the military base and the ability to attract other business opportunities by the end of the construction period.

Happy Valley-Goose Bay would encounter a range of social challenges, among them a shortage of housing, a possible workforce shortage, increased drug and alcohol abuse, and an increase in violence against women and children. With appropriate mitigation, including those recommended by the Panel, a concerted monitoring effort and active adaptive management, there would be every opportunity to address these social impacts and ensure net benefits to Happy Valley-Goose Bay.

The overall effect of the Project on Sheshatshiu would be complex and uncertain. The settlement of Innu Nation's Land Claim, for which the Project clearly was a catalyst, would give the community much more control over its future. Furthermore, the *Tshash Petapen* Agreement would provide the community with the resources to address many of the serious social challenges it is facing. In short, there is every opportunity for the Project to be a good news story for the community, however, getting to that point would be a complex process that would likely require effective responses to many unexpected challenges.

Of the remaining communities, Mud Lake is closest to the Project and the area directly affected by it. Mud Lake could experience transportation disruptions during impoundment and also potentially at the time of freeze-up and break-up for the life of the Project. Mud Lake residents were also concerned about possible navigation changes and would be most at risk should a dam failure occur. The combined effect of these impacts, about which there is still considerable uncertainty, evidently made residents concerned about the future viability and character of their community. Mud Lake, North West River and possibly Rigolet, would be affected if consumption advisories were required in Lake Melville and by other possible consequences of downstream Project effects. At the same time, some members of these communities would be able to take advantage of the job and business opportunities the Project would provide, particularly during the construction phase.

The Panel concludes that these three communities would likely not receive a net benefit from the Project, unless a number of residents obtained employment with the Project. The

communities would likely only be significantly affected if downstream effects turn out to be much worse than predicted by Nalcor. However the Panel notes that Mud Lake is at somewhat greater risk of negative impact if effects turn out to be worse than predicted or if mitigation is not effective. If the Project is approved, it will be important to actively engage these communities in ongoing monitoring and adaptive management efforts. Further efforts requiring modest resources could be undertaken to ensure net benefits to each of these communities. If the Project is approved, the Panel encourages Nalcor and the Province to actively engage with each of these communities.

The Panel concludes that the effect of the Project on Cartwright and Nain would likely be neutral. There is some risk of minor adverse effects, such as the effects of out-migration, but also some potential for jobs, training and business opportunities for members of these communities. The risk of direct adverse effects from the Project on these communities would be small.

The Panel heard from seven Aboriginal communities in the province of Quebec that have made claims to rights and titles in the Project area, six of which presented to the Panel at community sessions held in Sept-Iles. As it is not within the mandate of the Panel to assess the nature or strength of these claims, the Panel is not in a position to comment on whether, or to what extent, there is a legal requirement to accommodate the concerns expressed.

The Panel received only anecdotal information on current use within the Project area by members of Aboriginal communities in Quebec. Nalcor's position on current use by Aboriginal communities in Quebec was that these communities make no or minimal use of the area likely to be affected by the Project. The information provided directly by Quebec Aboriginal communities was provided with the understanding that it was incomplete, and that sufficient time and resources were not made available to these communities to provide a complete picture of current use.

Most of the information about current use was provided by Chiefs and Elders from the community. Without common reference points and local knowledge, the Panel was not in a position to assess how much of the use discussed was in the Project area. As a result, the Panel was not in a position to assess the impact of the Project on current use by Quebec Aboriginal communities, although, based on the limited information presented, it would appear that the main current use of the Project area would be to hunt caribou.

In conclusion, the extent of the adverse impact on rights and title and current use on Aboriginal communities in Quebec could not be assessed by the Panel due to limits in its mandate and due to information gaps with respect to current use. Furthermore, there is no clear evidence of substantial benefits to these communities. This means that if there is a negative impact on the rights, titles, or current use by a given community, the net effect of the Project on that community would likely be negative unless additional steps are taken. Otherwise, the net effect of the Project on that community would likely be neutral.

It seems clear that these communities, to varying degrees, have suffered from impacts from previous developments without their consent and without meaningful consultation. Governments would be well advised to consider this history and make every effort to meaningfully engage with these communities before a Project decision is made.

## 17.9 CONCLUDING THOUGHTS ON THE FINAL PROJECT DECISION

If the financial review and alternatives assessments recommended by the Panel were to show that there are alternative ways of meeting the electricity demands of the Island over the medium term in a manner that is economically viable and environmentally and socially responsible, the Project should likely not be permitted to proceed for purposes of meeting Island demand. This is critical for the Muskrat Falls facility, because meeting Island demand has been put forward as its main justification.

If the Gull Island facility were to be developed first, or a joint sanction decision were to be made, this would be a different situation as the Gull Island facility would produce more power at a lower unit cost and therefore would offer much greater potential for revenue generation from the export of power. If market access for Gull Island were to be resolved, the cost of bringing Gull Island power to market would have to be carefully assessed by government decision makers. With this information and the projected price of power in accessible markets, the potential of the Project to provide lower cost power to Newfoundland and Labrador and generate revenues for the Province could then be assessed (see Recommendation 4.1).

The effect of the Project on Aboriginal rights and title as well as the effect on current use by Aboriginal communities has to be fully understood and agreement should be reached with affected communities on how any impacts will be addressed. These issues could be addressed together in the context of the federal consultation framework. In case of any impact on current use, Nalcor would then be asked to address the impacts identified. This would ensure that the process of repairing the relationships with Aboriginal communities could continue, and would ensure that the full costs of proceeding with the Project are understood.

At the hearing, the Panel heard a number of presenters from Labrador say that they had struggled long and hard to reach a personal decision about the merits of the Project, recognizing that it would deliver both local benefits, particularly during construction, and adverse effects including the "loss of the river". The Panel can certainly empathize with this struggle, and is aware that some readers of this report, hoping for a simple verdict (and particularly one that matches their own particular views) may be dismayed at the emphasis placed on caution, balancing, and conditional conclusions. The Panel maintains however that this is the only reasonable and responsible approach in what are very complex circumstances.

As the Panel observed in its closing remarks at the last day of the hearings, the five Panel members began the process with open minds. Throughout the review we have enquired, listened, and sought to understand to the best of our ability.

Finally, the Panel wants to thank everyone who participated in the review - individuals and organizations, communities, Aboriginal groups, governments and Nalcor. Your hard work, persistence, and willingness to provide information and share experience, knowledge, ideas and aspirations with the Panel was invaluable. The Panel writes the report but the environmental assessment as a whole is truly a collective effort. It is our hope that all participants in this environmental assessment feel that they have both contributed to the conclusions and recommendations reached and have learned from other participants during the course of the process.



## APPENDIX 2 JOINT REVIEW PANEL AGREEMENT AND TERMS OF REFERENCE

### AGREEMENT

#### Concerning

**The Establishment of a Joint Review Panel for the Environmental Assessment of the Lower Churchill Hydroelectric Generation Project**

between

**The Government of Canada, as represented by the Minister of the Environment**

and

**The Government of Newfoundland and Labrador, as represented by  
the Minister of Environment and Conservation and  
the Minister for Intergovernmental Affairs**

### PREAMBLE

**WHEREAS** Newfoundland and Labrador Hydro is proposing to develop hydroelectric generating facilities with interconnecting transmission lines on the lower section of the Churchill River;

**WHEREAS** the Project/Undertaking, as proposed by the Proponent, is subject to an environmental assessment under the *Canadian Environmental Assessment Act* and the *Environmental Protection Act*;

**WHEREAS** the Governments of Canada and Newfoundland and Labrador wish to ensure that the type and quality of information and conclusions on environmental effects required to satisfy their respective legislative requirements are produced through a single, effective and efficient environmental assessment process;

**WHEREAS** the Minister of the Environment of Canada has responsibilities pursuant to the *Canadian Environmental Assessment Act* and has referred the environmental assessment relating to the project to a review panel in accordance with subsection 29(1) of the Act;

**WHEREAS** the Minister of Environment and Conservation of Newfoundland and Labrador has responsibilities pursuant to the *Environmental Protection Act* and has recommended to the Lieutenant-Governor in Council of the Province of Newfoundland and Labrador that public hearings be held on the Project/Undertaking;

**WHEREAS** the Minister for Intergovernmental Affairs of Newfoundland and Labrador has responsibilities pursuant to the *Intergovernmental Affairs Act*;

**WHEREAS** section 72 of the *Environmental Protection Act* provides that the Minister of Environment and Conservation, with the approval of the Lieutenant-Governor in Council of the Province of Newfoundland and Labrador, may enter into an agreement with another government regarding the environmental assessment of an undertaking;

**WHEREAS** section 73 of the *Environmental Protection Act* provides that the Lieutenant-Governor in Council of the Province of Newfoundland and Labrador may establish a joint review panel in conjunction and coordination with another government where an agreement has been reached with such other government pursuant to section 72 of the Act with respect to an undertaking;

**WHEREAS** section 40(2) of the *Canadian Environmental Assessment Act* enables the Minister of the Environment to enter into an agreement with other jurisdictions respecting the joint establishment of a review panel and the manner in which the environmental assessment of the project is to be conducted by the review panel;

**WHEREAS** the Minister of the Environment has determined that a joint review panel with the Province of Newfoundland and Labrador will be the means by which Canada will proceed with the environmental assessment of the Project/Undertaking;

**WHEREAS** the Lieutenant-Governor in Council of the Province of Newfoundland and Labrador has ordered public hearings and authorized the Minister of Environment and Conservation to enter into an agreement with Canada on the conduct of those hearings; and

**WHEREAS** the Ministers have requested the Proponent to submit an Environmental Impact Statement to the joint review panel for the purposes of informing the environmental assessment process.

**THEREFORE**, the Minister of the Environment and the Minister of Environment and Conservation hereby establish a joint review panel for the environmental assessment of the Project/Undertaking in accordance with the conditions of this agreement and the Terms of Reference attached as Schedule 1.

## 1.0 Definitions

For the purpose of this Agreement, including the recitals and Schedule 1:

"Agency" means the Canadian Environmental Assessment Agency;

"Agreement" means this Agreement including Schedule 1;

"CEAA" means the *Canadian Environmental Assessment Act*;

"Day" means a calendar day;

"Department" means the Newfoundland and Labrador Department of Environment and Conservation;

"EIS Guidelines" mean the direction provided to the Proponent by Canada and Newfoundland and Labrador, which must be addressed in the Proponent's Environmental Impact Statement;

"Environment" means the components of the Earth, and includes:

- (i) land, water and air and all layers of the atmosphere,
- (ii) all organic and inorganic matter and living organisms as well as plant, animal and human life,

- (iii) the social, economic, recreational, cultural and aesthetic conditions and factors that influence the life of humans or a community,
- (iv) a building, structure, machine or other device or thing made by humans,
- (v) a solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from the activities of humans, or
- (vi) the interacting natural systems, a part or a combination of those things referred to in subparagraphs (i) to (v) and the interrelationships between 2 or more of them;

"Environmental Assessment" ("EA") means an assessment of the Environmental Effects of the Project/Undertaking that is conducted in accordance with the Legislation;

"Environmental Effect" means:

- (a) any change that the Project/Undertaking may cause in the Environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of the Species at Risk Act;
- (b) any effect of any change referred to in paragraph (a) on:
  - (i) health and socio-economic conditions;
  - (ii) physical and cultural heritage;
  - (iii) the current use of lands and resources for traditional purposes by aboriginal persons; or,
  - (iv) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance; or,
- (c) any change to the Project/Undertaking that may be caused by the Environment;

whether any such change or effect occurs within or outside Canada.

For the purposes of this Agreement, "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.

"Environmental Impact Statement" (hereinafter "EIS") means the environmental assessment report that is prepared by the Proponent;

"EPA" means the Newfoundland and Labrador *Environmental Protection Act*;

"Follow-up Program" means a program for

- (a) verifying the accuracy of the EA of the Project/Undertaking; and,

- (b) determining the effectiveness of any measures taken to mitigate the adverse environmental effects of the Project/Undertaking;

"Legislation" means, collectively, the CEAA and the EPA;

"Ministers" means the federal Minister of the Environment and the provincial Minister of Environment and Conservation;

"Panel" means the joint review panel, which is appointed pursuant to Section 2 of this Agreement;

"Participant Funding Program" means the program referred to in Section 8.0 of this Agreement;

"Parties" means the signatories to this Agreement;

"Project/Undertaking" means the Lower Churchill Hydroelectric Generation Project as described in Scope of the Project/Undertaking in Part 1 of the attached Schedule.

"Proponent" means Newfoundland and Labrador Hydro;

"Public Registry" means a repository to facilitate public access to the records relating to the EA of the Project/Undertaking in accordance with section 55 of the CEAA, that has been established by Fisheries and Oceans Canada and Transport Canada and that will be maintained by the Agency or the Secretariat until submission of the Panel report to the Ministers;

"Secretariat" means the Secretariat referred to in Section 5.0 of this Agreement;

"Terms of Reference" means the Terms of Reference for the Panel, as set out in Schedule 1 of this Agreement;

## **2.0 Establishment of the Panel**

**2.1** A process is hereby established for the creation of a Panel, pursuant to sections 40, 41 and 42 of the CEAA and section 73 of the EPA and, for the purposes of the review of the Project/Undertaking.

**2.2** The Agency and the Department will make arrangements for the coordination of public announcements respecting the establishment of the Panel.

## **3.0 Constitution of the Panel**

**3.1** The Minister of the Environment and the Lieutenant-Governor in Council of the Province of Newfoundland and Labrador shall jointly establish the Panel

**3.2.** The Panel shall consist of five members.

**3.3** The Agency and the Department will jointly compile a list of recommended Panel members and will provide that list to the Minister of the Environment and the Lieutenant-Governor in Council of the Province of Newfoundland and Labrador for their consideration in establishing the Panel.

**3.4** The Minister of the Environment and the Lieutenant-Governor in Council of the Province of Newfoundland and Labrador shall appoint Panel members from the joint list, consistent with the requirements of the CEAA and the EPA.

**3.5** The Minister of the Environment and the Lieutenant-Governor in Council of the Province of Newfoundland and Labrador shall each appoint one member of the Panel and shall jointly appoint the remaining members.

**3.6** The Minister of the Environment and the Lieutenant-Governor in Council of the Province of Newfoundland and Labrador shall jointly appoint the chair or co-chairs of the Panel, who shall not be a resident of the geographical area of the Project/Undertaking

**3.7** Panel members shall be unbiased and free from any conflict of interest relative to the Project/Undertaking and have knowledge or experience relevant to the anticipated effects of the Project/Undertaking on the environment.

**3.8** Panel members will not be employed by the Public Service of Newfoundland and Labrador or of Canada.

**3.9** At least two (2) of the Panel members shall be residents of the geographical area of the Project/Undertaking.

**3.10** In the event that a Panel member resigns or is unable to continue to work, the remaining members shall constitute the Panel unless the Minister of the Environment and the Lieutenant-Governor in Council of the Province of Newfoundland and Labrador determine otherwise. In such circumstances, the Minister of the Environment and the Lieutenant-Governor in Council of the Province of Newfoundland and Labrador may choose to replace the Panel member.

#### **4.0 Conduct of the Environmental Assessment by the Panel**

**4.1** The Panel shall have all the powers and duties of a panel set out in section 35 of the CEAA and sections 64 and 65 of the EPA and applicable regulations.

**4.2** The Panel shall conduct the EA in a manner that discharges the requirements set out in the CEAA, the EPA and in the Terms of Reference for the Panel set out in Schedule 1.

**4.3** All Panel hearings shall be public and shall provide for the participation of Aboriginal groups, the public, governments, the Proponent and other interested parties.

**4.4** A majority of the Panel members constitutes a quorum for the purposes of the EA to be conducted by the Panel. When a hearing, public meeting, or other activity is conducted by the Panel and a member of the Panel for any reason does not attend on any day or part of a day, the other member or members who are sitting at the hearing, public meeting or other activity, if they constitute a quorum, may continue as fully and effectively as though the absent member or members were present.

#### **5.0 Secretariat and Administrative Matters**

**5.1** Administrative, technical and procedural support for the Panel shall be provided by a Secretariat jointly established by the Agency and the Department.

**5.2** The Secretariat shall report to the Panel and shall be structured and operated so as to allow the Panel to conduct the EA in an efficient and cost effective manner.

**5.3** Prior to the appointment of the Panel, the Agency and the Department shall prepare a budget estimate for the activities of the Panel. The budget as agreed to by the Agency and the Department shall be finalized following the appointment of the Panel.

**5.4** Costs associated with the review by the Panel will be apportioned between the Agency and the Department in accordance with a cost-sharing agreement to be finalized prior to the appointment of the Panel.

## **6.0 Record of Environmental Assessment and Panel Report**

**6.1** A Project File containing all records produced, collected or submitted with respect to the EA of the Project/Undertaking shall be maintained by the Agency from the appointment of the Panel until the report of the Panel is submitted to the Ministers. The Public Registry shall be operated in a manner to ensure convenient public access to the records for the purposes of compliance with section 55 of the CEAA and the practices of the Department.

**6.2** On completion of the EA of the Project/Undertaking, the Panel shall prepare a report and submit it to the Ministers who will make it public.

**6.3** The report will address the factors required to be considered under section 16 of the CEAA and section 65 of the EPA, will set out the rationale, conclusions and recommendations of the Panel relating to the EA of the Project/Undertaking, including any mitigation measures and follow-up program, and include a summary of issues raised by Aboriginal groups, the public, governments and other interested parties.

**6.4** The Parties agree to coordinate, to the extent possible, the timing and announcements of decisions on the Project/Undertaking.

**6.5** Once the report is submitted to the Minister of the Environment, responsibility for the maintenance of the Public Registry in accordance with section 55 of the CEAA will be transferred to Fisheries and Oceans Canada as responsible authority.

## **7.0 Other Government Departments or Agencies**

**7.1** At the request of the Panel, federal and provincial departments or agencies having specialized knowledge with respect to the Project/Undertaking shall provide available information and knowledge in a manner acceptable to the Panel.

**7.2** Subject to clause 7.1 of this Agreement and subsection 12(3) of the CEAA, nothing in this agreement shall restrict the participation by way of submission to the Panel of federal or provincial departments or agencies.

## **8.0 Participant Funding**

**8.1** The Agency will administer a participant funding program to facilitate the participation of Aboriginal groups and the public in the EA of the Project/Undertaking.

## **9.0 Review, Interpretation and Amendment of this Agreement**

**9.1** The Parties will review this Agreement at the request of either Party.

**9.2** The Parties will make every reasonable effort to agree on the interpretation and application of this Agreement.

**9.3** To the extent practicable, the Parties will seek to resolve differences of opinion in the interpretation and application of this Agreement at a working level, through good faith reasonable efforts.

**9.4** The Agreement may only be amended with the written consent of both Parties. Unless another day is agreed, an amendment will become effective upon its execution by the last of the Parties.

**In witness whereof** our signatures are hereunto inscribed on this \_\_\_\_\_ day of \_\_\_\_\_ 2008.

*[Original signed by:]*

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The Honourable Jim Prentice  
Minister of the Environment – Government of Canada  
Date:

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The Honourable Clyde Jackman  
Minister of Environment and Conservation (Acting) – Government of Newfoundland and Labrador  
Date:

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The Honourable Dave Denine  
Minister for Intergovernmental Affairs – Government of Newfoundland and Labrador  
Date:

## Schedule 1 - Terms of Reference for the Panel

### Introduction

Pursuant to the Agreement Concerning the Establishment of a Joint Review Panel for the Environmental Assessment of the Lower Churchill Hydroelectric Generation Project, a Panel is appointed to conduct an EA of the Project/Undertaking proposed by Newfoundland and Labrador Hydro.

The Panel shall conduct the EA of the Project/Undertaking in accordance with these Terms of Reference and consistent with the Agreement between Canada and Newfoundland and Labrador on the Establishment of a Joint Review Panel for the Environmental Assessment of the Lower Churchill Hydroelectric Generation Project.

In performing its responsibilities, the Panel shall promote and facilitate public participation and ensure that the process takes into account the concerns and traditional knowledge of Aboriginal persons or groups and the concerns and community knowledge of the public.

### Part I – Scope of the Project/Undertaking

The Proponent proposes a project/undertaking consisting of hydroelectric generating facilities at Gull Island and Muskrat Falls, and interconnecting transmission lines to the existing Labrador grid. The Project/Undertaking includes the following components as described by the Proponent<sup>1</sup>. The specific dimensions/characteristics of the proposal are subject to change as a result of the findings of the environmental assessment.

The Gull Island facility consisting 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 215 km<sup>2</sup> reservoir in area at an assumed full supply level of 125 m above sea level (asl).

The dam is to be a concrete faced, rock fill dam. The reservoir is to be 230 km long, and the area of inundated land is to be in the order of 85 km<sup>2</sup> at full supply level. The powerhouse is to contain five Francis turbines.

The Muskrat Falls facility consisting 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 km<sup>2</sup> reservoir in area 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 in the order of 32 m high and 432 m long, while the south section is to be in the order of 29 m high and 125 m long. The reservoir is to be 60 km long and the area of inundated land is to be in the order of 41 km<sup>2</sup> at full supply level. The powerhouse is to contain four propeller or Kaplan turbines, or a combination of both.

Interconnecting transmission lines consisting 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 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 combined on double-circuit structures.

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<sup>1</sup> All measures are approximate



## Part II – Scope of the Environmental Assessment

The Panel shall consider the following factors in the EA of the Project/Undertaking as outlined in Sections 16(1) and 16(2) of the CEAA and Sections 57 and 69 of the EPA:

1. Purpose of the Project/Undertaking;
2. Need for the Project/Undertaking;
3. Rationale for the Project/Undertaking;
4. Alternative means of carrying out the Project/Undertaking that are technically and economically feasible and the environmental effects of any such alternative means;
5. Alternatives to the Project/Undertaking;
6. Extent to which biological diversity is affected by the Project/Undertaking;
7. Description of the present environment which may reasonably be expected to be affected, directly or indirectly, by the Project/Undertaking, including adequate baseline characterisation;
8. Description of the likely future condition of the environment within the expected life span of the Project/Undertaking if the Project/Undertaking was not approved;
9. Environmental Effects of the Project/Undertaking, including the Environmental Effects of malfunctions, accidents or unplanned events that may occur in connection with the Project/Undertaking;
10. Any cumulative Environmental Effects that are likely to result from the Project/Undertaking in combination with other projects or activities that have been or will be carried out;
11. The significance of the Environmental Effects as described in items 9 and 10;
12. Mitigation measures that are technically and economically feasible and that would mitigate any significant adverse Environmental Effects of the Project/Undertaking, including the interaction of these measures with existing management plans;
13. Proposals for environmental compliance monitoring;
14. Measures to enhance any beneficial Environmental Effects;
15. Need for and requirements of any follow-up program in respect of the Project/Undertaking;
16. Capacity of renewable resources that are likely to be significantly affected by the Project/Undertaking to meet the needs of the present and those of the future;
17. Extent of application of the precautionary principle to the Project/Undertaking; and
18. Comments received from Aboriginal persons or groups, the public and interested parties by the Panel during the EA;
19. Factors related to climate change including greenhouse gas emissions;
20. Proposed public information program.

To assist in the analysis and consideration of these issues, in addition to the Secretariat established by Canada and Newfoundland and Labrador to support the Panel, the Panel may retain, within its approved budget, independent expertise to provide information on and help interpret technical and scientific issues and matters related to traditional knowledge and community knowledge.

### Aboriginal Rights Considerations

The Panel will have the mandate to invite information from Aboriginal persons or groups related to the nature and scope of potential or established Aboriginal rights or title in the area of the Project, as well as information on the potential adverse impacts or potential infringement that the Project/Undertaking will have on asserted or established Aboriginal rights or title.

The Panel shall include in its Report:

1. information provided by Aboriginal persons or groups related to traditional uses and strength of claim as it relates to the potential environmental effects of the project on recognized and asserted Aboriginal rights and title.
2. any concerns raised by Aboriginal persons or groups related to potential impacts on asserted or established Aboriginal rights or title.

The Panel will not have a mandate to make any determinations or interpretations of:

- the validity or the strength of any Aboriginal group's claim to aboriginal rights and title or treaty rights;
- the scope or nature of the Crown's duty to consult Aboriginal persons or groups;
- whether Canada or Newfoundland and Labrador has met its respective duty to consult and accommodate in respect of potential rights recognized and affirmed by s. 35 of the *Constitution Act, 1982*; and
- The scope, nature or meaning of the Labrador Inuit Land Claims Agreement.

### **Part III - Steps in the Environmental Assessment Process**

The main steps in the EA by the Panel will be as follows:

#### **1. Site Visit:**

The Panel will visit the proposed Project area to gain a first-hand understanding of the Project/Undertaking and its surroundings.

#### **2. Public Information Centres**

Public information centres will be established by the Panel in Happy Valley – Goose Bay, Sheshatshiu, Natuashish, and other locations in the Province as deemed appropriate by the Panel. These public information centres will be administered by the Secretariat.

#### **3. Submission of the EIS**

The Proponent shall submit to the Panel the EIS prepared in accordance with the EIS Guidelines issued by the Ministers. The Panel shall direct the Proponent to distribute the EIS to Aboriginal groups, the public, governments and other interested parties.

#### **4. Review of the EIS:**

Within 7 days of receiving the EIS from the Proponent, the Panel shall initiate a 75-day public comment period on the EIS. Aboriginal groups, the public, governments and other interested parties will be able to review the EIS and provide comments to the Panel on whether it adequately addresses the EIS Guidelines and whether additional information should be provided before public hearings are convened. The Panel also has the independent authority to request additional information from the Proponent. The comments are to be provided either in writing or verbally by submitting quality recordings. Comments given verbally are to be considered as fully as written comments.

## 5. Comments provided to the Proponent

Comments received by the Panel during the public comment period, shall be provided to the Proponent. The Proponent shall provide its response to the comments not later than 60 days following completion of the public comment period.

## 6. EIS Sufficiency

The Panel shall review all comments received from Aboriginal groups, the public, governments and other interested parties. Should deficiencies be identified as a result of the review of the EIS, and in consideration of any comments received from Aboriginal groups, the public, governments and other interested parties and of the Proponent's response to those comments, clarification, explanation or additional technical analyses may be required from the Proponent by the Panel. The Panel will determine the need for an additional 30-day public comment period on any supplemental information provided by the Proponent in response to deficiencies identified by the Panel. Any request for additional information shall be issued by the Panel within 30 days following the close of the public comment period [or 60 days following receipt of written comments from the Proponent, whichever occurs later.] The Panel will determine the need, timing and location of any meetings required for the clarification of additional and/or technical information. Once the Panel is satisfied that all the relevant information is available, it will make a determination on the sufficiency of the EIS for the purpose of proceeding to public hearings.

## 7. Scheduling of Public Hearings

The Panel shall schedule and announce the start of the public hearings once it is satisfied that it has adequate information to proceed to public hearings. A minimum of 45 days notice will be provided to Aboriginal groups, the public, governments and other interested parties prior to the start of the public hearings. The Panel will schedule the public hearings to encourage the attendance and participation of Aboriginal groups and the public.

As required, the Panel will hold technical hearings on specific aspects of the Project/Undertaking in addition to community-based hearings focused on seeking the views of Aboriginal persons or groups and the public on the potential Environmental Effects of the Project/Undertaking.

## 8. Location of Public Hearings

The Panel will hold public hearings in locations determined by the Panel within the area likely to be affected by the Project/Undertaking, or in any area reasonably close to where the Project/Undertaking is proposed to be carried out, to provide convenient access for potentially affected Aboriginal persons or groups and the public.

## 9. Conduct of Public Hearings

The Panel will establish rules of procedure for public hearings and will conduct the public hearings in a manner which will:

- promote and facilitate the participation of Aboriginal persons or groups, the public and interested parties in the project area,
- afford those Aboriginal persons or groups, the public and interested parties an opportunity to present their views on the potential Environmental Effects of the Project/Undertaking; and
- ensure a thorough examination of matters relevant to its mandate.

The Panel will determine how to engage the Proponent in the public hearings. The Panel will also determine interpretation requirements for the public hearings and any other activities associated with the EA.

#### 10. Length of Public Hearings

The public hearings will be completed within 45 days from the start of the hearings.

#### 11. Delivery of Panel Report

The Panel will deliver its report to Ministers within 90 days following the close of the public hearings. The report will take into account and reflect the views of all Panel members. The report will include:

- a description of the EA process, including public hearings
- the rationale, conclusions and recommendations of the Panel with respect to the nature and significance of the potential Environmental Effects of the Project/Undertaking,
- the Panel's recommendations concerning, as appropriate, any mitigation measures including, as pertinent, recommendations concerning the environmental management of the Project/Undertaking and follow-up programs
- a summary of any issues identified and comments and recommendations received from Aboriginal persons or groups, and
- a summary of the issues raised and any comments and recommendations received from the public, governments and interested parties.

#### **Translation and Interpretation**

The translation of documents in any language other than English shall be for convenience only. The English version of each document is authoritative. In the case of any inconsistency between the English document and a translated version, the English version will prevail.

#### Panel's Documents

The Panel's operational procedures, public notices pertaining to the Panel's meetings and hearings, detailed procedures for the conduct of the public hearings, and any information request or deficiency statement issued by the Panel will be translated into French, Innu-aimun, as well as other aboriginal language(s) that the Panel deems necessary to enable open and effective participation in the process by Aboriginal persons and groups. Reasonable measures will be taken to ensure that the translations will be made available, in written and/or audiovisual forms, on the Public Registry and at Public Information Centres in a timely manner following the public release of the English version by the Panel, and will be provided on request to individuals and groups.

The Executive Summary and Recommendations of the Panel report will be translated into French, Innu-aimun, as well as other aboriginal language(s) that the Panel deems necessary to convey its key findings and recommendations to Aboriginal persons and groups that have participated in the review process prior to public release of the Panel report. Such translations in written and/or audiovisual forms will be available on the Public Registry and at Public Information Centres at the same time as the English version of the Panel report to the public.

The Panel report will be translated in French and made available in a timely manner following Panel submission of the English version of the report. Translation of the remainder of the Panel report into aboriginal language(s) will be undertaken by the Governments and made available in a timely manner upon request from Aboriginal persons or groups or the public.

Proponent's Documents:

The Panel shall consult with the participating Aboriginal groups and the Proponent regarding which parts of the EIS and any other documentation or additional information prepared by the Proponent for the Panel for use during the Environmental Assessment of the Project/Undertaking will be translated into aboriginal language(s). As determined by the Panel, the Proponent shall translate those documents and shall ensure that all reasonable measures are taken to effect translations in a timely manner.

Translations of the parts of the EIS and other Proponent documents into aboriginal language(s) as determined in the manner outlined above shall be made available in written and/or audiovisual forms, on the Public Registry and at Public Information Centres

Interpretation:

The Panel shall consult with participating Aboriginal groups prior to making a determination of interpretation requirements from English to aboriginal language(s) and from aboriginal language(s) into English for any public meetings hosted by the Panel and the public hearings, including the technical and community hearings, and any other interpretation requirements, and appropriate interpretation services will be provided by the Panel.

**Amendment to the Agreement Concerning the Establishment of a Joint Review Panel for  
the Environmental Assessment of the Lower Churchill Hydroelectric Generation Project**

**between**

**The Government of Canada, as represented by the Minister of the Environment**

**and**

**The Government of Newfoundland and Labrador, as represented by  
the Minister of Environment and Conservation and  
the Minister for Intergovernmental Affairs**

The agreement concerning the establishment of a Joint Review Panel for the environmental assessment of the Lower Churchill Hydroelectric Generation Project (the Agreement) shall be amended pursuant to clause 9.4 of the Agreement. The amendment extends the 75-day period for public comment on the Environmental Impact Statement (EIS) for an additional 30 days to three Aboriginal groups in Labrador – the Innu Nation, the Nunatsiavut Government and the Labrador Metis Nation.

Clause 4.1 of Part 3 of Schedule 1 to the Agreement is added and reads as follows:

***4.1 Notwithstanding clause 4, the Innu Nation, the Nunatsiavut Government and the Labrador Metis Nation shall have an additional thirty (30) days beyond the seventy-five (75) day comment period to provide comments to the Panel on the environmental impact statement.***

[Original signed by:]

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The Honourable Jim Prentice  
Minister of the Environment – Government of Canada  
Date: 15 May 2009

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The Honourable Clyde Jackman  
Minister of Environment and Conservation (Acting) – Government of Newfoundland and  
Labrador  
Date: 8 May 2009

-----  
The Honourable Dave Denine  
Minister for Intergovernmental Affairs – Government of Newfoundland and Labrador  
Date: 8 May 2009

**Amendment to the Agreement Concerning the Establishment of a Joint Review Panel for the Environmental Assessment of the Lower Churchill Hydroelectric Generation Project**

**between**

**The Government of Canada, as represented by the Minister of the Environment**

**and**

**The Government of Newfoundland and Labrador, as represented by  
the Minister of Environment and Conservation and  
the Minister for Intergovernmental Affairs**

The agreement to establish a Joint Review Panel for environmental assessment of the Lower Churchill Hydroelectric Generation Project (the Agreement) shall be amended pursuant to section 9.4 of the Agreement.

The first paragraph under the heading of *Translation and Interpretation*, Panel's Documents at Schedule 1 to the Agreement is hereby amended to read as follows:

***The Panel's operational procedures, public notices pertaining to the Panel's meetings and hearings, and detailed procedures for the conduct of the public hearings will be translated into French and those aboriginal languages that the Panel deems necessary to enable open and effective participation in the process by aboriginal peoples and groups. In addition, the Panel's information requests and deficiency statements will be translated into French. With respect to aboriginal languages, the Panel will determine the extent and form of translation to be applied to its information requests and deficiency statements, including consideration of the use of summaries where appropriate.*** Reasonable measures will be taken to ensure that the translations will be made available, in written and/or audiovisual forms, on the Public Registry and at Public Information Centres in a timely manner following the public release of the English version by the Panel, and will be provided on request to individuals and groups.

[Original signed by:]

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The Honourable Jim Prentice  
Minister of the Environment – Government of Canada  
Date: June 9, 2010

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The Honourable Charlene Johnson  
Minister of Environment and Conservation – Government of Newfoundland and  
Labrador  
Date: April 27, 2010

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The Honourable Dave Denine  
Minister for Intergovernmental Affairs – Government of Newfoundland and Labrador  
Date: May 3, 2010

## APPENDIX 8 FRAMEWORK FOR DETERMINING WHETHER SIGNIFICANT ADVERSE ENVIRONMENTAL EFFECTS ARE JUSTIFIED AND WHETHER THE PROJECT SHOULD BE APPROVED

This framework was developed from a number of sources, including criteria suggested in the literature, criteria applied in previous panel reports, participant input on draft criteria released by the Panel prior to the hearing, and information provided during the hearing process.

At the heart of the decision-making framework is the concept that the effects, risks and uncertainties of the Project should be fairly distributed among affected communities, jurisdictions and generations, and that the Project should result in net environmental, social and economic benefits.

The framework consists of two main components:

- The first component is a set of sustainability criteria designed to assist in identifying the range of effects on sustainability the Project is predicted to have, and to work toward minimizing adverse effects and maximizing benefits.
- The second component is a set of principles that set out the proposed approach to residual effects. These principles are designed to assist in assessing the range of positive and negative social, economic and environmental effects of the Project and to determine whether, in light of the identified range of effects, risks and uncertainties, the Project is expected to make a net positive contribution to sustainability.

### Sustainability Criteria to Predict the Effects and Risks of the Project, and to Identify Uncertainties

1. ***Ecological Effects, Benefit, Risks and Uncertainties*** – Are biophysical systems adequately protected throughout all phases of development, construction, operation, and decommissioning of the Project?
  - Is the long-term integrity of biophysical systems ensured and are the irreplaceable life support functions protected upon which human as well as ecological well-being depends?
  - Are complex interactions sufficiently understood?
  - Are potential adverse effects minimized?
  - Does the Project reduce threats to the long-term integrity of ecological systems by reducing extractive damage, avoiding waste and cutting overall material and energy use per unit of benefit?
2. ***Economic Effects, Benefit, Risks and Uncertainties*** – Does the Project provide net economic benefits to the people in the area surrounding the Project, in the province, and in Canada?
  - Does the Project enhance practically available livelihood choices and the power to choose?
  - Does the Project reduce gaps in sufficiency and opportunity (and health, security, social recognition, political influence, etc.) between the rich and the poor?



3. ***Social and Cultural Effects, Benefit, Risks and Uncertainties*** – Does the Project contribute to community and social well being of all potentially affected people? Is it compatible with their cultural interests and aspirations?
  - How will the Project affect individual communities?
  - Does the Project assist in building the capacity, motivation and habitual inclination of individuals, communities and other collective decision-making bodies to apply sustainability requirements?
  - Does the Project encourage more open and better informed deliberations, greater attention to fostering collective responsibility, and more integrated use of individual and collaborative collective decision-making practices?
  - Does the Project strengthen individual and collective understanding of ecology and community, foster customary civility and ecological responsibility, and build civil capacity for effective involvement in collective decision making?
  
4. ***Fair Distribution of Effects, Risks and Uncertainties*** – Are the effects, risks, and uncertainties fairly distributed among potentially affected individuals, communities, regions and other interests?
  - Does the Project consider carefully the geographical distribution of the social, economic and environmental effects, risks, and uncertainties of the Project?
  - Will affected individuals and communities have the prerequisites for a decent life and the opportunities to seek improvements that do not compromise equivalent opportunities for future generations?
  - Is the diversity of those whose needs are being addressed appreciated? Is their involvement ensured?
  - Does the Project emphasize less materially and energy intensive approaches to personal satisfactions among the advantaged, to permit material and energy sufficiency for all?
  
5. ***Present versus Future Generations*** – Does the Project succeed in providing economic and social benefits now without compromising the ability of future generations to benefit from the environment and natural resources in areas potentially affected by the Project?
  - Does the Project favour options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably?
  - Does the Project assist in returning current resource exploitation and other pressures on ecological systems and their functions to levels that are safely within the perpetual capacity of those systems to provide resources and services likely to be needed by future generations?
  - Does the Project apply precaution, by respecting uncertainty, avoiding both well and poorly understood risks of serious or irreversible damage to the foundations for sustainability, planning to learn, designing for surprise, and managing for adaptation?

- Will decision-makers act on incomplete but suggestive information where social and ecological systems that are crucial for sustainability are at risk?
  - Has the proponent designed for surprise and active adaptation, favouring diversity, flexibility and reversibility?
  - Has the proponent ensured the availability and practicality of backup alternatives?
  - Has the proponent established mechanisms for effective monitoring and response?
6. **Integration** – Are all principles of sustainability applied together, seeking mutually supportive benefits and multiple gains?
- Integration is not the same as balancing because greater efficiency, equity, ecological integrity and civility are all necessary for sustainability, therefore, positive gains in all areas are essential for sustainability.
  - What happens in any one area affects what happens in all of the others?
  - It is reasonable to expect, but not safe to assume, that positive steps in different areas will be mutually reinforcing.
  - A sustainable project requires positive steps in all areas, at least in general and at least in the long term.
  - Sustainability requires decision-makers to resist convenient immediate compromises unless they clearly promise an eventual gain.

A key goal of these criteria is to encourage the search for integrated solutions that provide net immediate and long-term gains in all areas. This approach should reduce the need to consider whether negative effects in one area are outweighed against positive effects in another area. In recognition that this ideal is rarely achieved, the following section proposes principles to guide the consideration of the range of positive and negative effects identified through the application of the six criteria above.

### **Principles to Guide the Project Decision in Light of the Range of Positive and Negative Effects of the Project**

#### ***Maximum Net Gains***

- Overall, the Project should deliver net progress towards meeting the requirements for sustainability; it should seek mutually reinforcing, cumulative and lasting contributions and should favour achievement of the most positive feasible overall result, while avoiding significant adverse effects.

#### ***Avoidance of Significant Adverse Effects***

- A significant adverse effect on any sustainability requirement area can only be justified if the alternative is the acceptance of a more significant adverse effect.

- Compromise is acceptable if it avoids further decline or risk of decline in a major area of existing concern, or if it improves prospects for resolving problems properly identified as global, national and/or local priorities.
- Incomplete mitigation of significant adverse effects is not acceptable if stronger mitigation efforts are feasible.

### ***Principles of Fairness***

- No current or future generation should bear an unreasonable share of the adverse effects, risks or costs, or be denied a reasonable share of the benefits of the Project.
- No geographic region affected by the Project should bear an unreasonable share of the adverse effects, risks or costs, or be denied a reasonable share of the benefits.
- The Project should make a net positive contribution to sustainability in each of the three main areas, the environment, the economy, and social conditions.

### ***Explicit and Transparent Justification***

Any compromises on the overall effects, risks and uncertainties of the Project and their distribution should be accompanied by an explicit and transparent justification based on openly identified, context specific priorities as well as the sustainability decision criteria.