

**ANALYSIS OF THE REPORT
OF
THE JOINT REVIEW PANEL
FOR THE
LOWER CHURCHILL HYDROELECTRIC GENERATION PROJECT**

**PREPARED BY:
KEN DOMINIE, P.ENG
ENVIRONMENTAL MANAGER
SNC LAVALIN**

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INTRODUCTION

On August 23, 2011 the Joint Review Panel for the Lower Churchill Hydroelectric Generation Project submitted its report to the federal and provincial Ministers of Environment. This 5 person Panel was appointed by the Ministers in August of 2009. Their assignment was to:

- Conduct an examination of the environmental effects of the proposed Project and significance of those effects;
- Consider measures that are technically and economically feasible to mitigate any adverse environmental effects, the need for and requirements of any follow-up programs with respect to the project; and
- Consider comments from the public that are received during the review.

In the discharge of their duties, the Panel reviewed the Environmental Impact Statement that was prepared by Nalcor, additional information that was provided by Nalcor at the Panel's request and information brought forward through public hearings. These hearings were held over a 45 day period (March 3-April 15) in Labrador, St.John's and Quebec(Sept-Isles).

The Panel made 83 recommendations to the Ministers and also drew a number of conclusions which are noted in their report.

The Panel report has been reviewed to determine what impact, if any, the conclusions and recommendations of the Panel would have on the Project's design, cost or schedule. While many of the recommendations of the Panel do not directly impact these aspects of the Project, the full list of the recommendations is appended to this analysis. **It should be noted that the Panel report is advice and recommendations only to the Ministers. The Ministers may accept or reject recommendations as they see fit. The firm direction on the Project will likely come in an official release of the Project from the Environmental Assessment process.**



REPORT ANALYSIS

General

With regard to the Project overall, the Panel made several conclusions and recommendations as follows:

- The Panel concludes that, in light of the uncertainties associated with transmission for export markets from Gull Island, Nalcor has not demonstrated the justification of the Project as a whole in energy and economic terms.
- The Panel further concludes that there are outstanding questions for each of Muskrat Falls and Gull Island regarding their ability to deliver the projected long-term financial benefits to the Province, even if other sanctioning requirements are met.

The Panel has made the following recommendation in regard to these conclusions:

Recommendation 4.1—Government confirmation of projected long-term returns:

The Panel recommends that, if the Project is approved, before making the sanction decision for each of Muskrat Falls and Gull Island, the Government of Newfoundland and Labrador undertake a separate and formal review of the projected cash flow from the Project component being considered for sanctioning (either Muskrat Falls or Gull Island) to confirm whether that component would in fact provide significant long-term financial returns to Government for the benefit of the people of the Province. Such financial returns must be over and above revenues required to cover operating costs, expenditures for monitoring, mitigation and adaptive management, and financial obligations to Innu Nation. The Panel further recommend that the government of Newfoundland and Labrador base these reviews on information on energy sales, costs and market returns that have been updated at the time of sanction decision, and make the results of the reviews public at that time. The financial reviews should also take into account the results of the independent alternatives assessment recommended in Recommendation 4.2 (see below).

With regard to the potential alternatives to the Project, the Panel concluded as follows:



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 should be undertaken.

The Panel made the following recommendation in this regard:

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);
- the use of Gull Island power when and if it becomes available since it has a lower per unit generation cost than Muskrat Falls;
- the extent to which Nalcor's analysis looked only at current technology and systems versus factoring in developing technology;
- a review of Nalcor's assumptions regarding the price of oil until 2067, since the analysis provided was particularly sensitive to this variable;
- a review of Nalcor's estimates of domestic demand growth (including the various projections to 2027 in the EIS (2007,2008,2009 and the 0.8 percent annual growth to 2067 provided at the hearing);
- Nalcor's assumptions and analysis with respect to demand management programs (compare Nalcor's conservative targets to targets and objectives of similar programs in other jurisdictions and consider the specific recommendations, including the use of incentives to curtail electric base board heating from Helios Corporation, among others);
- the suggestion made by the Helios corporation that an 800 MW wind farm on the Avalon Peninsula would be equivalent to Muskrat Falls in terms of supplying domestic needs, could be constructed with a capital cost of \$2.5 million, and would have an annual operating cost of \$50 million and a levelized cost of power of 7.5 cents per kilowatt-hour;
- whether natural gas could be a lower cost option for Holyrood rather than oil; and
- potential for renewable energy sources on the island (wind, small scale hydro, tidal) to supply a portion of Island demand.



It is understood that in the preparation of the Project Description/EIS, Nalcor used the international firm Navigant to assist them with their economic analysis. It is further understood that Nalcor still has Navigant under contract to assist them with this issue. However it is not known what the nature of Navigant's current assignment is or what their timing is for preparation of a report or information for Nalcor.

The Provincial government, in June of 2011, through the Minister of Natural Resources has asked the Public Utilities board to address the following question:

'The board shall review and report to government on whether the Projects represent the least-cost option for the supply of power to Island Interconnected customers over the period 2011-2067 as compared to the Isolated Island option'

In answering the Question, the Board:

- *shall consider and evaluate factors it considers relevant including NLH's and Nalcor's forecasts and assumptions for the Island load, system planning assumptions, and the processes for developing and comparing the estimated costs for the supply of power to Island interconnected customers; and*
- *shall assume that any power from the Projects which is in excess of the needs of the Province is not monetized or utilized, and therefore the board shall not include consideration of the options and decisions respecting the monetization of the excess power from Muskrat Falls generation facility, including the Maritime Link project.*

The Board has commissioned Manitoba Hydro International to assist them with their work and their report is due to the minister of Natural resources by December 30, 2011. The Minister will make the report public.

There is no action for SLI on these recommendations. It is difficult to say what impacts these broad conclusions and recommendations will have on the project. It will depend to some degree on what information Nalcor and the Public Utilities Board provides to the Ministers, if it addresses the questions raised and on what schedule the information is presented.

However, as noted above, the report from the Public Utilities board (as one piece of information) is not due to be submitted to the minister until December 30, 2011. Before construction can begin, the Project will have to be (i) released from the Environmental Assessment process (which may not be until the governments receive satisfactory information) and (ii) the Project is sanctioned.

How long and on what schedule these two events will occur is unclear at this point in time. However, in reality, it could take some time in January 2012 before final decisions are made.



The Southside road portion of the Project is currently scheduled to commence around the middle of January, 2012. Any delay in EA release and/or Project sanction could impact this schedule. If the Project start up is delayed for any significant period, the Project planners and schedulers will need to assess this to determine what, if any, cascading effects there may be in project construction and/or equipment delivery contracts.

Specific Issues

Reservoir Preparation

Nalcor has proposed in the EIS that both the Muskrat Falls and Gull Island reservoirs be only partially cleared of timber. This would mean that trees generally in an area 3 meters above full supply level and 3 meters below low supply level would be harvested. Within these areas there may be trees that would not be harvested for safety reasons (i.e. steep slopes) and for environmental reasons (habitat preservation). There has been considerable debate over the approach to the clearing of the reservoirs with some people calling for full clearing.

The Panel concludes that for reservoir preparation purposes it is appropriate to consider the Muskrat Falls reservoir separately from the Gull Island reservoir because of the vastly different physical characteristics of the two and because they are subject to different sanction decisions.

With regard to “partial” or “full” clearing the Panel presents the following conclusion:

The Panel concludes that it is both technically and economically feasible to carry out full clearing for the Muskrat Falls reservoir

The Panel made the following recommendation with respect to this issue:

Recommendation 4.5 Full clearing of the Muskrat Falls reservoir

The Panel recommends that, if the Project is approved, Nalcor be required to apply its “full clearing” reservoir preparation option to the Muskrat Falls reservoir.

The Panel undertook a cursory analysis of what the implications of full vs. partial clearing would be for the Muskrat Falls reservoir. According to their calculations, applying the full clearing option would increase the amount of timber to be harvested by 141,000 cubic metres. This would mean that the amount of timber to be cleared would increase by approximately one-third. (390,000 cubic metres under partial clearing vs. 491,000 cubic metres under full clearing). If the full clearing option is chosen we can refine this estimate using the GIS tools that we have at our disposal. The harvesting of the extra timber will increase the cost of reservoir preparation



but not by one-third as some of the basic infrastructure (roads, camps) will be in place but it could increase it by 25%.

From a timing perspective, the Panel indicated that it could take an extra year to harvest the timber. This would be in addition to the four year plan (as noted in Nalcor's reservoir preparation plan) for partial clearing. The Panel did however suggest that if additional resources were applied annually, the four year schedule could be achieved. It is significant to note that the inundation of the reservoir is planned for late 2016. Therefore for a four year preparation plan, clearing activities should start in 2012. It will be more critical to start in 2012 if the extra timber noted above is to be harvested.

It will be necessary for the SLI reservoir preparation team to review this issue in detail to determine the exact cost and schedule implications should Nalcor be required by regulators to fully clear the Muskrat Falls reservoir.

Although not in SLI's scope of work at this time, the Panel did consider the clearing of the Gull Island reservoir. They suggested that a decision on this issue could wait but they did say in their report "it would be very desirable for its preparation plan to increase the clearing activity and harvest volumes from those currently projected by Nalcor for that reservoir".

Atmospheric Environment

The Panel did not identify any major issues with respect to the atmospheric environment and drew the following conclusion:

The Panel concludes that with appropriate mitigations the Project would not result in significant adverse environmental effects related to atmospheric issues. Air pollution and noise are appropriately mitigated and are localized and temporary in nature and therefore not likely to be significant. The greenhouse gas emissions from the Project while significant in isolation do not constitute a significant adverse environmental effect because the power produced by the Project would very likely displace more greenhouse gases than the Project would cause.

The Panel recommended as follows:

Recommendation 5.1 Use of Best Available Technology

The Panel recommends that, if the Project is approved, Nalcor be required to implement its mitigation commitments⁷ to minimize air pollution, noise and greenhouse emissions resulting from the Project. In addition, Nalcor should be required to use best available technology for any new construction and harvesting equipment purchased for the Project. This means that any new equipment purchased after Project approval should be required to meet the highest standards for such equipment, even if such standards are above current regulatory requirements.



*Nalcor's proposed mitigation measures in this regard are :

Air Quality

- incorporate in an Environmental Protection Plan measures to reduce dust and vehicle emissions from construction activities. Implement measures equivalent to those contained in “ *Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities*” as recommend by Environment Canada ; and
- Monitor ambient air quality and deposition of dust at the edge of the buffer zones with annual reporting if required by government regulators.

Greenhouse Gas Emissions

- Limit Project greenhouse emissions by measures including: proper vehicle operation and maintenance, enforcement of speed limits, anti-idling policy and no slash burning;
- Monitor greenhouse gas emissions during construction by tracking fuel consumption for all construction equipment; and
- Monitor greenhouse gas fluxes from reservoirs.

Climate Change

- Implement adaptive measures as needed in response to predicted climate change effects on the Project, which could involve new flood procedures, water management practices or increasing spillway capacity;
- Continue to work and partner with the Department of Environment and Conservation to determine the optimal approach and Nalcor's role in monitoring for climate change;
- Carry out the following monitoring programs for Project- related effects, which would also provide long-term information on climate change effects:
 - Remote monitoring systems to measure environmental conditions including: wind, precipitation, temperature, ice, reservoir and trash rack conditions, and tailrace levels;
 - An ice observation program to be carried out throughout the reservoirs, downstream of Muskrat Falls to the mouth of the Churchill River, and Lake Melville, including: timing of ice formation and breakup, area covered, and open water areas including ashkui;
 - Satellite –based monitoring of ice progression and stability in the vicinity of Mud Lake and Happy Valley-Goose Bay;
 - Monitoring of ice thickness at selected locations on the river, including public advisories; and
 - Carry out research for the period 2009-2012 involving the modeling of the effects of climate change on the hydrological cycle of the lower Churchill watershed.



Noise

- Mitigate noise from Project activities when baseline noise plus Project-related noise exceeds 75 decibels and when noise becomes an annoyance factor for a number of people.

NOTE:

Nalcor predicted noise levels and noise zones of influence due to various Project activities. Given the relatively quiet surroundings, sustained noise levels of 55 decibels during the day and 65 decibels at night would represent a zone of influence. The distance to attenuate noise to below these levels were estimated as follows:

- Heavy truck traffic on access roads---200 meters from the road;
- Operation of typical groupings of construction equipment---one to two kilometers from the site; and
- Blasting—two kilometers from source would only attenuate noise to about 90 decibels.

While many of the above noted mitigations are related to monitoring and would be the responsibility of Nalcor, some of the commitments should be included in contract documents and construction operational procedures.

Aquatic Environment

Reservoir impoundment

There was some discussion at the public hearings for the Project regarding the timing of impoundment of the reservoir. Fisheries and Oceans Canada identified a period from **mid-July to mid-September** as the preferred time from an aquatic perspective but Nalcor identified a slightly longer period from **August to October** in order to address terrestrial concerns as well.

In the end, the Panel leaned towards the DFO position and recommended as follows:

Recommendation 6.1 Timing of reservoir impoundment

The Panel recommends that, if the Project is approved, Fisheries and Oceans Canada require Nalcor to carry out impoundment of both the Muskrat Falls and Gull Island reservoirs during the period **mid-July to the end of September**, and to prepare a detailed mitigation plan for approval by Fisheries and Oceans Canada. The mitigation plan should include information on how the effects of dewatering would be monitored, threshold to trigger further mitigation, and identification of specific adaptive management measures and how they would be applied.

The construction of the Project components should be scheduled to meet the above noted impoundment schedule should it be imposed on the Project. Also, SLI should become familiar



with any provisions of the recommended mitigation plan to determine what, if any, portions of it would impact the Project's design, cost or schedule.

Water Quality Effects in the Reservoirs

The Panel concluded that Nalcor should make every effort to reduce the impact of activities in the reservoirs on water quality, particularly with respect to erosion and sedimentation and recommend as follows:

Recommendation 6.3 Erosion and Sedimentation prevention

The Panel recommend that, if the Project is approved, Nalcor be required to prepare an erosion and sedimentation protection strategy including the use of 15m vegetated buffer areas during reservoir preparation, best practices at all construction and cleared areas, and specified adaptive management measures to be applied should these mitigation measures fail

Some of these measures will be covered in the Generic Environmental Protection Plan being prepared for the Project. However, the engineering teams should take this into account when developing workplans for their respective areas in conjunction with the SLI and Nalcor environment teams and prepare contract-specific mitigation measures as appropriate.

Fish Habitat Loss, Alteration and Compensation

It is recognized that the Project, particularly in the reservoir areas, will displace fish habitat. Nalcor is currently developing a Fish Habitat Compensation Plan directly with DFO. However, in all likelihood, SLI will be asked to engineer and construct compensation facilities, possibly in conjunction with reservoir preparation activities.

With regard to this issue, the Panel recommended as follows:

Recommendation 6.6 Fish Habitat Compensation

The Panel recommends that, if the Project is approved, Fisheries and Oceans Canada require Nalcor to:

- Prepare a detailed fish habitat compensation plan in consultation with stakeholders and Aboriginal groups that addresses to the extent possible the likely interactions between species and life stages, including predator-prey relationships and also the potential to replace tributary-type habitats;
- Prepare a habitat monitoring plan including thresholds for further action and identified adaptive management measures;
- Implement the proposed plan, documenting the process;
- Evaluate the extent to which new, stable habitat has been created, its use and productivity; and
- Apply lessons learned from implementing the Muskrat Falls compensation plan to the proposed Gull Island compensation works.



If, after all feasible adaptive management measures have been applied, fisheries and Oceans determines that there has been a significant shortfall in the amount of habitat successfully created and maintained compared to the original proposal, Nalcor should be required to compensate by carrying out compensation works in other watersheds in Labrador. Preference should be given to remediation and enhancement in areas adversely affected by the Churchill Falls project.

While recognizing the comprehensive nature of Nalcor's compensation plan, the Panel concluded that there is considerable risk that compensation measures would not be as effective as needed for the following reasons:

- the Project would create a heavy dependence on the success of an ambitious compensation plan;
- there are considerable uncertainties associated with Nalcor's ability to establish new, stabilized habitats in an environment that would be fundamentally unstable due to ongoing erosion for at least 15 years;
- new, low velocity, engineered habitats in the main stem would not easily provide the variety of niche habitats that have developed over long periods of time in the existing river and tributaries;
- habitat replacement plans did not take into consideration the complex interactions of species and this could lead to unintended and deleterious effects; and
- adaptive management, should monitoring show that the new habitat was not working effectively, might not be possible.

Given these reservation about the compensation plan (and our possible engineering of it) we should be very cautious about guarantees that we would attach to our work.

Riparian and Wetland Habitat

Riparian and wetland habitat will be lost when the reservoir is inundated. Unlike fish habitat which, by law, proponents are required to implement a No-Net loss policy, there is no similar law governing riparian and wetland habitat. Environment Canada has however had a policy in place since 1991 covering this topic. While that policy does not explicitly have a No-Net loss requirement, in the EA panel public hearings, Environment Canada suggested that Nalcor implement a No-Net loss policy for wetland replacement and that replacement riparian wetland habitat should have the same function as the habitat lost through inundation but also noted that there would be alternative habitat outside the Project footprint to help alleviate effects of habitat loss on certain key indicator species.



Nalcor has identified riparian habitat to be lost by inundation as providing particularly important services to key indicator species and has proposed the development of detailed habitat compensation plans for riparian marsh.

The Panel agreed that compensation plans, such as that proposed, are critical. However, the Panel was not convinced that there is a high degree of certainty that the compensation efforts with respect to wetland and riparian habitats would be sufficient to mitigate the significant loss of wetland and riparian habitats that would result from inundation. If the Project proceeds, ongoing monitoring and active adaptive management will be critical to the success of riparian and wetland compensation efforts.

The Panel recommend as follows:

Recommendation 7.1 Wetland compensation plan

The Panel recommends that, if the Project is approved, Nalcor be required to develop a detailed wetland compensation plan in consultation with Environment Canada, the provincial Department of environment and conservation, Aboriginal groups and appropriate stakeholders. The plan should set appropriate goals for the re-establishment of wetlands taking into account the purpose served by each type of wetland in the context of the surrounding ecosystem

Recommendation 7.2 Riparian compensation plan

The Panel recommends that, if the Project is approved, fisheries and Oceans require Nalcor to develop a detailed riparian habitat compensation plan in consultation with Fisheries and Oceans Canada, the provincial Department of Environment and Conservation, Aboriginal groups and appropriate stakeholders, that looks closely at water levels and variations in the levels need to ensure healthy and resilient riparian habitat.

The rules of engagement with respect to such compensation are somewhat vague at this time and the extent to which we will have to consider it in project design or how it will impact cost and/or schedule will depend on how hard regulators push for compensation for lost habitat. We will need to follow this closely.

Rare Plants

The Panel concludes that with appropriate mitigation the adverse environmental effects of the Project on rare plant species are not likely to be significant.

However, the Panel notes that given the somewhat limited information available on rare plants in the Labrador region and the resulting uncertainty on the predictions made about the presence of rare plants in the Project area, the accuracy of the prediction made by Nalcor that rare plants would not be significantly impacted would have to be carefully monitored during the reservoir preparation stage.



Note

Nalcor has proposed the following mitigation and monitoring measures with respect to rare plants:

- develop an Environmental Protection Plan for rare plants;
- include hidden fruit bladderwort on the list of regionally uncommon plants;
- relocate Canada yew plants from within the inundated area to an area above the future reservoir limits;
- relocate the regionally rare plants identified from the flood zone to suitable habitat outside the flood zone;
- undertake a follow-up and monitoring program considering Traditional Knowledge for relocated Canada yew plants and implement adaptive management measures as appropriate;
- monitor the relocation success of regionally uncommon plants including Canada yew; and
- develop monitoring plans to monitor rare plants in all stages of the Project to ensure that these species persist in Labrador.

Wildlife

In general the Panel concluded that with appropriate scheduling of reservoir impoundment (**mid-July to the end of September**), the impoundment process is not likely to have a significant impact on terrestrial species.

Nalcor has committed to the following mitigation measures:

- determine habitat availability and quality outside the Project area for species at risk and the distribution and abundance of species at risk in the Project area;
- develop protocols to mitigate for disturbance and incidental take and outline how construction would minimize these effects;
- reduce wildlife mortality by posting speed limits and implementing a no harassment/ no harvesting policy;
- ensure waste management and relocate nuisance animals;
- reduce habitat loss effects on key-indicator species using mitigation measures such as relocating beaver colonies, replacing osprey nests with artificial platforms, wetland enhancement and creating new hardwood stands;
- relocate active beaver colonies and establish habitat selection criteria for beaver to maximize adult/kit survival for relocated colonies;
- create herpetile (frogs, salamanders) habitat in conjunction with rehabilitation of the Project facilities such as access roads, borrow pits, quarries and transmission line roads;
- relocate herpetiles from locations within the reservoirs to locations of suitable existing habitat, such as engineered wetlands, riparian habitat, and decommissioned facility locations.



There are a number of monitoring activities proposed by Nalcor as well for wildlife which is assumed that they will be leading directly. It is anticipated however that SLI will participate in or be responsible for the above noted mitigation activities as part of our Project implementation responsibilities.

Birds

There is some considerable discussion in the Panel report about the impact of the Project, particularly during reservoir clearing activities on birds. Environment Canada stated that in order to comply with the *Migratory Birds Convention Act* **clearing and grading must be avoided between May 1 and July 31** to minimize impacts on nesting birds. Nalcor stated that it intended to implement an avifauna management plan. As one measure, ornithologists would identify nesting sites in advance and relocate them. Nalcor stated that it would not violate the *Migratory Birds Convention Act* and the creation of an avifauna management plan would ensure this.

Nalcor's proposed mitigation and monitoring related to birds include the following:

- develop an avifauna management plan with Environment Canada for all species;
- replace osprey nests with artificial platforms;
- follow best management practices and demonstrate due diligence to avoid incidental take of breeding migratory birds and avian species at risk;
- mitigate effects of harlequin duck through standard measures to be included in Environmental Protection Plans and by the use of best management techniques prescribed in Environment Canada's *Harlequin Duck Eastern Population Management Plan*;
- monitor deciduous habitat creation efforts to evaluate success and use of such sites by ruffed grouse;
- conduct aerial surveys of the lower Churchill river and surrounding locations to verify ashkui formation post-inundation;
- collect additional baseline data on osprey and otter mercury levels to evaluate impacts post-inundation and evaluate mercury levels before and after Project construction;
- conduct surveys for active osprey nests (and other raptors) within 800 metres of the proposed construction zone and monitor any relocated nests;
- undertake pre-construction studies on the use of the lower Churchill River as staging habitat for late nesting waterfowl;
- undertake an additional year of field studies on abundance and distribution of surf scoter and a behavioral study to determine the extent of foraging during the spring stopover;
- monitor the presence and breeding activity of large raptors (e.g. golden eagle, bald eagle, osprey, red-tailed hawk, and rough legged hawk) in the Project area; and
- monitor avifauna for changes in distribution and abundance through re-surveying established transects.



The Panel commented on this issue as follows:

“ The issue of compliance with the *Migratory Birds Convention Act* , particularly during reservoir clearing activities, should be resolved between Nalcor and Environment Canada prior to the start of any clearing activities. The state of affairs that was presented to the Panel, where Environment Canada indicated that **the only way to comply with the *Migratory Birds Convention Act* is to avoid clearing between May 1 and July 31** and Nalcor’s indication that it does not intend to clear in that period in a manner consistent with the *Migratory Birds Convention Act*, is not acceptable.”

The Panel recommend as follows:

Recommendation 7.8 Effect of reservoir preparation on migratory birds

The Panel recommends that, if the Project is approved, Nalcor and Environment Canada negotiate an agreement prior to reservoir preparation regarding whether and how clearing could proceed between May and July without violating the *Migratory Birds Convention Act*. To initiate this process, Nalcor should be required to submit a plan describing how it would carry out clearing activities during this period in compliance with the *Migratory Birds Convention Act*.

Vegetation Management

The primary issue that was discussed in the vegetation portion of the Panel report was the use of herbicides.

The Panel recommended as follows:

Recommendation 7.9 Vegetation control

The panel recommend that, if the Project proceeds, Nalcor be required to restrict the use of chemical herbicides to areas where alternative vegetation control is not reasonably possible. Approval of the use of herbicides should only be granted after Nalcor has submitted an overall vegetation control plan to the provincial Department of Environment and Conservation, demonstrating that all alternatives have been adequately explored and the use of non-chemical approaches maximized.

Land and Resource Use

There were a number of Land and Resource Uses identified and Nalcor proposed the following mitigation measures, some of which may impact Project implementation:

- request that active work areas be closed to hunting pursuant to the *Wildlife Regulations*;
- limit the amount of new roads built for Project construction that would remain accessible during the operations phase;



- finalize the trapping compensation program the start of construction and provide information to trappers on Project-related activities;
- consider the possibility of increasing fishing opportunities in Grand Lake by implementing fish habitat compensation measures;
- implement a no-harvesting and no-firearm policy for all Project employees;
- issue public advisories in compliance with provincial regulations and post public notices to inform berry pickers of herbicide applications;
- notify the public about imminent flooding of reservoirs;
- rely on government regulations and wildlife adaptive management measures to be undertaken by the provincial government to address adverse issues resulting from increased access to the land in the region;
- provide Project related information on a quarterly basis to the authorities responsible for land and resource use such as the status of new access roads and the results of monitoring programs related to fish and wildlife; and
- assess marten and porcupine trapping data post-Project and compare with pre-Project data.

Navigation

Nalcor proposed the following mitigation and monitoring measures related to navigation, some of which will influence Project implementation:

- use safety signage, floating booms, public advisories, fences, audible warning and signs and education and awareness campaigns(television, schools, and educational material) to inform boaters of the potential navigational hazards due to Project construction sites and activities and the presence of hydroelectric facilities;
- inform the public of navigational risks posed by trees remaining in the stick-up zones at full supply level;
- provide portages around the dams and maintain access to existing portage routes;
- replace boat launches permanently affected by construction as close as feasible to the original ones, in consultation with stakeholders and based on accessibility, safety and technical constraints;
- implement feasible changes to the construction schedule to minimize disruption to boating due to construction activities;
- provide alternative transportation to Mud Lake residents if they are prevented from travelling to Happy Valley-Goose Bay by boat due to low water levels during the impoundment period;
- monitor trees remaining in the stick-up zones within the reservoirs and remove them mechanically or manually to below low water levels; and
- monitor downstream effects of the Project on navigational patterns between Mud Lake and Happy Valley-Goose Bay.



Forestry

Apart from the debate over the amount of clearing that Nalcor proposes to undertake in the reservoirs, the goal of the provincial Department of Natural Resources is to maximize the volume of timber that would be harvested from the reservoirs. For areas that would not be cleared under Nalcor's preferred clearing option, the Department planned to obtain a commitment from Nalcor so that other forest operators, should they wish, could have unrestricted access to those areas at the same time that harvesting is being completed by Nalcor.

If this is accepted by Nalcor it may create logistical and safety issues for the Project.

The Panel made some recommendations related to the issues noted above as follows:

Recommendation 8.3 Navigation during impoundment

The Panel recommends that , if the Project is approved, Nalcor be required to develop a mitigation plan in consultation with the Mud Lake Improvement Committee to address temporary transportation difficulties during reservoir impoundment.

Recommendation 8.4 Lower Churchill navigation and monitoring plan

The Panel recommends that, if the Project is approved, Transport Canada require Nalcor to develop a mitigation and monitoring plan for each reservoir, in consultation with river users, to address navigation issues on the river, including both reservoirs and the downstream portion of the main stem. The plan would address (a) navigation issues during the construction and impoundment, (b) provision of boat launches and portages, (c) identification of areas that need to be cleared before impoundment to create safe shoreline access for small boats, (d) management of stick-up zones, including how and when Nalcor would manually remove trees left standing three years after impoundment, (e) management of trash and debris in the reservoirs, (f) charts to show navigational hazards, signage and information, and (g) monitoring and specific adaptive management measures to address any navigational problems downstream from Muskrat Falls.

Recommendation 8.5 Allowing local forestry operators to clear additional areas

The Panel recommends that ,if the Project is approved, the provincial Department of Natural Resources require Nalcor to allow forestry operators to clear timber from areas not otherwise scheduled to be cleared, provided that they can demonstrate a safe approach. Nalcor should be required to pay the stumpage fees for the forestry operators salvaging the extra timber.



Culture and Heritage

There were several issues of a culture and heritage nature that were discussed:

- Historic and Archeological Resources
- Sites of Spiritual and Cultural Importance
- River Landscape

Nalcor proposed a number of mitigation and monitoring initiatives for these issues:

- continue to identify historic sites through detailed Project planning and during the second phase of the historical resource assessment program;
- implement data recovery and field recording programs for 44 identified archaeological sites;
- use best practice archaeological interpretation and analysis methods when implementing mitigation measures, such as radio-carbon dating and the compilation of available archival, informant and land use data;
- engage with communities to develop ways to commemorate sites and artifacts and to make historic information available to be displayed locally;
- implement a Contingency and Response Plan for Historic and Archaeological Resources outlining procedures to follow upon discovery of previously unknown historic and archaeological resources during construction;
- engage Aboriginal groups in the mitigation, preservation and documentation of any new discoveries of historical resources, including the hiring of Aboriginal persons to carry out fieldwork and research;
- reduce disturbance at *Manitu-utshu* (the rock knoll) through Project redesign, including developing an alternate layout and concentrating activities on the south side of the river;
- develop a community consultation program to inform the public about expected Project-related noise levels at potentially sensitive cultural sites;
- outline measures in the Environmental Protection Plan for the Muskrat Falls construction site to reduce interaction with the rock knoll and to educate Project staff about its spiritual and cultural significance;
- continue discussion with Innu Nation and Innu Elders on ways to reduce Project effects on the rock knoll;
- respect the cultural beliefs of the Labrador Innu, including communicating with the creatures living under the rock knoll to ask them not to retaliate in response to the Project;
- identify Innu cultural and heritage sites, in consultation with Innu Nation, as part of the implementation of the Impacts and Benefits Agreement;
- encourage the development of shrubs and vegetation to mimic natural nearshore zones;
- manage and remove timber debris from the reservoirs;
- implement a program to be approved by the Provincial Archaeology Office to recover historic and archaeological information through recording, analyzing, and interpreting; and



- compile information from monitoring programs for cultural and heritage resources and provide it annually to the Provincial Archaeology Office.

Economy, Employment and Business

The Panel discussed a number of issues related to this topic and concluded that, overall, the impact of the Project would be positive. They made recommendations, the pertinent ones for SLI being:

Recommendation 12.1 Early candidate selection and training

The Panel recommends that, if the Project is approved, Nalcor take a more proactive approach to providing early and specific training programs to certain Labrador candidates. This approach could include measures such as early candidate selection, conditional letters of intended employment, and on-the-job training at other Nalcor operations or with other entities with which Nalcor has influence.

Recommendation 12.2 Workplace attachment for apprenticeship graduates

The Panel recommends that, if the Project is approved, Nalcor commit to providing workplace attachment for both first and second year graduates of apprenticeship programs to the maximum extent possible.

Recommendation 12.4 Address wage subsidy stigma

The Panel recommend that, if the Project is approved, to the extent that wage subsidies might be available and used for new job entrants, Nalcor implement an education and communications program to address and remove the stigma that some might feel is associated with such a practice.

Recommendation 12.5 Preparing for participation in wage economy

The Panel recommends that, if the Project is approved, Nalcor develop and implement, in consultation with Aboriginal groups, an appropriate orientation and information process to assist prospective employees who might have little or no experience of participation in a wage economy. Nalcor should also expand training programs to include, in addition to skills training, training to equip potential Aboriginal employees to deal with various financial, social and cultural challenges as a result of employment in the construction industry. In consultation with Aboriginal groups, Nalcor should also consider providing additional money management programs such as payroll savings schemes.



Recommendation 12.7 Employment outreach to Quebec Aboriginal communities

The Panel recommends that, if the Project is approved, Nalcor initiate an employment outreach program for interested Aboriginal groups in Quebec; such a program could include among other measures, a specific recruitment program, transportation assistance from Sept-Îles, and measures to address social and cultural issues including any associated language barriers.

Recommendation 12.8 Quantitative targets for goods and services

The Panel recommends that, if the Project is approved, the concept of quantitative objectives or targets be applied to the provision of goods and services, with targets established for both the province as a whole, and for Labrador.

Recommendation 12.9 Enhanced supplier development program

The Panel recommends that, if the Project is approved, Nalcor enhance its supplier development program by implementing the following measures: (a) establish the Labrador Business Opportunities Committee and appoint a full time Coordinator in Happy Valley-Goose Bay as soon as possible, (b) ensure the Coordinator (a Nalcor employee) has sufficient seniority within the organization to influence relevant procurement decisions and has full access to all procurement information and related decision making, (c) release as soon as possible the list of goods and services required by the Project, with specific indications of time frame, approximate volumes and dollar values or ranges as appropriate, and (d) ensure immediately that all engineering management personnel involved in specifications, bidder prequalification, and procurement are fully aware of Nalcor's commitments towards maximizing benefits in this area and act accordingly.

Recommendation 12.10 Update quantitative targets at time of sanction

The Panel recommends that, if the Project is approved, Nalcor update at the time of Muskrat Falls sanction, the quantitative objectives or targets and the detailed list of goods and services required by the Project. Further, that this update be done in consultation with interested parties and the information be provided for Muskrat Falls construction and, to the extent possible, for the Project as a whole.

Recommendation 12.11 Transparent bidding process

The Panel recommends that, if the Project is approved, Nalcor implement a transparent bidding process that ensures that bidders are fully aware of the decision-making process, unsuccessful bidders can find out the reasons why and thereby improve, and Nalcor's commitments and programs apply and are enforced by all its contractors, sub-contractors and suppliers.



Recommendation 12.12 Modifications to the Benefits Strategy

The Panel recommends that, if the Project is approved, Nalcor and the provincial Department of Natural Resources modify two overall provisions of the Benefits Strategy. The first is to ensure that both the monthly reports on employment and goods and services and the quarterly reports on compliance are publically available and not restricted by confidentiality provisions of Nalcor's legislation. The second is to remove the provision that allows the minister to modify the benefits targets and other commitments regarding this Project at the minister's sole discretion.

Nalcor's proposed mitigation measures and monitoring related to employment and business opportunities included the following:

- collect data on project employment by number employed, location of primary residence, occupational category, gender and Aboriginal status and report to government on a quarterly basis;
- collect data on Project expenditures to businesses by amount, location and type, with a report to government on a quarterly basis;
- implement the Lower Churchill Construction Project Benefits Strategy regarding employment and business benefits during construction of the Project, as required by the Provincial Government and ensure that the strategy would be followed by Nalcor, its contractors and sub-contractors, and would be reflected in all collective bargaining agreements;
- promote local employment through implementation of an adjacency policy for Project hiring, giving priority to qualified and experienced workers in the vicinity of the Project first satisfying any Impacts and Benefits Agreement commitments with Aboriginal groups, then giving priority to residents of Labrador, followed by residents of Newfoundland, then residents of Canada, and finally workers from abroad.
- encourage preconstruction training initiatives to help local residents to fully participate in the Project and work with successful contractors to ensure adequate workplace training would be provided and implement apprenticeship programs;
- offer technical advice to training institutions and government agencies to ensure training of relevant stakeholders;
- encourage the participation of Labrador Innu in the Project workforce by measures including: Impacts and Benefits Planning Strategy & Impacts and Benefits Agreement, support for an Innu Training Program, an Innu Employment Training Coordinator, on-site Innu liaison position, and employment and training information provided in Innu-aimun;
- provide flexible work schedules where possible to accommodate traditional harvesting and other Aboriginal cultural, family and community needs;
- use a commute worker system and house the workers in accommodation complexes at the Project site;
- compensate Labrador workers from different regions for the costs of travel to work on the Project;



- travel between the accommodation complexes and the airport will be scheduled so as to minimize impact on the community. If flights are delayed or cancelled, workers will remain at the work site until the problem is resolved;
- implement progressive hiring, promotion, and mentoring practices for women;
- implement measures to encourage the hiring of all types of workers for whom there currently exist barriers to employment, including women and Aboriginal people;
- develop prior to beginning construction, a Gender Equity Program, Project diversity Plan, Women's Employment Plan, and Business Access Strategy;
- include support for women in the Women's Employment Plan such as family-friendly policies and practices, facilities for women, safe accommodations, washrooms and change rooms, and health supports and supports for all employees including addiction services, addictions awareness training, harassment prevention training, zero tolerance on harassment, violence prevention training and gender and cultural sensitivity training;
- establish a Labrador Business Opportunities Committee with a full-time coordinator position in Labrador as part of the Benefits Strategy;
- maximize benefits to the local communities and the province through job creation, business activity, improved investor confidence, training initiatives for individuals and through supplier development programs for businesses;
- hold project-specific supplier development seminars in Labrador that would include sizing and designing of packages, where appropriate to fit the capabilities of Newfoundland and Labrador companies; and
- inform businesses of Project employment needs as early as possible so they can retain their existing workers, identify gaps, and implement training programs.

Family and Community Life, and Public Services

The Panel considered a number of issues related to the above noted topic and made recommendations, most of which are intended for Nalcor and government social departments to consider. These were some that may have an impact on the Project as follows:

Recommendation 13.3 Worksite measures to address addictions issues

The Panel recommends that, if the Project is approved, Nalcor conduct careful monitoring of the effectiveness of the policy of controlled access to alcohol at the accommodation camps and provide professional addictions counseling to employees.

Recommendation 13.4 Variety of work schedules

The Panel recommends that, if the Project is approved, Nalcor offer a variety of work schedules, and require the same of its contractors, to accommodate different groups of workers and to assist in meeting its employment goals, particularly for Aboriginal employees and women.

Accidents and Malfunctions



The Panels concludes that in light of Nalcor's commitments, the environmental effects of the Project from forest fires and spills of hazardous materials are not likely to be significant.

Nalcor has proposed the following mitigation measures and monitoring related to accidents and malfunctions:

- use only those technologies that have a proven record of performance. Incorporate fail-safe design into Project planning;
- identify ways to prevent each potential accident or malfunction and reduce any effects if they do occur;
- address in the construction Environmental Protection Plan procedures for handling domestic garbage, sewage, wastewater and construction waste;
- establish the procedures to be followed in the event of a spill of hazardous material such as hydrocarbon products, battery acid or alkaline fluids;
- prepare Safety, Health and Environmental Emergency Response Plans, including identifying responsibilities and reporting protocols in the event of an incident;
- incorporate a plan for preventing and combating forest fires into the Emergency Preparedness Plan;
- incorporate worst case scenarios into emergency response planning, to be completed prior to reservoir impoundment;
- work with each community identified in the Dam Break Study to develop evacuation strategies in the event of a dam failure, to be completed prior to inundation;
- work with emergency response providers and assist as appropriate in the event of an evacuation;
- implement a flood warning system for Mud Lake and Happy Valley-Goose Bay to be approved by the provincial Department of Environment and Conservation; and
- undertake additional field work to support the conclusions reached on geotechnical activity and seismic activity, as recommended by Natural Resources Canada, including examination of faults and prehistoric landslides plus seismograph monitoring for reservoir triggered seismicity, prior to construction.



Environmental Management

The Panel made the following recommendation with respect to environmental management of the Project:

Recommendation 15.1 Authorizing regulation

The Panel recommends that, if the Project is approved, the Government of Newfoundland and Labrador issue an authorizing regulation or equivalent mechanism that:

- lists and requires Nalcor to implement all its environmental management commitments in relation to the Project made during the course of the environmental assessment plus the additional measures recommended by the panel and accepted by the Government of Newfoundland and Labrador;
- lists and requires provincial departments to implement all their environmental management commitments in relation to the Project made during the course of the environmental assessment, plus the additional measures recommended by the Panel and accepted by the government of Newfoundland and Labrador;
- includes a mechanism for updates as required to reflect any additions or changes, including adaptive management strategies that may be required and are not yet identified;
- ensures compliance with Environmental Protection Plans, Emergency Response Plans, Contingency Plans, Occupational Health and Safety plans, and Environmental Effects Monitoring Plans including those that are implemented through another regulatory instrument and those that are unregulated;
- establishes a monitoring and community liaison committee; and
- requires Nalcor to prepare and publish on the internet an annual report describing its environmental management activities and results, including mitigation, monitoring and adaptive management as appropriate, and related disbursements.

Recommendation 15.2 Federal-provincial joint regulatory plan

The Panel recommends that, if the Project is approved, the federal and provincial governments prepare a joint regulatory plan for the Project which outlines their respective regulatory requirements and includes a coordinated approach to areas where there is overlapping or related jurisdiction, and commit to it by signing a Memorandum of Agreement. The regulatory plan should address the regulations, guidelines, standards and criteria to be applied to activities. Each government would appoint a coordinating department or agency to prepare the plan and to produce a joint annual report regarding Nalcor's compliance, any issues or problems that were identified and how they were resolved. This report would be made available to the public through the internet.



Recommendation 15.5 Lower Churchill Project Monitoring and Community Liaison Committee

The panel recommends that, if the Project is approved, prior to the start of construction, the provincial Department of Environment and Conservation appoint a Monitoring and Community Liaison Committee, using a community-based nomination process. Nalcor, through the Department, should provide the committee with sufficient resources to allow for staff support, expenses and a modest honorarium for non-government participants, acquisition of independent expert advice, and adequate communication with community residents including occasional public forums. The mandate of the Committee would be set out in the Authorizing Regulation and the Federal-Provincial regulatory plan. The committee would operate throughout the construction period and for the first ten years of the operating period, at which point the continuing need for the committee should be reassessed by the Department in consultation with the Committee, the communities and Nalcor.

The Committee would:

- provide community feedback and advice to the department and to Nalcor on relevant issues including Project-specific mitigation, impact monitoring and adaptive management committed to by Nalcor and as recommended by the panel;
- be empowered as required to establish subcommittees or working groups to address the key areas of biophysical monitoring and follow-up, enhancing employment and business benefits, and health and social issues;
- have representation from communities, community –based agencies and non-government organizations, Aboriginal organizations, relevant federal and provincial government departments and Nalcor (ex officio); and
- liaise with the public to ensure a transparent approach to addressing public concerns and the communication of monitoring results.

Recommendation 15.10 Local hiring for environmental management work

The Panel recommends that, if the Project is approved, where possible, Nalcor hire local people to work on environmental monitoring and mitigation projects to benefit from their local knowledge and to develop local skills and experience in the field of environmental management.

APPENDIX 1 LIST OF RECOMMENDATIONS

RECOMMENDATION 4.1 Government confirmation of projected long-term returns

The Panel recommends that, if the Project is approved, before making the sanction decision for each of Muskrat Falls and Gull Island, the Government of Newfoundland and Labrador undertake a separate and formal review of the projected cash flow of the Project component being considered for sanctioning (either Muskrat Falls or Gull Island) to confirm whether that component would in fact provide significant long-term financial returns to Government for the benefit of the people of the Province. Such financial returns must be over and above revenues required to cover operating costs, expenditures for monitoring, mitigation and adaptive management, and financial obligations to Innu Nation. The Panel further recommends that the Government of Newfoundland and Labrador base these reviews on information on energy sales, costs and market returns that have been updated at the time of sanction decision, and make the results of the reviews public at that time. The financial reviews should also take into account the results of the independent alternatives assessment recommended in Recommendation 4.2.

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);
- the use of Gull Island power when and if it becomes available since it has a lower per unit generation cost than Muskrat Falls;
- the extent to which Nalcor's analysis looked only at current technology and systems versus factoring in developing technology;
- a review of Nalcor's assumptions regarding the price of oil till 2067, since the analysis provided was particularly sensitive to this variable;
- a review of Nalcor's estimates of domestic demand growth (including the various projections to 2027 in the EIS (2007, 2008, 2009 and the 0.8 percent annual growth to 2067 provided at the hearing);
- Nalcor's assumptions and analysis with respect to demand management programs (compare Nalcor's conservative targets to targets and objectives of similar programs in other jurisdictions and consider the specific recommendations, including the use of incentives to curtail electric base board heating, from Helios Corporation, among others);
- the suggestion made by the Helios Corporation that an 800 MW wind farm on the Avalon Peninsula would be equivalent to Muskrat Falls in terms of supplying domestic needs, could be constructed with a capital cost of \$2.5 billion, and would have an annual operating cost of \$50 million and a levelized cost of power of 7.5 cents per kilowatt-hour;
- whether natural gas could be a lower cost option for Holyrood than oil; and

- potential for renewable energy sources on the Island (wind, small scale hydro, tidal) to supply a portion of Island demand.

RECOMMENDATION 4.3 Integrated Resource Planning

The Panel recommends that the Government of Newfoundland and Labrador and Nalcor consider using Integrated Resource Planning, a concept successfully used in other jurisdictions. Such an approach would involve interested stakeholders and look simultaneously at demand and supply solutions and alternative uses of resources over the medium and long term.

Recommendation 4.4 Project sequencing and applying lessons learned

The Panel recommends that, if the Project is approved, and if for any reason construction of the Gull Island portion of the Project occurs before Muskrat Falls, Nalcor should be expected to apply the lessons learned from the construction of Gull Island to the construction of Muskrat Falls.

RECOMMENDATION 4.5 Full clearing of the Muskrat Falls reservoir

The Panel recommends that, if the Project is approved, Nalcor be required to apply its 'full clearing' reservoir preparation option to the Muskrat Falls reservoir.

RECOMMENDATION 4.6 Preparation approach for Gull Island reservoir

The Panel recommends that, if the Project is approved, the reservoir preparation approach for the Gull Island reservoir be finalized and approved by the provincial Department of Natural Resources at the time of the sanction decision for Gull Island. The approach should take into account lessons learned from the preparation of the Muskrat Falls reservoir and should make all reasonable effort to increase harvested volumes above those currently projected by Nalcor under its 'partial clearing' option for the Gull Island reservoir.

RECOMMENDATION 4.7 Utilization of merchantable timber

The Panel recommends that, if the Project is approved, Nalcor be required to ensure utilization of both the harvested timber from reservoir preparation and the merchantable wood taken from the reservoir as part of its 'trash and debris' removal program after impoundment. Nalcor would retain the right to determine how this would be achieved, but should work with relevant Provincial Government departments and third party commercial interests to identify options.

RECOMMENDATION 5.1 Use of best available technology

The Panel recommends that, if the Project is approved, Nalcor be required to implement its mitigation commitments to minimize air pollution, noise and greenhouse gas emissions resulting from the Project. In addition, Nalcor should be required to use best available technology for any new construction and harvesting equipment purchased for the Project. This means that any new equipment purchased after Project approval should be required to meet the highest current emissions standards for such equipment, even if such standards are above current regulatory requirements.

RECOMMENDATION 5.2 Backing up intermittent renewable energy

The Panel recommends that, if the Project is approved, Nalcor be required to make all reasonable efforts to maximize the potential to utilize power from the Project to back-up wind power and other intermittent renewable sources of electricity. The results of Nalcor's efforts should be reported to the public through its annual report.

RECOMMENDATION 5.3 Displacement of high greenhouse gas energy sources

The Panel recommends that, if the Project is approved, Nalcor be required to take all reasonable steps to ensure that power from the Project is used to displace energy from high

greenhouse gas emission sources and does not displace demand management, conservation, efficiency, and the generation of power from renewable, low greenhouse gas emission energy sources. The results of Nalcor's efforts should be reported to the public through its annual report.

RECOMMENDATION 5.4 Atmospheric monitoring

The Panel recommends that, if the Project is approved and in addition to its monitoring commitments, Nalcor should carry out the following monitoring programs using methodologies approved by federal and provincial regulators:

- monitor greenhouse gas emissions related to construction;
- monitor greenhouse gas emissions related to operation;
- track the displacement of greenhouse gas emissions in the various markets for Project power and report annually based on transparent methodologies approved by federal and provincial regulators, taking into account relevant issues identified by the Panel; and
- work with appropriate government agencies to ensure that there are active climate change monitoring programs on appropriate rivers in Labrador not affected by the Project, so that there is a better chance to separate Project impacts from climate change impacts based on local weather data collected within the Project area.

RECOMMENDATION 6.1 Timing of reservoir impoundment

The Panel recommends that, if the Project is approved, Fisheries and Oceans Canada require Nalcor to carry out impoundment of both the Muskrat Falls and Gull Island reservoirs during the period mid-July to the end of September, and to prepare a detailed mitigation plan for approval by Fisheries and Oceans Canada. The mitigation plan should include information on how the effects of dewatering would be monitored, thresholds to trigger further mitigation, and identification of specific adaptive management measures and how they would be applied.

RECOMMENDATION 6.2 Environmental flow standards

The Panel recommends that, if the Project is approved, the provincial Department of Environment and Conservation, in consultation with Fisheries and Oceans Canada, Nalcor, Churchill Falls (Labrador) Corporation Limited, and Aboriginal groups and stakeholders, develop environmental flow standards for the lower Churchill River with respect to flows (magnitude, frequency, duration, timing, and rate of change) designed to promote the maintenance of ecological functions and the conservation of riparian and fish habitat. The environmental flow standards should be incorporated by regulation under appropriate provincial legislation and acknowledged in the Water Management Agreement. The Panel further suggests that the Department of Environment and Conservation consider developing environmental flow standards for the upper Churchill River, recognizing the importance of addressing the entire watershed as an integrated system.

RECOMMENDATION 6.3 Erosion and sedimentation prevention

The Panel recommends that, if the Project is approved, Nalcor be required to prepare an erosion and sedimentation prevention strategy including the use of 15-metre vegetated buffer areas during reservoir preparation, best practices at all construction and cleared areas, and specified adaptive management measures to be applied should these mitigation measures fail.

RECOMMENDATION 6.4 Mitigating entrainment effects

The Panel recommends that, if the Project is approved, Fisheries and Oceans Canada require Nalcor to take the following steps before receiving a Section 35(2) authorization with respect to potential entrainment losses: (a) carry out further baseline sampling at Gull Island to verify both juvenile and adult fish movements in this area; and (b) prepare a mitigation and adaptive

management strategy that establishes thresholds for further action, and identifies what adaptive measures would be taken when, and for what species. The strategy should also address compensation measures should it become apparent that high losses of a specific species are inevitable.

RECOMMENDATION 6.5 Pilot study for methylmercury mitigation through soil removal

The Panel recommends that Natural Resources Canada, in consultation with Nalcor and, if possible, other hydroelectricity developers in Canada, carry out a pilot study to determine (a) the technical, economic and environmental feasibility of mitigating the production of methylmercury in reservoirs by removing vegetation and soils in the drawdown zone, and (b) the effectiveness of this mitigation measure. The pilot study should take place in a location where the relevant parameters can be effectively controlled (i.e. not in the Lower Churchill watershed) and every effort should be made to complete the pilot before sanction decisions are made for Gull Island. If the results of the pilot study are positive, Nalcor should undertake to employ this mitigation measure in Gull Island to the extent possible and monitor the results.

RECOMMENDATION 6.6 Fish habitat compensation

The Panel recommends that, if the Project is approved, Fisheries and Oceans Canada require Nalcor to:

- prepare a detailed fish habitat compensation plan in consultation with stakeholders and Aboriginal groups that addresses to the extent possible the likely interactions between species and life stages, including predator-prey relationships and also the potential to replace tributary-type habitats;
- prepare a habitat monitoring plan including thresholds for further action and identified adaptive management measures;
- implement the proposed plan, documenting the process;
- evaluate the extent to which new, stable habitat has been created, its use and productivity; and
- apply any lessons learned from implementing the Muskrat Falls compensation plan to the proposed Gull Island compensation works.

If, after all feasible adaptive management measures have been applied, Fisheries and Oceans Canada determines that there has been a significant shortfall in the amount of habitat successfully created and maintained, compared to the original proposal, Nalcor should be required to compensate by carrying out habitat compensation works in other watersheds in Labrador. Preference should be given to remediation and enhancement in areas adversely affected by the Churchill Falls project.

RECOMMENDATION 6.7 Assessment of downstream effects

The Panel recommends that, if the Project is approved and before Nalcor is permitted to begin impoundment, Fisheries and Oceans Canada require Nalcor to carry out a comprehensive assessment of downstream effects including:

- identifying all possible pathways for mercury throughout the food web, and incorporating lessons learned from the Churchill Falls project;
- baseline mercury data collection in water, sediments and biota, (revised modelling taking into account additional pathways, and particularly mercury accumulation in the benthos) to predict the fate of mercury in the downstream environment;
- quantification of the likely changes to the estuarine environment associated with reduction of sediment and nutrient inputs and temperature changes; and
- identification of any additional mitigation or adaptive management measures.

The results of this assessment should be reviewed by Fisheries and Oceans Canada and by an independent third-party expert or experts, and the revised predictions and review comments discussed at a forum to include participation by Aboriginal groups and stakeholders, in order to provide advice to Fisheries and Oceans Canada on next steps.

RECOMMENDATION 6.8 Published analysis of downstream effects over time

The Panel recommends that, if the Project is approved, Nalcor contribute to the overall knowledge about the effects of hydroelectric projects in northern regions by ensuring that a longitudinal analysis of the effects of the Project on the downstream environment (Goose Bay and Lake Melville) over an appropriate time period, including both mercury transport and bioaccumulation and other ecological parameters, is published in a peer-reviewed journal or the equivalent. The Panel suggests that Nalcor consider collaborating with an appropriate independent research organization to carry out this recommendation by providing knowledge, data and financial resources.

RECOMMENDATION 6.9 Development of the aquatic monitoring program

The Panel recommends that, if the Project is approved, Fisheries and Oceans Canada require Nalcor to organize a workshop with third-party facilitation and invited participation by Aboriginal groups, stakeholder organizations, knowledgeable local people, and independent experts from academic or equivalent organizations to review and advise on a detailed draft monitoring plan.

RECOMMENDATION 7.1 Wetland compensation plan

The Panel recommends that, if the Project is approved, Nalcor be required to develop a detailed wetland compensation plan in consultation with Environment Canada, the provincial Department of Environment and Conservation, Aboriginal groups and appropriate stakeholders. The plan should set appropriate goals for the re-establishment of wetlands taking into account the purpose served by each type of wetland in the context of the surrounding ecosystem.

RECOMMENDATION 7.2 Riparian compensation plan

The Panel recommends that, if the Project is approved, Fisheries and Oceans Canada require Nalcor to develop a detailed riparian habitat compensation plan in consultation with Fisheries and Oceans Canada, the provincial Department of Environment and Conservation, Aboriginal groups and appropriate stakeholders, that looks closely at water levels and variations in the levels needed to ensure healthy and resilient riparian habitat and coordinates with the environmental flow standards referenced in recommendation 6.2.

RECOMMENDATION 7.3 Recovery strategies for endangered species

The Panel recommends that, if the Project is approved, federal and provincial governments make all reasonable efforts to ensure that recovery strategies are in place and critical habitat is identified for each listed species found in the assessment area before a final decision is made about the effects of the Project on those species. Compliance with federal and provincial species protection legislation should be seen as a minimum standard. In fairness to Nalcor, this work should be given the priority needed to ensure that the Project decision is not unduly delayed. A final Project decision should only be made once government decisionmakers are satisfied that the recovery of listed species would not be compromised by the Project. Where Environment Canada is relying on provincial efforts to fulfill its obligations under the safety net provisions of the federal *Species at Risk Act*, before a federal decision is made about the Project it should satisfy itself that the provincial efforts for any species at risk are sufficient for its recovery and will not be compromised by the Project.

RECOMMENDATION 7.4 Compliance with species at risk legislation

The Panel recommends that, if the Project is approved, Nalcor should work with federal and provincial departments responsible for species at risk legislation to ensure all Project-related activities comply with restrictions and prohibitions against harassment, disturbance, injuring or killing of listed species or destroying and disturbing their residence.

RECOMMENDATION 7.5 Road construction and decommissioning

The Panel recommends that, if the Project is approved, the provincial Department of Natural Resources require Nalcor to minimize road construction outside the reservoirs, by locating new roads inside the impoundment area as much as possible. Any new roads proposed by Nalcor to be located outside the impoundment areas should be carefully reviewed by the Forestry Branch of the Department of Natural Resources and only approved if there is no reasonable alternative. In order to ensure that conservation objectives are met, all temporary roads outside the reservoir should be decommissioned as soon as possible to the satisfaction of the provincial Department of Environment and Conservation.

RECOMMENDATION 7.6 Recovery of the Red Wine Mountain caribou herd

The Panel recommends that, if the Project is approved, the provincial Department of Environment and Conservation ensure that adequate resources are available so that all reasonable efforts to ensure the recovery of the Red Wine Mountain caribou herd are taken. In addition, the Department should require Nalcor to play an enhanced role in the recovery process for the Red Wine Mountain caribou herd by putting resources into the process for research and recovery efforts and to participate actively in the overall effort to ensure the recovery of the caribou herd.

RECOMMENDATION 7.7 Management of the George River caribou herd

The Panel recommends that, if the Project is approved, the provinces of Quebec and Newfoundland and Labrador, Environment Canada and all interested Aboriginal communities initiate a dedicated range-wide joint management program for the George River caribou herd, and through this program cooperatively carry out a comprehensive cumulative effects assessment of the impact of human activities on the herd to be updated periodically as required.

RECOMMENDATION 7.8 Effect of reservoir preparation activities on migratory birds

The Panel recommends that, if the Project is approved, Nalcor and Environment Canada negotiate an agreement prior to reservoir preparation regarding whether and how clearing could proceed between May and July without violating the *Migratory Birds Convention Act*. To initiate this process, Nalcor should be required to submit a plan describing how it would carry out clearing activities during this period in compliance with the *Migratory Birds Convention Act*.

RECOMMENDATION 7.9 Vegetation control

The Panel recommends that, if the Project is approved, Nalcor be required to restrict the use of chemical herbicides to areas where alternative vegetation control is not reasonably possible. Approval of the use of herbicides should only be granted after Nalcor has submitted an overall vegetation control plan to the provincial Department of Environment and Conservation, demonstrating that all alternatives have been adequately explored and the use of non-chemical approaches maximized.

RECOMMENDATION 7.10 Monitoring, follow-up and adaptive management for the terrestrial environment

The Panel recommends that, if the Project is approved and in addition to its monitoring commitments listed in Chapter 7, Terrestrial Environment, Nalcor should carry out the following monitoring programs:

- monitor the effectiveness of riparian and wetland habitat compensation work, including the effect on wetland sparrows;
- monitor the response of the Red Wine Mountain caribou herd including any population changes through the construction phase and in the early part of the operation phase;
- monitor wolf predation of caribou, particularly the Red Wine Mountain herd;
- monitor interactions of the George River caribou herd with Project activities and facilities and identify any impacts;
- monitor ashkui formation in the Project area;
- monitor direct and indirect impacts on waterfowl, such as waterfowl adjustment to changes in riparian habitat, and changes in the location and formation of ashkui;
- confirm the presence of and monitor the impact of the Project on salamanders and spring peepers;
- develop a detailed mitigation and monitoring plan for all listed species for approval by the provincial Department of Environment and Conservation;
- confirm the presence outside the flood zone of the eight plant species identified by Nalcor as unique to the river valley plus the two additional species listed by the Department of Environment and Conservation (marsh horsetail and hidden fruit bladderwort) and develop a detailed mitigation plan for these plant species for approval by the Department;
- monitor the impact of the Project on furbearers, small game, small mammals, and black bears; and
- collaborate with the Department of Environment and Conservation to develop an appropriate approach to monitor pine marten in areas affected by the Project where there is no trapping activity.

RECOMMENDATION 8.1 Trapping compensation program

The Panel recommends that, if the Project is approved, Nalcor be required to establish a compensation program for all bona fide trappers along the lower Churchill River, without requiring proof of ten years' use as an entry point. Instead, compensation should be commensurate with the total extent of trapping activity during the previous ten years, as shown by the recorded income attributable to the Project area. Compensation should be awarded within six months after an individual trapper has established eligibility.

RECOMMENDATION 8.2 Mud Lake ice bridge mitigation

The Panel recommends that, if the Project is approved, Nalcor, the Government of Newfoundland and Labrador and the Mud Lake Improvement Committee negotiate an agreement to address how any future adverse changes to the ice bridge that would lengthen the existing period of time when residents are unable to cross the river by boat or snowmobile would be assessed and mitigated. Alternative transportation options should be provided if travel across the river is prevented during the freeze-up or break-up for periods in excess of two weeks. The selected solution should adequately meet the residents' needs for everyday and emergency travel and should respect the character of the community. Road access should not be imposed on the community as a solution to address ice bridge changes without its consent. The primary onus to cover the costs of this mitigation should be placed on Nalcor. The agreement should also address the role of the Province in mitigating any cumulative effects caused by climate change.

RECOMMENDATION 8.3 Navigation during impoundment

The Panel recommends that, if the Project is approved, Nalcor be required to develop a mitigation plan in consultation with the Mud Lake Improvement Committee to address temporary transportation difficulties during reservoir impoundment periods. If transportation is impeded,

Nalcor should provide and pay for alternative transportation that minimizes inconvenience to the residents.

RECOMMENDATION 8.4 Lower Churchill navigation mitigation and monitoring plan

The Panel recommends that, if the Project is approved, Transport Canada require Nalcor to develop a mitigation and monitoring plan for each reservoir, in consultation with river users, to address navigation issues on the river, including both reservoirs and the downstream portion of the main stem. The plan would address (a) navigation issues during the construction and impoundment periods, (b) provision of boat launches and portages, (c) identification of areas that need to be cleared before impoundment to create safe shoreline access areas for small boats, (d) management of the stick-up zones, including how and when Nalcor would manually remove trees left standing three years after impoundment, (e) management of trash and debris in the reservoirs, (f) charts to show navigational hazards, signage and information, and (g) monitoring and specific adaptive management measures to address any navigational problems downstream from Muskrat Falls.

RECOMMENDATION 8.5 Allowing local forestry operators to clear additional areas

The Panel recommends that, if the Project is approved, the provincial Department of Natural Resources require Nalcor to allow local forestry operators to clear timber from areas not otherwise scheduled to be cleared, provided they can demonstrate a safe approach. Nalcor should be required to pay the stumpage fees for the forestry operators salvaging the extra timber.

RECOMMENDATION 9.1 Noise and dust management

The Panel recommends that, if the Project is approved, and to avoid disturbance of persons carrying out traditional land and resource use activities, Nalcor be required to monitor and manage construction traffic and borrow pit activities to minimize dust problems, noise and sleeping disturbance for occupants of cabins and camps along the roads.

RECOMMENDATION 9.2 Relocation of Canada yew

The Panel recommends that, if the Project is approved, Nalcor be required to collaborate with Innu Elders on where and how to relocate Canada yew plants, conduct regular field visits with Elders for assessment, and employ any adaptive management procedures required to maintain a stable population of the plant.

RECOMMENDATION 9.3 Community level land and resource use monitoring

The Panel recommends that, if the Project is approved, Nalcor involve all Aboriginal groups in the design and implementation of its proposed community land and resource use monitoring program for the duration of the construction period to ensure that parameters of importance to these groups and Traditional Knowledge are included.

RECOMMENDATION 11.1 Involvement of Aboriginal groups in the management and protection of historic and archaeological resources

The Panel recommends that, if the Project is approved, Nalcor, in collaboration with the Provincial Archaeology Office, establish and support a program to involve all three Labrador Aboriginal groups in (a) the documentation and interpretation of known historic and archaeological sites and artifacts and (b) the process to be followed in the case of inadvertent discoveries of previously unknown sites and artifacts during construction, including notification of the three groups. Nalcor should also give consideration to inviting participation by interested Aboriginal communities in Quebec. Nalcor should share with Aboriginal groups the results of its work on the monitoring of historic and archaeological resources to be compiled and provided annually to the Provincial Archaeology Office.

RECOMMENDATION 11.2 Commemoration initiatives

The Panel recommends that, if the Project is approved, Nalcor work in collaboration with local communities and Aboriginal groups to (a) identify sites, artifacts and intangible elements (including portages, traplines, trails and personal stories) to be documented and commemorated, (b) determine how commemoration should occur and (c) implement specific commemorative initiatives (such as plaques and story boards) at appropriate locations in communities and throughout the river valley. Local heritage organizations could benefit by receiving funding to undertake part of this work and to implement education and interpretation programs.

RECOMMENDATION 11.3 – Naming Project-related features

The Panel recommends that, if the Project is approved, the Government of Newfoundland and Labrador develop an approach to the naming of Project-related features in consultation with local communities and Aboriginal groups that recognizes the importance of place names in Aboriginal cultures.

RECOMMENDATION 12.1 Early candidate selection and training

The Panel recommends that, if the Project is approved, Nalcor take a more proactive approach to providing early and specific training programs to certain Labrador candidates. This approach could include measures such as early candidate selection, conditional letters of intended employment, and, on-the-job training at other Nalcor operations or with other entities with which Nalcor has influence.

RECOMMENDATION 12.2 Workplace attachment for apprenticeship graduates

The Panel recommends that, if the Project is approved, Nalcor commit to providing workplace attachment for both first and second year graduates of apprenticeship programs to the maximum extent possible.

RECOMMENDATION 12.3 Training to 'journey person' level in community of residence

The Panel recommends that, if the Project is approved, relevant provincial departments commit to explore with Nalcor, other educational entities and agencies and relevant communities in Labrador, how to implement to the extent practical, training to 'journey person' level in the community of residence.

RECOMMENDATION 12.4 Address wage subsidy stigma

The Panel recommends that, if the Project is approved, to the extent that wage subsidies might be available and used for new job entrants, Nalcor implement an education and communications program to address and remove the stigma that some might feel is associated with such a practice.

RECOMMENDATION 12.5 Preparing for participation in wage economy

The Panel recommends that, if the Project is approved, Nalcor develop and implement, in consultation with Aboriginal groups, an appropriate orientation and information process to assist prospective employees who might have little or no experience of participation in a wage economy. Nalcor should also expand training programs to include, in addition to skills training, training to equip potential Aboriginal employees to deal with various financial, social and cultural challenges as a result of employment in the construction industry. In consultation with Aboriginal groups, Nalcor should also consider providing additional money management programs such as payroll saving schemes.

RECOMMENDATION 12.6 Continuation of Labrador Aboriginal Training Partnership

The Panel recommends that, if the Project is approved, Nalcor support the continuation of the Labrador Aboriginal Training Partnership beyond 2012, including making a financial contribution

if required to both enable current participants to complete their training and to meet additional training requirements.

RECOMMENDATION 12.7 Employment outreach to Quebec Aboriginal communities

The Panel recommends that, if the Project is approved, Nalcor initiate an employment outreach program for interested Aboriginal groups in Quebec; such a program could include among other measures, a specific recruitment program, transportation assistance from Sept-Îles, and measures to address social and cultural issues including any associated language barriers.

RECOMMENDATION 12.8 Quantitative targets for goods and services

The Panel recommends that, if the Project is approved, the concept of quantitative objectives or targets be applied to the provision of goods and services, with targets established both for the province as a whole, and for Labrador.

RECOMMENDATION 12.9 Enhanced supplier development program

The Panel recommends that, if the Project is approved, Nalcor enhance its supplier development program by implementing the following measures: (a) establish the Labrador Business Opportunities Committee and appoint the full time Coordinator in Happy Valley-Goose Bay as soon as possible, (b) ensure the Coordinator (a Nalcor employee) has sufficient seniority within the organization to influence relevant procurement decisions and has full access to all procurement information and related decision making, (c) release as soon as possible the list of goods and services required by the Project, with specific indications of time frame, approximate volumes and dollar values or ranges as appropriate, and (d) ensure immediately that all engineering management personnel involved in specifications, bidder prequalification, and procurement are fully aware of Nalcor's commitments towards maximizing benefits in this area and act accordingly.

RECOMMENDATION 12.10 Update quantitative targets at time of sanction

The Panel recommends that, if the Project is approved, Nalcor update at the time of Muskrat Falls sanction, the quantitative objectives or targets and the detailed list of goods and services required by the Project. Further, that this update be done in consultation with interested parties and the information be provided for Muskrat Falls construction and, to the extent possible, for the Project as a whole.

RECOMMENDATION 12.11 Transparent bidding process

The Panel recommends that, if the Project is approved, Nalcor implement a transparent bidding process that ensures that bidders are fully aware of the decision-making process, unsuccessful bidders can find out the reasons why and thereby improve, and Nalcor's commitments and programs apply and are enforced by all its contractors, sub-contractors and suppliers.

RECOMMENDATION 12.12 Modifications to the Benefits Strategy

The Panel recommends that, if the Project is approved, Nalcor and the provincial Department of Natural Resources modify two overall provisions of the Benefits Strategy. The first is to ensure that both the monthly reports on employment and goods and services and the quarterly reports on compliance are publically available and not restricted by the confidentiality provisions of Nalcor's legislation. The second is to remove the provision that allows the Minister to modify the benefits targets and other commitments regarding this Project at the Minister's sole discretion.

RECOMMENDATION 13.1 Sheshatshiu social effects mitigation

The Panel recommends that, if the Project is approved, Innu Nation, Sheshatshiu Innu Band Council, Nalcor, the provincial Department of Health and Community Services, and relevant federal government departments develop a Memorandum of Understanding with regard to identifying and implementing (a) mechanisms to prevent the exacerbation of existing social

problems and (b) mitigation measures such as mental health and addictions services and family support required to address any Project-related increases in social problems. Each party would bring to the table its relevant knowledge and resources. In the case of Innu Nation and Sheshatshiu Innu Band Council, this would include any provisions of the Impacts and Benefits Agreement component of the *Tshash Petapen* Agreement that directly address this issue. In the case of Nalcor, its role would be to adjust hiring, employment and employee assistance arrangements where possible and appropriate to assist or reinforce mitigation. The federal and provincial governments should provide resources to discharge their responsibilities in these areas.

RECOMMENDATION 13.2 Social effects needs assessment and research

The Panel recommends that, if the Project is approved, the provincial Department of Health and Community Services, in consultation with Aboriginal groups, and appropriate government and community agencies from the Upper Lake Melville area, conduct a social effects needs assessment, including an appropriately resourced participatory research component, that would determine the parameters to monitor, collect baseline data, and provide recommendations for social effects mitigation measures and an approach to on-going monitoring. It is expected that Innu Nation would be a participant in the research and that the results would inform and enhance the social effects mitigation measures suggested in Recommendation 13.1. The results of the needs assessment would be documented in a public report and, subject to the agreement of participants, the results of the research would be published in a peer-reviewed journal.

RECOMMENDATION 13.3 Worksite measures to address addictions issues

The Panel recommends that, if the Project is approved, Nalcor conduct careful monitoring of the effectiveness of the policy of controlled access to alcohol at the accommodation camps and provide professional addictions counselling to employees.

RECOMMENDATION 13.4 Variety of work schedules

The Panel recommends that, if the Project is approved, Nalcor offer a variety of work schedules, and require the same of its contractors, to accommodate different groups of workers and to assist in meeting its employment goals, particularly for Aboriginal employees and women.

RECOMMENDATION 13.5 Health and social services

The Panel recommends that, if the Project is approved, the provincial Department of Health and Community Services formally commit to provide the human resources required to address any Project-related increases in the demand for mental health, addictions and other health and social services at the Labrador Health Centre, as identified in the needs assessment. Nalcor's contribution to mitigation measures to address this should be clarified through a Memorandum of Understanding with the Labrador-Grenfell Regional Health Authority.

RECOMMENDATION 13.6 Capacity agreement with Happy Valley-Goose Bay

The Panel recommends that, if the Project is approved, the Government of Newfoundland and Labrador and Nalcor negotiate a capacity agreement with the Town of Happy Valley-Goose Bay to provide financial resources to increase the Town's capacity to address additional administrative demands related to the Project. The time period for the agreement would be negotiated by the parties and should relate to the needs expected at different stages of the Project. The resources would be intended to enable the Town to:

- establish baseline data on infrastructure capacity and use prior to the start of construction;
- monitor Project-related infrastructure effects throughout the construction period of the Project and identify needed mitigation;

- prepare, publicize and update on a regular basis, emergency preparedness plans to address the possibility of a catastrophic flood event;
- prepare a low income housing strategy; and
- address issues related to Project-related in-migration and the potential economic downturn at the end of the construction phase, and any other Project-related effects within the Town, not otherwise mitigated.

RECOMMENDATION 13.7 Funding for infrastructure mitigation

The Panel recommends that, prior to Project sanction, a binding and firm commitment be given by Nalcor and the Government of Newfoundland and Labrador that sufficient funds and resources be made available to fully mitigate Project-related adverse impacts on infrastructure in Happy Valley-Goose Bay.

RECOMMENDATION 13.8 Low-income housing strategy

The Panel recommends that, if the Project is approved, before construction begins, Nalcor support the efforts of the Town of Happy Valley-Goose Bay, relevant federal and provincial departments, and local low-income housing agencies, to develop and implement a strategy to set measurable targets, address the existing low-income housing needs and mitigate the adverse impacts of Project-related in-migration on low-income housing.

RECOMMENDATION 13.9 Possible requirement for consumption advisories in Goose Bay or Lake Melville.

The Panel recommends that, if the Project is approved and the outcome of the downstream mercury assessment (Recommendation 6.7) indicates that consumption advisories would be required for Goose Bay or Lake Melville, Nalcor enter into negotiations prior to impoundment with the parties representing – as appropriate – Goose Bay and Lake Melville resource users. Depending on where the consumption advisories would apply, these could include Aboriginal groups, the Town of Happy Valley-Goose Bay, Mud Lake Improvement Committee, the Town of North West River and the community of Rigolet. The purpose of the negotiations would be to reach agreement regarding further mitigation where possible and compensation measures, including financial redress if necessary. This recommendation would also apply later in the process if the downstream mercury assessment indicated that advisories were not likely, but monitoring subsequently required their application.

RECOMMENDATION 13.10 Consumption advisory implementation

The Panel recommends that, if the Project is approved and fish and seal monitoring indicates that consumption advisories are required, Nalcor:

- follow Health Canada guidelines regarding the establishment of human mercury hazard quotient levels and fish consumption advisories;
- consult with Aboriginal Affairs and Northern Development Canada regarding best practices for the communication of advisories;
- consult with Aboriginal groups and affected communities regarding an effective approach to the communication and implementation of consumption advisories that ensures that affected communities have an understanding of the quantities and types of fish that can be consumed safely and the health benefits of including fish in one's diet;
- ensure that notifications of the consumption advisories are placed at regular intervals in easily visible locations along the shorelines of affected water bodies;
- ensure that consumption advisories are updated as necessary to reflect any changes detected in mercury levels in fish or seal; and

- provide publicly accessible, up-to-date and accurate information through the internet, radio, newspapers and other means regarding the health risks of mercury and the status of the advisories.

RECOMMENDATION 13.11 Human health and mercury monitoring

The Panel recommends that, if the Project is approved, Nalcor, in collaboration with Health Canada and the provincial Department of Health and Community Services:

- consult with Aboriginal groups and affected communities regarding the approach to be taken to baseline and follow-up mercury testing and the communication of results for each group; and
- establish baseline human mercury levels in Churchill Falls, Upper Lake Melville communities and Rigolet, with consideration given to offering blood tests as well as hair samples for Innu participants, due to inconsistencies noted in the correlation between hair sample results and dietary consumption.

If consumption advisories are required, it is further recommended that Nalcor ensure that a human health mercury monitoring program is established concurrently with the issuing of consumption advisories. This monitoring would continue until five years after the lifting of consumption advisories, or until such time as determined by Health Canada, and would be overseen by the Monitoring and Community Liaison Committee described in Chapter 15.

RECOMMENDATION 13.12 Dietary surveys

The Panel recommends that, if the Project is approved and consumption advisories are required as a result of mercury levels in fish or seal, Nalcor conduct ongoing dietary surveys as an integral part of the mercury monitoring program, including fish, seal, caribou and other country food. Dietary surveys should be conducted concurrently with regular mercury testing in affected communities to determine the effectiveness of the consumption advisories and the overall impact on fish and country food consumption.

RECOMMENDATION 13.13 Research on mercury in country food

The Panel recommends that, if the Project is approved, the provincial Department of Labrador and Aboriginal Affairs, in consultation with Health Canada and Aboriginal groups, initiate a study of (a) the extent of country food contamination by mercury and other contaminants and (b) human consumption levels of country food, particularly in areas where people are also exposed to mercury in fish, to identify the potential risks to human health in Labrador.

RECOMMENDATION 14.1 Emergency preparation for the possibility of a dam failure

The Panel recommends that, if the Project is approved, Nalcor be required to:

- prepare and provide to affected communities updated maps that more clearly show areas that would be flooded following a dam failure;
- prepare, in consultation with the relevant communities and appropriate authorities, an Emergency Preparedness Plan, for response in the event of catastrophic dam failure, and emergency response procedures and community evacuation procedures related to a dam failure and subsequent flooding; the Plan should be reviewed every five years;
- work with each community that has been identified as being at risk of flooding in the event of a dam failure to develop evacuation plans, to be completed prior to filling of the reservoirs;
- work with emergency response providers and assist as appropriate in the event of an evacuation;
- implement a flood warning system for Mud Lake and Happy Valley-Goose Bay to be approved by the provincial Department of Environment and Conservation; and
- conduct seismographic monitoring in the Project area prior to construction.

RECOMMENDATION 14.2 Compensation for losses in the event of a dam failure

The Panel recommends that, if the Project is approved, the Government of Newfoundland and Labrador require Nalcor to assume liability on a 'no fault' basis for any loss of life and financial losses incurred because of the destruction of property and belongings and disruption of activities caused by flooding as a result of one or more dams failing on the lower Churchill River. Nalcor should provide guarantees in the form of insurance, bonds or other appropriate measures that individuals, businesses and institutions suffering damage would receive full compensation, the amount to be determined by a neutral third party, regardless of the cause of the dam failure.

RECOMMENDATION 14.3 Seismic testing

The Panel recommends that, if the Project is approved, Nalcor carry out seismic testing during reservoir filling and apply appropriate mitigation measures in the event of a seismic event related to reservoir filling.

RECOMMENDATION 15.1 Authorizing regulation

The Panel recommends that, if the Project is approved, the Government of Newfoundland and Labrador issue an authorizing regulation or equivalent mechanism that:

- lists and requires Nalcor to implement all its environmental management commitments in relation to the Project made during the course of the environmental assessment, plus the additional measures recommended by the Panel and accepted by the Government of Newfoundland and Labrador;
- lists and requires provincial departments to implement all their environmental management commitments in relation to the Project made during the course of the environmental assessment, plus the additional measures recommended by the Panel and accepted by the Government of Newfoundland and Labrador;
- includes a mechanism for updates as required to reflect any additions or changes, including adaptive management strategies that may be required and are not yet identified;
- ensures compliance with Environmental Protection Plans, Emergency Response Plans, Contingency Plans, Occupational Health and Safety Plans, and Environmental Effects Monitoring Plans including those that are implemented through another regulatory instrument and those that are unregulated;
- requires Nalcor to prepare and publish on the internet an annual report describing its environmental management activities and results, including mitigation, monitoring and adaptive management as appropriate, and related disbursements;
- establishes a monitoring and community liaison committee; and
- remains in effect for the duration of the construction period and a sufficient period of time thereafter to ensure there is no longer a risk of adverse effects as a result of the Project.

RECOMMENDATION 15.2 Federal-provincial joint regulatory plan

The Panel recommends that, if the Project is approved, the federal and provincial governments prepare a joint regulatory plan for the Project which outlines their respective regulatory requirements and includes a coordinated approach to areas where there is overlapping or related jurisdiction, and commit to it by signing a Memorandum of Agreement. The regulatory plan should address the regulations, guidelines, standards and criteria to be applied to activities. Each government would appoint a coordinating department or agency to prepare the plan and to produce a joint annual report regarding Nalcor's compliance, any issues or problems that were identified and how they were resolved. This report would be made available to the public through the internet.

RECOMMENDATION 15.3 Long-term funding for environmental management from Nalcor

The Panel recommends that, if the Project is approved, and to the extent that funds are not committed from other sources, Nalcor identify and allocate in its detailed Project budget, financial support for environmental management for the duration of Project construction. The Panel further recommends that Nalcor make a general commitment with a ten-year forecast, to be updated every five years, until such time as there is no longer evidence of ongoing environmental effects resulting from the Project.

RECOMMENDATION 15.4 Long-term funding for environmental management from government departments

The Panel recommends that, if the Project is approved, the governments of Newfoundland and Labrador and Canada make long-term commitments to support annual budget requests by the relevant departments with responsibilities for project-related environmental management including socio-economic mitigation commitments. The Panel further recommends that the governments make general commitments with a ten-year forecast, to be updated every five years, until such time as there is no longer evidence of ongoing environmental effects resulting from the Project.

RECOMMENDATION 15.5 Lower Churchill Project Monitoring and Community Liaison Committee

The Panel recommends that, if the Project is approved, prior to the start of construction, the provincial Department of Environment and Conservation appoint a Monitoring and Community Liaison Committee, using a community-based nomination process. Nalcor, through the Department, should provide the Committee with sufficient resources to allow for staff support, expenses and a modest honorarium for non-government participants, acquisition of independent expert advice, and adequate communication with community residents including occasional public forums. The mandate of the Committee would be set out in the Authorizing Regulation and the Federal-Provincial regulatory plan. The Committee would operate throughout the construction period and for the first ten years of the operating period, at which point the continuing need for the Committee should be reassessed by the Department in consultation with the Committee, the communities and Nalcor.

The Committee would:

- provide community feedback and advice to the Department and to Nalcor on relevant issues including Project-specific mitigation, impact monitoring and adaptive management committed to by Nalcor and as recommended by the Panel;
- be empowered as required to establish subcommittees or working groups to address the key areas of biophysical monitoring and follow-up, enhancing employment and business benefits, and health and social issues;
- have representation from communities, community-based agencies and non-government organizations, Aboriginal organizations, relevant federal and provincial government departments and Nalcor (ex-officio); and
- liaise with the public to ensure a transparent approach to addressing public concerns and the communication of monitoring results.

RECOMMENDATION 15.6 Project-specific effects monitoring programs

The Panel recommends that, if the Project is approved, all Project-specific effects monitoring programs, whether conducted by Nalcor, governments or in combination, include the following elements:

- identification of monitoring objectives and means of achieving verifiable results capable of guiding remedial action;

- formulation of clearly stated research questions capable of testing impact predictions;
- key measurable indicators linking Project activities to outcomes, and threshold or reference levels to identify Project effects;
- strategies and protocols for data collection and quality control;
- protocols for data compilation, storage, control and access;
- provision for data analysis and assessment; and
- reporting procedures and schedules.

RECOMMENDATION 15.7 Adaptive management

The Panel recommends that, if the Project is approved, adaptive management for Project-specific or cumulative effects, whether conducted by Nalcor, governments, or in combination, include the following components:

- commitment to a proactive approach to adaptive management;
- clearly defined impacts thresholds to clarify where and when adaptive responses would be necessary;
- implementation and contingency plans and resources to enable responsive action especially in areas where effect predictions are thought to be uncertain and where predictive errors may have serious consequences;
- transparent process for setting and adjusting monitoring and management priorities; and
- provision for regular review of adaptive management effectiveness, adjustment of related monitoring and responses to focus on significant continuing concerns.

RECOMMENDATION 15.8 Complaints resolution

The Panel recommends that, if the Project is approved, before the start of construction, Nalcor develop a complaints resolution process, in consultation with the Monitoring and Community Liaison Committee, to address concerns relating to possible adverse Project effects on individuals, and to be implemented during construction and operations. The process could include the following:

- easy access for individuals to bring concerns or complaints to Nalcor via a toll-free phone number, website and other appropriate means;
- dedicated Nalcor staff support to receive, process and respond to complaints;
- a tracking process with response time targets;
- third-party adjudication in the event that complaints cannot be otherwise resolved to the satisfaction of both Nalcor and the complainant; and
- a system to report on complaints received and how they were resolved.

RECOMMENDATION 15.9 Environmental review in the event that construction of the second generating facility is delayed

The Panel recommends that, if the Project is approved and the construction of the second generating facility and reservoir does not start before the first is completed, the environmental release would expire and terms and conditions contained in the original release would be revisited. The extent of the review required for later release would be the decision of the relevant federal and provincial governments, depending on applicable laws and circumstances at the time.

RECOMMENDATION 15.10 Local hiring for environmental management work

The Panel recommends that, if the Project is approved, where possible, Nalcor hire local people to work on environmental monitoring and mitigation projects to benefit from their local knowledge and to develop local skills and experience in the field of environmental management.

RECOMMENDATION 15.11 Government response to Panel report

The Panel recommends that the federal and provincial governments provide written responses to the Panel report and that these responses be made available to the general public through the internet.

RECOMMENDATION 15.12 Decommissioning

The Panel recommends that Nalcor demonstrate, prior to Project approval and in a manner acceptable to both governments, how it will assume financial responsibility for the potential future decommissioning of the Project to ensure that decommissioning does not become a burden to future generations.

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.

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.