

Smyth
Woodland
Del Rizzo
Barrett

Caitlin Urquhart
curquhart@[REDACTED]

May 9, 2018

By Courier and by Email: admin@muskratfallsinquiry.ca

Commissioner Justice Richard LeBlanc
Beothuk Building, Suite 502
20 Crosbie Place
St. John's, NL A1B3Y8

Dear Justice LeBlanc,

RE: Request for expanded scope of standing granted to Grand Riverkeeper, Labrador Inc. and Labrador Land Protectors pursuant to the Decision of April 16, 2018

I am pleased to advise that I have been retained by Grand Riverkeeper, Labrador Inc. and Labrador Land Protectors (the "Parties") to represent them in respect of the Commission of Inquiry into the Muskrat Falls Project. We write to respectfully request an expansion of the scope of standing granted pursuant to your Decision issued April 16, 2018. The Parties request the Commissioner's indulgence for a further opportunity to set out in writing their interests and involvement in the Project as it relates to the Terms of Reference for the Inquiry and to request that the scope of their limited standing be expanded to include aspects beyond environmental analysis, risk assessment and mitigation measures. We set out our position in respect of same herein below.

I. Request for Expanded Scope of Standing

1. We respectfully request that standing may be expanded to permit Grand Riverkeeper, Labrador Inc. ("GRK") and Labrador Land Protectors ("LLP") to engage in a robust manner when topics are addressed which are of interest to the organizations, and where the organizations were active participants in the dialogue and events as they unfolded.
2. **Grand Riverkeeper, Labrador Inc.** is in a unique position to contribute to the conduct of the Inquiry and the openness and fairness of the Inquiry because of its intimate knowledge and understanding of the Project and the processes leading up to sanction. It has the ability to provide insights into the documentary evidence and witness testimony that is distinct from any other party. Grand Riverkeeper, Labrador Inc. requests that its standing be expanded to include:

- i. Section 4.(a) Nalcor's underlying considerations in recommending the Project as it relates to the consultation processes pre-sanction;
- ii. Section 4.(b) the difference in estimated and actual costs to the extent that they relate to information gathered by GRK and LLP during construction,
 - i. (v) risk assessment and mitigation (for which standing has been granted);
- iii. Section 4.(c) the decision to exempt the Project from PUB oversight to the extent that GRK raised public awareness about the exclusion of the public from decision-making, and the potential effect and impact upon the Project, and rates;
- iv. Section 4.(d) whether government was aware of the risks or problems anticipated as it relates to economic and engineering risks associated with the water management rights and North Spur stability, together with impacts on the local environment and economy; and
- v. Section 5.(e) balancing the interests of taxpayers and ratepayers to the extent that GRK was involved and raised concerns in this debate.

GRK seeks to participate in the hearing as it relates to the above-noted matters to the extent that it has relevant knowledge, interest or involvement.

3. The interests of **Labrador Land Protectors** and **GRK** risk being adversely affected by the findings of this Inquiry and therefore requests that their standing be expanded to include any portion of the Inquiry dealing with section 4.(b) the construction phase to the extent that testimony is brought out respecting events and circumstances where LLP and GRK members were present, including without limiting when members were conducting interviews, information gathering, observing or engaged in onsite demonstrations.
4. As was noted in GRK and LLP's initial standing application, it remains their intention to collaborate with the Muskrat Falls Concerned Citizens' Coalition ("**MFCCC**") to ensure efficiency and avoid duplication. The Parties are satisfied that MFCCC will represent their interests from those matter outside of the scope set out above.

II. Overview

5. Over the last decade, GRK has participated fully and actively in the consultative processes concerning the Muskrat Falls Project (the "**Project**") and has played an important role in the dialogue about the energy justification and the business case for the Project. It has offered detailed refutations of many of the arguments made by the Government and Nalcor with respect to the project's financial viability. It has proposed alternatives, and has provided analysis that challenged the assumptions and forecasts underlying the business case

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presented by Nalcor and the government. These analyses included the assessment of the need for the Project, and of risks and costs not addressed by proponents. GRK fully participated in the environmental assessment processes for the Lower Churchill Project and the Labrador Island Transmission Project, as well as the Muskrat Falls Reference at the PUB. In the course of these processes, significant knowledge, institutional memory and expertise has coalesced within GRK.

6. GRK has shared this knowledge with the broader public by providing information and education sessions, from a session co-hosted with Sierra Club of Canada in 2007 through to participation in a Muskrat Fall Symposium in 2018. GRK was the first organization to draw public attention to gaps in the business case for the Project. In addition to its substantive submissions to the consultative processes, GRK has issued media releases, written letters to Ministers, Premiers and other elected officials from well before sanction, through construction to present. GRK is seeking expanded standing to have an opportunity to illuminate and inquire into the understanding (or lack thereof) of proponents and officials whom GRK wrote to, met with personally or engaged leading up to sanction and thereafter.
7. Furthermore, given that most GRK and LLP members live in and are embedded in the affected communities, they have a unique point of view on the risks and impacts of the projects from the social and economic impacts on the community (such as increased costs of housing, food and fuel, increased income disparity, the differentiated impacts on Indigenous and Settler people, the spiritual and cultural losses inflicted on Indigenous people). The perspectives of Labradorians who live in the affected area are relevant and necessary to the determination as to the reasonableness of the mitigation measures proposed and undertaken.
8. In addition, members of LLP and GRK, have expended immense time, energy and social capital in advocating against the Project. Many have staked their names and reputations on their opposition to the Project. Some members have risked their liberty, by engaging in civil disobedience, and some have risked their lives, by hunger strike, to draw attention to their concerns. At this time, GRK and LLP have significant public support across Labrador and the island portion of the province, as evidenced by the over 1000 signatures on their petition calling for an independent inquiry into the Project.
9. That being said, members of GRK and LLP, over the years, have been subjected to negative comments and treatment from those who believe that the benefits of jobs and promised inducements outweighed the risks and costs they have identified. A finding, or even the suggestion or implication, that these concerns were unfounded or their actions disproportionate or unjustified would have a significant adverse impact on their interests. The findings of this Commission of Inquiry have the potential to adversely affect the reputations and the place in the community of the organizations and their individual members. For this reason, GRK and LLP are seeking to ensure that they are able to participate in all sessions involving events and circumstances in which their organizations and members were present or involved.

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10. GRK and LLP are pleased to work with the MFCCC and are satisfied that MFCCC will represent their aligned interests in matters which are not within the scope, interest or experience of GRK or LLP. However, GRK's interest and participation in the processes leading up to sanction of the Project is different from that of MFCCC and extends well beyond environmental considerations. As such, the Parties are seeking expanded standing to participate in collaboration and concert with MFCCC.
11. GRK and LLP have significant expertise, knowledge and perspective that is relevant to the Commission's mandate and unique to these organizations. Their members have diverse educational backgrounds (in economics, environment and social health), they have varied work experiences (in policy and government, and construction in the North) and they all have lived experience as Northerners and tax and rate-payers. They include Elders and members of both Inuit communities, Nunatsiavut and NunatuKavut, and from Sheshatshiu Innu First Nation, as well as settler people from the surrounding communities. They are local knowledge keepers. Collectively they have a distinct capacity to contribute and add value to the fact finding and the conduct of the Commission.
12. Greater participation of GRK and LLP would enhance the openness and fairness of the Commission in its investigation of the Project. Throughout the history of the Project, they have raised their voices on behalf of Labradorians and Newfoundlanders. However, their voices were discounted, minimized and sometimes shut out completely. Expanding the scope of their standing at this Inquiry will contribute to the fairness and openness of the Inquiry and go a long way to diminish the public perception that Labradorian voices are being ignored.

III. Involvement of Grand Riverkeeper, Labrador Inc. Prior to Sanction

13. Grand Riverkeeper, Labrador Inc. is a volunteer-run not-for-profit organization. It has been raising concerns about the Muskrat Falls Project since its inception. Roberta Frampton Benefiel, one of the founders of GRK, a Past Vice-President and Riverkeeper, gave her first presentation on the economics of the Lower Churchill Project (the "LCP") in 1998 as part of her undergraduate degree at Mount Allison University's Environmental Studies Program. Roberta was involved with GRK's predecessor at the time, the Friends of the Grand River, a group of Labradorians determined to protect the health and wellbeing of the Grand River ecosystem, including its human inhabitants.
14. In 2005, the Friends of the Grand River applied and were accepted as members of the Waterkeeper Alliance, an international organization that unites more than 300 Waterkeeper Organizations and Affiliates around the world, focusing citizen action on issues that affect our waterways, from pollution to climate change. GRK was then incorporated federally as a non-profit and renamed "Grand Riverkeeper, Labrador Inc." pursuant to the rules of the

Waterkeeper Alliance. GRK has recently revived its federal incorporation and is currently a federally incorporated not-for-profit in good standing.

15. GRK has been an active participant and vocal opponent of the Project and could contribute to the conduct of the Inquiry into the pre-sanction phase of the Project. GRK questioned the assumptions and forecasts, proposed alternatives and refuted the assertion that the Project was the least-cost option.

a. Public Outreach and Informal Input

16. For more than a decade, GRK has been investigating, generating knowledge within the organization and the community, providing input and expertise to proponents, legislators and oversight bodies and participating in public debate surrounding the Project. GRK members have expended significant volunteer time and energy in this domain and have a great deal of knowledge about the Project and the process.
17. GRK participated actively in every forum available, formal and informal, to challenge the proponent and question its assumptions regarding the need for and alternatives to the Project. GRK raised public awareness and disseminated information to the broader public about their concerns. To that end, GRK prepared media releases, provided media interviews, prepared ATIPP requests, and wrote to elected officials. Highlights of GRK's public outreach are listed below
 - A. **Editorial:** On July 24, 2003, the Telegram published an Editorial on behalf of the Friends of Grand River opposing hydroelectric generation projects at Gull Island and Muskrat Falls. Attached hereto at **Tab 1.1** is the Editorial.
 - B. **Letter to Minister of Natural Resources:** On January 15, 2006, GRK provided a submission to Minister of Natural Resources Newfoundland and Labrador, entitled "*RE Developing an Energy Plan for Newfoundland and Labrador*" which highlighted alternatives to meeting the province's energy needs, environmental risks and the need for greater community consultation. Attached hereto at **Tab 1.2** is a copy of the letter.
 - C. **Public Information Session:** On January 13, 2007, GRK presented educational sessions regarding the Project in St. John's on the invitation of the Northeast Avalon Sierra Club. Then GRK President, Clarice Blake Rudkowski, discussed the costs and consequences of the Upper Churchill, and the risks of the proposed Lower Churchill, followed by a lively question and answer period. Approximately thirty to fifty people attended each of the three sessions. Attached hereto at **Tab 1.3** is an article from the Telegram reporting on the session.

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- D. **Portage Demonstration:** On June 25, 2008, GRK prepared information sheets which were distributed while they portaged a canoe through St. John's to educate and promote awareness of the ecological, cultural, aesthetic and economic impacts of the proposed Lower Churchill Hydroelectric Project. Following the demonstration, GRK held a meeting with concerned citizens to discuss alternatives and other important issues relating to the Project. Attached hereto at **Tab 1.4** is the press release.
- E. **Feedback on Nalcor Information Session:** GRK attended nearly every single open house during the lead up to the EA. On April 8, 2009, GRK disseminated a press release entitled "Lower Churchill Hydroelectric Generation Project - Public Need Not Attend" criticizing the manner in which Nalcor held its information sessions held in Happy Valley-Goose Bay as lacking in transparency and public engagement. They opined that the closed session which did not provide meaningful opportunities for dialogue or participation was contrary to the Corporation's mandate for full and open consultation. Attached hereto at **Tab 1.5** is the press release.
- F. **Presentation to HV-GB re Project Impacts:** On May 20, 2010, GRK provided a presentation to the Town Council of Happy Valley-Goose Bay that summarized available research (from Infrastructure Canada) regarding the development "boom" and "bust" effects and impacts on small communities near large resource development projects. Attached hereto at **Tab 1.6** is the powerpoint from the presentation.
- G. **Raising Alarm about Rising Rates:** On September 19, 2011, GRK prepared a press release regarding the impact on electricity rates from the Project. Attached hereto at **Tab 1.7** is the press release.

All of which are attached hereto at **Tab 1**.

- 18. **Canadian Research Institute for the Advancement of Women:** In addition to the above, between 2011 and 2016, the Canadian Research Institute for the Advancement of Women carried out research and engagement with community to study the Lower Churchill Project and its effects on diverse groups of women and the broader community. The research project was a part of FemNorthNet and members of GRK and LLP worked with FemNorthNet to gather input and contribute to the dialogue on the Project, including preparing press releases, research papers and informational videos. FemNorthNet has since been defunded, but the knowledge is retained within the membership of GRK and LLP.
- 19. After the work done by GRK and LLP came to the attention of prominent blogger, Mr. Des Sullivan, known as Uncle Gnarley in his blog, the groups were regularly in contact with him and Mr. David Vardy, providing information, photographs and perspectives from Labrador. The bloggers wrote numerous articles incorporating information and perspectives provided by GRK.

b. The Joint Review Panel and Joint Comprehensive Study

20. GRK has contributed opinions and has expertise as it pertains to the justification, assumptions and forecasts, the alternatives and other gaps in the business case for the Project. GRK's submissions are relevant to the extent that they form part of the body of information, known data gaps and risks which were available to Nalcor and the government prior to sanction.
21. The Environmental Assessment carried out jointly by the Canadian Environmental Assessment Agency and the Newfoundland and Labrador Department of Environment and Conservation, referred to as the Joint Review Panel ("JRP") was the only public review of the energy and economic justification for the Project and its environmental and social impacts.
22. GRK, in collaboration with the Sierra Club of Canada, intervened and participated actively in each and every phase of the hearings, as the only non-Indigenous citizens' organization.
23. On March 9, 2009, GRK first wrote to the Minister of Natural Resources to express its concerns and interests in being involved in the environmental assessment process. GRK participated in a month of hearings, cross-examined witnesses, and made at least 18 presentations and representations to the Panel.
24. GRK presented expert reports regarding the energy and economic justification and alternatives by Mr. Philip Raphals, and regarding riparian habitat and loss of wetlands by Dr. Annette Luttermann. GRK also connected with, compiled and presented comments from experts regarding effects on Caribou, loss of fish habitat and fish assemblages, loss of value to the tourism industry, alternatives and cost/benefit analysis. Audio and video recordings of the hearings will be made available upon request.
25. On February 28, 2011, GRK's energy policy expert submitted a report to the JRP entitled "Comments on the Justification of the Proposed Lower Churchill Project".

Attached hereto at **Tab 4 (sub 4.2.2)** is a copy of the submission.
26. In March and April, 2011, GRK made its closing submissions to the JRP, entitled "death by a thousand cuts".

Attached hereto at **Tab 2 (sub 2.1)** are speaking notes for the submission and a transcript is available upon request.
27. GRK's expert gave testimony which underscored the gaps in the economic justification put forward by proponents, specifically the inadequacy of financial and other information demonstrating the purpose, need and alternatives.
28. On GRK's urging, the JRP did request further information from the proponent. Despite a written response from the proponent, GRK maintained its position that the economic justification was not adequately supported and was based on unsubstantiated assumptions and forecasts. A further submission to that effect was made in writing on April 13, 2011.

Attached hereto at **Tab 4 (sub 4.2.8)** is a copy of the submission

29. In 2012, as part of the Comprehensive Study on the Labrador Island Transmission Link, GRK prepared written submissions which questioned the adequacy of the comprehensive study, in particular with respect to the Project's justification. As part of this process, GRK also undertook a community consultation tour along the Labrador Coast and the part of the Island to be affected by the transmission line. At the conclusion of the tour, GRK convened a meeting in St. John's gathering concerned citizens and environmental groups, and met with the 2041 Group together with Mr. Dennis Browne, Mr. David Vardy and Mr. Ron Penney.

Attached hereto at **Tab 2 (sub 2.2)** is GRK's submission to CEAA.

30. Following sanction and the conclusion of the JRP Report in 2013, GRK, together with the Sierra Club of Canada and the NunatuKavut Community Council, applied to the Federal Court for a judicial review. Affidavits prepared for that proceeding provide a detailed review of the decision-making process regarding the Project up to that point and are attached hereto for reference. The Affidavit of Roberta Benefiel provides a concise history of the Lower Churchill Project and the environmental assessment process. The Affidavit of Philip Raphals provides a concise history of the treatment of the project justification in this process.

Both affidavits are attached hereto at **Tab 4**.

c. Public Utilities Board – Muskrat Falls Reference

31. In April 2012, GRK provided expert testimony to the Public Utilities Board's Muskrat Falls Reference, regarding the inadequacy of the "Isolated Island Option" as a comparator for determining whether or not the Muskrat Falls Project constituted the least-cost option and provided an economic analysis of the Muskrat Falls Power Purchase Agreement that addressed the issue of the sharing of costs between shareholder (taxpayer) and ratepayer.

Attached hereto at **Tab 3 and Tab 4.2.13 through 4.2.19** are supporting documents related to GRK's intervention in the PUB reference.

32. GRK advocated against the exemption of the Project from PUB oversight and raised concerns about the lack of checks and balance for electricity rates and ATIPP exemptions which precluded public scrutiny. GRK made public statements and gave presentations in 2013 in Chicago and New York highlighting these concerns.
33. As the decision was made without public consultation, GRK had no opportunity to participate in the decision-making process. However, as GRK was highly involved in the processes surrounding the Project at the material time and could provide perspective, insights and analysis of the disclosure and testimony which would further the conduct of the Inquiry.

IV. After Sanction

34. The potential of failure of the North Spur is an engineering and economic risk which GRK asserts was inadequately studied or addressed in the business case for the Project. In 2014, GRK, together with members of what is now the Muskrat Falls Concerned Citizens Coalition, retained an international expert to review the available information and assess the risk of a failure of the North Spur, which has the potential to completely undermine the financial viability of the project and put the property and lives of Labradorians at risk.
35. In recent years, GRK and LLP have undertaken their own information gathering regarding the construction of the Muskrat Falls Project, including conversations with proponent's representatives, employees and contractors, site visits, and videographer and photography, which have been used by traditional and independent media. A list of relevant media will be provided upon request.
36. GRK and LLP have openly criticized the overall management and oversight of the Project and believe that this has caused or contributed to cost overruns and delays. In November and December 2017, representatives from GRK and LLP, Roberta Frampton Benefiel and Amy Norman joined together for a speaking tour of Northeastern States entitled "Mega Dams/Mega Damage" to raise awareness about their concerns. The tour included 14 speaking engagements and was funded by donations from Universities, local people, environmental lawyers and other organizations.
37. On February 21st and 22nd, 2018, GRK and LLP members were invited guest speakers at a Muskrat Falls Symposium put on by the Royal Society of Canada and MUN's Labrador Institute on topics including: business impacts; UNDRIP; traditional foods and contamination; intangible cultural assets; justice and colonial oppression; and emerging resistance networks.

Demonstrations

38. In the summer of 2016, members of LLP and GRK were engaged in demonstrations that led to the arrest of several members. We expect that these actions may be raised in the context of any increased cost associated with work delay and/or disruption. Should these events be brought out during the Inquiry, LLP and GRK seek standing and an opportunity to be represented by counsel.

V. Conclusion

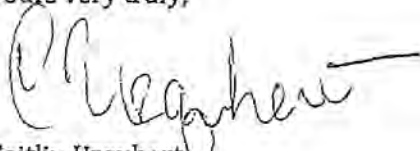
39. As evidenced by the information set out herein, Grand Riverkeeper, Labrador Inc. has been involved from the outset in the process surrounding the Muskrat Falls Project in ways that extend beyond environmental concerns. GRK has knowledge, expertise and perspective that is unique to the organization. As such, we respectfully request that the Commission consider expanding the scope of standing for Grand Riverkeeper, Labrador Inc. to include, where relevant,
- i. Section 4.(a) Nalcor's underlying considerations in recommending the Project as it relates to the consultation processes pre-sanction;
 - ii. Section 4.(b) the difference in estimated and actual costs to the extent that they relate to information gathered by GRK and LLP during construction,
 - i. (v) risk assessment and mitigation (for which standing has been granted);
 - vi. Section 4.(c) the decision to exempt the Project from PUB oversight to the extent that GRK raised public awareness about the exclusion of the public from decision-making, and the potential effect and impact upon the Project and rates;
 - iii. Section 4.(d) whether government was aware of the risks or problems anticipated as it relates to economic and engineering risks associated with the water management rights and North Spur stability, together with impacts on the local environment and economy; and
 - iv. Section 5.(e) balancing the interests of taxpayers and ratepayers to the extent that GRK was involved and raised concerns in this debate.

GRK seeks to participate in the hearing as it relates to the above-noted matters to the extent that it has relevant knowledge, interest or involvement.

40. As set out herein above, Labrador Land Protectors requests that its standing be expanded to include the portions of the Inquiry dealing with section 4 (b) the construction phase to the extent that testimony is brought out respecting events and circumstances where LLP members were present.

All of which is respectfully submitted.

Yours very truly,


Caitlin Urquhart

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TAB 1 — Grand Riverkeeper Public Outreach

- 1.1. St. John's Telegram Editorial, July 24, 2003, "*Churchill Threatened*"
- 1.2. Submission to Minister of Natural Resources, Newfoundland and Labrador, January 15, 2006, "*RE Developing an Energy Plan for Newfoundland and Labrador*"
- 1.3. St. John's Telegram, January 12, 2007, "*Information Session to be held on Lower Churchill*"
- 1.4. Press Release, June 25, 2008, "*Portage through St. John's and concerned citizens meeting*"
- 1.5. Press Release, April 8, 2009, "*Lower Churchill Hydroelectric Generation Project - Public Need Not Attend*"
- 1.6. Notes of GRK presentation to the Town Council of Happy Valley-Goose Bay, May 20, 2010, "*Impacts of large scale resource development projects*"
- 1.7. Press Release, September 19, 2011, "*Navigant Report Fails to Address Concerns Raised by the Joint Review Panel*"

TAB 2 — Grand Riverkeeper submissions to Joint Review Panel hearings on Lower Churchill Project and to CEAA Comprehensive Study of Lower Churchill Transmission Project (Labrador Island Transmission Link)

See also below, documents 4.2.2 through 4.2.11

- 2.1. Closing remarks to the Joint Review Panel, April 15, 2011, "*Death by a Thousand Cuts*"
- 2.2. Submission to CEAA Comprehensive Study, June 12, 2012, "*Comments on the Justification for the Lower Churchill Transmission Project (Labrador-Island Transmission Link)*" respecting the Comprehensive Study on the Lower Churchill Transmission Project by Phil Raphals on behalf of Grand Riverkeeper, Labrador Inc. Inc.

TAB 3 — Grand Riverkeeper submission to PUB hearings on Muskrat Falls Reference

See also documents listed below, 4.2.13 through 4.2.19

- 3.1. Presentation to the Public Utilities Board, February 23, 2012, "*Comments on the Muskrat Falls Reference*" by Phil Raphals on behalf of Grand Riverkeeper, Labrador Inc. Inc.
 - 3.1.1 - Raphals presentation
 - (3.1.2-3.1.7 provided by email only)
 - 3.1.2 - Raphals CV (omitted)
 - 3.1.3 - CA-KPL-Nalcor-Rev1 updated by P. Raphals
 - 3.1.4 - Marbek CDM Report, Jan. 2008
 - 3.1.5 - Electricity Regulation in the US - A Guide (March 2011)
 - 3.1.6 - World Oil Prices, Projected vs. Actual
 - 3.1.7 - RFP Energy Innovation Roadmap, Dec. 2011

TAB 4 — GRK documentation from its Federal Court Application for Judicial Review of the JRP Report (Federal Court File T-2060-11)

4.1. Affidavit of Roberta Benefiel, January 31, 2012, Federal Court File T-2060-11

4.2. Affidavit of Philip Raphals, January 31, 2012, Federal Court File T-2060-11

(Exhibits provided by email only)

- 4.2.1. Exhibit A: P. Raphals, *Curriculum vitae*
- 4.2.2. Exhibit B: P. Raphals, Comments on the Proposed Justification of the Lower Churchill Project (Report), 28/02/2011
- 4.2.3. Exhibit C: P. Raphals, Comments on the Proposed Justification of the Lower Churchill Project (Presentation, 08/03/2011
- 4.2.4. Exhibit D: Nalcor, Lower Churchill Hydroelectric Generation Project - Need, Purpose and Alternatives Hearing (Presentation), 07/03/2011
- 4.2.5. Exhibit E-1: P. Raphals, Letter to Joint Review Panel, 14/03/2011
- 4.2.6. Exhibit E-2: Joint Review Panel, Information Request to Nalcor, 21/03/2011
- 4.2.7. Exhibit F-1: Nalcor, Letter to Joint Review Panel, 01/04/2011
- 4.2.8. Exhibit F-2: P. Raphals, Comments on Proponent's Response to the Panel's Information Request of March 21, 2011, 13/04/2011
- 4.2.9. Exhibit G: Joint Review Panel, JRP Hearing Transcript (excerpt), 14/04/2011
- 4.2.10. Exhibit H: Joint Review Panel, Notice of Closing of Hearings, 15/04/2011
- 4.2.11. Exhibit I: Joint Review Panel, Public Hearing Procedures, 16/02/2011
- 4.2.12. Exhibit J: Province of Newfoundland and Labrador, Backgrounder - Nalcor Energy and Emera Inc. Term Sheet, 18/11/2010
- 4.2.13. Exhibit K: Department of Natural Resources, Press Release and Backgrounder on PUB Review, 17/06/2011
- 4.2.14. Exhibit L: PUB, List of exhibits from the PUB Review, 30/01/2012
- 4.2.15. Exhibit M: PUB, PUB Letter to Province, 22/09/2011
- 4.2.16. Exhibit N: Minister of Natural Resources, Province Letter to PUB, 12/12/2011
- 4.2.17. Exhibit O: PUB, PUB Letter to Province, 16/12/2011
- 4.2.18. Exhibit P: Minister of Natural Resources, Province Letter to PUB, 23/12/2011
- 4.2.19. Exhibit Q: PUB, PUB Letter to Province, 06/01/2012
- 4.2.20. Exhibit R: Nalcor, Press Release on Navigant Study, 15/09/2011
- 4.2.21. Exhibit S: Navigant, Independent Supply Decision Review, 15/09/2011
- 4.2.22. Exhibit T: C.D. HOWE Institute, J. Feehan, Newfoundland's Electricity Options report, 11/01/2012
- 4.2.23. Exhibit U: Nalcor, Lower Churchill Project - website,
- 4.2.24. Exhibit V: Nalcor, 2010 Annual Report (excerpts), 03/05/2011
- 4.2.25. Exhibit W: CEA Registry, LIL Notice of Commencement, 26/09/2011
- 4.2.26. Exhibit X: CEA Registry, Amended LIL Notice of Commencement, 28/04/2010
- 4.2.27. Exhibit Y: Natural Resources Canada, Backgrounder - Nalcor Energy and Emera Inc. Term Sheet,
- 4.2.28. Exhibit Z: The Telegram, Questions Linger Around Muskrat, 19/01/2012

Tab 1

Tab 1.1

1 of 1 DOCUMENT

St. John's Telegram (Newfoundland)

July 24, 2003 Thursday Final Edition

Churchill threatened

SOURCE: The Telegram

BYLINE: Clarice Blake Rudkowski

SECTION: Editorial; Pg. A6

LENGTH: 327 words

I wish to comment on the Churchill River in Labrador making the environmentally endangered list compiled by Earth Wild and wildcanada.net -- organizations dedicated to raising the profiles of Canadian rivers threatened by human activity.

Not only is there talk of a dam at Gull Island, but the spectre of another at Muskrat Falls still lurks in the background. On top of that, there is now a proposal to construct a causeway/bridge nine miles up river from our town.

Along with that, Happy Valley-Goose Bay pumps raw sewage directly into the river which, in itself, is an environmental disaster, not to mention the stench we have to live with on a daily basis. Our river is indeed under threat and is endangered.

I strongly disagree with Environment Minister Robert Mercer in several respects. He suggests that hydroelectricity is an eco-friendly source of power -- clean, safe, green. Thousands upon thousands of dams have been built worldwide and there are mountains of evidence about the negative impacts of such projects.

In our own backyard, the Upper Churchill demonstrates that well. The creation of the Smallwood Reservoir, the second largest man-made lake in the world, bigger than Prince Edward Island, affected all waterways flowing out of the height of land. It caused methyl mercury poisoning which moves through our food chain (Health Canada warns we should eat only one meal of trout a month); there is loss of habitat for our wildlife; salination of drinking water as far downstream as Northwest River; and siltation is happening in the reservoir itself, as well as downstream.

In addition, the reservoir emits methane gas, adding to greenhouse gases. A study is ongoing to determine the effects the project may have had on the declining fish stocks on the Hamilton Banks, some 600 miles away.

Clean -- no; safe -- no; green -- no; endangered -- yes.

Clarice Blake Rudkowski

Friends of Grand River/Mista Shipu Happy Valley-Goose Bay

LOAD-DATE: July 24, 2003

LANGUAGE: ENGLISH

TYPE: Letter

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Tab. 1.2

SUBMISSION TO
ED BYRNE, MINISTER OF NATURAL RESOURCES
RE
“DEVELOPING AN ENERGY PLAN FOR NEWFOUNDLAND & LABRADOR”
BY
GRAND RIVERKEEPER, HAPPY VALLEY-GOOSE BAY
17 JANUARY 2006 – AURORA HOTEL

We Are Pleased To See The Government Of Newfoundland And Labrador Finally Putting Together A Comprehensive Energy Policy. We Agree With Four Of The Five Principles Of The Plan But Worry About How The Mandate Of Newfoundland And Labrador Hydro Will Be Expanded. We Would Not Want To See It Granted A Monopoly, Thereby Stifling Competition In The Energy Industry, That Could Only Be To The Detriment Of The Consumer.

Grand Riverkeeper Is Dedicated To The Protection And Preservation Of The Grand River, (A.K.A. Churchill River) Its Valley And Watershed. We Advocate Sources Of Clean, Sustainable Energy And Alternative, Sustainable Economic Development - Development That Respects The Environment And Maintains Ecological Integrity For Generations To Come.

It Is From That Perspective We Cannot Support Your Governments Proposed Hydro Plans For The Lower Part Of Our River But, On The Other Hand, We Wholeheartedly Support More Environmentally Friendly Projects Such As The 1000 Megawatt Height Of Land Wind Park Announced Today By Ventus Energy And The Metis Development Corporation.

Your Proposed Lower Churchill Hydro Project Will Only Add To The Environmental Legacy Of The Upper Churchill. Impoundment Of Water Behind Dams At Gull Island And Muskrat Falls Will Create Two Reservoirs; Effectively Destroying What Is Left Of Our Free Flowing River. This Is Going To Have Major Environmental Impacts And Will Change The Ecology Of The Whole Region. Further We Wish To Point Out That These Are Not “Essentially Run-Of-The-River Facilities” As Claimed In Your “*Climate Change Action Plan 2005*”.

For Your Understanding Please Let Us Elaborate:

Run-Of-The-River Facilities Has, For The Most Part, No Impoundments So The Water Must Be Turbined As It Arrives From The Catchment Area (The River). In This Type Of Facility Electricity Generation Cannot Be Regulated And Rises And Falls With The River’s Flow.

- According To *Restructured Rivers 2001* By Philip Raphals Of The Helios Centre In Montreal, If There Are Impoundments Then The Storage Capacity Should Be No More Than 48-Hours.
- In The *Green Energy Study For British Columbia Phase 2* The Following Is What They Consider A Description Of Run-Of-The-River Hydro “Run-Of-The-River Hydro Implies That There Is No (Or Minimal) Storage Reservoir. The Instantaneous Flows That Are

Passed Through The Power House Are Essentially The Flows That Occur In The Stream At The Intake And Flows Downstream Of The Powerhouse Are Virtually Identical To Pre-Development Flows.”

- Also In The Same Report Under A Heading Called *Dams* It States, “Technically, Any Blockage Of A Watercourse Could Be Considered To Be A Dam But Not Every Dam Would Exclude A Project From Being Green. The Green Rating Relates To The Amount Of Water Stored And Whether There Is Significant Impoundment Of Water.”
- As Well In The Kyoto Protocol’s *Clean Development Mechanisms* The Executive Boards States: “...To Conform As Run-Of-The-River Hydro ...The Nominal Installed Capacity Of The Project Must Be Below 15 Megawatts.”
- In Order To Meet British Columbia Provincial Standards To Be Considered “Clean”, Run-Of-The-River Projects Are To Be “Not More Than 50 Megawatts And The Stream Flow Passing Through The Powerhouse Must Be Basically The Same As The Natural System Flow” Implying That There Is Minimal Reservoir Storage.
- The Gull Island And Muskrat Falls Facilities Do Not Qualify As Run-Of-The-River Projects, Nor Will They Qualify As “Green” Projects Because The Impoundment Area Will Be Two Very Long Lakes.

The Government’s Proposal Is For Storage Hydro Where Production Can Be Timed To Correspond To Periods Of Peak Demand Meeting The Utilities Obligation To Provide Service At All Times. In The Case Of The Gull Island Dam You Will Create A Reservoir 155 Miles Long. It Might Be More Appropriate To Call The Facility “Run-Of-The-Reservoir”.

With Regards To Large Hydro, The *Canadian Environmental Assessment Agency* States The Following On Their Web Site:

There Are Many Known Social And Environmental Impacts Of Hydro Projects;

1. Mercury Contamination
2. Water Level Fluctuations
3. Reservoir Sedimentation
4. Changes In Water Quality
5. Affects Biodiversity
6. Socio-Economic Impacts On Aboriginal And Other Local Communities
7. Extremely Costly On The Environmental Assessment End Because Of All These Impacts
8. And We Added This One Ourselves: Decommissioning Of Old Dams At End Of Their Time Is At Present Not Included In The Initial Costs. If We Are Serious About Sustainability, And Leaving Future Generations As Well Off As We Were, We Must Include In The Costs Side Of The Books, The Projected Cost To Future Generations To Dismantle Or Repair Old, Dilapidated Dams.
9. As Well- According To This Same Source, Additional Impacts Are Imposed By Climate Change;
10. Several Degrees Of Global Climate Warming Will Affect Dams And Their Output.
11. Changes In Precipitation Patterns
12. Accelerated Snowmelt
13. Changes In The Magnitude And Frequency Of Flooding.

14. Changes In River Flow
15. Changes In River Patterns
16. More Changes In Water Quality
17. And Changes In Energy Supply And Demand.

Because Of These Many Environmental And Social Impacts, Large Hydro Projects Are On The Decline In Most Areas Of The World. International Rivers Network, (Talking About Large Projects In Brazil) States---“Without Public Subsidies, Companies Are Unwilling To Put Their Own Money On The Table To Construct Hydro Electric Dams. Large Dams May Go The Way Nuclear Power Has Gone In Brazil, As A Form Of Energy Whose Real Costs Make It Too Expensive To Rely On As An Energy Source.

In The United States, The Epa Has Not Approved Large Hydro Dams For Years. In Fact, Decommissioning Is More The Trend These Days.

Even China Has Just Scrapped 9 Of 13 Dam Proposals Because Of Their Environmental Impacts.

So, Why Are We Still Considering Destroying An Entire River System When Much More Environmentally Friendly Alternatives Are Possible?

Wind Energy: Your Current Energy Discussion Paper Does Not Give The Attention To Wind Energy That It Deserves.

According To The U.S. Research Institute: “The 2004 World Energy Outlook Predicts That In 2030 Wind Power Will Be The Second-Largest Source Of Renewable Electricity After Hydroelectricity.

In British Columbia, The District Of Squamish Released A Paper Called Wind Power: An Alternative Energy Opportunity: In It They State “Wind Technology Is The Fastest-Growing Generation Source In The World. By The End Of 2002, There Was An Estimated 31,000 Mw Of Wind Energy Installed Throughout The World. “...“The United States Is Experiencing The Largest Surge In Utility-Scale Wind Development Since The 1980’s” And “More Than 11 Billion Kwh Of Electricity Was Generated Last Year, Enough To Supply 1.1 Million Homes” Also, It States- “The Production Of Wind-Generated Electricity Emits No Greenhouse Gases Or Other Harmful Air Or Water Pollutants, Has Shorter Construction Lead Time, Has The Ability To Be Modular, Meaning, More Turbines Can Always Be Added If Loads Grow, Has No Fuel Costs, No Air Emissions And Higher Customer Approval.” “Wind” They Say, “Is A Perfect Complement To Hydro Power. When The Wind Is Blowing, Water Could Be Stored Behind The Dam. And When It Is Calm, It Could Be Released To Generate Power At The Dam. Wind Turbines Generate Their Power When It Is Most Needed. Winds In Canada Are Stronger In The Winter, So Power Generated By Wind Turbines Is Higher In The Winter. Wind Also Generates More Power During The Day Than At Night, Which Matches Peak Loads.

The Canadian Wind Energy Association Report Federal/Provincial/Territorial Council Of Energy Ministers’ Meeting July 19, 2004/ Iqaluit, Nunavut Has A Table, Which Shows The Emerging Provincial Initiatives On Wind Energy. Of The 10 Provinces, Newfoundland And Labrador Show “No Specific Policy In Place”. All Other Provinces Show Much More Action On Wind Energy.

Minister Byrn, Your Energy Plan Discussion Paper States That The Costs Associated With Alternatives Are Too High At Present; But The Canadian Wind Energy Association In Ottawa States The Following; "In Good Wind Areas, The Costs Of Generating Electricity From Wind Ranges From 6 To 12 Cents Per Kwh. While This Is Still Somewhat Higher Than Other Energy Costs, Wind Energy Has No Fuel Costs And Operating Costs Are Continuing To Decrease Every Year By 3-5% Partly As A Result Of Greater Efficiencies And Economies Of Scale. In Contrast, Most Conventional Generation Costs Are Going Up And Steadily Increasing. Natural Gas Prices Are Making Wind Power Economies More And More Attractive.

It Is Past Time For The Government Of Newfoundland And Labrador To Get On The Wind Band Wagon And Pay More Than Lip Service To Developing Specific Policies On Wind Generation In The Province.

Conservation;

We Also Notice That Not Much Attention Is Paid To Conservation. Policies And Regulations Must Be Added To This Energy Plan That Force Conservation. An Example Would Be Initiatives To Promote Better Insulation In Homes, And Initiatives To Discourage Use Of Vehicles Like Hummers And Gas Guzzling Suv's.

To Conclude:

- 1. The Environmental Impacts And Costs Of Mega Hydro Projects Like Those Your Government Proposes To Build On The Grand River Are Far Greater Than The Benefits That Will Accrue To Labrador.**
- 2. You Are Hereby Asked To Remove From All Government Reports, The Description Of The Said Project As "Run-Of-River" (Implying It Is Low Impact), Because This Statement Is Misleading To The Public And Is Tantamount To An Outright Lie.**
- 3. Wind Energy Is Most Definitely A Viable Alternative For Newfoundland And Labrador Along With Conservation, Tidal Energy, Wave Energy, Biomass, Etc. And Your Government Must Pay More Than Lip Service To These Alternatives In Your Energy Plan.**
- 4. Finally, As The Areas Only Public Environmental Group, We Ask That In Future We Receive Up Front Notice Of These Types Of Meetings In Order To Allow More Time For Preparation (Over And Above Your Nov. 10 Press Release Stating That Community Consultations Would Begin In Early 2006).**

Thank You For Listening.

**Clarice Blake Rudkowski, President
Grand Riverkeeper**



E-Mail: [Redacted] Telephone: 709-[Redacted] 530

**Roberta Frampton Benefiel, Vice-President
Grand Riverkeeper**

[Redacted]

E-Mail:

[Redacted]

Telephone: 709-

[Redacted] 164

Tab 1.3

1 of 1 DOCUMENT

St. John's Telegram (Newfoundland)

January 12, 2007 Friday

Information session to be held on Lower Churchill

SECTION: BUSINESS; Pg. D1

LENGTH: 246 words

The northeast Avalon branch of the Sierra Club of Canada and Grand River Keeper Labrador Inc. are inviting the public to a day- long information event on the Grand River (Lower Churchill) Saturday.

The event will feature viewings of "Grand River, Labrador's Treasure, Newfoundland's Secret" - an 18-minute educational film produced with funding from Riverkeeper, an environmental group whose director's include Robert F. Kennedy Jr. - followed by presentations by Clarice Blake Rudowski, president of Grand Riverkeeper Labrador and Peter Earle of the local Sierra Club branch, among others.

The presentations will take place at two-hour intervals: 10 a.m., 12 p.m., 2 p.m., 4 p.m. and 6 p.m., with group discussions to follow.

Part of the discussions will focus on the environmental impact of the proposed hydroelectric dams on the Grand River.

"Global warming is becoming a big issue, and the oxygen production of approximately 84 square kilometres of land along the river (would be compromised) by flooding in the river valley," said Derek James, one of the event's organizers.

Other topics of discussion will be alternative sources of power and equivalent ways the river can contribute to the province's economy, James said.

Snacks, refreshments and activities for children, including face- painting will also be available at the event, as will copies of the film.

The event will take place at the Masonic Temple, Cathedral Street in St. John's Saturday, between 10 a.m. and 8 p.m.

LOAD-DATE: January 12, 2007

LANGUAGE: ENGLISH

PUBLICATION-TYPE: Newspaper

Tab 1.4

For immediate release: June 25th, 2008

GRAND RIVERKEEPER OFFICIAL CANOE PORTAGES THE STREETS OF ST. JOHN'S TO HIGHLIGHT THE PLIGHT OF THE GRAND RIVER (A.K.A. CHURCHILL RIVER)

Groups and Concerned Individuals in the St. John's area come together to support Grand Riverkeeper Labrador, Inc. in their campaign to educate and promote awareness of the ecological, cultural, aesthetic, and economic impacts of the proposed Lower Churchill Hydroelectric Project in Labrador.

Information sheets will be distributed at the crossroads at Prince Philip Parkway and Allandale Road during the morning rush hour on Wednesday, June 25th, and between 11:30am and 12:30am at various areas along Water Street, downtown.

Roberta Frampton Benefiel, Vice President of Grand Riverkeeper Labrador (GRK), states, "No amount of money could adequately compensate for the destruction which will be caused by damming this near-pristine 56,00 sq mi (93,000 sq km) watershed. The groups and individuals providing information are united with us by their respect for the natural and cultural environment which would be forever lost to two huge reservoirs should this project be built."

Dr. Murray Rudd, Canada Research Chair in Ecological Economics at Memorial University states in his submission to the Canadian Environmental Assessment Agency on the Draft Guidelines for the Environmental Impact Statement, "Billions of dollars will be invested in the Lower Churchill and tied up for decades..." "If, as it appears, the objective of the Province is simply to generate revenue for future generations, are there not better ways to do it? How could billions in debt financing be used for alternative investments that (1) provide better overall returns on investment and (2) are less risky"...

Julie Huntington, Executive Director of Canadian Parks and Wilderness Society states, "We Newfoundlanders and Labradorians boast that we live in an unspoiled land and we promote this view as a tourism draw both nationally and internationally. CPAWS-NL opposes the unnecessary flooding of boreal forest, destruction of fish habitat, and the creation of health hazards, in order to create massive, non-sustainable energy projects like the Lower Churchill. This large project will alter seasonal river flows, disturb aquatic species migration and life cycles, and adversely effect species and habitat within the outer boundaries of the proposed Mealy Mountains National Park."

Nick Burnaby of the Atlantic Canada Sustainable Energy Coalition (ACSEC) states: "We should not rush into convincing people that large hydroelectric dam projects, which destroy natural Canadian boreal ecosystems and wild rivers are providing us with benign, green energy solutions. It is important that all options are evaluated thoroughly, including a serious examination of smaller scale, less destructive projects that would diversity our energy supply and maximize benefits to local communities."

The portage and information distribution blitz will be followed by a meeting with environmental groups and concerned citizens to discuss alternatives and other important issues relating to the Lower Churchill Hydroelectric Project.

For further information please contact the following:

Grand Riverkeeper Labrador, Roberta Frampton Benefiel-780-██████████927 or 709-██████████370

Dr. Murray Rudd, Canada Research Chair in Ecological Economics at MUN-709-██████████439

Nick Burnaby, Atlantic Canada Sustainable Energy Coalition (ACSEC) 709-██████████848

Julie Huntington, Canadian Parks and Wilderness Society-Newfoundland and Labrador Chapter

(CPAWS-NL)- 709- [REDACTED] 800

Tab 1.5

- Grand River Keepers Press Release

April 8, 2009
For immediate release

LOWER CHURCHILL HYDROELECTRIC GENERATION PROJECT

PUBLIC NEED NOT ATTEND

Grand Riverkeeper Labrador is very disappointed that the "information sessions", described by Nalcor as the Fish Habitat Compensation Workshops and held in Happy Valley-Goose Bay on April 7, 2009, and in St. John's on April 3, 2009 were CLOSED to the public.

Valued and respected citizens and elders in Labrador were denied access. Nalcor's local representative was very heavy handed in his refusal to accommodate even two more people and the general public were never informed of the process at all.

As well, by holding two or three separate, small "by invitation" only sessions on this extremely important issue, Nalcor appears to be using a "divide and conquer" tactic smothering cross-fertilization of diverse opinions within the community in the process. Information sessions do not constitute proper consultation and we demand a better process with proper interaction.

SHORT NOTICE

As in the past, invitees were given very short notice and minimal time to prepare. Grand Riverkeeper had 4 working days notice while another participant had one day. We are all busy people and this shows a complete lack of consideration and respect for the very people Nalcor expects to solicit feedback from.

NOT ENOUGH TIME

There is never enough time to fully cover the issue. These "information sessions" need to be extended to a full day and involve everyone at once, including the public. Only then will we have meaningful public consultation.

PUBLIC PARTICIPATION IS A FULLY INTEGRATED AND INTERACTIVE PROCESS

If, as stated in the Executive Summary of the Lower Churchill Project Environmental Impact Statement:

Nalcor Energy is committed to full and open consultation as a means of enabling meaningful dialogue with the people and groups who have an interest in the Project. Consultation is an opportunity for Nalcor Energy to share Project information and to receive information and comments from the public. (Exec.Summ. P.8, 2.2)

then these divisive practices must cease.

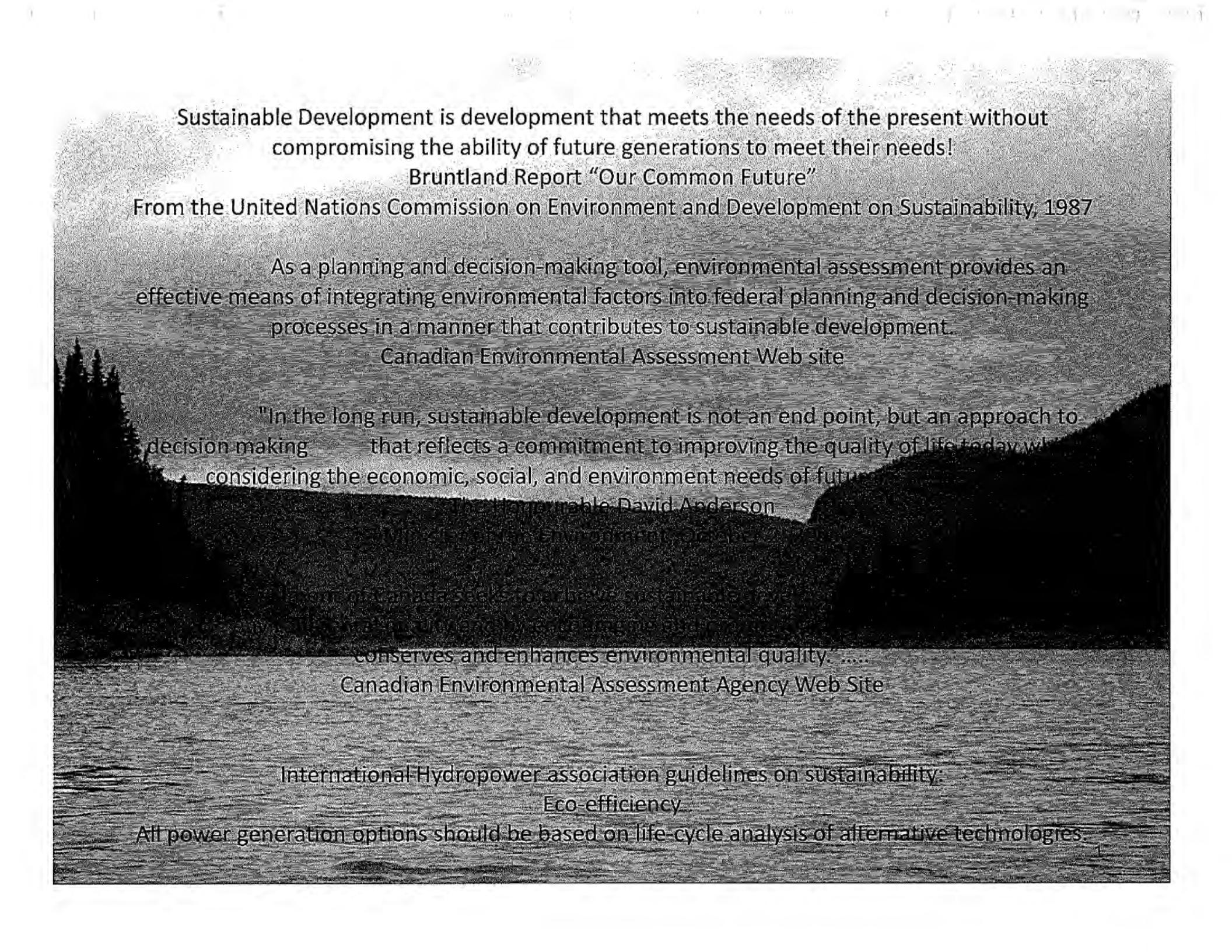
For further information contact Roberta Frampton Benefiel, Grand Riverkeeper Labrador at 709-██████████008 or refbnfl@██████████ or Bruno Marcocchio, Sierra Club of Canada, 902-██████████132, bmarcocchio@██████████

Tab 1.6

Proposed Lower Churchill Hydro Project/Labrador Island Transmission Link

Presentation to the Happy Valley-Goose Bay
Town Council
May 20th 2010
By Grand Riverkeeper® Labrador Inc.
Member Waterkeeper Alliance®





Sustainable Development is development that meets the needs of the present without compromising the ability of future generations to meet their needs!

Bruntland Report "Our Common Future"

From the United Nations Commission on Environment and Development on Sustainability, 1987

As a planning and decision-making tool, environmental assessment provides an effective means of integrating environmental factors into federal planning and decision-making processes in a manner that contributes to sustainable development.

Canadian Environmental Assessment Web site

"In the long run, sustainable development is not an end point, but an approach to decision making that reflects a commitment to improving the quality of life today while considering the economic, social, and environment needs of future generations."

The Honourable David Anderson

Minister of the Environment, October 1990

"The Government of Canada seeks to achieve sustainable development by... conserves and enhances environmental quality."

Canadian Environmental Assessment Agency Web Site

International Hydropower association guidelines on sustainability:

Eco-efficiency

All power generation options should be based on life-cycle analysis of alternative technologies.



One tree island, Grand River

The Lure of the Labrador is the Lure of the wilderness. The Grand River watershed covers a full 93,000 sq km of near-pristine boreal forest. *A jewel in our midst that could be marketed to the world through eco-tourism!* The extent of the proposed ecological damage to the Grand River Valley will render it un-marketable as wilderness territory. Cultural and historic sites will be destroyed. Future Generations will be left with controlled reservoirs that they may never be able to access. Knowing we live alongside this mighty river promotes pride in our surroundings and improves our quality of life even more than the Mealy Mountains National Park or the Torngat National Park can! This River IS CENTRAL LABRADOR! Damming the Grand nullifies environmental Sustainability!

There are a number of areas in the Environmental Impact Statement of the Lower Churchill Hydroelectric Project and the Labrador-Island Transmission Link that directly affect the Town's municipal infrastructure, programs and services, the social fabric of our community as well as cultural, historic and ecological effects.

Some of those impacts are identified and discussed in this presentation.

They, by no means, constitute all issues!

Infrastructure Impacts of Hydro and other large Resource Development projects Boom/Bust

Increased number of Residents and Transient Workers create increased usage in the following areas:

- Fire protection (for increased number of buildings and homes)
- Recreation facilities (swimming pool, arena, parks etc)
- Water (system is already taxed with some residents complaining of low pressure)
- Sewage (more pollution at outfalls and/or impediment of river's ability to flush effluent from new lagoon system)
- Solid Waste (due to more residents, more industrial waste, increase in hazardous materials , decrease in lifespan of the dump)
- Land development (proportional demand for housing and lots. Secondary/support industry will need more commercial land)
- Roads (wage economies create more vehicles and more vehicles per capita. Industrial activities necessitate more and heavier vehicles.)
- Local Government Employment (LCHP positions closely related to community government positions..Some qualified people likely to leave to pursue higher pay)

These types of increases have already occurred and created a housing crisis and other social. (see info in the *HV-GB Community Plan for Addressing Homelessness and Transition Housing (Jill)*)

Community and Infrastructure issues/impacts cont...

- Socio-economic issues related to boom/bust resource extraction economy!
 - Unwanted pregnancies (transient worker problems)
 - Housing (rising rental rates and housing prices) (currently poor people bank up-live with relatives, creates tension, family stress)
 - Emergency shelter use (by our most vulnerable people who cannot afford housing or have stressed family life)
 - Crisis workers (financial and family life stresses rise)
 - Stressed family life (due to high rents, high prices, unwanted pregnancies)
 - Labor force/employment/training (34% of HV-GB citizens earn less than \$15,000 and 25% earn less than \$29,000) (=59% earning less than \$30,000)
 - Loss of Traditional culture/values
 - Loss of Heritage resources
 - Health care facilities and services (already taxed, but needs will increase with influx of more residents and transient workers)
 - Medical staff (already overworked-extra 2000 workers will stress further)

Past experience shows Municipalities bare the brunt of costs!

- Municipalities have tended in the past to bear the cost of the increased use of their infrastructure including increases in administrative and employment costs, insurance and deferred maintenance and capital costs. HV-GB needs to be prepared in advance to negotiate with industry and other orders of government to mitigate the effects of a likely substantial increase in the use of our physical infrastructure. Benefits to the community from this Project will outweigh the negative impacts, only if the community is adequately prepared to take advantage of opportunities!

NO POWER for Labrador

- Labrador North Chamber of Commerce comments on the EIS
 - *“power must be made available throughout Labrador ...” (Sterling Peyton, Labrador North Chamber of Commerce, Letter to the Joint Panel, May 22, 2009)*

The Transmission Link document/map CLEARLY shows, NO Power is slated for Labrador!

Town of Happy Valley comments on the EIS

- *“Transmission lines will either be going back to Churchill Falls into Quebec or directly across Labrador to the Island with no energy access available for Labrador communities from this project.” “we require 25MW of power...in order to attract potential business ventures.” (Mayor Leo Abbass, letter to Joint Panel May 22, 2009)*

Former town Planner, Dennis Peck on Hydro Power:

- *“NL Hydro has reached it’s capacity to provide electricity...unless new power lines are installed”*
- *“The Town is of the opinion that NL Hydro has not adequately planned for future development.”.....“says it can build to meet demand, but issue is cost.”*
- *“Hydro’s indecisiveness stifles our ability to develop accurate future economic development plans that will attract investment.”*

No Infrastructure Money for Labrador

- *“without additional financial assistance the enormity of this development will greatly stress the infrastructure of a municipality of our size.” (Mayor Leo Abbass, letter to the Joint Panel, May 22, 2009)*

Voisey’s Bay Nickle-Inco invested several million dollars in the local Hospital!

Hydro Quebec has invested millions in communities near the La Romaine project!

Nalcor can be approached to do likewise! It’s the cost of doing business and the business is the extraction of resources from our area with absolutely no guarantee of what will ever come back! Grand Riverkeeper Labrador has already submitted comments stating there needs to be an Impact Benefit’s Agreement or a Share agreement for all of Labrador before the project proceeds!

Possible solutions to some of these socio-economic and infrastructure issues

- Lobby Government through Municipalities Act and Landlords and Tenants Act for changes allowing rent control
- Lobby Nalcor for funding to upgrade existing community crisis centres and other impacted infrastructure
- Withhold support of the project unless Power is supplied to all of Labrador
- Withhold support unless an Impact's Benefit Agreement signed for the Town and for all of Labrador's communities
- Lobby Government for funds to prepare for hearings (Municipalities, Provincial and Federal)
- Review Municipal by-laws now to be certain that any changes needed are in place before the Proposed Project begins
- Hold town meetings outlining the infrastructure and social impacts of the Project and ask for input (Educate, Educate, Educate)

Possible ways to be pro-active in dealing with this proposed mega-project are outlined in Infrastructure Canada's report listed below

- Incorporate local environmental impact assessments into community planning process.
- Ensure that Nalcor clearly indicates how project-specific infrastructure will be used once project is completed or provides plans for decommissioning.
- Provide baseline data on condition of current infrastructure at start of Project
- Technical support, written guidelines etc. exist with Infrastructure Canada and other Government agencies on issues such as total life cycle costs of infrastructure, resources for negotiating with other governments and industry etc. Workshops can be targeted to Council and managers. See reference below!

(see Infrastructure Canada's report *"Northern Communities, Boom, Bust and the Role of Infrastructure. On line!"*)

ECOLOGICAL ISSUES

Each of These will be discussed separately

Generation Project

- Ashkui
- Fish and Fish habitat loss/alterd and compensation/downstream effects/mercury/cumulative effects
- Downstream effects/Lk Melville/Goose Bay
- Fish mortality
- Greenhouse gas/methane/CO2
- Loss of tourism potential
- Flushing ability of River compromised with an altered flow/sewage issue
- Salt intrusion
- Reservoir induced earthquakes/flooding
- No net loss of wetlands
- Reservoir clearing/preparation
- Decommissioning of the project

Transmission Project

- Subsea cables
Electrodes/EMF emissions
 - Overlap of transmission line and low level flight path
 - Cumulative effects
- Project splitting- Generation and Transmission
- AND: not all transmission included.

Ashkui

- Formation of new Ashkui (open water areas)
“may not replace habitat lost when natural ashkui are flooded.” And “ the ecological function of the new ashkui may not be the same as those that are lost.” (Environment Canada) (IR# JRP.154)

Migrating waterfowl return year after year to open areas along the river on their way north to breed. Natural ashkui provide nutrients and resting spots. It could take years for new ashkui to become productive and it is not known where new ashkui will form or even if it will form.

Direct Fish Mortality/Fish Kills

Direct fish mortality from turbine operations was not adequately addressed in the EIS!

DFO scientists state: “the impact of direct fish mortality from turbine operations was not addressed in a population context.”

Fish that manage to escape being chewed up in the Gull Island turbine will develop bubble disease from too much oxygen and will not have time to recover before entering the Muskrat turbine.

Fish and Fish Habitat concerns

- Downstream effects below the falls not adequately studied. (Lake Melville and beyond) (DFO Science evaluation of the EIS)
- Uncertainty that reservoirs will exhibit a similar fish habitat usage pattern as is described for Lake Winokapau (DFO)
- Reservoir filling at Gull Island followed by turbine operation can have significant consequences for fish populations between Gull Island and Muskrat Falls. (DFO)
- Sample sizes are small and limited both in spatial and temporal coverage. And therefore add a heightened level of risk and uncertainty to any predictions or analysis based on this date.(DFO)
- Fish passage not assessed for Muskrat falls (DFO)
- Fish Habitat Compensation plans historically work approximately 35% of the time. (DFO Director, Jason Quigley,)
- Mercury contamination will increase in fish and up the food chain, especially if the no-cut scenario is adopted for river bank vegetation.
- Habitat altered is considerably larger than the habitat lost and will therefore have a great impact on the fishes in the river and the application of DFO's No Net Loss Policy.. (DFO)
- Cumulative effects of all past, current and proposed projects on the River must be assessed, including "any residual effects of the Upper Churchill project." (DFO)

Greenhouse Gas/methane/CO2 displacement

- The Panel requested in JRP.7 that Nalcor provide “a comparative analysis of GHG displacement scenarios for possible electricity markets served and generation sources displaced” and reiterated their request in JRP.S/85S
Nalcor has not yet provided this information which is needed to determine the amount of GHG likely to be displaced by the project
- Methane is constantly produced in reservoirs due to rotting vegetation and is 27 times more effective as a greenhouse gas than CO2, These emissions must be taken into consideration when deciding on GHG displacement scenarios.

Salt Intrusion

- Nalcor's salt intrusion model only valid as far as southern part of Lake Melville-thus impossible to predict any changes outside Goose Bay, model not applicable to the question of changes seaward.
- From the magnitude of the effects predicted at the river mouth it is inferred that no significant effects in Lake Melville. **“This appears to be a logically unsound conclusion”.** (DFO Science Evaluation of the EIS)
- Salt Intrusion during reservoir filling most likely will contaminate water wells in Mudlake, North West River and possibly Town wells.

Reservoir induced earthquakes and dam breaks.

Per IR # JRP.162-Nalcor has yet to provide

- a dam failure study,
- an updated dam break model with inundation mapping,
- an outline of integrated emergency planning for each of the scenarios involving the Upper Churchill, Gull Island and Muskrat Falls
- a dam breach analysis for construction phase cofferdams
- and, estimates of economic losses from dam failure. (i.e. not just residential dwellings)

Due to the existence of fault lines near Gull Island, Nalcor's dam failure study must include models of possible dam induced earthquakes and possible resulting dam failure.

Town should also produce emergency evacuation plan and educate, educate, educate!

Even though this event is unlikely, if it happened, it would be **catastrophic**.

Calls for the "precautionary principle" rather than "risk-based" decision making!

Wetlands

- CWS (Canadian Wildlife Service) states they cannot determine if the project will cause significant impacts on the abundance and distribution of wetlands and their provisioning of ecological functions based on the information provided by Nalcor.
- Canada signed on to North American Wetlands Conservation Act: No Net Loss Wetlands Agreement and Nalcor must comply by creating wetlands for those lost.

The Panel has asked Nalcor to provide a reference map, a summary table of information and discussion on the proportions of each wetland type lost or impacted by the Project.

Reservoir Clearing/Preparation (Ecological/Economic & Socio-Economic)

- Nalcor has “failed to adequately justify the proposed approach to reservoir clearing as required by the EIS Guidelines” IR# JRP.148

The Panel has asked that Nalcor compare and analyze the different clearing scenarios, i.e. partial clearing, no clearing and full clearing, in relation to their environmental and social costs and benefits and include those alternatives which cost more to build or operate but which might result in reduced environmental effects. (i.e. reduced methyl-mercury contamination)

This has yet to be provided!

Decommissioning of the Project at its life's end. Ecological and Economic

- EIS Guidelines require Nalcor to “present an approach for the decommissioning phase of the Project, which sets out a commitment to address: environmental planning and mitigation measures; socio-economic mitigation measures; and public health and safety procedures.”

Nalcor stated they have no plans to ever decommission the Project.

Therefore, the Panel's original request for the information below was not provided!

However, the Panel has again asked Nalcor to provide an overview of the range of options that exist for decommissioning hydroelectric facilities, including environmental planning and mitigation measures, socio-economic mitigation measures, public health and safety procedures and costs (order of magnitude estimates)

The Panel also asks Nalcor to discuss how dam decommissioning would change environmental conditions, whether the pre-Project river system and associated habitats could be re-established and how long this might take. IR# JRP 150

Sub-sea Cables/Electrodes

Issues surrounding electrodes

- **Underwater noise** (caused during installation and operation. Still large gaps in knowledge of sound emissions and sound perception by marine animals.)
- **Temperature effects** (various marine organisms react sensitively to minor increase of ambient temperature)
- **Electromagnetic fields** (electroreception in fish has been recorded for a number of species. Other species have been shown to use electromagnetic fields as an orientation cue. Limited number of studies undertaken to date to form any conclusion regarding impacts of EMF on aquatic species and systems per OSPAR Commission. Request that Nalcor do more primary studies.
- **Risk of Contamination** from seabed disturbance or cable itself and from turbidity!

Economics

- Thoughts on the Dis-economies of large dams
 - Huge expenditure on dams creates cuts in public expenditures in health, education and other services. What other, possibly better, uses could 12 to 14 billion dollars be put to in our sparsely populated Territory to benefit everyone?

Example from Dr. Murray Rudd (Education)

Alternatives to the Project (Economics)

- EIS guidelines requires Nalcor to “include an evaluation of the threshold for economic viability and indicate under what circumstances a change in economic conditions might influence its selection of preferred alternatives”

(IR # JRP 147)

- Information not yet provided: Therefore difficult to determine whether this project is the best “bang for our bucks”

Need Purpose and Rationale for the Project (Economics)

- EIS Guidelines requires that the “EIS shall provide a comprehensive explanation of the need, purpose and rationale for the project....justification shall be presented in both energy and economic terms,...”

Sufficient information has not been supplied and In IR# JRP 146, the Panel asks that Nalcor provide “order of magnitude estimates, financial analysis, risk assessments and sensitivities normally or generally available at the feasibility stage of a Project of this nature.”

- Ecosystem services the River provides not quantified as suggested by Dr. Murray Rudd, Canadian Chair in Ecological Economics.

Without this information it will be difficult, if not, impossible to determine whether the benefits outweigh the costs of this project!



Thank you for listening
Feel free to contact us any time!

Tab 1.7



GRAND RIVERKEEPER® LABRADOR INC.



MEDIA ADVISORY

For immediate release – September 19, 2011

Navigant Report Fails to Address Concerns Raised by the Joint Review Panel

HAPPY VALLEY-GOOSE BAY, LABRADOR, NL – “This report was commissioned and paid for by Nalcor,” said Roberta Frampton Benefiel, Vice-President of Grand Riverkeeper Labrador Inc. “Its purpose was to confirm the decision to go ahead with Muskrat Falls, not to question it.”

The Joint Review Panel (JRP) was not convinced that Muskrat Falls is “the best and least cost way to meet domestic demand requirements”, and called for an independent review to ask: “What would be the best way to meet domestic demand under the No Project option?” Navigant was not mandated to answer this question, and it didn’t answer it. Instead, it simply affirms that Nalcor’s assumptions are “reasonable”.

The Panel specifically required that the “independent reviewer” address certain specific issues, which Navigant failed to do, including, to mention a few:

- Recall power options
- Technologies that are not yet commercially available, but which will be within the 50-year study horizon,
- Additional wind generation on the Avalon Peninsula,
- More aggressive conservation and demand management (CDM).

“Navigant’s analysis is strictly cost based, and doesn’t even try to take the environmental and social implications of energy choices into account,” added Ms. Benefiel. “Navigant did not even begin to address the JRP’s call for an **“independent analysis of economic, energy and broad-based environmental considerations of alternatives”**.”

Furthermore, Grand Riverkeeper Labrador Inc. believes that Navigant erred in accepting some of Nalcor's premises, in particular with respect to wind power and Conservation and Demand Management (CDM).

Navigant acknowledges that wind is ubiquitous, cheaper than smaller hydro, and readily available on the Avalon peninsula; without transmission upgrades, thereby confirming information presented to the Panel by the Helios Centre on behalf of Grand Riverkeeper. Citing a 2004 study, Nalcor refuses to even consider requiring wind generators to curtail production during certain hours, even though their cost advantage is great enough to make this cost-effective. Inexplicably, Navigant finds it "reasonable".

Navigant acknowledges that saving energy costs less than Muskrat Falls or any other generation technology, estimating that CDM energy cost would be around \$60/MWh. Navigant relies, like Nalcor, on the 2008 Marbek study, but failed to note that Marbek's estimate of potential savings is very much out of date. There is no doubt that, if the Marbek study were brought up to date, the potential savings would be much higher, given the much higher energy prices forecast for the coming years.

The bottom line is that **neither Nalcor nor Navigant adequately addressed the potential contributions of either Wind power or CDM to meet future generation requirements** – two key elements of the Joint Review Panel's recommendations.

Rate Impacts

Navigant indicates that the supply cost for Muskrat Falls energy is \$76/MWh (2010\$), and that adding the cost of the Labrador-Island Link (LIL) increases the capital costs by 73%. This is coherent with Nalcor's estimate that delivered cost of Muskrat Falls power is over 14 cents/kWh.

How, then, can it be that the average revenue requirement is far less than the cost of Muskrat Falls power (delivered), even later on, when Muskrat Falls is serving a significant portion of Island loads? Nalcor's rate impact projections are dubious on their face, and no supporting information has been released.

Curiously, Navigant was extremely cautious in its review of Nalcor's rate impact analysis, declining to repeat the formulaic statement that "Navigant finds reasonable..." used elsewhere in the report.

"The Muskrat-LIL project is a high-cost solution that can only make money for the government by taking it out of ratepayers' pockets," said Roberta Frampton Benefiel. "The Joint Review Panel had grave concerns about the economics of this project, which is why it called for 'a separate and formal review of the projected cash flow of the Project...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’.” **“The Navigant report does nothing to provide this assurance,”** she added.

Grand Riverkeeper Labrador Inc. (www.grandriverkeeperlabrador.ca) first came together as a concerned citizens group in 1998 to challenge plans for a mega hydro dam project. In 2005 they became affiliated with Waterkeeper Alliance (www.waterkeeper.org) and joined some 200 other Waterkeepers worldwide. The purpose of GRK is to preserve and protect the water quality and ecological integrity of the Grand River watershed and its estuary, through actions of public awareness, monitoring, intervention and habitat restoration. It actively promotes economically and environmentally sustainable ecosystem management approaches that will maintain the heritage and intrinsic value of this river for present and future generations.

- 30 -

**FOR MORE INFORMATION, please contact: Roberta Frampton Benefiel at 709- [REDACTED]
[REDACTED] 164 or 709- [REDACTED] 241**

Tab 2.1



GRAND RIVERKEEPER® LABRADOR INC.



“DEATH BY A THOUSAND CUTS”

CLOSING REMARKS

TO THE

JOINT PANEL REVIEWING THE PROPOSED

**LOWER CHURCHILL HYDROELECTRIC GENERATION
PROJECT**

April 15th, 2011

By Grand Riverkeeper® Labrador Inc.

**Clarice Blake Rudkowski, Roberta Frampton Benefiel and
Carly Thompson**

The presentation on the first two pages is from a young adult member of Grand Riverkeeper, Carly Thomson. Carly's family on her mother's side were born and raised in the community of Mudlake. Carly made a presentation to the Joint Panel when they visited Mudlake for the Community Hearings and wanted to also make some closing remarks today at the final session. Her comments are below.

To the panel, I strongly believe that it is your duty to recommend, without concessions, that this project be denied.

You have been given a lot of information over the past weeks about the benefits and concerns of the proposed project. The business community, the politicians, Nalcor and the government departments all speak to the wonderful economic outcomes this project will bring. In a nutshell they are suggesting that economic benefits, which are themselves debatable for the people of Labrador, outweigh the environmental, social, cultural and historical costs. That is simply not true. The combined total worth of the environment including all vegetation, fish and wildlife, the loss of historical sites, the cultural relevance to the people of this region, the untapped tourism opportunities and the cost to the social fabric of the area far exceeds any financial gains.

It seems very odd to me that even the Department of Tourism, Culture and Recreation supports this project. Its mission statement reads in part "By 2011, the Department of Tourism, Culture and Recreation will have supported and promoted the development of the tourism and culture and heritage industries, ...preserved tangible and intangible heritage resources...to improve the... well being of the people of Newfoundland and Labrador". Its mandate is to "support the development of sustainable economic growth in tourism and cultural industries" and to "Preserve the province's cultural heritage and historic resources and recognize their importance". It is painfully clear that the department has abandoned its own vision and mandate as it relates to Labrador and its people. They are not doing their job, they are failing us. It should not be ok with a department whose job it is to preserve and protect our heritage to destroy the largest, richest most significant historical site in central Labrador. If provincial government departments represented Labrador fairly, they would be

adamantly opposed to the destruction of such a rich cultural and historical resource and potentially unparalleled tourism gem the Grand River could be.

For every environmental concern raised, the proponent answers that based on their research they predict that any negative impact will be minimal or short term. They predict that there should no significant changes to the fall ice formation, to the vegetation, to the river water levels, to the fish habitat or to our way of life. But, what is a prediction? It is nothing more than a best guess. Of course, they will predict or guess favourable outcomes to support their own agenda.

The issue then becomes what will be the impact of errors. What might the impact be if Nalcor is indeed wrong...perhaps a species or two may lose it's habitat; perhaps water levels will change so significantly that boat travel will be impossible; perhaps the water will become and forever remain murky unable to support trout and salmon; perhaps the ice will not form to a sufficient thickness to allow for safe travel in the winter; perhaps mercury will be introduced into the water system at such levels that fish will no longer be safe for human consumption; perhaps drinking water will become contaminated; or perhaps the dam will fail and the river valley will flood with such force and speed that evacuation would be impossible. Lives will be lost, homes swept away and entire landscapes changed forever.

That has to be weighed against the money that will be generated for the provincial coffers. By proceeding with the project, Nalcor and the province are saying that the risks to Labrador, it's people, the environment, the culture, the way of life, is worth it as long as Newfoundland prospers.

I realize that Nalcor has a mandate to secure alternate power resources to replace the Holyrood refinery. Well, please keep exploring options, I wish you luck with that. It can't be this river because we are not finished with it yet and we are simply not willing to accept the devastation and risks this project will bring.

Finally, it can and likely will be the death of a community. A community that relies on the river for everything, the river is the only means of transportation. I am referring of course to Mud Lake, my community of origin. It is one of the oldest communities in the area and it is steeped in history. The people of Mud Lake don't refer to it as the "Churchill River" or the "Hamilton River" or even the "Grand River" to us it is simply "The

River". Its significance is so great that when we say "the River" we know what is being referred to. Without "The River" there can be no Mud Lake, this project threatens Mud Lake's very existence. No business venture should trump the right of a community to exist.

**Clarice Blake Rudkowski, President, Grand Riverkeeper
Labrador, Inc.**

"Death by a thousand cuts" refers to slow slicing, a form of torture and execution originating from Imperial China. In today's world the expression refers to creeping normalcy, the way a major negative change which happens slowly in many unnoticed increments, is not perceived as objectionable.

.....Wikipediain

Grand Riverkeeper Labrador, Inc. is convinced that our Territory, our Home, will die by a thousand cuts if Nalcor energy is permitted to put two dams on the lower part of Grand River. Already, the rest of the major rivers in the Territory have been studied for their hydro-electric potential. Already, the uranium industry and other mining companies have hundreds of claims staked throughout. Already, our MHA has been talking of bringing an aluminum smelter to Labrador! Already, our caribou herds are losing habitat and numbers at unprecedented rates. Already our fish have been contaminated with methylmercury and this will certainly continue if those dams are built!

One project at a time, with creeping normalcy, our home will be changed from the near pristine wilderness we currently enjoy to a territory crisscrossed with roads and power lines; filled with Walmarts; ponds fished out along the highways and

transmission lines because of lack of wildlife officers; filled with gaping holes in the ground where minerals once lay, and more than likely a mixture of uranium dust and radioactivity all around us. And each and every one of these “cuts” will require that one more river be dammed to provide the energy needed to support this extraction styled development.

Where will it end? When will Labrador residents get to decide for themselves, where, when, how, and how fast they want these “cuts” to take place? Unfortunately, not until a fair voting system is introduced where Labrador residents have the right to decide what takes place in their territory, without fear of being out-voted by an entirely different culture in an entirely different geographic region of the Province.

Grand Riverkeeper Labrador has learned a lot from this Environmental Assessment process - from the different presenters, the experts, the people in the audience and from the insightful questions asked of the Proponent by the Panel Members.

We were pleasantly surprised that most of the presenters within the communities did not want to see the river dammed or the Project proceed as proposed.

What we have learned from the rest of our communities has totally galvanized us. It has inspired us beyond even our own understanding of the detrimental, long-term, environmental and social effects this Project would have overall on our region. Taking from us without our permission, an icon such as this River, is akin to taking our pride, our source of connection to where we are and who we are! It is akin to cultural genocide for those of us who connect strongly with the land and the River.

This proposed project is an environmental disaster! The significant, adverse, environmental effects will far outweigh the few “crumbs” of benefits that will accrue to Labrador. Viable alternatives to damming this River exist as we heard time and time again from different presenters including Mr. Raphals yesterday. Yet they were never considered in any meaningful way by Nalcor or the Government of Newfoundland. Make no mistake, we are totally aware that those two entities are one and the same and finding the separation between them would be difficult if not impossible. We were made painfully aware throughout these hearings that the Regulators appointed to protect the land, the waters, the animals, the vegetation and the people who live within that environment, are no more than puppets of a government hell bent on a political legacy to dam this and every other river in Labrador. While it appeared they had reservations about many of the same issues that we had, in the end, their mantra was the same as that of Nalcor’s “no significant adverse environmental effects”!

ECONOMIC IMPACTS

Economic impacts have not been presented in a manner that the average citizen can understand. No comparison of economic impacts of alternatives was presented, such as better ways to spend 12 billion dollars that might better benefit the Province as a whole and Labrador specifically. As well, no cost-benefit analysis was presented. The Federal government does require cost-benefit analysis for all regulatory change in Canada through the Regulatory Impact Assessment Statements (submitted as part of the regulatory change process). While dam approval is not a regulatory change, it is a much larger project with more impacts on Canadians than those from small regulatory changes. From a Federal

perspective, it would make sense to revisit the environmental assessment procedures to ensure coherence between them.

The Proponent discusses economic impacts mostly from the perspective of the BOOM of construction jobs and spin-offs as their main economic impact. There are only vague promises of how Labrador will benefit economically after the construction phase is complete. They are trying to use economic impact analysis – the spin-offs for local business - as economic justification.

Grand Riverkeeper Labrador Inc. has consistently asked that a proper cost-benefit analysis be done for the project, which would include all costs, including the transmission lines to take all power to market, (or at least estimates of the various possible scenarios) as well as the dollar value of all non-market costs of such things as ecosystem services provided by the River and the dollar value of lost opportunities due to the loss of the river; for example, eco-tourism.

In one of our presentations, Grand Riverkeeper talked about all the major rivers in Labrador that have been studied for their hydro potential: The Eagle, the Paradise, the Alexis, the Pinware, the Elizabeth, the Pinware, the Kenamu, the Fig, etc.

The Panel is aware of the political situation in Labrador – 4 seats in the House of Assembly versus 44 on the Island. We will have no political say when the time comes to dam each of these rivers, just like we will be paid no heed in respect to the Grand River.

**RESERVOIR PREPARATION, FILLING,
OPERATION AND DECOMMISSIONING**

Reservoir preparation:

The full clearing scenario has been touted by the Proponent as too expensive and consequently they have chosen a partial clearing option stating that it is the least cost that meets operational, environmental, and safety requirements of the Project. Yet various experts have stated that full clearing is necessary to reduce as much as possible, the contamination by methyl-mercury, emissions of methane and CO₂, and the danger posed by stick-ups and floating debris.

Reservoir filling:

The possibility, no matter how unlikely, of reservoir induced seismic activity that might cause dam failure during or right after reservoir filling has been dismissed by the Proponent time and time again as “unlikely”. Even though the Proponent’s own consultant has presented a main dam- break scenario and maps showing that lower portions of the town of Happy Valley-Goose Bay, including one of two roads that would be used for evacuation, and all of Mud Lake would be inundated within 2.3 hours. Over and over again throughout the hearings the Proponent steadfastly states this scenario is “unlikely” as though to dismiss the severity of this event should it ever happen.

It should be noted that the earthquake that struck just a month ago off the coast of Japan, churned up a devastating tsunami that swept over cities and farmland in the northern part of the country. It created the worst nuclear crisis since Chernobyl at the Fukushima Daiichi Nuclear Power Plant. Thousands of people are dead and thousands of others are still missing. The earthquake and resultant dam break in Sichuan province, China, in May

2008, killed over 80,000 people and 100's of other dams were damaged. These were also "unlikely" events.

The Proponent has also made no offer, at this time, to provide financial assistance to either of these communities that would help them prepare an evacuation plan and an evacuation route that would ensure that lives would not be lost should this "unlikely" event take place. This is unacceptable and Grand Riverkeeper Labrador Inc. asks the Panel to insist that a workable evacuation plan be presented to the residents of these two communities for approval before any further discussion on this Project takes place. Nalcor insists that they will "work with" the communities in question to "assist" them in preparing an evacuation plan for all possible types of catastrophic events that "might" occur, effectively, in our opinion, dismissing the fact that the proposed Dams would be the main threat to the communities. Nalcor seems to want to diminish the threat of possible dam breaks by throwing in other possible events that MIGHT happen. By insisting that they will work with the affected communities to prepare an evacuation plan for all types of catastrophic events they are effectively downplaying the gravity of the possible failure of their dams. Grand Riverkeeper contends that if Nalcor builds the dams, then it is their total responsibility to protect the communities downstream.

Reservoir Operation:

In our past presentations and submissions, Grand Riverkeeper Labrador has quoted the World Commission on Dams report "Dams and Development, and the Millennium Ecosystem Assessment to provide the Panel with scientific information about flow regimes, reduction in sediment and nutrient transport, changes in water

turbidity and physical modification of rivers creating habitat change as being the most important direct drivers of biodiversity loss globally. We have forwarded information about 29 countries that have sought to minimize ecosystem impacts by using environmental flow requirements. And we have asked that Nalcor consider the cumulative effects of the Upper Churchill and the Lower Churchill and determine how the flow patterns could be reversed in the Upper Churchill Project to better mimic environmental flows to re-establish what originally existed downstream. We need only to look at the number of river diversions and dams within Canada to see what these kinds of alterations have wrought. Yet, we are expected to believe that, this time, Nalcor, in all its wisdom, will not allow these adverse effects to happen, that they can mitigate everything.

Decommissioning:

Nalcor's dam decommissioning report states that full decommissioning of both the Gull Island and Muskrat Falls dams in 50 to 100 years would cost (in today's dollars) \$5, 373,691,390. That's five billion, 374 million dollars. However, if we consider just 2% inflation over the next 100 years that figure would be more like 35 Billion dollars.

Contrary to Nalcor's assertion that dams will last into perpetuity, Grand Riverkeeper contends that a decommissioning fund needs to be set aside now to cover the eventuality of decommissioning so that future generations are not saddled with this debt. We also contend that the future cost of decommissioning should be added to the total cost of the project.

AQUATIC ENVIRONMENT

Ashkui, or “open water”, are areas of early or permanent open water on rivers, lakes and estuaries and at the confluences of rivers. They are sites where migrating waterfowl congregate to rest and feed, on their way north to breed. Many of these ashkui will be lost due to heavier ice cover and changes in flow rates. Nalcor states new sites will form. However, Grand Riverkeeper and others, including Environment Canada have stated that it is unlikely that any open water forming after inundation will be as productive as the original sites since those have resulted over years and years of sediment trapping and vegetation growth. In Grand Riverkeeper Labrador’s opinion, there is considerable uncertainty with regards to formation of productive ashkui. Ashkui cannot be replicated and this will have a huge negative impact on waterfowl.

EFFECTS BEYOND THE MOUTH OF THE RIVER

Grand Riverkeeper and others, including various experts, have consistently stated that the Project will have adverse effects beyond the mouth of the river. The Canadian Science Advisory Secretariat, in their science evaluation of the environmental impact statement for the Lower Churchill Generation project state: “The exclusion of the receiving environment below Muskrat Falls, including Lake Melville from the project description within the EIS was viewed as a major deficiency.” Yet, Nalcor continues to assert the project will have no effects beyond the mouth of the river.

Grand Riverkeeper Labrador asks that the Panel insist that complete studies be done to ascertain the cumulative effects downstream, out into Goose Bay, Lake Melville and beyond.

FISH HABITAT COMPENSATION

Grand Riverkeeper Labrador has consistently advised the Panel of our lack of confidence in the ability of both Nalcor and the Department of Fisheries and Oceans to create fish habitat, or to monitor and follow-up on any attempt at creating fish habitat. We have quoted studies by DFO's own scientists and reports by the Commissioner of the Environment to explain our reasoning. We are also not convinced that the fish assemblage will remain the same as before impoundment and we have heard various fish experts make that determination. i.e. Dr. R.J. Gibson, Dr. Gordon Hartman, Dr. David Rosenberg, etc. Nothing Nalcor has said to date has convinced us otherwise. We ask the Panel to consider the magnitude of what Nalcor proposes in their Fish Habitat Compensation package and require them to provide dollar figures on what this compensation, monitoring and follow-up will cost and to include these on the cost side of a cost-benefit analysis.

ENVIRONMENTAL MANAGEMENT, MONITORING AND FOLLOW-UP

Grand Riverkeeper Labrador has stated time and time again throughout these hearings that we have no confidence in Nalcor's ability to monitor and follow-up on the creation of new fish habitat, the creation of new

ashkui, and the creation of new wetlands. We have quoted various studies and the Auditor General's reports to back up our statements. It is our contention that one small project, the Granite Canal, does not qualify Nalcor for the magnitude of this Project. The failure of the Star Lake project could be considered a wash for the seeming success of the Granite Canal. The increased complexity of this huge undertaking surely will lead to increased risks and uncertainties, as stated by Dr. Gordon Hartman in his critique of Taseko's Prosperity Mine project. As with the Prosperity Mine, the Lower Churchill Project is larger in scale and more complex than the majority of compensation plans that have been approved in Canada. Dr. Hartman states, "after reviewing key documents on large scale fish habitat compensation (Birtwell et al. 2005, Hartman and Miles 2001, Lange et al. 2001, Packman et al. 2006) we have found no Canadian example of a successfully implemented plan to compensate for such a large area of highly valued, productive and complex freshwater ecosystem as the current proposal by Taseko."

Grand Riverkeeper Labrador contends that the Lower Churchill Fish compensation plan is of a magnitude equal to the Taseko project and will not work!

THIS PROJECT IS NOT FOR LABRADOR

As we have stated time and time again, this Project is not being built for Labrador. Our coastal communities will remain on diesel. Others will benefit from the power and while we understand that producing electricity will always have some externalities, it is unfair that Labrador residents will reap all of these externalities while Island residents will reap the

benefits. Part of the justification of the project is to meet the Island's needs for power and the shut down of the polluting Holyrood plant. We agree that Islanders deserve not to be forced to breathe the pollutants from this dirty plant, but there are ways to produce enough power to either replace Holyrood, or at least discontinue it for most of the year by installing wind turbines in various locations across the Island. As Mr. Raphals stated in his submission on Wednesday and spoke on again yesterday, the Island of Newfoundland has the best wind power potential of any place in Canada and it seems a total travesty to ignore this much-greener alternative to damming the largest river in eastern Canada.

However, with regards to wind energy, Nalcor consistently states that installing wind is counterproductive because if NLH has a Power Purchase Agreement to buy too much wind power, it will result in spilling from the hydro system during the summer.

While it is true that baseload wind power can't all be used effectively, without either storage or a transmission link. Both are feasible, eventually -- perhaps hydrogen-based storage, like in the pilot project at Ramea, or the Maritime Link. But, even without them, the price advantage of wind power compared to Muskrat Falls (6.5 cents compared to 14.3 cents) is so great that, even if a third or even a half of the wind power were wasted, it would still be cheaper than Muskrat Falls -- and with much lower environmental and social externalities.

The economics are even better if Nalcor is the developer, instead of buying the wind power under a Power Purchase Agreement. It would have a lower cost of capital, and lower risk premiums, so the overall unit cost would be lower.

IN CLOSING

This project is viewed with a great deal of uncertainty, skepticism and mistrust based on a history of exploitation and promises not kept. This came home to us late yesterday afternoon when Nalcor filed its final 195-page written submission, far too late for us to read and respond to. It demonstrated a shocking abuse of process.

As we stated in our April 5th presentation to the Panel in St. John's, what we should be thinking of at this challenging time in our history as humans is a bigger question than just whether we should dam one more river. What we should be asking ourselves, is how do we consciously create the future that we want? How do we bring ourselves into a mutually-enhancing relationship with not only each other but with the entire earth community? Is damming yet another massive river and its watershed conducive to "sustainable development" or are there better ways to provide the energy needed for the betterment of our lives and the lives of our families? Or, in fact, do we just need to re-assess and re-distribute what we already have and be thankful that what is currently available to us here in Newfoundland and Labrador is not available to two thirds of the world's population.

Is an increase in Gross Domestic Product or Gross National Product what constitutes "sustainable development", or is that just an impossible theorem called "sustainable growth"; an oxymoron since continuous growth in a finite system such as our earth obviously must reach a limit and may already have! The question is, when will the earth reach its limit? When will that last dammed river be the one that "breaks the camel's back" or the one that destroys the last

ecosystem capable of maintaining the food and water necessary to our survival?

In Labrador, the Grand River is our main artery. It has history going back thousands of years. Many of the people in this territory who live along its banks, and even those who live in our coastal communities and in Western Labrador, far from the Grand River, connect with this river, in song, in stories, through family ties, and in their hearts.

Currently, the protection of our river rests with this environmental assessment process and we urge you to consider in your deliberations and final report, all the “cuts”, both past, current and future, that, if taken, will cause the eventual death of this river. We urge you to consider the words of the community members who have spoken from their hearts about their concerns with regards to the usurpation of this River by outsiders, resulting in the usurpation of a foundation of their culture. This massive River and its valley stand as an icon of their understanding of what it means to be “home”! To have it damaged and controlled by outsiders is akin to cultural genocide!

Since this is just the first of many major rivers in Labrador already studied and slated for hydro potential, we ask the Panel to consider the “long-term” cumulative effects of this current Project, not just in conjunction with possible future mines, or other types of developments currently planned, but also in conjunction with the apparent plans of NL Hydro, now Nalcor, to develop the hydro potential of every major river in Southern Labrador.

Tribute to [REDACTED] and [REDACTED] by Roberta.

We want now to acknowledge two friends of the River who are no longer with us.

[REDACTED] passed away on [REDACTED]. [REDACTED] campaigned to stop the building of the Oldman River Dam and followed with a legal campaign resulting in environmental improvements to the project when the Dam was approved and a Supreme Court decision that environmental protection is in the jurisdiction of both the federal and provincial governments. She also worked tirelessly on the Clean Air Strategic Alliance committee and was part of the effort that resulted in the reductions to air pollution.

[REDACTED] came here to Labrador and facilitated a workshop with our group even while she was gravely ill. She said to us at that workshop, I would like to help save one more River. [REDACTED] has been with us constantly throughout this hearing process.

[REDACTED] Mr [REDACTED] was an elder and member of NunatuKavut Community Council and a long-time member of Grand Riverkeeper Labrador. He passed away on [REDACTED] this year, just two weeks after the love of his life, [REDACTED] succumbed to cancer. His children said he died of a broken heart.

[REDACTED] was always a strong advocate for the River. He attended as many Grand Riverkeeper meetings and assessment meetings as he could, even if he had to walk, and he often did. We have a DVD of an interview that was done last summer with [REDACTED] talking about the River, but unfortunately we are unable to play it. However, we know [REDACTED] is here with us

today and if he could speak to you he would tell you! Please, don't dam this River!

Again, Panel members, we wish you courage in your deliberations and thank you again for listening.

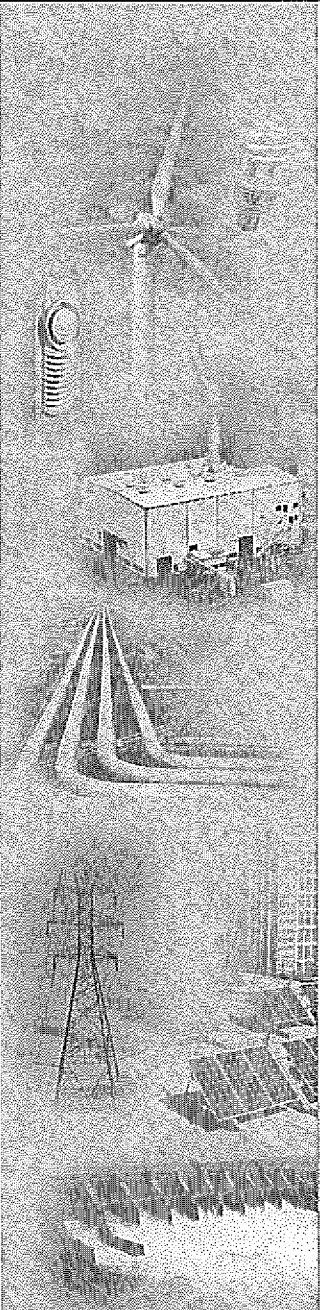
Tab 2.2



HELIOS

*Une expertise en énergie
au service de l'avenir*

June 12, 2012



Comments on the Justification for the Lower Churchill Transmission Project (Labrador-Island Transmission Link)

submitted to the
Canadian Environmental Assessment Agency
Comprehensive Study on the Lower Churchill
Transmission Project

and to
Government of Newfoundland and Labrador,
Department of Environment and Conservation

on behalf of Grand Riverkeeper Labrador Inc.

by

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1. Mandate

1.1. Mandate

Grand Riverkeeper, Labrador Inc. has asked me to review the stated justification for the Labrador-Island Transmission Link (“the Project”), as presented in the Proponent’s Environmental Impact Statement, taking into account the report of the Public Utilities Board of Newfoundland and Labrador (PUB), as well as that prepared for the PUB by its consultant Manitoba Hydro International Inc. (MHI).

1.2. Qualifications

Cofounder of the Helios Centre, Philip Raphals has extensive experience in many aspects of sustainable energy policy, including least-cost energy planning, competitive market design, utility regulation (including transmission ratemaking) and green power certification. He is the author of numerous studies and reports and frequently appears as an expert witness in the regulatory arena. He has explored in detail the interaction between competition and regulation as well as the environmental implications of electricity trade.

Mr. Raphals is also an authority in the area of hydropower and the environment. From 1992 to 1994, he was Assistant Scientific Coordinator for the Support Office of the Environmental Assessment of the Great Whale hydro project, where he coauthored a study on the role of integrated resource planning in assessing the project’s justification.¹ In 2001, he authored a major study on the implications of electricity market restructuring for hydropower developments, entitled *Restructured Rivers: Hydropower in the Era of Competitive Energy Markets*. In 2005, he advised the Federal Review Commission studying the Eastmain 1A/Rupert Diversion hydro

¹ J. Litchfield, L. Hemmingway, and P. Raphals. 1994. *Integrated resources planning and the Great Whale Public Review*. Background paper no. 7, Great Whale Public Review Support Office, 115 pp. (also published in French).

project with respect to project justification. Later, he drafted a submission to this same panel on behalf of the affected Cree communities of Nemaska, Waskaganish and Chisasibi.

Mr. Raphals chairs the advisory committee for renewable energies of the Low Impact Hydropower Institute (LIHI) in the United States, and has participated actively in the developing the low impact renewable electricity guideline for the Canadian Ecologo programme. Mr. Raphals is a frequent expert witness before the Quebec Energy Board (the Régie de l'énergie du Québec), notably with respect to transmission regulation.

Mr. Raphals has testified before the Joint Review Panel for Lower Churchill Generation Report, and before the Public Utilities Board of Newfoundland and Labrador, with respect to its review of the Muskrat Falls project.

He studied at Yale and at Boston University.

2. Project justification in the EIS

The Proponent's stated justification for the proposed Project is presented in Chapter 2 of the EIS, entitled "Projet Rationale and Planning". In this chapter, after presenting the provincial energy plan (section 2.1), the Proponent describes the "Need, Purpose and Rationale" for the Project (section 2.2), its Justification in Energy Terms (section 2.3), and its Economic Analysis (section 2.4).

It then proceeds to discuss "Alternative Generation Sources" to the Muskrat Falls generation project (section 2.5, and the Development of Least-Cost Expansion Plans (section 2.6).

In section 2.7, it presents a Discussion of the Economic Analysis; in section 2.8, the project's Financial Benefits; and in section 2.9, its Environmental Benefits. Section 2.10 addresses Risk Management; section 2.11, Project Planning; and Section 2.12, Alternative Means of Carrying out the Project.

In section 4 of this report, we will comment on several of these elements.

3. Project rationale

In section 2.2 of the EIS, the Proponent clearly articulates its rationale for the Project:²

By constructing the Project, Nalcor will develop a long-term asset to meet this requirement for least-cost energy. The rationale for the Project is that its construction enables the transmission of energy from Muskrat Falls in Labrador: the least-cost option to meet long-term supply of power to the Island.

Thus, the Project is required to transmit the energy from the Muskrat Falls generation facility to the Island of Newfoundland. The stated justification for the Project is that, in combination with the closely related Muskrat Falls facility, it would constitute “the least-cost option to meet long-term supply of power to the Island.”

This same question has already been addressed by two public bodies: the Joint Review Panel for the Environmental Assessment of the Lower Churchill Generation Project, and the Public Utilities Board of Newfoundland and Labrador, in response to a reference from the provincial government.

Neither of these two bodies concluded that the proposed project is justified. The high-level conclusions of these two bodies are described in the following subsections.

3.1. Report of the Joint Review Panel

Section 4.2 of the Report (Alternatives to the Project) concludes at page 34 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 of alternatives is required. (bold in the original)

² EIS, page 2-3.

Given that a Joint Review Panel, after several years of effort, found Nalcor's analysis showing Muskrat Falls to be the best and least cost way to meet domestic demand requirements to be **inadequate**, it is hard to see how the Responsible Authorities or the Agency, in a comprehensive study, could ever find the same analysis to be convincing.

That said, Nalcor has included in the LITL EIS certain information which it did not present to the Review Panel. It is thus relevant to ask whether the new information presented in the LITL EIS, which was not made available to the JRP, could be sufficient and adequate as a matter of fact to put to rest the concerns raised by the JRP? We will address this question from a factual perspective in our concluding chapter.³

3.2. Reference to the Public Utilities Board

On June 17, 2011, the government of Newfoundland and Labrador announced that it had mandated the provincial Public Utilities Board ("PUB") to conduct a review of the Muskrat Falls component of the Lower Churchill Generation Project and the Labrador-Island Link transmission line ("PUB Review of Muskrat Falls").

The Reference Question that the Province referred to the PUB is that "[t]he 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 of 2011-2067, as compared to the Isolated Island Option". This reference to the PUB is also mentioned by Nalcor in section 2.2 of the EIS.

³ I understand that several issues related to these questions are currently being argued before the Federal Court. I do not purport in any way to comment, in this document, on any matters of law in relation to that proceeding.

Following a call for tenders, the PUB engaged Manitoba Hydro International as a consultant to assist it in the process. MHI produced a two-volume report entitled *Report on Two Generation Expansion Alternatives for the Island Interconnected Electrical System* in January 2012.⁴

In its report, MHI gave qualified support to Nalcor's conclusion that the Cumulative Present Worth (CPW) of the Infeed Option (including Muskrat Falls and the LITL) was lower than that of the Isolated Island Option as defined by Nalcor and as included in the PUB's Terms of Reference. It found Nalcor's analysis to be correct, given the inputs used, and it found these inputs to be "generally ... appropriate" (v. 1, p. 15). However, it identified a number of risks, related in particular to assumptions regarding load forecasts, capital cost estimates and fuel price, that could affect this outcome. And it found these risks to be substantial, given the 50+ year timeframe of the CPW analysis. MHI also raised a number of important concerns about design choices and reliability, where are summarized below.

In its report,⁵ however, the Public Utilities Board of Newfoundland and Labrador did **not** make a determination as to the cost effectiveness of the Interconnected Option as compared to the Isolated Island Option, but rather concluded that the information provided to it was not adequate to support such a determination. On page iv, it wrote:

The Board concludes that the information provided by Nalcor in the review is not detailed, complete or current enough to determine whether the Interconnected Option represents the least-cost option for the supply of power to Island Interconnected customers over the period of 2011-2067, as compared to the Isolated Island Option.

The Board based this conclusion in large part on the inadequacy of the information provided to the Board and its consultants.

In the final section of its report, the Board addressed in detail many of MHI's comments concerning planning criteria, AC integration studies, reliability assessment and adherence to

⁴ Available at <http://www.pub.nf.ca/applications/MuskratFalls2011/MHIreport.htm>.

⁵ Available at http://www.gov.nl.ca/lowerchurchillproject/muskrat_falls_pub_final_report.pdf.

NERC standards. In particular, the Board rejected Nalcor's justification for the use of a 1:50 return period for the reliability assessment of the HVDC line.

Nalcor's reasoning for its rejection of this recommendation is not supported by the facts. Nalcor is relying on its own operational experience to support a design standard for a critical component of the Island's transmission infrastructure, even though it has no experience with the transmission line conditions in the alpine areas contemplated by the proposed route. **Nalcor proposed a "worst case" two-week scenario** to compare a prolonged HVdc bipole outage to a similar two-week outage on the existing system. **The Board agrees with MHI that this two-week period is not realistic and is not an industry accepted metric. Nalcor does not plan to add backup generation, such as combustion turbines, on the Island in the event of a major failure of the HVdc line with or without the Maritime Link.** The Board is of the view that Nalcor should address these significant gaps related to a major component of the Interconnected Option before proceeding to the next decision phase.⁶ (emphasis added)

The Board also expressed concern about the possibility of load shedding on the Avalon and possibly the Burin Peninsula, in the event of an HVDC bipole outage (p. 85).

The Board considers that its statutory responsibility for reliability obliges it to consider these issues, even though Nalcor is exempted from the EPCA. It concludes:

In the Board's opinion, when considered together, **these gaps related to power system reliability raise serious concerns in relation to Nalcor's assessment of the interconnection of the significant generation associated with the Muskrat Falls generating facility to the Island Interconnected system.** These deficiencies should be addressed by Nalcor in a meaningful way should the Interconnected Option proceed to project sanction.⁷ (emphasis added)

None of these deficiencies are addressed in the EIS.

As noted above, the PUB concluded that the information provided to it was not detailed enough, complete enough or current enough to support a determination as to the superiority of the Interconnected Option as compared to the Isolated Island Option. The information provided in the EIS with respect to project justification represents only a small subset of the information

⁶ Ibid., p. 99.

⁷ Ibid., p. 100.

provided to the PUB, and it is neither more detailed, more complete nor more current.⁸ The full body of information presented by Nalcor to the PUB was inadequate to convince the Board of the superiority of the Infeed Option, compared to the Isolated Island Scenario defined by Nalcor. One must therefore conclude that the PUB's review, like that of the Joint Review Panel, fails to support the project justification submitted by Nalcor in support of the LITL project.

4. Detailed Comments

In this section, I will comment on a number of specific elements raised by Nalcor in its chapter 2 of its EIS.

4.1. *Project planning and risk management*

4.1.1. Planning process

In section 2.3 of the EIS, the Proponent explains its planning process has three basic functions:

- 1) The development of a long-term energy and capacity forecast.
- 2) An evaluation of whether existing supplies are adequate to meet forecasted requirements.
- 3) The development of expansion plans to meet the forecast.⁹

The Proponent asserts that the Isolated Island alternative presented in the EIS, which was developed using *Strategist* software, "represents the optimum portfolio of available generation

⁸ On page 2-2 of the EIS, Nalcor indicates that this chapter is largely based on Nalcor's submission to the PUB.

⁹ EIS, p. 2-3.

sources without the Project.”¹⁰ However, no demonstration is made of this assertion, either in the EIS or in other documents made public to date by Nalcor.

According to the *Electrical Power Control Act, 1994*, s. 3(b)(iii), the province’s power system should be managed and operated in a manner that would result in power being delivered to consumers in the province at the lowest possible cost consistent with reliable service.

Utilities across North America and abroad have put planning processes in place to determine the least-cost portfolio of resources to meet forecast demand. Such processes generally include several common features:

- Inclusion of supply-side (generation) and demand-side (demand management and conservation) resources;
- Evaluation of several alternative resource portfolios that meet projected demand; and
- Comparison of portfolios based on various parameters (cost, reliability, risk and, in many cases, environmental and social considerations).

There is no indication to the effect that any such process has been carried out by Nalcor or its subsidiary NLH in determining that the Isolation Island Scenario described in Table 2.6.1-1 actually represents the least-cost portfolio.

It is important to understand that planning programs like *Strategist* represent important inputs into a least-cost planning process, but can in no way substitute for such a process.

Back in 2007, the PUB found that “an IRP (Integrated Resource Plan) undertaken as part of a generic process as described in Order No. P.U. 14 (2004) is an important planning tool and would enhance the information available to the Board and other parties regarding future generation and supply options in the Province.”¹¹

¹⁰ EIS, p. 2-66.

¹¹ Order P.U. 8 (2007), p. 60.

In that decision, the Board quotes P.U. 14 (2004) as follows:

"...implementation of Integrated Resource Planning may present sound opportunities for coordinated planning and improved regulation involving both utilities. This process brings together strategic planning, future supply and demand, least cost analysis, demand side management options and environmental considerations."

According to Nalcor's testimony before the Joint Review Panel for the Lower Churchill Generation Project, there has been no progress since that then with respect to integrated resource planning, either from the PUB or from the regulated utilities. This is unfortunate, because IRP is one important tool (among others) needed to properly compare the economic and environmental implications of alternate solutions to providing reliable electric power. Had Nalcor or its subsidiary NLH undertaken an integrated resource planning process *prior to* choosing a resource development strategy, the controversy surrounding the justification of and alternatives to the Muskrat Falls Generation and Transmission projects might well have been avoided.

While the restructuring of electric markets has resulted in limiting the application of IRP in many regions, it remains very relevant, *especially* for isolated electric systems. The Hawaiian Electric Company is a leader in this regard. The utility explains its planning process as follows:

How do we ensure that Hawaii's energy needs will be met reliably and affordably for the years to come? It takes selecting the best mix of energy resources. That choice is not a matter of "either/or," but rather an array of solutions, combining conservation and energy efficiency, renewables, distributed generation technologies as well as clean and efficient central power plants.

To find the right mix, Hawaiian Electric uses a process called Integrated Resource Planning (IRP). The Hawaii Public Utilities Commission (PUC) established IRP in 1992 for electric utilities to forecast energy demand and analyze the best ways to meet it. No other sector regulated by the PUC goes through such a thorough and far-reaching planning process.

In IRP, an outside advisory group representing business, government, energy regulators, consumers, environmentalists, and other interested stakeholders work closely with utility planners and engineers. They consider population growth, culture, lifestyle, the economy, the environment, available energy technology and other factors.

Hawaiian Electric, Maui Electric and Hawaii Electric Light companies each undertakes a separate IRP process for its service territory.

Hawaiian Electric has begun its fourth IRP Process which is expected to result in a new 20-year plan being developed and filed with the PUC in mid-2008.¹²

Hawaii, like Newfoundland, is anxious to find ways to use indigenous renewable energy to replace fossil fuels. However, unlike Newfoundland and Labrador, it is approaching the question in a structured fashion designed to discover and compare all possible solutions, in order to choose the best one.

Furthermore, given that it excludes *demand*-side resources (as discussed below), many of which are clearly cost-effective, it is virtually impossible that the portfolio developed by *Strategist* is indeed the least-cost portfolio.

For all these reasons, the Comprehensive Study Report should conclude that the Proponent has failed to demonstrate that the Muskrat Falls Transmission Project, in combination with the Muskrat Falls Generation Project, constitutes the least-cost option to meet long-term supply of power to Newfoundland Island.

4.1.2. Risk

Management of the risks and uncertainties related to the various resource options is an essential aspect of least-cost planning. In section 2.10, the Proponent addresses the question of Risks and Risk Management.

Unfortunately, this discussion remains entirely theoretical. It fails to address or specify in any way how the Proponent intends to address any of the specific risks related to the planning of its power system in general or the Muskrat Falls project in particular.

¹²

<http://www.heco.com/portal/site/heco/menuitem.8e4610c1e23714340b4c0610c510b1ca/?vqnextoid=b71bf2b154da9010VqnVCM10000053011bacRCRD&vqnextfmt=defau>

The Comprehensive Study Report should therefore conclude that the Proponent has failed to adequately address the risks and uncertainties related to the various resource options it considers.

4.2. Needs

4.2.1. Load Forecast

The first step in the Proponent's planning process, as described above, is to develop a long-term energy and capacity forecast. This is indeed a critical step.

In its report, MHI indicated:

“The amount of variability due to potential load changes is high and could materially impact the results of the cumulative present worth analysis” (v. 2, p. 39).

The implications are twofold: first, that the uncertainty with respect to the Proponent's load forecast is great, and second, that this uncertainty could invalidate the Cumulative Present Worth (CPW) analysis on which the Proponent's justification rests. It is thus important to look at the load forecast in detail.

The Proponent's load forecast projects “utility loads” (residential, commercial and institutional loads) increasing at 1.3% from 2009 to 2029, despite the fact that population is expected to decline gradually throughout this period (Table 2.3.1-2). The explanation is found on page 2-11, where Figure 2.3.1-4 shows that growth in the number of domestic customers has increased along with that of the population 25 and over, despite the decline in total population that began in 1993. The Proponent then explains that household and customer formation are most closely related to this age subset.

The EIS does not go deeper into the province's demographic projections, nor does it address load growth past 2029, despite the fact that planning period extends to 2067.

However, if the 25+ population has grown while the total population has declined, this inevitably means that the population under 25 has declined. Whether that is the result of an aging population that has fewer children, or of the emigration of young adults, we do not know. In either case, however, it suggests that the current pattern cannot sustain itself indefinitely. If current under-25 cohorts are smaller than the older cohorts, that could well suggest a long-term trend toward a significantly smaller population.

The MHI report points out that, for the last ten years, NLH's has consistently underforecast domestic energy consumption.¹³ However, a systematic error in the past is no guarantee that future forecasts will err in the same direction. (The same issue arises with respect to fuel price forecasts, discussed below.)

Furthermore, MHI points out that the forecasting methodology used by Nalcor, based exclusively on econometric modeling, without any end-use modeling, does not represent best utility practice. Given that electric space heating is a key driver for electricity demand, end-use modeling is essential.

With respect to the industrial forecast, MHI shows that Nalcor and NLH's forecasts have dramatically overstated industrial demand over the years, as shown in the following table:¹⁴

Forecast Accuracy Measured in Percentage of Deviation from the Actual Load										
Years of History	1	2	3	4	5	6	7	8	9	10
Industrial	5%	14%	27%	37%	50%	67%	76%	92%	119%	124%

As noted above, MHI concluded that "The amount of variability due to potential load changes is high and could materially impact the results of the cumulative present worth analysis."¹⁵ MHI

¹³ MHI, v. 2, p. 19, Table 4.

¹⁴ MHI, vol. 2, p. 24.

also pointed out that Nalcor's industrial load forecast assumed no change in status for the Corner Brook Pulp and Paper Mill.¹⁶ However, as of this writing, the closure of the Corner Brook Pulp and Paper Mill appears probable, as NL Natural Resources Minister Jerome Kennedy recently announced that it is 'on the verge of bankruptcy'.¹⁷

MHI concluded that the loss of a load of this magnitude would on its own result in a reduction of the perceived CPW benefit of the Interconnected Option from \$2.158 billion to \$408 million, a reduction of over 80%.

I therefore conclude that the Proponent's load forecast does not provide a solid basis on which to base the conclusion that the Muskrat Falls option is preferable to the No Project option.

4.2.2. Conservation and demand management

In a one-and-a-half page section contained in s. 2.3.1.4 ("Key Forecast Assumptions and Drivers") of the EIS, the proponent describes the status and potential for Conservation and Efficiency in Newfoundland and Labrador. It indicates in the following section that "NLH has not explicitly incorporated these utility sponsored program savings targets into its PLF (Planning Load Forecast) due to the uncertainty of achieving dependable firm outcomes."¹⁸

The Proponent's exclusion of CDM from its planning process flies in the face of good utility practice. For example, MHI explains that, in the standard generation planning process, "Demand

¹⁵ Ibid., p. 39.

¹⁶ MHI Report, v. 1, p. 85.

¹⁷ <http://www.cbc.ca/news/canada/newfoundland-labrador/story/2012/06/08/nl-jerome-kennedy-mill-future-608.html>

¹⁸ EIS, page 2-13.

side management is treated as if it were generation, as it represents a reduction from the base load forecast. The economics of DSM programs should be evaluated to ensure that they make a positive contribution to the overall financial well-being of the province.”¹⁹

MHI criticized Nalcor for preparing its domestic forecast using only econometric modelling techniques which, it explains, are **not the best utility practices** in this area.²⁰ It points out that the domestic load forecast is primarily driven by electric space heat, and it emphasizes that developing an end-use forecasting model would have many benefits, including improving the design of CDM programs.

The forecasting methodology identified by MHI may be one of the reasons that Nalcor has failed to meet its own CDM objectives to date, and why its future CDM objectives are so weak.

CDM results to date, shown in the table 2.3.1-5 on page 2-13, demonstrate savings of only 5.3 GWh/year in 2010, or just 0.5% of the identified potential.

The Proponent states that “To date, the *response* to CDM programs and initiatives has been modest and lagging targets.”²¹ (emphasis added) However, it fails to point out that the **programs and initiatives themselves** have also been modest and lagging targets.

The following chart, drawn from my April 13, 2011 submission to the Joint Review Panel,²² demonstrates that CDM funding by NLH and by NP lagged far behind that which was projected in their Five-Year Joint CDM Plan.

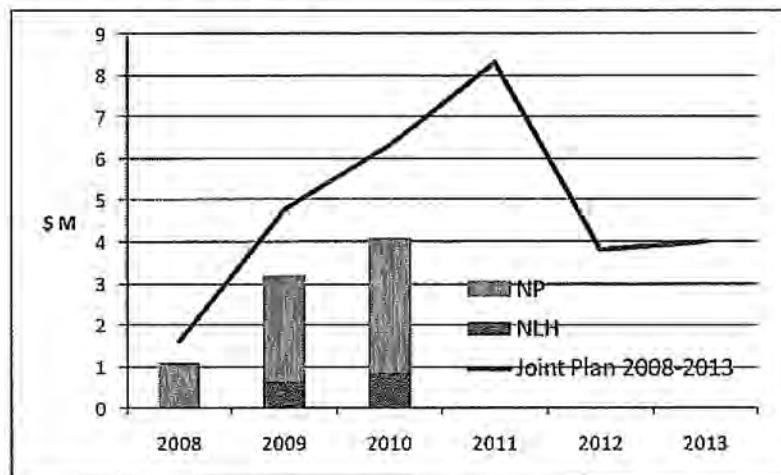
¹⁹ MHI Report, vol. I, p. 31.

²⁰ Ibid., v. 2, pp. 20 and 39.

²¹ P. 2-13.

²² P. Raphals, “Comments on Proponent’s Response to the Panel’s Information Request of March 21, 2011,” submitted to the Joint Review Panel for the Lower Churchill Generation Project, April 13, 2011, p. 9. Available on CEAA website.

CDM Program Funding



This is not particularly surprising: Most utilities perform very poorly when they first begin to pursue CDM savings. What is surprising is that, based on its admittedly poor performance in the first years of its CDM program, **NLH has chosen to exclude consideration of CDM savings as a resource in its 50-year power plan.** I am not aware of any other utility in North America that has so blatantly disregarded CDM as a resource.

The EIS also states: “As a *stand-alone option*, CDM is not a reliable alternative and cannot meet the long term electricity demands for electricity consumers in NL.” (emphasis added).

Obviously, CDM can never be a stand-alone option. This has not prevented it from being a major component of the least-cost resource plan of virtually every utility in North America.

Table 2.7.1-3 presents the results of five sensitivity analyses with respect to CDM, together with the resulting CPW preference for the Interconnected Island (Muskrat Falls) option. The results are as follows, expressed as a percentage reduction of the base case preference of \$2,158 million:

1. Moderate conservation (375 GWh/yr by 2031) — 21% reduction
2. Aggressive conservation (750 GWh/yr by 2031) — 41% reduction
3. Loss of 880 GWh/yr from 2013 on — 81% reduction

4. Loss of 1086 GWh/yr from 2013 on — 100% reduction
5. Low load growth (50% of projected load growth) — 65% reduction

Scenarios 3 and 4, which represent a sudden decrease of 11% or of 13% of total load, presumably model the sudden loss of an industrial load. While the relationship is not spelled out in the EIS,²³ Scenario 3 refers to the possible closing of the Corner Brook Pulp and Paper Mill. This possibility was invoked by MHI, at whose request this sensitivity analysis was carried out. The relevant passage of the MHI report reads as follows:

7.5 Load Forecast Sensitivity

Another consideration which could have a significant impact on the resulting CPW relates to the assumption used for the load forecast. The assumption used for the Isolated Island Option was based on the same planning load forecast⁶⁹ (PLF) described in the 2010 Capital Budget Application to the Board, but extended to 2067. **However, the significance of a possible alternate future for the remaining pulp and paper mill was not considered as an additional Isolated Island scenario. The PLF makes the assumption that there is no change in status for the mill.** MHI requested Nalcor to perform a sensitivity analysis with a reduction in system consumption of 880 GWh per year, equivalent to the total electric energy requirement of the mill including purchases from Nalcor and their own generation. In Exhibit 43, revision 1, Nalcor indicated the CPW differential between the two Options would be reduced from \$2.158 billion in the base case to \$408 million in favour of the Infeed Option.²⁴ (emphasis added)

As noted above, the closure of the Corner Brook Pulp and Paper Mill appears probable. In other words, this Scenario 3, which now seems likely to occur, would on its own result in eliminating **four-fifths** of the perceived benefit of the Muskrat Falls scenario.

Scenarios 1 and 2 refer to “Moderate” and “Aggressive” conservation, with gains of 375 or 750 GWh/yr by 2031. However, it is important to note that, according to documents detailing these

²³ See page 2-10.

²⁴ MHI Report, v. 1, p. 85.

scenarios filed with the PUB, the scenarios foresee no additional CDM gains between 2031 and 2067.

How “aggressive” is the Aggressive Conservation scenario? To answer this question, we need to refer to the study of the CDM potential in Newfoundland prepared by Marbek Resource Consultants in 2008.²⁶ It was filed in response to PUB Order PU 8 2007, which required NLH to file it and a five-year plan for implementation of CDM programs, starting in 2008.

The summary of the study findings, on page 9, identifies the Upper and Lower limits of Achievable Savings by the year 2026 as 951 and 556 GWh/yr, respectively. This table is reproduced on p. 2-12 of Nalcor’s EIS.

This 2008 Marbek report, which is mentioned on page 2-12 of the EIS, and which is apparently the only serious study of conservation and demand management (CDM) potentials ever undertaken by NLH, identifies an upper achievable limit of 951 TWh, or 15% of total base-year consumption, as shown in Table 2.3.1-4.

It fails, however, to mention two important aspects of this estimate of an “achievable upper limit”. First, it is based on a horizon of 2026.²⁷ Obviously, the achievable potential over the 50-year planning horizon for the Muskrat Falls project would be considerably greater.

Second, it is based on an avoided cost of just 9.8 cents/kWh.²⁸ In evaluating CDM potentials, a key parameter is the cost of energy the use of which could be avoided, since it is this cost which ultimately determines what CDM measures are cost effective. Given that, with or without the

²⁶ Marbek Resource Consultants Ltd., CONSERVATION AND DEMAND MANAGEMENT (CDM) POTENTIAL, NEWFOUNDLAND and LABRADOR: Residential, Commercial and Industrial Sectors

– Summary Report, prepared for Newfoundland & Labrador Hydro and Newfoundland Power, Jan. 31, 2008.

²⁷ *Ibid.*, p. 2.

²⁸ *Ibid.*, p. 4.

Muskkrat Falls project, the cost of wholesale power for NLH, at the margin, is anticipated to be around 16¢ by 2017, a similar study done today would use that higher avoided cost figure. **As a result, it would inevitably result in higher potentials, since, in addition to the CDM measures which were already deemed cost-effective in 2008, based on a lower avoided cost, more expensive CDM measures would now also become cost-effective.** Thus, the 2008 Marbek study necessarily **underestimates** the real CDM potential.⁷

I conclude that the EIS **fails to properly take into consideration the impacts on load growth of a properly designed and executed portfolio of CDM programs over the planning period. Had it done so, the CPW advantage of the Infeed scenario would be greatly decreased, if not eliminated, even before considering other sensitivities.**

As noted above, the generation planning methodology used by Nalcor explicitly excludes two important elements: demand side management options and environmental considerations. Instead, they are based on just one criterion: the reduction of costs to the utility. Benefits relating to reduced ratepayer cost are excluded from the analysis. According to a document provided by Nalcor to the PUB:

The chosen resource plans (generation expansion plans) were selected on the minimization of revenue requirement, modeled as the “minimization of utility cost” objective function. **As there was only one objective function used, its weighting was 100 percent.** There were no objectives tied together as only one objective function was used.²⁹ (emphasis added)

Energy efficiency programs are generally measured by a number of tests, the most important of which is the Total Resource Cost test, which measures the total cost to a society, not just the cost to the utility. Thus, unlike the “minimization of utility cost” function, it also takes into account reductions of **customer** costs, resulting from reduced electricity use.

A recent study by the Regulatory Assistance Project in the US explains this as follows:

²⁹ PUB, MHI-Nalcor-41 Rev. 1.

The goal of an IRP is to identify the least-cost resource mix for the utility and its consumers. *Least-cost* in this case means lowest total cost over the planning horizon, given the risks faced. The best resource mix is typically the one that remains cost-effective across a wide range of futures and sensitivity cases — the most *robust* alternative — and that also minimizes the adverse environmental consequences associated with its execution.³⁰

As noted earlier, if Nalcor had undertaken an IRP process in the past, as suggested by the PUB in 2007, most of the issues addressed in this brief would have been resolved prior to the initiation of the environmental assessment process.

As for environmental considerations, which play an important role in IRP, they are excluded from the Proponent's generation expansion planning.

The PUB declined to order implementation of an IRP in 2007, in anticipation of the provincial Energy Plan. I am not aware of any progress in that direction in the meantime.

Once again, we must distinguish between a generation scenario optimized on the basis of cost only, on the one hand, and a robust integrated plan, on the other. The Isolated Island Scenario is an example of the former. It constitutes an important input in the development of a plan, but should not be confused with the result.

The Comprehensive Study Report should therefore include the following findings:

- **that the Proponent has failed to present a coherent load forecast that properly accounts for the uncertainty of its forecast industrial loads, or the achievable levels of Conservation and Demand Management,**
- **that the Proponent has also failed to otherwise account for achievable levels of CDM in its resource strategy;**

³⁰ Electricity Regulation in the US: A Guide, RAP, www.raponline.org, p. 73.

- that, as a result, the Proponent has failed to demonstrate that its Isolated Island Option constitutes the least-cost option in the absence of the Muskrat Falls Generation and Transmission projects; and
- that, in consequence, the Proponent has failed to demonstrate that the Muskrat Falls Transmission Project, in combination with the Muskrat Falls Generation Project, constitutes the least-cost option to meet long-term supply of power to Newfoundland Island.

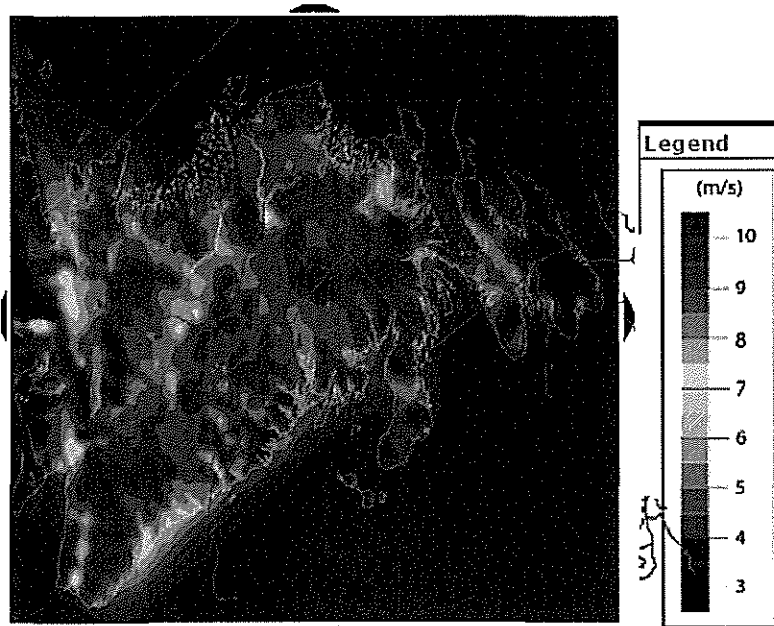
4.3. Alternatives

The EIS devotes some 30 pages to purporting to review generation alternatives to Muskrat Falls, as part of setting out its views on the justification of the Labrador-Island Transmission Link. Many aspects of this review are deficient, as indicated in the following sections.

4.3.1. Wind power

In section 2.5.8, the Proponent provides a summary description of wind power technology, and describes its costs and limitations for the Island grid.

The EIS states that “Good wind sites are often located in remote locations, far from places where the electricity is needed.” This is indeed often the case, but it is most certainly **not** the case on the Island of Newfoundland. As the following image from the Canadian Wind Atlas demonstrates, average wind speeds are over 10 m/s across virtually all Newfoundland, including on the Avalon Peninsula, where most of the load is located.



As for the limitations on wind power, the EIS indicates that they were established in a 2004 NLH study (*An Assessment of Limitations for Non-Dispatchable Generation of the Newfoundland Island System*), which was provided to the PUB as Exhibit 61.³¹ The EIS states that “The limits identified in the 2004 study are still applicable today.”³² This statement is misleading and factually incorrect.

The EIS states that the study “established two limits regarding the possible level of wind generation integration on the Isolated Island system, an economic limit and a maximum technical limit.”³³ The economic limit is that, in excess of 80 MW, “there would be a significant increase in the risk of spill at the hydroelectric reservoirs.”³⁴ The study notes that an additional 20 MW of wind power could result in an increase in expected spill from 9 to 19 GWh/yr, with a cost of

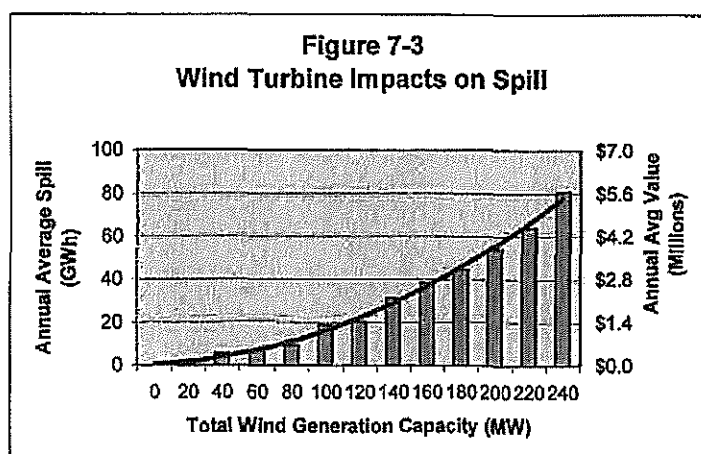
³¹ A copy can be found at <http://www.pub.nf.ca/applications/MuskratFalls2011/files/exhibits/Exhibit61.pdf>

³² Page 2-46.

³³ Page 2-45.

³⁴ Ibid.

\$1.3 million/yr.³⁵ The technical limit could require curtailment of wind down to 130 MW during periods of light load.³⁶ To avoid incurring these costs, NLH recommended limiting installed wind power to 80 MW.³⁷ The graph related installed wind generation to the economic impacts of spill is reproduced below.³⁸



Obviously, hydro spillage and wind curtailment are to be avoided as much as possible. However, in an economic analysis, it is the bottom line that counts. So we need to look a little closer.

³⁵ NLH, *An Assessment of Limitations for Non-Dispatchable Generation of the Newfoundland Island System*, p. 20-21 and 27. Available at <http://www.pub.nf.ca/applications/MuskratFalls2011/files/exhibits/Exhibit61.pdf>

³⁶ *Ibid.*, p. 16.

³⁷ *Ibid.*, p. 28.

³⁸ *Ibid.*, p. 20.

First, let's start with the cost of wind power. The EIS relies on an unidentified publication of the Pembina Institute, an Alberta environmental NGO, to state the cost of onshore wind as 8-12 cents/kWh,³⁹ pointing out that good wind sites on the island are "at the lower end of this range." In fact, based on data from the Canadian Wind Atlas, we estimated that wind power costs on the Island would be much lower – as low as \$75/MWh, using conservative assumptions,⁴⁰ and as low as \$65/MWh, using escalation factors similar to those used for the Muskrat Falls project.⁴¹ Given that these costs are roughly half the cost of Muskrat Falls power delivered to the Island, wind power clearly merits an in-depth evaluation, not a cursory dismissal based on a preliminary study that is almost 10 years old.

According to Canadian Wind Atlas data, Island wind power would have a capacity factor as high as 45%. This means that an additional 20 MW of installed wind capacity would produce 79 GWh a year, at a levelized annual cost of around \$5.2 million.

According to the 2004 NLH study, this additional 20 MW of wind power could result in increasing spillage by 10 GWh/yr, to a total of 19 GWh/yr, with a total value of \$1.3 million. Charging that cost that to the wind project results in net generation of 79 GWh for a total cost of \$6.5 million, or just \$82/MWh, net of spillage. Given that this cost is significantly less than the cost of either Muskrat Falls or continued operation of Holyrood, there is no justification for excluding this additional 20 MW of wind power from the least-cost plan.

As for the technical limit, the EIS states that:

"for wind generation above 130 MW it would not always be possible to maintain system stability particularly during periods of light load and during these periods

³⁹ EIS, page 2-46.

⁴⁰ Philip Raphals, "Comments on Proponent's Response to the Panel's Information Request of March 21, 2011," page 14. (Available at <http://ceaa.gc.ca/050/documents/49714/49714E.pdf>)

⁴¹ Philip Raphals, Final Presentation to Joint Review Panel, April 14, 2011 (Transcript of April 14, 2011, <http://ceaa.gc.ca/050/documents/49747/49747E.pdf>, page 17).

wind generation would have to be curtailed, again, reducing the economic benefit of the additional wind generation.⁴²

In other words, since this technical limit can be resolved by wind curtailment during light load periods, it is in fact an economic limit as well. And since the economic parameters of the Island power system have changed so dramatically since 2004, economic limits based on 2004 avoided costs clearly cannot be relied on.

It goes without saying that wind generators don't like curtailment any more than hydro operators like spillage. However, in areas with open wholesale markets, wind generators are now frequently required to curtail generation when so required. If new wind generation is economic, *taking into account the cost of curtailment*, there is no reason to exclude it.

Finally, it is important to mention that the 2004 study made it very clear that it was a preliminary investigation:

However, given the preliminary nature of this investigation, it would be prudent to further limit the initial quantities of wind generation into the system. Consideration should be given to a stepwise pattern of increased penetration levels over a number of years to gain direct operating experience with the technology and its integration into the Island system. This would allow Hydro to further define the opportunities and constraints associated with the resource without subjecting customers to undue expense or power quality issues. As well it would allow the industry to arrive at possible solutions which, along with the experience gained by Hydro, may permit penetration levels beyond those currently identified.⁴³

Indeed, the Government of Newfoundland and Labrador seems to continue to be interested in the possibility of increasing wind penetration beyond the levels identified in the 2004 study. A Request for Proposals was issued last year by the provincial Department of Natural Resources

⁴² EIS, pp. 2-45 and 2-46.

⁴³ NLH, *An Assessment of Limitations for Non-Dispatchable Generation of the Newfoundland Island System*, op. cit., p. 28.

concerning Onshore Wind, in Phase 2 of its Energy Innovation Roadmap process?⁴⁴ However, this reasonably foreseeable future activity is not considered in the EIS, and it should have been. A copy of this RFP is attached, as Appendix 1.

For Onshore Wind, one of the areas to be included in the Roadmap is identified as Grid Inflexibility/ Integration. The RFP states (p. 8):

The ability of the grid to absorb higher penetrations of intermittent wind energy is a function of the flexibility of other generation supply, interconnection, customer loads, and the availability of electricity storage facilities. This is particularly challenging for Newfoundland and Labrador given the absence of these features at the present time.

One of the work products requested is to:

“assess the flexibility of the existing generating capacity in Newfoundland and Labrador, particularly with respect to the integration of a significant amount of variable generation (e.g. wind power)”. (p. 9)

The consultant is also asked to:

- “recommend options and technologies that could improve the flexibility of the existing generating facilities;”
- “recommend options which could lead to the development of new concepts for the techno-economic integration of high wind penetration systems featuring hydro and gas (possibly) and storage facilities;” and
- **“recommend options for the development of power management strategies and system designs that are tolerant of high proportions of wind generated power and the consequent fluctuations in energy supply, by providing**

⁴⁴ <http://www.nati.net/membership/requests-for-proposals/rfp-energy-and-innovation-roadmap.aspx>

mechanisms such as storage loads or wide area balancing that provide grid stability despite unpredictable supply characteristics.” (emphasis added)

Read together, the 2004 study and the 2011 RFP make very clear that the 80 MW limit is not only preliminary, but also that significant effort is underway to overcome it. While it may be prudent *today* to limit wind penetration to 80 MW, **it is not reasonable to assume that this limit will remain in place for the next decade, much less for the next 50 years.**

Thus, it is incorrect to conclude that the Isolated Island Scenario includes the economically optimal level of on-island wind generation.

Section 2.5.8 of the EIS concludes by stating that “Wind power has a place in the electricity generation mix on the Island and, due to its low environmental footprint, it will be incorporated whenever economically viable.”⁴⁵

It is clear from the foregoing that neither of the two plans proposed for study by Nalcor (the Interconnected Island Option, based on the Muskrat Falls project, and its Isolated Island Option) come anywhere near approaching economically viable levels of wind power.

The Comprehensive Study Report should therefore include the following findings:

- **that the study the Proponent has invoked to justify its decision to limit wind power to 80 MW until 2067 in the Isolated Island Option is both preliminary and outdated,**
- **that the Proponent has failed to present a reasonable estimate of the economically optimal level of on-island wind generation, in the No Project scenario,**
- **that, as a result, the Proponent has failed to demonstrate that its Isolated Island Option constitutes the least-cost option in the absence of the Muskrat Falls Generation and Transmission projects; and**

⁴⁵ P. 2-46.

-
- **that, in consequence, the Proponent has failed to demonstrate that the Muskrat Falls Transmission Project, in combination with the Muskrat Falls Generation Project, constitutes the least-cost option to meet long-term supply of power to Newfoundland Island.**

4.3.2. Natural gas

In section 2.5.2, the Proponent explains its view that “‘landed’ Grand Banks gas is not a viable option to meet the Island’s electricity needs” (p. 2-37), identifying several barriers that have, to date, prevented the development of offshore gas for domestic needs. In particular, it is mentioned that “natural gas from White Rose is being stored in an adjacent reservoir for future use,” and that, “to date, no concrete plan for domestic natural gas development exists.”

Given the recent collapse of North American gas prices, and the widespread expectation that the shale gas phenomenon will keep gas prices low for decades, it seems unlikely that expensive infrastructure will be developed to land offshore gas for the continental market and in the foreseeable future. That said, it also seems reasonable to presume that, if NL government policy were to favour such a solution, offshore gas could indeed be brought to the Island for power generation purposes at some time in the coming decades.

What does *not* seem reasonable is the presumption that, for fifty years, NL will continue to buy oil on the world market to run Holyrood, despite its domestic gas reserves. And yet, it is this hypothesis that underlies the Proponent’s Isolated Island Alternative. Indeed, given the ever-increasing prices forecast for #6 fuel oil, which according to the PIRA forecast used by Nalcor increase to around \$200/barrel by 2043⁴⁶, and to over \$300/barrel by 2067⁴⁷, there is no doubt

⁴⁶ PUB, Exhibit 4, Nalcor, « NLH Thermal Fuel Oil Price Forecast Reference Forecast, », January 2010.

⁴⁷ Increasing by 2%/year from 2043 to 2067. MHI, vol. 2, p. 204.

that, in the No Project alternative, pressure will increase, decade by decade, to replace oil as a fuel. In such a context, it is difficult to imagine that offshore gas will remain in the ground for the next fifty years.

It is important to recall that, since fuel costs represent 69% of all costs in the Isolated Island Alternative,⁴⁸ any new development that reduces or replaces part of these costs can be expected to have a significant effect on the CWP analysis.

The Comprehensive Study Report should therefore include the finding that the Proponent has failed to adequately consider the possibility of refueling Holyrood with natural gas, sometime prior to 2067.

4.3.3. Electricity imports

In section 2.5.14, the EIS addresses the possibilities of regional power imports as a supply alternative. It judged these alternatives in terms of three considerations:

- Exposure to price volatility or significant price premiums,
- Security of supply, and
- Potential market structure/transmission impediments.⁴⁹

The review was limited to two transmission paths (Churchill Falls to the Island, and Maritimes to the Island). The EIS states:

For purposes of the screening review, energy was assumed to be ultimately sourced from the New York and New England markets as both regions have competitive wholesale generation markets.⁵⁰

⁴⁸ Figure 2.6.1-1

⁴⁹ EIS, page 2-63.

⁵⁰ EIS, page 2-62.

It is surprising that the possibility of a power purchase from Hydro-Québec was not even mentioned in this section. It is well known that Hydro-Québec has a great deal of surplus power, and is actively seeking purchasers under long-term contracts.

Hydro-Québec's recent long-term contract with Vermont was priced lower than the cost of Muskrat Falls power. While such purchases may well turn out not to be the best solution, there is no basis for excluding them from consideration *a priori*.

The Comprehensive Study Report should therefore include the finding that the Proponent has failed to adequately consider the possibility of regional imports from sources other than the New York and New England electricity markets, in particular the possibility of imports sourced from Hydro-Québec.

4.4. Reliability

In section 2.3.5, the EIS addresses issues related to transmission reliability.

In this section, the Proponent states that the two options were judged against NLH's "accepted" transmission planning criteria which, it states, "adhere to industry accepted practice."

The MHI report examined the question of reliability at length, and found that **NLH's transmission planning criteria do not meet industry standards**. In its report, MHI addressed at length Nalcor's compliance, or lack thereof, with NERC reliability standards, which are mandatory in the US. MHI found that compliance with these standards is now an essential element of Good Utility Practice, and has been adopted by virtually all other jurisdictions in Canada. It was very critical of Nalcor's statement that "it does not plan to address a 3 phase fault at Bay d'Espoir as the present system fails to maintain angular stability following this

contingency under some operating conditions.”⁵¹ As NERC reliability standards would inevitably apply to the Labrador operations of the Lower Churchill Project, if and when the Maritime Link is commissioned, MHI considers this non-compliance to be a serious issue.

The Comprehensive Study Report should therefore include the finding that NLH’s failure to conform to NERC reliability standards is a significant departure from Good Utility Practice.

4.4.1. HVDC Converter Stations and Electrodes

MHI was also very critical of the lack of risk review of the HVDC converter stations and electrodes. It noted that there was no comprehensive HVDC system risk analysis review of operations and maintenance for the overall HVDC transmission system.⁵²

There does not appear to be any risk analysis done for the HVDC converter stations or the operational aspects of the LIL HVDC system. Converter station outages could be lengthy and could be very costly to repair, particularly if lost revenues are considered. MHI recommends that this be completed prior to the development of the HVDC converter station specification so any additional requirements can be included.⁵³

The Comprehensive Study Report should therefore include the finding that NLH has failed to carry out a comprehensive review of the financial and reliability risks of the overall HVDC system.

4.4.2. HVDC Transmission Lines

⁵¹ MHI report, v. 2, p. 78.

⁵² *Ibid.*, p. 112.

⁵³ *Ibid.*

MHI pointed out that transmission losses for the proposed HVDC link would be approximately 10%.⁵⁴ It analyzed in detail the choice of design criteria for the transmission line, and criticized Nalcor's choice to design to a 1:50 year reliability return period. It pointed out that the international and Canadian standards for a line without an alternate source of power supply is 1:500 years, and, when an alternate source of supply does exist, it is 1:150 years. "MHI considers this a major issue and strongly recommends that Nalcor adhere to these criteria."⁵⁵ There has been no indication that it intends to do so.

The Comprehensive Study Report should therefore include the finding that the planning criteria used for the HVDC transmission lines is inadequate.

4.4.3. Strait of Belle Isle Marine Cable Crossing

MHI's review pointed out a number of risk factors with respect to the marine cable. Literature reviewed indicated cases of cable failures due both to external and internal causes. External causes include third-party mechanical damage (anchors, fishing trawlers, excavation activities). Lightning and of course icebergs – for which the risk is deemed significant -- represent other possible external causes of failure.

A number of HVDC failures over the last decade were attributed to internal causes, including two due to damage caused by installation difficulties. In other cases, the causes of failure are unknown.⁵⁶ Assuming that the cable will be problem-free, as Nalcor appears to do, would therefore be optimistic.

Based on historical data, MHI indicated that Nalcor should expect one cable failure every 10 years – though this figure does not take into account the particular characteristics of the Strait of

⁵⁴ *Ibid.*, p. 116.

⁵⁵ *Ibid.*, p. 121.

⁵⁶ *Ibid.*, p. 134.

Belle Isle.⁵⁷ The installation of a third cable will clearly alleviate the risk of a prolonged outage following a cable outage. However, a damaged cable must be repaired, and repairs can be expected to be costly and lengthy.⁵⁸

The Comprehensive Study Report should therefore include the finding that Strait of Belle Isle Marine Cable Crossing creates risks that have not been recognized in the Proponent's EIS.

4.4.4. AC transmission upgrades

In section 2.3.6 of the EIS, the Proponent refers to the Island Transmission System Outlook Report, which identifies several transmission constraints that may need to be addressed in the next 5 to 10 years, depending on generation choices. It states that:⁵⁹

Following development of generation expansion plans through the generation planning process, the transmission system effects of the proposed generation sites can be more fully assessed and transmission system additions more fully defined.

It is important to note that MHI was very critical of Nalcor's failure to complete AC Integration Studies, which define the additional modifications to the Newfoundland transmission system that would be required in order to successfully integrate power from Muskrat Falls, prior to deciding to go ahead with Muskrat Falls. MHI states that these studies provided "do not adequately describe the facilities required to successfully operate the transmission system under the new configuration. As such, there may be unidentified risks in proceeding with this project at this time."⁶⁰

⁵⁷ Ibid., p. 135.

⁵⁸ Ibid.

⁵⁹ EIS, page 2-23.

⁶⁰ MHI report, vol. 2, page 75.

MHI states that “Good utility practice requires that these integration studies be completed as part of the project screening process (DG2); MHI considers this a **major gap** in Nalcor’s work to date.”⁶¹ (emphasis added)

The Comprehensive Study Report should therefore include the finding that the Proponent’s failure to fully assess the AC transmission upgrades required to integrate the Muskrat Falls project into its existing system is a major failing, and that this failing may create unidentified financial and reliability risks for the Island power system.

4.5. Fuel price forecasts

In section 2.7.1.1 of the EIS, the Proponent presents a sensitivity analysis based on the price of fuel. The analysis demonstrates that the justification of the proposed Project is highly dependant on fuel price forecasts. Thus, Table 2.7.1-1 shows that, under PIRA’s Low World Oil Forecast, the preference for the Interconnected Island scenario, as compared to Nalcor’s Isolated Island scenario, almost completely disappears, dropping from \$2,158 million to just 120 million. In MHI’s words:

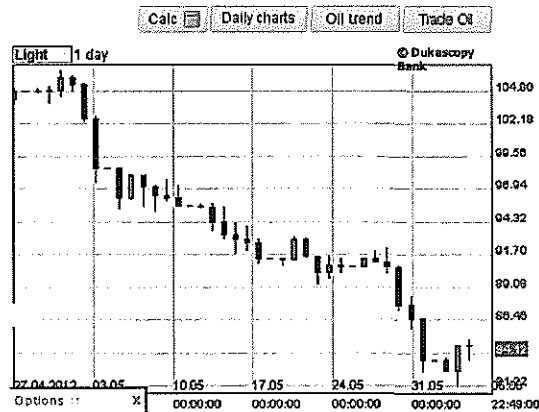
More interesting is the low price case, where a **near-term double-dip recession in the US might lead to fuel prices that are so low that the CPW gap almost disappears.**⁶²

It is widely recognized that fuel price forecasts are highly uncertain and volatile. The recent drop in oil prices, which have fallen by almost 25% in the last month (from about \$105 a barrel at the beginning May 2012 to just over \$80 a barrel on June 4), only reminds us of this fact.

⁶¹ *ibid.*

⁶² MHI, vol. 2, p. 205.

LIVE CHARTS - CRUDE OIL CHART AND LIVE OIL PRICES
USE OUR CRUDE OIL CHART TO VIEW LIVE OIL PRICES



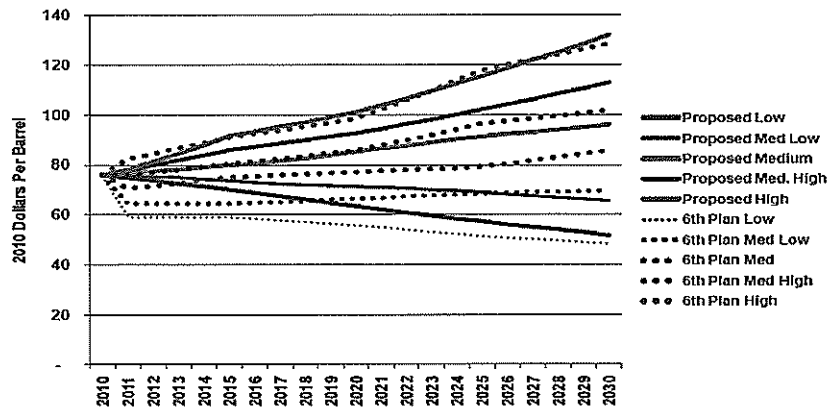
MHI pointed out this uncertainty as well, writing:

It is clear there is much uncertainty related to the pricing of fuel for thermal-based power generation. Different scenarios can and should be run and compared, but **the results related thereto often have a short shelf life**. While the prospect of raising the necessary capital to finance and construct the Infeed Option may be daunting, **the uncertainty associated with forecasting the price of fuel for thermal generation over the long term might be, and likely is, even more so.** (emphasis added)⁶³

The PIRA high and low forecasts have not been made public, so to get an idea of the extent of the typical spreads between high and low oil price forecasts, I had to look to other sources. The following chart presents the oil price forecast from the Northwest Power Planning Council's 2009 Power Plan.

⁶³ Ibid.

Comparison of Revised and Sixth Plan Oil Price Forecasts
Refiners Acquisition Cost \$2010/barrel



The high scenario shows prices more than twice as great as the low scenario (about \$130 versus about \$50 per barrel, in 2030). As MHI wrote in their report, long-term fuel price forecasts have a short shelf life.

The following table, assembled by the US Energy Information Agency, assesses the accuracy of its own fuel price forecasts from 1982 to 2010.

Table 4. World Oil Prices, Projected vs. Actual
(Percent Difference)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
AEO 1982	2.3	148.7	119.5	225.9	197.3	171.4																				
AEO 1983	7.8	118.0	89.2	170.0	154.8	144.6																				
AEO 1984	7.7	192.0	70.8	133.2	105.2	87.6																				
AEO 1985	0.0	84.7	38.5	78.7	64.2	54.1	57.7	172.7	154.9	207.5	189.6															
AEO 1986		4.1	-12.5	18.8	4.1	-5.2	19.0	32.4	94.3	124.7	122.8															
AEO 1987			-0.1	18.9	-2.6	-8.4	-11.8	-1.8	4.7	77.3	88.1															
AEO 1988				1.0	-17.4	-24.9	-5.1	8.2	31.3	62.5	68.3	11.3	104.1	262.7	114.6	80.4										
AEO 1989					-2.1	-19.6					28.1															
AEO 1991						-1.1	17.4	48.0	63.0	78.3	69.5	41.6	64.8	166.0	98.6	21.2	81.1	87.9	63.0	42.0	13.0	10.8	-5.2	-27.1	21.2	
AEO 1992							1.8	18.0	28.0	43.8	43.2	27.8	84.1	184.8	86.7	31.4	81.4	81.2	66.7	37.0	23.4	-5.3	-11.3	-31.8	18.6	
AEO 1993								1.4	2.5	36.8	31.0	14.7	18.0	111.8	65.5	12.0	52.2	63.0	40.4	14.4	-10.7	-21.4	-26.1	-42.8	-2.9	
AEO 1994									5.7	10.0	6.4	-5.9	11.4	83.7	37.7	-7.9	25.0	26.1	15.0	-5.3	-26.2	-35.0	-39.2	-53.3	-22.5	
AEO 1995										-1.8	0.0	-11.7	1.0	89.2	21.1	-17.1	30.5	8.8	-1.8	-19.7	-37.8	-45.5	-49.4	-61.4	-35.8	
AEO 1996											-8.3	-14.0	4.3	23.8	71.6	-19.3	28.0	26.6	-3.6	-27.4	-39.9	-46.6	-50.6	-62.5	-21.1	
AEO 1997												-3.1	4.8	62.4	16.3	-25.7	-1.5	-4.2	-14.2	-31.0	-47.1	-54.3	-58.1	-68.5	-48.7	
AEO 1998														0.0	36.3	-24.4	-1.0	-6.0	-15.3	-32.2	-48.3	-55.9	-59.7	-69.8	-59.8	
AEO 1999															3.8	-21.0	-47.0	-25.7	-34.8	-28.1	-41.1	-53.8	-59.0	-61.6	-71.4	
AEO 2000																-20.9	-21.3	-4.6	-9.2	-20.4	-37.8	-52.5	-55.6	-65.4	-56.3	
AEO 2001																					-1.8	13.0	-3.7	-19.3	-35.8	-41.6
AEO 2002																						4.6	-7.3	-13.4	-28.8	-47.5
AEO 2003																							-0.3	-2.9	-28.4	-48.0
AEO 2004																								-0.2	-9.7	-31.7
AEO 2005																										-0.4
AEO 2006																										-0.4
AEO 2007																										-4.4
AEO 2008																										-4.4
AEO 2009																										-5.5
AEO 2010																										-5.0
Average Absolute Percent Difference (All AEOs)	5.3	91.5	54.8	93.0	68.8	57.5	24.0	34.5	57.0	72.7	115.5	33.1	44.7	126.3	67.4	42.1	28.7	34.0	22.3	37.2	35.5	39.3	41.9	53.4	34.0	

The results are surprising. The forecasts produced from 1982 to 1985 were far too high – 133% too high, on average. From 1986 to 1995, the forecasts were still too high – by 35%, on average. But for the next 10 years, from 1996 to 2005, forecasts were all too low -- 32% on average.

This is particularly interesting, not just because it shows the inaccuracy of the forecasts, but because the errors are so systematic. We don't see random variation – we see that forecasters were systematically wrong, in the same direction, for years on end. From 1982 through 1994, they *consistently* over-forecast oil prices. And from 1995 until today, they have consistently under-forecast prices. What does that tell us about today's forecasts? That there is a very substantial chance that they will be wrong, and significantly so. We just don't know in which direction.

A forecast with this much uncertainty has little if any predictive value. Basing decision-making on calculations based on the median value is methodologically unsound. As Nalcor's CPW calculations depend heavily on such values, the conclusions drawn from them cannot be relied upon, as the PUB very correctly noted.

The Comprehensive Study Report should therefore include the findings:

- **that the Proponent's fuel price forecasts include a very high degree of uncertainty, and thus have little predictive value, and,**
- **that economic analyses based on a single value extracted from these forecasts, such as the Proponent's CPW calculations for the Isolated Island Option, also have little predictive value.**

4.6. Power purchase expense

In section 2.4.1.1 of the EIS (pages 2-30 to 2-31), the Proponent explains the power purchase agreement that would define the price paid to Nalcor by NLH for Muskrat Falls power. It begins

the section by saying: “The price that NLH pays for power and energy from Muskrat Falls on behalf of Island ratepayers is a cornerstone for the Lower Churchill Project.”⁶⁴

It is noteworthy that, even though the price paid is a “cornerstone” of the Lower Churchill Project, most of the information provided in this section was not presented to the Joint Review Panel for the Lower Churchill Generation Project.

In this section, the Proponent explains that its proposed PPA was developed in order to address the fact that, under cost-of-service (COS) price setting, the price of Muskrat Falls power would be a significant burden for ratepayers in the early years.⁶⁵

Under a regulated Cost of Service (COS) price setting environment, the annual revenue requirement for a utility asset would be comprised of:

COS = Operating and Maintenance Costs + Power Purchases+ Fuel + Depreciation + Return on Rate Base

Where Return on Rate Base would be comprised of a cost component for lenders (cost of debt) and a profit component for shareholders (return on equity) for a prescribed debt-equity capital structure. This annual COS would then be divided by the output produced and sold from the asset in question to derive an average selling price or rate (such as cents per kilowatt hour (kWh), or equivalent dollars per megawatt hour (MWh). An important feature of this pricing methodology is that under COS price setting, the unit rate revenue paid by ratepayers for a given asset is highest in the first year. This is because as a new regulated asset goes into rate base, the undepreciated cost of the asset is at its maximum and return on rate base is driven by undepreciated net book value. Another feature of this pricing framework is that as the equity investor earns its regulated return each year, the return in dollars is also highest in the first and initial years. This is not necessarily prudent for the Muskrat Falls development in that the Island ratepayer energy requirements at the time of plant commissioning is projected to be only about 40%, or 2 terawatt hours (TWh), of the plant’s average annual production of 4.9 TWh. While the Island’s energy requirements increase over time in line with economic growth, the early-year COS rate for Muskrat Falls power would be a significant burden for ratepayers in those years. The required COS revenue for Muskrat Falls would be at its maximum and the power required by ratepayers at a minimum. In an effort to address this issue, an alternative approach to Muskrat Falls power pricing was developed that affords a number of advantages for ratepayers.

However, the EIS fails to mention the advantages for consumers of COS pricing in later years, or the corresponding drawbacks of the proposed PPA approach.

⁶⁴ EIS, p. 2-30. It is interesting to note that this issue was not addressed in the EIS of the Lower Churchill Generation Project.

⁶⁵ Ibid.

Traditionally, hydro projects have been developed as ratebase projects under COS principles, which implies higher costs in the first few years, that decrease dramatically over time. That's why the costs of many existing hydro projects such as Bay D'Espoir are so low. If they had been built under a PPA, instead of COS, it would cost consumers far more today.

In my comments to the PUB, I demonstrated why, under the proposed PPA, Muskrat Falls will probably never be a low-cost resource. The table presented in Appendix 2 is based on data provided by Nalcor to the PUB.⁶⁶ All the columns in white are from Nalcor's document; my additions are presented in yellow.

Nalcor's column 5 shows the nominal annual cost, in \$/MWh, of the whole Lower Churchill Project (generation and transmission). This cost remains relatively constant, varying between \$190 and \$260/MWh over the life of the project.

My new columns 5a and 5b break down the nominal annual cost between MF and LITL, by dividing the incremental costs of each (columns 2 and 3) by the total energy (column 1). We see that, while the nominal annual cost of LITL falls (from \$147/MWh at the beginning to \$13 at the end), the annual cost of MF increases, from \$92 to \$247/kWh.

These combined costs are then levelized, on a nominal basis, in column 6, resulting in a fixed nominal dollar cost of \$208/MWh. Again, I have broken this down into MF and LITL components, using the same methodology described in Nalcor's note 2. The levelized nominal LUEC for MF is \$126/MWh, and that for LITL is \$83/MWh.

In column 7, I have only changed the title. While Nalcor calls it an "escalating real LUEC", I find this confusing, since the figures are actually in nominal dollars, not real ones. I find it clearer to refer to it as a "Real LUEC expressed in nominal dollars". In other words, we have converted the nominal LUEC to real dollars, and then re-translated it back into nominal dollars, as a price that escalates with inflation. These are thus the actual prices, in current dollars, that

⁶⁶ CAKPL-Nalcor-27 rev. 1

will be charged to consumers for Muskrat power (delivered to the Island and blended, of course, with other sources), which starts at \$152/MWh in 2017 and increases to \$409/MWh in 2067. (Nalcor's figures, from col. 7.)

In column 7a, I have indicated the total annual payments (MF plus LITL), in current dollars. (That's the energy from column 1 times the current dollar prices, in column 7.) In column 7b, I have subtracted from that the LITL payments in column 3, to show the current dollar payments under the MF PPA. Then, in column 7c, I have calculated the current dollar unit cost for Muskrat Falls power (without transmission), by dividing by current dollar payments in column 7b by the amount of energy, from column 1.

Column 7c shows that the actual price paid to Nalcor for Muskrat Falls power starts at \$5/MWh in 2017, and rises to \$396/MWh in 2067. This result – more extreme than the blended result shown by Nalcor in column 7, results from mixing PPA and COS costs, and from the fact that customers must pay the full cost of LITL, under COS, but only for the energy they actually consume, under the PPA. But in either case, the price to be paid for Muskrat Falls power under the PPA in 2067 comes to around \$400/MWh, or 40 cents/kWh.

The costs of Muskrat Falls power under a COS regime have not been produced by the Proponent. However, the information in this table allows us to estimate that as well.

Making the simplifying assumption that the capital structure and depreciation of MF are similar to that of LITL, we can simply inflate the LITL payments in column 3 to correspond to the MF CPW of \$2.682 billion (column 2). The result, shown in column 8a, shows the annual current dollar payments that would be required to cover the costs of Muskrat Falls under a COS regime identical to one applied to LITL. These costs start at \$407 million in 2017, and fall to \$90 million by 2067. Column 8b then shows this amount divided by the total energy each year, giving the unit cost in \$/MWh for Muskrat Falls energy under COS. It starts at \$225/MWh in 2017, and then fall to \$20/MWh by 2067. Of course, if consumers were credited with the revenues of third party sales, which would be normal in COS, the early-year costs would be lower.

This exercise shows the real difference between COS and PPA pricing. With the PPA, Muskrat Falls prices are much lower at first, but 20 times higher in 2067.

In other words, if Muskrat Falls were subject to COS regulation, in 50 years its power would be almost as cheap as any other low-cost old hydro project.

And what happens after 2067? Under COS, the unit cost from MF would remain stable, somewhere around \$20/MWh or lower, like it does for other COS hydro projects.

Under the escalating price scenario, however, NF consumers would be paying \$396/MWh for MF power in 2067. How much would Nalcor charge in 2068? Would it suddenly cut the price to \$20/MWh, pointing out that, since all its costs incurred 50 years ago had now been paid, it had no reason to charge more? Or, more likely, would it keep on charging \$400/MWh? Doing so would of course produce a windfall profit for Nalcor and its shareholder – paid from the pockets of Newfoundland consumers.

At Churchill Falls, Hydro-Quebec enjoys pricing very similar to COS pricing, and Newfoundland and Labrador certainly wishes that the pricing were more like the PPA proposed here. But in the case of Muskrat Falls, it is Newfoundland consumers who will be paying the escalating prices.

Thus, while the PPA is advantageous, compared to COS pricing for consumers in the project's first decade, it is very disadvantageous to consumers later on. This intergenerational equity issue is not addressed in the EIS.

The Comprehensive Study Report should therefore include the finding that the Proponent has failed to present the long-term disadvantages for Newfoundland consumers of its proposed PPA for Muskrat Falls power.

5. Conclusions and recommendations

As we have seen, the stated justification for the LITL is that **the Muskrat Falls generation project** represents “the least-cost option to meet long-term supply of power to the Island.” From a justification perspective, the two projects are inseparable.

The previous (albeit partial) reviews of the justification of the Muskrat Falls project are thus entirely relevant to the assessment of the LITL. As we have seen, the Joint Review Panel for the Lower Churchill Generation Project was unable to resolve a number of key questions related to the project’s justification, in particular with respect to alternatives to the project.

A great deal of new information has been made public since the issuance of the JRP report, in the process carried out by the PUB and in the EIS for the LITL. However, as we have shown above, the fundamental questions raised by the JRP still have not been resolved. **In my opinion, Nalcor’s analysis showing Muskrat Falls to be the best and least cost way to meet domestic demand requirements is still inadequate.**

That is, the Proponent’s attempt to demonstrate that Muskrat Falls represents the least-cost option to meet long-term supply of power to the Island fails, because it depends on the comparison with an Isolated Island Scenario which is in no way optimal, because it:

- is not the fruit of a true planning process, but is simply the output of a planning program.
- is based on a load forecast:
 - in which the forecast residential growth rate is inadequately substantiated, and
 - which fails to account for the potential closure of Corner Brook Pulp and Paper, which in itself would eliminate 80% of the CPW reduction under the Muskrat Falls scenario;
- fails to include **any** Conservation and Demand Management savings in the base plan, and the CDM scenarios explored in the sensitivity analyses remain modest, with no gains foreseen after 2031;
- ignores the phenomenal wind power potential near load centers on the Island based on a preliminary 2004 study, the underlying parameters of which are no longer valid;

-
- fails to address the possibility of purchases from Hydro-Québec;
 - Relies on a CPW analysis that depends heavily on long-term fuel price forecasts, which are known to have a “very short shelf life” and which have so much uncertainty as to be of little or no predictive value;
 - assumes that Holyrood will continue to burn oil until 2067, making the unjustified assumption that, in the absence of the Muskrat Falls project, offshore gas will remain untapped for the next 50 years.

Given these many and substantial flaws, the analysis comparing the Muskrat Falls Interconnected Island Scenario to the Isolated Island Scenario prepared by Nalcor should be judged, once again, inadequate.

I recommend that the Agency find that the rationale presented in the EIS for the proposed Labrador-Island Transmission Link is factually unsupported, for the reasons set out above. More specifically, it should find that said rationale is based upon unsupported assumptions and deficient analyses.

For all these reasons, the Comprehensive Study Report should conclude that the Proponent has failed to demonstrate that the Muskrat Falls Transmission Project, in combination with the Muskrat Falls Generation Project, constitutes the least-cost option to meet long-term supply of power to Newfoundland Island.

APPENDIX 1

NL DEPARTMENT OF NATURAL RESOURCES REQUEST FOR PROPOSALS ONSHORE WIND PHASE 2 — ENERGY INNOVATION ROADMAP



Request for Proposals

**Phase 2
Energy Innovation Roadmap
Onshore Wind/Transmission in Harsh Environments**

**Department of Natural Resources
Government of Newfoundland and Labrador
St. John's, Newfoundland and Labrador
Canada**

December 2011

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**Request for Proposals
Energy Innovation Roadmap
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1.0 Introduction**

The Department of Natural Resources (NR), Government of Newfoundland and Labrador, is in the process of developing Energy Innovation Roadmaps to identify opportunities, set priorities and plan for new investments in the energy sector in Newfoundland and Labrador (NL). This process requires independent consultancy advice and expertise to assist the Department in this important and strategic planning exercise.

2.0 Background

In September 2007, the Government of Newfoundland and Labrador released its Energy Plan, *Focusing Our Energy* (<http://www.nr.gov.nl.ca/energyplan>). In the Plan, Government identified NL's abundant energy resource warehouse which includes oil, natural gas, hydroelectricity and wind, along with a number of other potential sources such as ocean energy, hydrogen, uranium and biomass. NL's energy industry is a key economic driver in our economy and innovation, coupled with resource development, has significant potential to contribute to future growth in our economy. However, the goals of sustainable development and a long term viable energy industry can not be achieved without strategies to identify opportunities, establish priorities and overcome challenges.

The Government of Newfoundland and Labrador recognizes the importance of energy innovation in improving the way energy is produced, transported and utilized. In an ever changing world, innovation is critical to ensure that the province's energy sector remains adaptable and sustainable in the long term.

The Energy Plan committed to invest in the planning, implementation and financing of energy innovation in the province, including the creation of an Energy Innovation Roadmap. The Plan further committed to:

- pursue a strategic, coordinated approach to energy innovation focusing on areas of competitive advantage;
- identify and work with various groups to focus on key opportunity areas;
- leverage existing strengths and energy expertise at Centres of Excellence and elsewhere by encouraging a common, coordinated approach to executing energy research; and
- address the lack of venture capital and other funding necessary to move ideas ahead into implementation.

The Government of Newfoundland and Labrador views the development of Energy Innovation Roadmaps (EIR) as an important step in the process of planning for energy innovation and development. The EIR will be a strategic planning tool for future investments in innovative energy technologies, from R&D through to technology demonstration and commercial deployment.

The EIR project is being undertaken in two phases:

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- Phase 1: Priorities Identification – this Phase, which has been completed, consisted of an analysis of NL's energy sources and innovation opportunities based on various screening criteria to determine the priority areas to focus development of energy innovation roadmaps;
- Phase 2: Roadmapping – this Phase will involve the development of energy innovation roadmaps for the priority areas that were identified in Phase 1.

Through a public, competitive process, NR retained consultants to undertake Phase 1. All energy sources relevant to NL were considered including crude oil, natural gas, wind, hydro, ocean, biomass, hydrogen, uranium, peat, geothermal and solar, as well as power transmission and energy efficiency & conservation.

The four main energy sources (crude oil, natural gas, wind, hydro) in the Energy Plan were earmarked for detailed evaluation from project start. However, the remaining other energy sources went through a filtering process to determine which ones may warrant further assessment. The filtering approach included the following screening criteria for the various energy types:

- Does NL have (or could NL have) sufficient local resources?
- Is the energy type consistent with the Energy Plan?
- Is technical innovation required i) locally, and ii) elsewhere external to NL?
- Is it feasible that NL has, or could have, appropriate capabilities to meet the challenge considering existing capability (e.g. university, industrial base) and international competitiveness?

Once this process narrowed the source types under consideration, a further analysis was undertaken which included an examination of:

- barriers to determine where innovation may be required;
- innovation opportunities to determine how valuable innovation would be and whether the innovation is well advanced outside Newfoundland and Labrador;
- innovator competitiveness to determine whether Newfoundland and Labrador has a basis to be competitive for the required innovation; and
- innovation priorities to determine the extent innovation may be a priority for local and/or external markets.

As a result of the above analysis, nine priority themes across four energy areas were recommended for Phase 2 roadmapping:

- **Oil & Gas** – given the complexity of the issues and the number of stakeholders that are involved in this sector, separate Roadmaps were recommended to address the following six priority areas: harsh environment, Arctic conditions, subsea protection, enhanced recovery,

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far offshore logistics and onshore seismic.

- **Onshore Wind** – one Roadmap for this sector was recommended which would address barriers impacting onshore wind innovation in the province, particularly related to icing, cold conditions, grid inflexibility and resource mapping.
- **Transmission** – one Roadmap was recommended to focus on innovations that would enhance power line de-icing capabilities (e.g. prediction, monitoring, control strategies, de-icing technologies) with a specific focus on Labrador conditions.
- **Remote Energy** – one Roadmap was recommended to address remote location power systems technologies that could be applied to smaller scale, off-grid settings such as outports (e.g. Ramea). This roadmap will be broad-based and provide considerable flexibility given the early stage and uncertain development path that some of these technologies (e.g. small scale generation, energy storage, control systems) may take.

Four reports for Phase 1 have been completed: (1) *Analysis Document: 'Energy Warehouse' Areas (Onshore Wind Energy, Hydroelectricity, Transmission, Upstream Oil & Gas, Midstream Gas)*; (2) *Screening Document: Other Energy Types*; (3) *Analysis Document: Other Energy Themes (Remote Energy Systems, Marine Energy Technologies, Energy Efficiency)*; and (4) *Recommendations for Innovation Priorities*. These reports are available online at <http://www.nr.gov.nl.ca>.

In light of the Cougar helicopter crash and the BP oil spill in the Gulf of Mexico, the results of Phase 1 were reviewed to determine if there were any prioritization implications from a health, safety and environment (HSE) perspective in relation to the development of the oil and gas innovation roadmaps. This review indicated that the high level priorities for innovation within the oil and gas sector have not been fundamentally altered as a result of the two incidents. However, the relative importance of innovation areas within the general priorities has changed. An example is the heightened significance of oil spill-related innovation within the previously defined category of "Arctic conditions". The report noted that the province has strength in areas such as oil spill detection and tracking in ice environments, and safety response and evacuation simulation. Other areas of provincial knowledge and capabilities that are relevant to innovation-need include the testing of flight suits and Arctic weather work-wear and support for oil spill clean-up in cold water environments. The results of this analysis are contained in a report *Oil and Gas HSE Addendum* which is also available online at <http://www.nr.gov.nl.ca>.

3.0 Scope of Work

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Through this Request for Proposals, NR invites proposals from consulting firms that are interested in undertaking and completing the development of an Energy Innovation Roadmap for specific technology issues related to Onshore Wind and Energy Transmission in Harsh Environments. Requests for Proposals to cover development of Energy Innovation Roadmaps for other priority areas will be issued separately.

The work undertaken for this initiative will be directed by a project Steering Committee comprised of officials from the Department of Natural Resources (lead), Department of Innovation, Business and Rural Development, Department of Business, the Newfoundland and Labrador Research & Development Corporation, and Nalcor Energy. An Executive Steering Committee, comprised of the Deputy Ministers, Chief Executive Officer and Vice-President(s) of the above departments/organizations will also direct the work and meet with the consultants during the course of the project.

As noted above, this Request for Proposals covers the preparation of an Energy Innovation Roadmap for Onshore Wind and Transmission. The Roadmap should address only innovation/technology issues and opportunities such as those outlined in this Scope of Work. It should be emphasized that the Roadmap itself should not try to solve each specific innovation/technology issue that will be considered (e.g. identify a specific solution for operating turbines at -40 °C or actually produce a provincial wind and ice map). Rather, the intent is to develop and recommend options for how to address these issues specifically within the Newfoundland and Labrador context, along with estimated timelines, costs, etc. Issues that are company, market or regulatory related will be considered through mechanisms outside of this roadmapping initiative.

3.1 Onshore Wind

The Energy Plan estimates that there are more than 5,000 Megawatts (MW) of potential wind energy available within the province, with much of the province having average wind speeds of between seven and ten metres per second at 50 metres above the ground.

There are two wind farms (Fermeuse and St. Lawrence) operating in the province which together generate up to 54 MW of wind energy. Both farms each generate 27 MW using nine, Vestas V90, 3 MW turbines. Nalcor Energy is also in the process of commissioning 390 kilowatts (six 65kw) of wind power as part of its Wind-Hydrogen-Diesel energy project in Ramea, on the southwest coast of the island.

Newfoundland and Labrador has a number of options for future engagement in innovation in the onshore wind sector, either as a wind turbine manufacturer, component manufacturer, test facility or research institute. These include establishing new entities or partnering with third parties with the relevant innovation capabilities. These options will be explored further as part of the roadmapping process.

For Onshore Wind, four areas were identified in Phase 1 which require innovation specific to Newfoundland and Labrador, particularly as it relates the operation of

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turbines in harsh environments. The four areas to be included in the Roadmap, as outlined below, are: Icing; Cold Conditions, Grid Inflexibility/Integration; and Resource Mapping.

3.1.1 Icing:

Build-up of ice on turbine blades can unbalance and damage turbines. Ice can also be thrown from the blades. Turbine energy production can be improved with the use of anti-icing or de-icing techniques. Anti-icing prevents the formation of ice, while de-icing removes ice when a predetermined amount has accumulated. The methods use to prevent and remove ice from wind turbine rotors can be mechanical, passive or active.

There is a considerable amount of existing and ongoing research related to anti-icing, de-icing and ice detection solutions for medium and severe icing conditions. While various applications have been developed in recent years, challenges still remain and reliable, commercial solutions need to be improved and/or developed.

The following work will be required with respect to turbine icing:

- review the existing research/literature and current practices in other jurisdictions (e.g. Yukon, Manitoba, Finland, Sweden, Norway) related to anti- and de-icing technologies and/or techniques to determine applicability and/or adaptation to Newfoundland and Labrador's circumstances. Examples of literature to review, but not limited to, include:
 - **Recommendations for Wind Energy Projects in Cold Climates**, Technical Research Centre of Finland, Working Paper 151, 2009;
 - **State-of-the-Art of Wind Energy in Cold Climates**, Technical Research Centre of Finland, Working Paper 152, 2010;
 - **Analysis and Mitigation of Icing Effects on Wind Turbines**, Wind Energy Research Laboratory, Université du Québec à Rimouski;
 - **Systems for Prediction and Monitoring of Ice Shedding, Anti-Icing and De-Icing for Overhead Power Line Conductors and Ground Wires**, CIGRE (International Council on Large Electric Systems) Working Group B2.29, July 2010;
 - **Guidelines for Meteorological Icing Models, Statistical Methods and Topographical Effects**, CIGRE (International Council on Large Electric Systems) Working Group B2.16, April 2006;
 - Relevant presentations from previous wind related conferences (e.g. **Wind Energy Development in Harsh Environments**, St. John's, 2010; **Winterwind**, Sweden, 2008, 2011).
- recommend anti- and/or de-icing technologies and techniques (e.g. icephobic coatings that are designed specifically for harsh environments) that could be adapted or developed and tested for future implementation in the province, with particular reference to Labrador;
- recommend options to undertake long term research-grade observations of wind (using ice-free anemometers) and icing conditions through the lower

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- boundary at heights up to 300-400 m above ground in particularly ice-prone areas;
- recommend options to implement research and demonstration sites to collect detailed icing impacts data that could lead to more effective anti-/de-icing measures;

3.1.2 Cold Conditions:

Although the cold climate turbine market is still relatively small, it is growing in countries such as Canada, China, US, Sweden, Norway and Finland. Task 19 of the International Energy Agency estimates that 5-10% of the total installations in Canada, US, Europe and China are cold climate installations.*

Similar to the issues related to icing, operation of wind turbines in cold conditions, such as in Labrador, is extremely challenging. For example, existing cold climate packages for turbines are normally rated for -30 °C. However, turbines operating in Labrador need to be able to operate at temperatures of -40 °C.

The following work will be required with respect to the operation of wind turbines in cold conditions:

- review the existing research/literature (see above) and current practices in other jurisdictions (e.g. Yukon, Manitoba, Finland, Sweden, Norway) related to the operation of wind turbines in cold climates to determine applicability and/or adaptation to Newfoundland and Labrador's circumstances;
- recommend options for the development and testing of more reliable turbines capable of working in cold conditions (e.g. -40 °C);
- recommend new concepts for the operation and maintenance of wind turbines in cold conditions (e.g. the development of equipment and operational processes that allow wind-based systems to be operated over higher duty cycles and serviced in harsher environmental conditions).

3.1.3 Grid Inflexibility/Integration:

The ability of the grid to absorb higher penetrations of intermittent wind energy is a function of the flexibility of other generation supply, interconnection, customer loads, and the availability of electricity storage facilities. This is particularly challenging for Newfoundland and Labrador given the absence of these features at the present time.

* **Wind Energy in Cold Climates IEA Task 19**, Presentation to Winterwind 2011, Sweden.

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The following work will be required with respect to grid inflexibility/integration:

- review the existing research/literature and experiences in other jurisdictions (e.g. Manitoba, Ontario, British Columbia, United States, Finland) related to issues of grid integration and assess the applicability and/or adaptation to Newfoundland and Labrador's circumstances. Examples of literature to review, but not limited to, include:
 - **Integration of Wind Generation with Power Systems in Canada Overview of Technical and Economic Impact**, Natural Resources Canada, February 2006.
 - **The Hydroelectricity Industry's Role in Integrating Wind Energy**, Summary Report, CEATI Project No. T102700-0371.
 - **Impacts of Large Amounts of Wind Power on Design and Operation of Power Systems, results of IEA Collaboration**, 2009.
 - **Wind Farm Integrated into Hydroelectric Power System/Washington State, USA**, Natural Resources Canada.
 - **BPA Wind Integration Services**, Bonneville Power Administration, March 2004.
 - Relevant presentations from previous wind/energy related conferences (e.g. **Wind Energy Development in Harsh Environments**, St. John's; 2010; **Winterwind**, Sweden, 2008, 2011; **RETECH**, United States, 2011);
- compare existing grid codes that are applied in Newfoundland and Labrador regarding wind turbine generator unit design and utilization with other developments in Canada and elsewhere. Particular attention should be given to recognizing grid codes and practices in island power systems around the world that are host to significant amounts of variable renewable generation;
- assess the flexibility of the existing generating capacity in Newfoundland and Labrador, particularly with respect to the integration of a significant amount of variable generation (e.g. wind power);
- recommend options and technologies that could improve the flexibility of the existing generating facilities;
- recommend options which could lead to the development of new concepts for the techno-economic integration of high wind penetration systems featuring hydro and gas (possibly) and storage facilities;
- given that large-scale wind development in Labrador could involve the addition of a HVDC transmission link and associated AC transmission in the province and beyond, recommend options for cost effective HVDC transmission, control development especially in weak networks, HVDC cable reliability, multi-terminal effects, voltage source converters and real-time or faster than real-time simulation.
- recommend options for the development of power management strategies and system designs that are tolerant of high proportions of wind generated power and the consequent fluctuations in energy supply, by providing

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- mechanisms such as storage loads or wide area balancing that provide grid stability despite unpredictable supply characteristics.

3.1.4 Resource Mapping

Although resource mapping is well advanced as a discipline, the combined effects of wind and ice for wind energy are not well understood or mapped. This is needed for Labrador wind development.

Nalcor Energy is undertaking a three-year Wind Monitoring Program in four communities in coastal Labrador – Nain, Hopedale, Makkovik and Cartwright. The scope of the work will include site visits for wind prospecting, the evaluation of transmission requirements, constructability, and other desirable qualities of a wind development site, as well as the collection and validation of the wind data from each site.

Without duplicating work that will be undertaken as part of the Wind Monitoring Program noted above or ongoing work of Natural Resources Canada and/or Environment Canada, options should be identified to:

- improve, verify and operationally implement meso-scale modelling approaches to predict the occurrence and amount of icing conditions;
- develop a provincial and regional atlas which would include the frequency and duration of icing conditions and distribution of ice amounts at high resolution (e.g. 1 km, and from 10-400 m above ground), particularly for potential wind energy and transmission line sites in Labrador and on the island;
- develop a long term predictability methodology for the creation of high-resolution wind and ice digital databases involving the creation of synthetic time series (using a mesoscale atmospheric model) of meteorological variables (e.g. winds, temperature, humidity, freezing rain, cloud liquid water content) at a horizontal resolution of 1 km over Newfoundland and Labrador, with a time sampling of every ten minutes;
- develop improved numerical forecasting of short term (0 to 48 hours) energy production;
- develop a methodology for the study of historical weather extremes (e.g. cold, icing conditions, precipitation) and their future trends in a changing climate.

3.2 Transmission

For the purpose of this RFP, transmission is defined as the establishment and operation of infrastructure for transmitting electricity at high and medium voltages. The Transmission industry is mature and well developed. However, similar to the icing issues related to onshore wind development, icing of above ground power lines is a hazard faced in many parts of the world and can bring down lines over long

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distances. It is a key factor for some parts of Labrador energy development since there is unlikely to be alternative routes to provide redundancy.

The following work is required with respect to transmission:

- recommend options to enhance power line de-icing capabilities (prediction, monitoring, control, de-icing technologies) with a focus on Labrador conditions.

3.3 General

In addition to the above, the following work is required:

- compile an inventory of existing onshore wind-related innovation capabilities and infrastructure in Newfoundland and Labrador;
- review the *Wind Technology Road Map* prepared for the Government of Canada (2009) to determine areas of potential fit with Newfoundland and Labrador's Innovation Roadmap for Onshore Wind;
- define, evaluate and recommend options for engagement including establishing new entities or partnering with third parties (e.g. research/test facilities, turbine/component manufacturers, etc.) taking into consideration key factors such as, but not necessarily limited to, cost to implement, time to implement, ease of implementation;
- evaluate and make recommendations on the potential to export the capabilities and expertise that will reside in the province as a result of developing and implementing the specific innovations that are recommended in the Roadmap for Onshore Wind/Transmission.

3.4 Energy Innovation Roadmap Structure

The Roadmap should cover a multi-year planning horizon and include the following components:

- **Overview** - this component should include an overview of the onshore wind and electrical transmission landscape in Newfoundland and Labrador, the challenges and opportunities that the environment poses to development, recent technological innovations that have occurred in these areas which have particular relevance to this province, recent and current research in the province that is related to onshore wind and transmission in harsh environments, and Canadian and NL company onshore wind and transmission expertise/capabilities.
- **Vision** - this component should identify the vision that will guide the objectives and actions that will be required to achieve it.
- **Innovation/Technology Objectives** - this component should identify innovation/technology objectives consistent with the vision.

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- **Actions Required** – this component should identify specific, detailed actions that are required to achieve the vision and objectives outlined in the previous section.
- **Ownership for Action** – this component should identify an organization(s) that could take a lead role in implementing the recommended action. An organization could be government (provincial or federal), university, institute, or individual companies. As outlined above, options for the type and level of engagement should be explored and recommendations developed. This could include, among other things, collaborative options for engagement with wind turbine companies (manufacturers), universities/institutes, testing centres, electric power utilities, and/or technology solution providers.
- **Key Milestones** – this component should identify key milestones over the planning period for the commencement and completion of the specific actions that will be required to fulfill the vision and innovation/technology objectives.
- **Resource/Cost Estimates** – this component should identify estimated costs of implementing the specific actions that will be required to fulfill the vision and objectives.
- **Performance Indicators (PIs)** – this component should identify specific performance indicators that can be used to evaluate the progress of achieving the vision and each objective.
- **Executive Summary (Report and Presentation formats)** – this component should provide a concise, visual presentation of the objectives, specific actions that are required to fulfill the objectives, and time frames for commencement and completion of the actions.

3.5 Methodology

Stakeholder interviews, focus groups and/or specific workshops will be required to obtain information and input to inform development of the Roadmap. It may be necessary to undertake meetings and site visits in other Canadian provinces and international, in order to complete the due diligence required. A stakeholder engagement strategy/approach should be proposed and costed in detail by the consultant as part of its proposal submission, including potential meetings and/or focus groups and proposed locations. The final strategy/approach and stakeholder/consultation list to be approved by the Department prior to implementation. A potential stakeholder/consultation list is attached as Appendix A.

The consultant will be expected to complete and deliver a final presentation to the Steering Committee, as well as a final written Roadmap report, no later than September 30, 2012. As well, the consultant should expect to complete and submit two (2) interim reports and/or presentations during the contract period, the content and timing of which will be agreed to by the Department. The consultant will be expected to meet in-person with the Steering Committee at the beginning of the project and in-person monthly thereafter until project completion, as well as

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participate in weekly teleconferences. Other shorter oral and/or written updates may also be required, at the discretion of the Department, from time to time.

The final report should include an Executive Summary, the format of which will be subject to final approval of the Department. The consultant will deliver the report in an electronic software format agreed by NR and the consultant. The consultant will also deliver any related and supporting work, reports, presentations and documentation from the completion of this work. The consultant should be aware that any work undertaken and completed by the Government of Newfoundland and Labrador, including that done by consultants on its behalf, is subject to possible public release. Any confidential information provided should be clearly identified.

4.0 Proposal Submission

Interested consultants are asked to review this Request for Proposals, available reports, studies and other documentation and submit proposals to complete an Energy Innovation Roadmap for the Onshore Wind and Transmission sectors. As referenced in Section 3, Requests for Proposals to cover development of Energy Innovation Roadmaps for other energy areas will be issued separately. The Government of Newfoundland and Labrador is not obligated to engage the consultant selected to complete the Onshore Wind and Transmission Energy Innovation Roadmap to develop any other Roadmap(s) that may be undertaken in the future.

Each submitted proposal must detail how the consultant will address the areas of local Newfoundland and Labrador knowledge, energy sector expertise and experience, and outline whether the consultant plans to subcontract work to local consultants with specific expertise in particular areas. The consultant's approach to addressing these requirements will form part of the overall evaluation of the consultant's proposal submission.

Proposals should include:

- project approach, summary/overview of work, and anticipated Energy Innovation Roadmap outline;
- project work schedule, including work schedule of the consultant's team members;
- key milestone check points to facilitate the Committee's review of progress towards completing the Roadmap;
- details as to how the consultant will address the areas of local Newfoundland and Labrador knowledge;
- the percentage of work under the contract to be undertaken in Newfoundland and Labrador;
- detailed budget including daily rates and total cost of each of the consultant's team members, including costs to travel to/from the province, within the province and to other proposed locations. Cost estimates for out-of-province consultations should be included separately as options;
- company prospectus, services offered and details on the experience of the firm, including previous experience in undertaking similar work;
- anticipated role/contribution and previous experience/curriculum vitae

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- for each of the consultant's team members, particularly with respect to their knowledge, experience and expertise related to energy innovation and innovation/technology Roadmaps;
- names of former clients and associates for whom similar or relevant work has been performed presented as references, including a description of the work completed (minimum of three (3) references required); and
- any additional information the consultant deems relevant to its proposal submission.

All proposals submitted in response to this Request for Proposals must be delivered in a sealed package and clearly marked with the title "Energy Innovation Roadmap – Phase 2: Onshore Wind/Transmission in Harsh Environments" to the Government Purchasing Agency, 30 Strawberry Marsh Road, St. John's, Newfoundland and Labrador, Canada, A1B 4R4 no later than the closing date of Friday, January 13, 2012 at 4:00 pm (NST). A proposal package shall include one (1) signed original and eight (8) complete paper copies and one (1) complete electronic copy in Adobe Reader format. Facsimile or electronic only proposals are not acceptable and will not be considered.

All proposals must remain valid and open for acceptance for not less than ninety (90) calendar days from the closing date of this Request for Proposals.

Consultants are solely responsible, and without recourse for any expenses they incur in preparing and submitting a proposal and for their participation in the Request for Proposals process including, but not limited to, attending any interviews or presentations requested by the Department of Natural Resources and providing any additional information that may be requested. The Department of Natural Resources shall not defray nor be liable for any reason for any expenses incurred by the consultant in responding to this Request for Proposals.

All proposals and accompanying documentation submitted under this Request for Proposals are considered to be the property of the Department of Natural Resources and will not be returned.

All proposals must address the content of this Request for Proposals. Proposals are those that clearly demonstrate a thorough understanding of this Request for Proposals, and its stated requirements and criteria. The Department of Natural Resources will disqualify proposals that do not demonstrate this understanding and do not include the information that is requested in this Request for Proposals.

5.0 Proposal Acceptance

The Department of Natural Resources reserves the unfettered right to reject any or all responses received in response to this Request for Proposals and is not bound to accept the highest ranking or any response. The Department of Natural Resources may elect to cancel this Request for Proposals at any time with or without cause and no liability shall accrue to the Department nor the Government of Newfoundland and Labrador as a result of its exercise of its discretion in this regard.

Should the Department of Natural Resources decide not to accept any proposal

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received, all proponents will be given written notice of such decision.

The proposal of the successful proponent will form part of any resulting agreement by attachment and incorporation by reference. Claims made in the proposal will constitute contractual commitments. Any provision in the proposal may be included in the resultant agreement as a direct provision thereof.

Any agreement resulting from this Request for Proposals shall be governed by the laws of the Province of Newfoundland and Labrador. An agreement issued pursuant to this Request for Proposals shall be issued in the name of the proponent exactly as that proponent's personal or corporate name is stated in the Request for Proposals document. Funds payable (CDN\$) for materials delivered pursuant to this agreement shall be paid only to the proponent who is listed as party to this agreement.

All documents and other records in the custody of, or under the control of some or all of the Department of Natural resources, or its representatives, shall remain confidential.

6.0 Proposal Evaluation

Proposals will be evaluated for completeness, conciseness and general suitability. Additional information may be requested from the consultant, if necessary, to validate and support proposals submitted in response to this Request for Proposals. Any such additional information will be provided at the consultant's expense.

Only proposals that have been deemed by the Department of Natural Resources to have met all mandatory requirements as identified within this Request for Proposals document will be evaluated.

Interviews or presentations may be requested of proponents, if necessary, to validate responses. Any presentations made on site will be at the proponent's expense.

Proposals should identify project costs by category, including the per diem rates and number of days for each person on the project team. All costs should be quoted in Canadian dollars, exclusive of applicable taxes.

The proposals will be scored out of 100 as follows:

Evaluation Criteria	Maximum Number of Points	Minimum Number of Points
Consultant Proposal Bid Price (CDN\$, exclusive of applicable taxes)	25	15
Consultant Profile, Proposed Team, Project Role, Expertise and Experience (including energy sector and innovation/technology roadmapping related experience)	30	15

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Local (NL) Knowledge, Energy Sector Expertise and Experience	10	5
Work Plan, Work Schedule, Approach and Proposed Methodology for Evaluating Opportunities and Developing the Roadmap	35	15
Total	100	50

Proposals which receive a score below the minimum threshold in any of the above categories will be removed from further consideration.

7.0 General Terms and Conditions

The successful proponent must be in good standing with the Workplace Health, Safety and Compensation Commission (WHSCC) or its equivalent in the jurisdiction where the proponent organization is located and provide a certification letter to this effect prior to receiving any payments for this contract.

If the proponent is a corporation, the organization must be licensed to conduct business in its own jurisdiction and shall be in good standing in that jurisdiction.

Any contract resulting from this Request for Proposals will be governed by the laws of the province of Newfoundland and Labrador.

The Department of Natural Resources will retain copyright of any programs, systems or other intellectual property developed as part of this project. The proponent will, upon either completion or termination of the project, immediately transfer to the Department of Natural Resources all materials including, but not restricted to, all research reports, papers, tapes, slides, CDs, films, photographs, audio-visual materials, electronic data or other information submitted to the proponent or developed by the proponent in the performance of the assignment, whether in draft or completed form.

8.0 Inquiries and Communication

Inquiries and questions related to this Request for Proposals are to be submitted to the Department of Natural Resources no later than Friday, January 6, 2012 at 4:00 pm (NST). Inquiries and requests received after this date will not be addressed.

Please forward all inquiries to:

Paul Morris
Assistant Deputy Minister
Energy Innovation Roadmap
Department of Natural Resources

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Government of Newfoundland and Labrador

Tel: (709) [REDACTED] 547

Fax: (709) [REDACTED] 871

Email: pmorris@[REDACTED]

All inquiries are to be submitted in writing or by e-mail and the Request for Proposals title "Energy Innovation Roadmap – Phase 2: Onshore Wind/Transmission" should be quoted on all correspondence. The Government Purchasing Agency shall provide to all bidders who have registered to receive amendments, any relevant information in response to inquiries received in writing without revealing the source of those inquiries. Bidders are cautioned that it is their responsibility to ensure that they receive all information relevant to this Request for Proposals. The Government of Newfoundland and Labrador shall not be responsible for bidders who fail to inform themselves regarding the scope and nature of the work. The Government Purchasing Agency shall publish all amendments to the procurement website at www.gpa.gov.nl.ca. Bidders may register on the procurement website to receive amendments automatically by fax. Bidders not registered to receive amendments are solely responsible for ensuring they are aware of and have complied with all amendments by closing time.

Verbal information or representations shall not be binding upon the Department of Natural Resources. Only written changes, alterations, modifications or clarifications approved by the Department of Natural Resources are binding. In order to be valid, all such changes, alterations, modifications or clarifications shall be issued in the form of addenda and all such addenda shall become part of this Request for Proposals.

Information pertaining to the Department of Natural Resources obtained by the proponent as a result of this Request for Proposals is confidential and must not be disclosed by the proponent, except as authorized by the Department of Natural Resources.

The Department of Natural Resources may, during the assessment period, request a meeting with a proponent to clarify points in the proposal. Demonstrations of any or all proposed solutions may also be requested. No changes or amendments by the proponent will be permitted to its proposal after the Request for Proposals closing date. The proponent shall be responsible for any expenses incurred related to this requirement.

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**Appendix A
Potential Stakeholder/Consultation List**

- Memorial University
 - Associate VP Research
 - Dean, Engineering & Applied Science
 - Associate Dean Research, Engineering & Applied Sciences
 - Various Faculty Members, Engineering & Applied Science
 - Genesis Research
- Government of Newfoundland and Labrador
 - Department of Natural Resources
 - Department of Innovation Trade & Rural Development
 - Department of Business
 - Department of Labrador and Aboriginal Affairs
 - Department of Environment & Conservation
 - Research & Development Corporation
 - Rural Secretariat
 - Women's Policy Office
- Government of Canada
 - Atlantic Canada Energy Office
 - Atlantic Canada Opportunities Agency
 - Industry Canada
 - Natural Resources Canada – (Ottawa, ON)
 - National Research Council of Canada (Ottawa, ON)
 - Environment Canada (Ottawa, ON; Montreal, QC)
- Newfoundland and Labrador Environmental Industries Association
- Newfoundland and Labrador Association of Technology Industries
- Canadian Manufacturers Association - NL
- Newfoundland and Labrador Organization for Women Entrepreneurs
- SafetyNet – Centre for Occupational Health & Safety Research
- College of the North Atlantic, Office of Applied Research
- Natural Sciences and Engineering Research Council of Canada
- Women in Science and Engineering Newfoundland and Labrador
- Women in Resource Development Corporation
- Professional Engineers & Geoscientists of Newfoundland and Labrador
- Newfoundland and Labrador Federation of Labour
- Canadian Wind Energy Association (Ottawa, ON)
- Canadian Electricity Association (Ottawa, ON)
- Electric Power Research Institute (Palo Alto, California)
- Wind Energy Institute of Canada (North Cape, PEI)
- Sustainable Development Technology Canada (Ottawa & Toronto, ON)
- Vestas (Toronto, ON; Houston, Texas; Denmark)
- Frontier Power Systems (Alberton, PEI)
- National Renewable Energy Centre – CENER (Sarriguren, Spain)
- CIGRE (International Council on Large Electric Systems), Montreal, QC; Paris France
- Bonneville Power Administration (Portland, Oregon)
- Wind Energy Strategic Network
- Wind Energy TechnoCentre (Gaspé, QC)

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- CEATI International Inc. (Centre for Energy Advancement through Technological Innovation, Montreal, QC)
- Electric Reliability Council of Texas, Inc. (Austin, Tx)
- National Renewable Energy Laboratory (Washington, DC)
- National Wind Technology Center (Boulder, Co)
- Finnish Meteorological Institute (Helsinki, Finland)
- Mount Washington Observatory (White Mountains, NH)
- Leading Edge Projects Inc. (Whitehorse, Yukon)
- WindREN (Färentuna, Sweden)
- GL Garrad Hassan (Ottawa, ON)
- Hatch (Mississauga, ON)
- VTT Technical Research Centre of Finland
- GE Energy (Canada, USA)
- Manitoba Hydro
- University of Alberta
- University of Windsor
- University of Manitoba
- University of Saskatchewan
- Compusult (Mount Pearl, NL)

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Energy Innovation Roadmap
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December 2011**

APPENDIX 2

**Exhibit GRK-3, as filed before the PUB
February 23, 2012**

Muskrat Falls Review

Exhibit - GRK #3

Filed: Feb 23, 2012 Board Secretary: [Signature]

Source: CAKPL-Nalcor-27 rev. 1
Columns in yellow: P. Raphals

(1)	(2)	(3)	(4)	(5)	(5a)	(5b)	(6)	(6a)	(6b)	(7)	(7a)	(7b)	(7c)	(8a)	(8b)
Incremental Costs: Muskrat Falls (MF) + Labrador Island Transmission Link (LI)															
Reference	Energy at Soldier's Pt GWh (2011-12)	MF Purchases \$000 (2011-12)	LITL \$000 (2011-12)	Total Incremental \$000 (2011-12)	Total (19/1)	Nominal Annual Cost \$/MWh (11/1)	Nominal LUEC \$/MWh (11/1)	Nominal LUEC MF \$/MWh (11/1)	Nominal LUEC LITL \$/MWh (11/1)	Real LUEC in nominal dollars (incl. losses) (11/1)	Total Annual Payments MF \$000 (11/1)	Total MF Payments \$000 (11/1)	MF Payments \$/MWh (11/1)	MF (COB) \$000 (11/1)	MF (COB) \$/MWh (11/1)
CPW Real	21 303	2 682 308	1 758 655	4 440 963			206	126	83	132				2 682 308	
2010	0	0	0	0	0	52	147	208	126	83	275 272	8 239	5	407 260	225
2011	0	0	0	0	0	53	140	208	126	83	291 090	27 798	19	401 974	214
2012	0	0	0	0	0	95	138	208	126	83	308 574	49 516	22	404 268	207
2013	0	0	0	0	0	97	127	208	126	83	325 059	69 224	34	390 201	193
2014	0	0	0	0	0	99	122	208	126	83	346 650	88 700	42	393 747	188
2015	0	0	0	0	0	101	112	208	126	83	371 616	123 201	56	378 884	171
2016	0	0	0	0	0	103	103	208	126	83	406 638	181 919	68	373 246	157
2017	1 811	166 064	267 033	433 097	239	106	93	208	126	83	425 778	264 746	75	367 623	150
2018	1 878	175 566	263 292	438 858	234	107	85	208	126	83	445 806	268 534	81	362 018	145
2019	1 953	186 252	265 058	451 310	231	110	81	208	126	83	468 247	278 824	88	368 174	142
2020	2 019	196 415	255 835	452 251	224	112	80	208	126	83	495 060	263 830	97	352 673	132
2021	2 115	209 849	258 160	468 009	221	114	81	208	126	83	520 960	303 286	108	347 159	124
2022	2 212	223 883	248 415	472 298	214	116	74	208	126	83	549 825	350 814	119	341 663	118
2023	2 378	245 531	244 719	490 250	206	119	71	208	126	83	608 384	407 765	129	326 156	103
2024	2 447	257 705	241 032	498 737	204	121	70	208	126	83	636 200	471 961	139	312 637	98
2025	2 505	269 059	237 356	506 455	202	123	66	208	126	83	664 632	493 358	139	299 283	90
2026	2 567	283 493	241 393	524 887	203	125	62	208	126	83	693 889	484 367	145	279 867	86
2027	2 676	299 074	231 230	530 304	189	127	58	208	126	83	722 182	521 001	133	264 488	82
2028	2 809	320 236	227 615	547 851	195	129	54	208	126	83	751 811	553 157	129	249 047	77
2029	3 025	351 695	224 011	575 706	190	131	50	208	126	83	783 445	575 995	162	218 499	83
2030	3 103	367 950	220 420	588 370	190	133	46	208	126	83	816 932	493 358	139	208 397	80
2031	3 181	384 734	224 237	608 970	181	135	42	208	126	83	851 889	484 367	145	191 867	76
2032	3 258	402 008	213 274	615 282	169	137	38	208	126	83	887 300	521 001	133	174 488	82
2033	3 336	419 822	209 721	629 543	169	139	34	208	126	83	923 889	504 284	139	159 560	80
2034	3 414	438 197	206 181	644 378	169	141	30	208	126	83	960 300	521 001	133	144 488	82
2035	3 483	456 106	202 654	658 760	169	143	26	208	126	83	1 008 384	544 284	139	134 047	82
2036	3 545	473 458	207 510	680 968	192	145	22	208	126	83	1 057 300	575 995	162	124 499	83
2037	3 482	474 395	195 644	670 039	192	147	18	208	126	83	1 106 932	599 284	170	114 397	80
2038	3 548	493 064	192 160	685 225	193	149	14	208	126	83	1 157 300	623 880	176	104 083	81
2039	3 618	512 787	188 692	701 479	194	151	10	208	126	83	1 208 300	649 538	183	94 794	80
2040	3 680	532 031	185 239	717 270	195	153	6	208	126	83	1 259 300	674 281	188	84 527	77
2041	3 742	551 796	191 269	743 027	199	155	2	208	126	83	1 310 300	700 779	193	74 721	78
2042	3 804	572 087	178 380	750 465	197	157	0	208	126	83	1 361 300	728 316	202	64 066	77
2043	3 865	592 988	175 426	768 414	199	159	0	208	126	83	1 412 300	756 284	209	54 560	80
2044	3 927	614 549	171 588	786 137	200	161	0	208	126	83	1 463 300	784 505	215	44 707	81
2045	3 989	636 677	168 218	804 896	202	163	0	208	126	83	1 514 300	812 878	222	34 567	84
2046	4 051	659 468	175 578	835 046	206	165	0	208	126	83	1 565 300	841 192	227	24 793	86
2047	4 112	682 807	161 533	844 340	205	167	0	208	126	83	1 616 300	869 267	236	14 371	82
2048	4 174	706 915	158 218	865 133	207	169	0	208	126	83	1 667 300	897 502	242	4 315	83
2049	4 235	731 704	154 922	886 625	209	171	0	208	126	83	1 718 300	925 884	249	0	80
2050	4 269	755 830	151 646	907 475	212	173	0	208	126	83	1 769 300	954 281	257	0	54
2051	4 343	780 595	160 509	941 104	217	175	0	208	126	83	1 820 300	982 703	261	0	28
2052	4 396	806 039	145 155	951 194	216	177	0	208	126	83	1 871 300	1 011 229	271	0	0
2053	4 450	832 197	141 941	974 138	219	179	0	208	126	83	1 922 300	1 039 750	278	0	0
2054	4 500	858 354	138 749	997 103	222	181	0	208	126	83	1 973 300	1 068 284	285	0	0
2055	4 550	885 208	135 579	1 020 789	224	183	0	208	126	83	2 024 300	1 096 821	292	0	0
2056	4 600	912 830	146 144	1 058 974	230	185	0	208	126	83	2 075 300	1 125 366	297	0	0
2057	4 629	937 105	179 309	1 066 414	230	207	0	208	126	83	2 126 300	1 153 911	307	0	0
2058	4 629	955 847	126 210	1 082 057	234	206	27	208	126	83	2 177 300	1 182 456	315	0	0
2059	4 629	974 644	123 135	1 098 099	237	211	27	208	126	83	2 228 300	1 210 999	322	0	0
2060	4 620	994 463	120 086	1 114 549	241	215	26	208	126	83	2 279 300	1 239 541	330	0	0
2061	4 629	1 014 353	132 576	1 146 928	248	219	29	208	126	83	2 330 300	1 268 084	334	0	0
2062	4 629	1 034 640	114 066	1 148 705	248	224	25	208	126	83	2 381 300	1 296 627	345	0	0
2063	4 629	1 055 332	111 096	1 166 428	252	228	24	208	126	83	2 432 300	1 325 170	351	0	0
2064	4 629	1 076 439	108 154	1 184 593	256	233	23	208	126	83	2 483 300	1 353 713	355	0	0
2065	4 629	1 097 968	105 241	1 203 209	260	237	23	208	126	83	2 534 300	1 382 256	359	0	0
2066	4 629	1 119 927	111 075	1 230 953	266	242	24	208	126	83	2 585 300	1 410 800	377	0	0
2067	4 629	1 142 326	59 364	1 201 689	260	247	13	208	126	83	2 636 300	1 439 343	376	0	0

Tab 3

Tab 3.1

Muskrat Falls Review

Exhibit - GRK #1

Filed: Feb 23, 2012 Board Secretary AK.

CENTRE
HELIOS

Une expertise en énergie
au service de l'avenir

www.centrehelios.org

Comments on the Muskrat Falls Reference

**Presentation to the Public Utilities Board of
Newfoundland and Labrador**

Philip Raphals

For Grand Riverkeeper Labrador Inc.

February 23, 2012

226, boulevard Saint-Joseph Est, bureau 100
Montréal (Québec) Canada H2T 1J2
Téléphone : (514) 849 7700
Télécopieur : (514) 849 6357
info@centrehelios.org

www.centrehelios.org

Optimality

- « How did you ensure that ... you were dealing with the optimal scenario under each one? »
 - > Technical optimization vs. planning processes
 - > Iterative process seeking robust solutions
 - > Real time (evolutive) versus planning exercise
 - > Avoiding irrevocable choices that would turn out badly in certain possible futures
 - > Scenario versus plan

PPA payment options

- “Does the 2035 ratepayer have to pay more so that the 2017 ratepayer can pay less?”
 - > Nominal LUECs vs. escalating prices
 - > Same present value, but different reality
 - > Consumers unlikely to prefer escalating prices

PPA vs COS

- Simulate annual costs for Muskrat Falls under COS
 - > Higher than PPA in early years
 - > Drastically lower in later years
- Prices post 2067
 - > PPA: maintaining 2067 price levels (\$400/MWh) ⇒ windfall profits
 - > COS: continue to decline (< \$20/MWh)

CDM

■ MHI

- > model CDM like generation
- > End-use modelling

■ Nalcor's approach

- > Integrate into load forecast through technological change variable
- > No measure-by-measure or program-by-program analysis

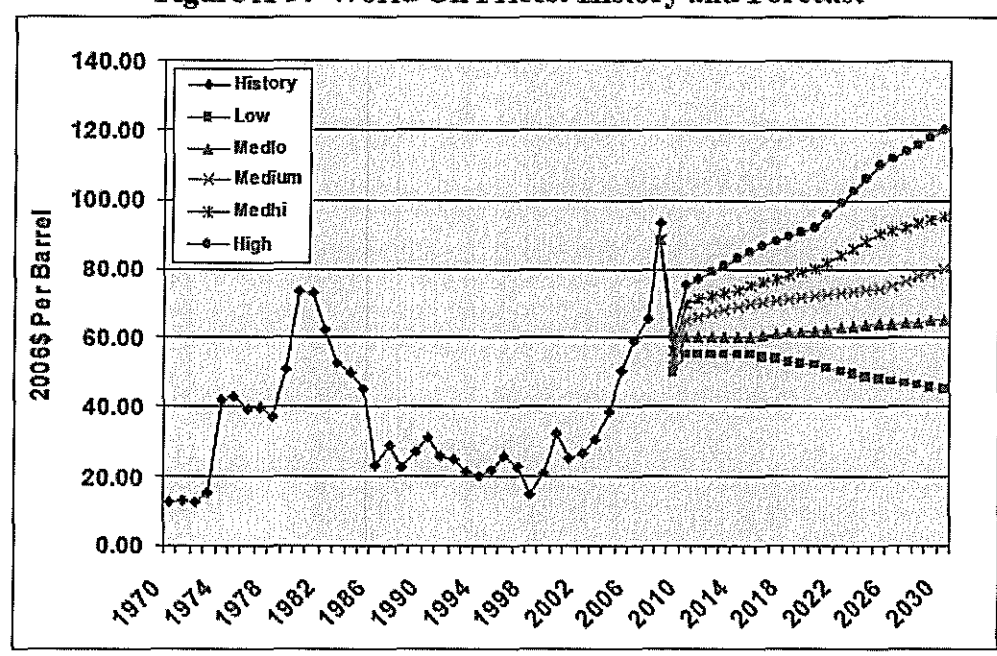
■ Objectives to date not met

■ Sensitivities

- > Far less than Marbek scenarios
- > At low demand (= high CDM) scenarios, CPW preference for Muskrat drastically reduced

Fuel price forecasts

Figure A-9: World Oil Prices: History and Forecast



NWPPC fuel forecast 2009

EIA Retrospective Review

Table 4. World Oil Prices, Projected vs. Actual
(Percent difference)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
ALSO 1982																										
ALSO 1983																										
ALSO 1984																										
ALSO 1985																										
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ALSO 2005																										
ALSO 2006																										
ALSO 2007																										
ALSO 2008																										
ALSO 2010																										

Wind power assessment

■ 2004 NLH study

- > Sole source for Strategist inputs
- > 80 MW limits primarily economic
 - Based on minimizing spill
 - Fails to take into account cost of wind, net of curtailment or spills
- > « preliminary »
- > Government RFP shows that higher penetration remains an objective

Conclusions

- Reference question
 - > Verify that the costs attributed to each scenario are correct?
 - > Verify that each scenario makes sense?
- Analyses of MHI and others
 - > Results highly dependent on assumptions
 - > Great uncertainties
 - > Little confidence that the Isolated Island scenario would play out as defined
- If Muskrat Falls does not go forward
 - > planning process will continue
 - > May lead to solutions very different from IIS
- Thus Reference Question largely academic

Tab 4

Tab 4.1

FEDERAL COURT

BETWEEN:

**GRAND RIVERKEEPER, LABRADOR INC.,
SIERRA CLUB OF CANADA, and
NUNATUKAVUT COMMUNITY COUNCIL INC.**

APPLICANTS

AND:

**ATTORNEY GENERAL OF CANADA,
MINISTER OF FISHERIES AND OCEANS,
MINISTER OF TRANSPORT,
MINISTER OF NATURAL RESOURCES, and
NALCOR ENERGY**

RESPONDENTS

AFFIDAVIT OF ROBERTA FRAMPTON BENEFIEL

I, **ROBERTA FRAMPTON BENEFIEL**, of the Town of Happy Valley-Goose Bay, in the Province of Newfoundland and Labrador, **AFFIRM THAT:**

1. I am the Vice-President and the Riverkeeper of the Grand Riverkeeper, Labrador Inc. (“Grand Riverkeeper”). My position as “Riverkeeper” is analogous to the position of executive director. I am authorized to provide this Affidavit on behalf of Grand Riverkeeper.
 - A. Grand Riverkeeper and our interests in the Grand River**
2. Grand Riverkeeper is a federally registered non-profit organization. Our goal is to preserve and protect the Grand River, its watershed and valley for present and future users and for posterity, through activities like promoting public awareness, monitoring, intervention and habitat restoration. We actively promote sustainable development and ecosystem management approaches that will maintain the heritage and intrinsic value of the Grand River. We learn and educate the public and decision-makers about the ecological, aesthetic,

recreational, economic, social, cultural and spiritual values and benefits of the Grand River. A copy of Grand Riverkeeper's Letters Patent is attached to my Affidavit as **Exhibit A**.

3. I was raised from infancy in the Grand River valley in Labrador. Currently I live and work in the town of Happy Valley-Goose Bay. I have an undergraduate degree in environmental studies from Mount Allison University, New Brunswick. As my paid employment, I teach various courses as a contract instructor with the College of the North Atlantic, which is the public college in Newfoundland and Labrador.
4. I have served as Vice-President and Riverkeeper since 2005. In these two roles, I am an unpaid volunteer. Grand Riverkeeper is a small organization driven by the efforts, time and passion of local volunteers. Currently, we do not employ any paid staff and do not currently maintain an office. The majority of our board members and volunteers are based in Labrador.
5. Grand Riverkeeper focuses our work entirely on issues related to the Grand River. On many maps, the Grand River is named the Churchill River. This is a result of a decision by Newfoundland Premier Joey Smallwood, in 1965, to change the name of the river in honour of Winston Churchill when he died. Previously, it was identified on maps as the Hamilton River, which name was assigned to it in approximately 1821. However, the river has traditionally been known by the Innu people as Mishta Shipu. This means "big river". As a loose translation of the Innu name, many of the original "settlers" to the area called it Grand River and most Labradorians still do.
6. Grand River is the seventh largest river in Canada and the largest river in the Province of Newfoundland and Labrador. In addition to being the longest river in the Province, it has the largest watershed, draining a 93,415 km² area largely comprised of high boreal forest. This river's watershed area is larger by 20,000 km² than the Province of New Brunswick.
7. The Grand River starts at the head of Ashuanipi Lake, dropping over Grand (Churchill) Falls, broadening into Winokapau Lake, and then flowing through a deep glacial gorge past Happy Valley-Goose Bay. It empties into Lake Melville and eventually into Groswater Bay at

Rigolet, a total journey of 835 km. Over the course of this journey, the river and its valley provide habitat for numerous aquatic and boreal species.

8. In the summer of 2005, Grand Riverkeeper became formally affiliated with the Waterkeeper Alliance. At that time, we changed our name to Grand Riverkeeper, Labrador Inc. Grand Riverkeeper is one of approximately 200 Waterkeeper organizations on six continents, and one of nine Waterkeeper organizations in Canada. Waterkeeper Alliance seeks to help communities stand up for their right to clean water and for the wise and equitable use of water resources, locally and globally.
9. Before our organization became a member of the Waterkeeper Alliance in 2005, we were known as Friends of Grand River/Mishta Shipu ("Friends"). Friends was formed in 1998. I started volunteering with Friends in 1998, and continued fairly continuously until 2005 when the new group became Grand Riverkeeper Labrador, Inc. Friends comprised a group of citizens who were concerned about the ecological and cultural damage done by the Upper Churchill Hydroelectric Project constructed in the 1960s and 1970s, and who were worried about a new proposal by the Province for more large-scale hydro development on the Grand River watershed. Friends was formed in response to that initial proposal to construct two dams on the lower Grand River, at Gull Island and at Muskrat Falls. While that initial proposal did not proceed, Nalcor Energy's proposed Lower Churchill Generation Project is very similar to it.
10. A major focus of Grand Riverkeeper's work consists of advocating against the further damming and unsustainable hydro development on the Grand River. In the last few years, we have devoted significant time and effort to the Lower Churchill Generation Project and closely related transmission projects, particularly through our participation in the assessment by the Joint Review Panel. If constructed, this Project would further dam the Grand River with two new, large hydroelectric dams. This would convert most of the remaining nearly free-flowing river reaches into two long reservoirs. These reservoirs would together be 285 km long and would flood approximately 135km² of boreal forest. The Project will cause irreversible impacts to and fundamentally alter the ecology of the Grand River.

11. In the context of our efforts to preserve the Grand River for future generations, we seek to ensure that local decision-makers are aware of the work of the World Commission on Dams (“WCD”). The WCD was a global multi-stakeholder body initiated in 1997 by the World Bank and the World Conservation Union (IUCN) in response to growing opposition to large dam projects. The WCD had a mandate to develop internationally acceptable guidelines for the planning, construction and operation of dams. In 2000, the WCD published its lengthy final report entitled *Dams and Development: A New Framework for Decision-Making*. The WCD framework establishes comprehensive guidelines for dam building, and its recommendations constitute international soft law. A webpage discussing the WCD and its report, published by the organization International Rivers, is located at <http://www.internationalrivers.org/way-forward/world-commission-dams>. A copy of this webpage is attached to my Affidavit as **Exhibit B**. The United Nations Environmental Program webpage on the WCD and its report is located at <http://www.unep.org/dams/WCD/>. A copy of this United Nations webpage is attached to my Affidavit as **Exhibit C**.
12. In addition to hydro development, Grand Riverkeeper also works on other projects and issue to further our goal, where time and resources permit. In particular, Grand Riverkeeper:
- delivers educational presentations and workshops, to students, clubs and other groups, describing the benefits provided by the Grand River and advocating its protection;
 - has delivered educational presentations to federal civil servants, through the federal government’s civil service training program, annually over the last four years;
 - has worked with film makers to create an 18-minute DVD entitled “GRAND RIVER – Labrador’s Treasure, Newfoundland’s Secret”, released in 2006, which has since been provided to every school in Labrador and is available on our website;
 - delivers 10-day canoe trips of the Grand River, in the summer;
 - where capacity permits, participates in provincial environmental assessments of proposed development projects affecting the Grand River;
 - monitors existing and emerging threats to the water quality of the Grand River, including from the discharge of raw sewage into the river over the last 30 years and from the remediation project for military bases in Goose Bay;
 - advocates for an appropriate wastewater treatment system for Happy Valley-Goose Bay;

- presented to the Province of Newfoundland and Labrador on developing a provincial energy plan, in 2006; and
- presented to the House of Commons Standing Committee on Natural Resources regarding greening electricity in Canada, at Churchill Falls, Labrador, in 2007.

13. I am also currently a volunteer member on the Advisory Committee for Renewable Low-Impact Energy (Hydro) for Environment Canada's "EcoLogo" certification program.

14. Prior to our extensive participation in the assessment of the proposed Lower Churchill Generation Project, and our ongoing participation in the assessment of the closely related Lower Churchill Transmission Project (also referred to as the "Labrador-Island Transmission Link Project"), Grand Riverkeeper had little experience with the administration of the Canadian Environmental Assessment Act ("CEAA"). I have previously followed some CEAA-related issues as a member of the Canadian Environmental Network's Environmental Planning and Assessment Caucus. In addition, with funding from the federal government provided through the Canadian Environmental Network, Grand Riverkeeper organized a workshop in Labrador to provide information to the public on CEAA. At this workshop, information was provided by guest speakers, including one from the Canadian Environmental Assessment Agency ("CEA Agency").

B. Grand Riverkeeper's participation in the environmental assessment of the proposed Lower Churchill Generation Project

15. Grand Riverkeeper participated extensively in the environmental assessment of the proposed Lower Churchill Generation Project. We participated both in the pre-hearing proceedings, occurring from 2007 through to early 2011, and in the hearings themselves, in the spring of 2011.

16. During our participation in the environmental assessment process, Grand Riverkeeper submitted dozens of letters, presentations and other documents onto the record before the Joint Review Panel. I have not attached all of our documents to my Affidavit. However, all of our documents that were submitted to the Panel are posted to the Canadian Environmental

Assessment Registry (“CEA Registry”) website for the proposed Lower Churchill Generation Project at <http://ceaa.gc.ca/050/05/documents-eng.cfm?evaluation=26178>.

C. Grand Riverkeeper’s participation in pre-hearing proceedings

17. Throughout the pre-hearing proceedings, Grand Riverkeeper reviewed and commented on documents and studies presented by the proponent Nalcor Energy; documents provided by the federal and provincial governments such as the Draft Guidelines for the Environmental Impact Statement, and draft documents provided by the Joint Review Panel itself regarding its intended hearings process.
18. Grand Riverkeeper also reviewed and commented on the Proponent’s responses to the Information Requests made of it by the Panel. For example, on September 23, 2010, we submitted comments to the Panel setting out our concerns with the Proponent’s responses to some of the Panel’s Information Requests. Among other concerns, at page 9, this submission noted our concerns regarding the George River caribou herd. A copy of our September 23, 2010 submission is attached to my Affidavit as **Exhibit D**.
19. During the pre-hearing proceedings, Grand Riverkeeper often raised to the Panel our concern with the lack of information from the Proponent addressing the need and rationale for the proposed Lower Churchill Generation Project.
20. As one example, on December 18, 2009, we submitted comments on the adequacy of the Proponent’s responses to the Panel’s Information Requests regarding the Environmental Impact Statement. A copy of our December 18, 2009 submission is attached to my Affidavit as **Exhibit E**. Pages 31-38 of Exhibit E contains comments by one of Grand Riverkeeper’s retained experts, Philip Raphals. His comments address the Proponent’s responses to Information Requests related to the need, purpose and rationale for the Project. His comments conclude by stating, while “the Panel has requested specific qualitative and quantitative information with regard to energy matters that it judges relevant to its analysis of the need, purpose and rationale of the Project”, that “[w]ith few exceptions, these requests for

specific information have gone unanswered” by the Proponent. He concludes by urging the Panel to persevere in its efforts to obtain substantive answers to its questions.

21. As a second example, on June 3, 2010, Grand Riverkeeper made comments on the Joint Review Panel’s draft hearing guidelines and draft hearing process documents released by the Panel on May 5, 2010. These comments also included our agreement with the Panel’s proposal that most public hearing sessions would take place in Happy Valley-Goose Bay. A copy of our June 3, 2010 submission is attached to my Affidavit as **Exhibit F**.
22. During the pre-hearing proceedings, Grand Riverkeeper expressed concern that the Lower Churchill Generation Project had been “split off” from the Lower Churchill Transmission Project (which is also known as the “Labrador-Island Transmission Link Project”). Despite that these are two sub-components of one larger development project, they are going through separate environmental assessments.
23. On March 9, 2009, we wrote a letter to federal and provincial environment ministers, in which we expressed our view that it would be impossible for the Panel to determine the financial viability of the Lower Churchill Generation Project without knowing the full cost of transmitting that electricity to market, through the Labrador-Island Transmission Link and/or other transmission facilities. A copy of our March 9, 2009 letter is attached to my Affidavit as **Exhibit G**.
24. As another example of our expression of concern with this “project-splitting” approach, Grand Riverkeeper sent a letter to the federal Minister of Environment and other officials on March 24, 2010. We requested that the Minister assess the Lower Churchill Generation Project and the Labrador-Island Transmission Link together, in one combined assessment. We explained that it would be onerous and burdensome for our organization and for others to respond to an entirely separate process for the Transmission Project. A copy of our letter of March 24, 2010 with the covering e-mail is attached to my Affidavit as **Exhibit H**.

25. The Minister of Environment later denied our request. When that happened, we expected that the impacts of the Labrador-Island Transmission Link Project would nevertheless be taken into account by the Joint Review Panel in its assessment of the cumulative environmental effects likely to result from the Lower Churchill Generation Project in combination with the Transmission Project. For example, we expected that the Panel would consider the cumulative effects associated with the construction of the transmission lines, like impacts on wetlands and terrestrial species. However, the Joint Review Panel did not address the environmental or cumulative effects of the Labrador-Island Transmission Link, in the section of its Report on cumulative environmental effects.
26. To me, it makes no sense to assess the environmental effects and economic justification of two hydroelectric generation dams without considering the transmission infrastructure necessary to transmit that hydroelectricity to end-users or to markets. Also, I am frustrated, as a member of a volunteer organization with limited capacity and resources, by having to participate in two separate assessments of two sub-components of the same overall project.
27. The Labrador-Island Transmission Link Project is currently undergoing its own separate environmental assessment process under CEAA. It is being assessed at the level of comprehensive study, a less intensive level of review than the review panel process which was applied to the Lower Churchill Hydroelectric Generation Project. Notably, Bill Coulter of the CEA Agency has confirmed for me that the comprehensive study of the Labrador-Island Transmission Link Project will not involve any public hearings.
28. Grand Riverkeeper is participating in that comprehensive study, to the best of our ability. However, in my experience from these two assessments, this project-splitting has undermined consideration of the cumulative effects of all the parts of the larger hydroelectric generation development. Grand Riverkeeper continues to express our concern about project-splitting in the context of the comprehensive study of the Labrador-Island Transmission Link Project, such as in our March 21, 2011 submission on the Draft Guidelines and Scoping Document for that project. A copy of our March 21, 2011 letter is attached to my Affidavit as **Exhibit I**.

D. Grand Riverkeeper's participation in the public hearings

29. The Joint Review Panel's public hearings for the proposed Lower Churchill Generation Project were held between March 3, 2011 and April 15, 2011. I participated on behalf of Grand Riverkeeper, as did our President Clarice Blake Rudkowski. Other members of Grand Riverkeeper also participated in the hearings. Grand Riverkeeper also brought forward expert evidence from a number of its own expert witnesses, both through written submissions and oral testimony.
30. The majority of the Joint Review Panel's hearings were held in Happy Valley-Goose Bay. For some other affected communities in Labrador, hearing sessions were conducted by videoconference, which allowed members of those communities to make presentations to the Panel members who were in Happy Valley-Goose Bay. In addition, there were a few days of in-person hearings in other communities in Labrador and Quebec, and in St. John's. I attended the vast majority of the hearings held in Happy Valley-Goose Bay. Due to a financial contribution from another environmental group in St. John's, I was able to attend the two days of hearings held there. However, I was not able to attend, in person, any of the other hearings held outside of Happy Valley-Goose Bay, due to financial constraints.
31. As a result of our organization's focus on the Grand River, and the implications of this Project for the Grand River, Grand Riverkeeper was interested in every topic being addressed by the Panel. We participated in the majority of topic-specific hearings conducted by the panel. We made presentations and asked questions on topics including fish and fish habitat impacts; impacts from methyl mercury; sedimentation and water quality; wetlands and terrestrial impacts; economic impacts; social and cultural impacts; reservoir preparation, flow regimes, and decommissioning; monitoring and follow-up; and cumulative effects.
32. Grand Riverkeeper also participated in topic-specific hearings on need, purposes and alternatives. The justification of the Project – or the lack thereof – is an issue of major concern to us. For example, on March 8, 2011, during the hearing session on need, purpose and alternatives, I made an oral presentation to the Panel on the topic of alternatives,

accompanied by a written submission. A copy of my written submission of March 8, 2011 is attached to my Affidavit as **Exhibit J**.

33. In addition, Grand Riverkeeper retained an expert to assist the Panel in its assessment of need/rationale, purpose and alternatives. Through a funding grant provided by the CEA Agency, we retained Philip Raphals to review and comment on the justification for and alternatives to the Lower Churchill Generation Project. Mr. Raphals is the Executive Director of the Helios Centre in Montreal, Quebec. He testified as an expert witness before the Panel on the issue of justification of the proposed Project, and specifically on the Project's need, purpose and alternatives. No participant in the hearings objected to Mr. Raphal's capacity to provide expert evidence on the topic of justification. Mr. Raphals is submitting an affidavit in these proceedings on behalf of Grand Riverkeeper.
34. Following Mr. Raphals' testimony, the Joint Review Panel wrote to the Proponent requesting additional information on the topic of the Project's need, purpose and alternatives. A copy of the Panel's letter of March 21, 2011 is attached to my Affidavit as **Exhibit K**.
35. The Panel did not enclose, with Exhibit K, any subpoena for the requested information. Based on my participation throughout the environmental assessment process and my review of the CEA Registry website listing all documents in the environmental assessment, to the best of my knowledge, the Panel never used its subpoena powers to obtain information from the Proponent. I have never seen any subpoena issued by the Panel. Throughout the environmental assessment process, I never heard any discussion of subpoenas, although the lack of sufficient information from the Proponent was commented on many times.
36. On March 29, 2011, Grand Riverkeeper wrote a letter to the Panel in response to Exhibit K. Our letter re-emphasized the importance of a full and complete analysis of alternatives to the Project. A copy of our letter of March 29, 2011 is attached to my Affidavit as **Exhibit L**.
37. The Panel closed its hearings on April 15, 2011. After it closed its hearings, the Panel did not request any additional information from the Proponent. In particular, the Panel made no requests for additional information within 30 days of the closing date. I know this to be true

based on my participation in the environmental assessment and my review of the CEA Registry website for the Lower Churchill Generation Project.

38. In its Report released in August 2011, at page 34, the Panel found that there are many outstanding issues and that it still did not have the information required to assess alternatives to the Project and reach conclusions on that issue.
39. For a grassroots, volunteer-based organization, the Joint Review Panel proceedings and hearings were a challenging and stressful process for me and for our other volunteers. Over a period of three and a half months, on behalf of Grand Riverkeeper, I volunteered daily on a full-time, unpaid basis, to prepare for and participate in the hearings. There were many documents to review and many new processes to learn, which stretched both our organization's financial capacity and our volunteer resources. However, because we had faith in the independence of the Joint Review Panel, and believed that the Panel would reach conclusions and make recommendations on all of the matters in its terms of reference, we persevered. My colleagues and I tried to participate as best and as fully as we could.
40. The Government of Canada, through the Participant Funding Program administered by the Canadian Environmental Assessment Agency ("CEA Agency"), provided us with funding to enable our participation in the environmental assessment of the Lower Churchill Generation Project. Grand Riverkeeper applied for and received funding to participate in this assessment on two occasions.
41. On August 30, 2007, as part of the pre-hearing proceedings, we were awarded \$13,000 to review and comment on the draft Guidelines for the Environmental Impact Statement. The CEA Agency published a news release and a report by its Participant Funding Program Review Committee, announcing and explaining this funding decision, on August 30, 2007. The news release is found on the CEA Agency's website at <http://www.ceaa.gc.ca/050/document-eng.cfm?document=23155> and the report is found at <http://www.ceaa.gc.ca/050/document-eng.cfm?document=23157>. A copy of this news release and a copy of this report are together attached to my Affidavit as **Exhibit M**.

42. As well, on September 4, 2008, the CEA Agency awarded us \$64,600 to support our participation in the CEAA assessment. This funding facilitated our efforts to engage our members and the local community in the environmental assessment, allowed us to retain experts, and facilitated our preparation for and involvement in the hearings.

E. Other processes outside of the Joint Review Panel's environmental assessment

43. I am aware that the provincial Public Utilities Board (PUB) has been mandated by the Government of Newfoundland and Labrador to conduct a review of the proposed Lower Churchill Generation Project.

44. In the summer of 2011, I contacted a PUB administrator, Cheryl Blundon, to make basic inquiries about the PUB review process. While I do not have a strong recollection of all the details of that phone call, Ms. Blundon advised that there would be public consultations. I expressed Grand Riverkeeper's interest in attending any such public hearings and that I hoped the PUB would consider having hearings in Happy Valley-Goose Bay. On September 22, 2011, I contacted Ms. Blundon again. I requested that the PUB keep Grand Riverkeeper informed about its review process, and again expressed our interest in participating in public consultations. However, I explained that, in order for Grand Riverkeeper members or experts to attend any public hearings or other public event in St. John's, Newfoundland, it would be necessary for the PUB to provide us with funding. Ms. Blundon advised me that the PUB would notify me of the dates and times of the public consultation phase, and the process for interveners. She did not identify any funding program.

45. Over the last two months, it has been widely reported by the news media that the PUB is being rushed to expedite its review without adequate information from Nalcor Energy. In this context, it has also been reported that the PUB has advised the Province and the media that it will have to scale down its planned public consultation phase, and that consultations will now be restricted to one public event in St. John's only. I have reviewed, among numerous other news articles, the four news articles which will be exhibited to the Affidavit of John Bennett to be filed in this proceeding. In addition, the concern that the PUB is being rushed has been covered by CBC radio, including on the "Radio Noon" program on January 17, 2011.

46. In the course of my inquiries to the PUB, including on the issue of funding, I was never advised of any process whereby participants or interveners in the PUB process may obtain funding assistance. To the best of my knowledge, based on information received directly from the PUB and from my review of the PUB website, the PUB does not have any funding program that could cover the costs of participants' or experts' travel to St. John's, Newfoundland.
47. Grand Riverkeeper does not have any funds budgeted to cover costs for me or another volunteer to travel to St. John's, Newfoundland, to participate in any PUB hearings held there. Without funding assistance, I am very unlikely to be able to attend any such hearings. Likewise, Grand Riverkeeper does not have any funds budgeted to pay for our expert, Mr. Raphals, to travel from Montreal, Quebec, to the Province of Newfoundland and Labrador to participate in any PUB hearings. Nor do we have funds budgeted to pay for his preparation time.
48. Along with other members of my organization, I am concerned that the Lower Churchill Generation Project, with its significant adverse environmental effects, is not justified. Specifically, I am concerned that there is a lack of need for this Project, that the Project lacks an adequate financial rationale, and that better alternatives exist.
49. Furthermore, I am concerned that the Joint Review Panel deferred, to other assessors, its assessment and conclusions on the need for, rationale for and alternatives to the Project. Grand Riverkeeper had both the right and the ability to participate in an assessment of those factors before the Panel, an independent body. However, we do not have the ability to participate in an assessment of those factors before the PUB (assuming that any meaningful public consultations happen).
50. Finally, I and other members are very concerned about the "piecemealing" and "splitting" of the environmental assessment of the Proponent's hydroelectric development, which has been split both between separate CEEA assessments and between other processes, like the

PUB. I would like the Joint Review Panel to finish its work by assessing and making findings on all of the relevant factors, with our participation, and by concluding, in light of all these factors, whether there is any justification for this Project to proceed.

AFFIRMED BEFORE ME at the Town)
of Happy Valley-Goose Bay in the)
Province of Newfoundland and Labrador)
on this _____ day of January, 2012)
)
)

Roberta Frampton Benefiel

Commissioner for Taking Affidavits

Tab 4.2

FEDERAL COURT

BETWEEN:

GRAND RIVERKEEPER, LABRADOR INC.,
SIERRA CLUB OF CANADA, and
NUNATUKAVUT COMMUNITY COUNCIL INC.

APPLICANTS

AND:

ATTORNEY GENERAL OF CANADA,
MINISTER OF FISHERIES AND OCEANS,
MINISTER OF TRANSPORT,
MINISTER OF NATURAL RESOURCES, and
NALCOR ENERGY

RESPONDENTS

AFFIDAVIT OF PHILIP RAPHALS

I, **PHILIP RAPHALS**, Energy Analyst, of 100-326 Saint Joseph Boulevard East, in the City of Montréal, in the Province of Québec, **AFFIRM THAT:**

1. I am the Executive Director and the co-founder of the Helios Centre, an independent non-profit energy policy research group based in Montréal, Québec.
2. I was engaged as an expert by Grand Riverkeeper, Labrador Inc. (“Grand Riverkeeper”) in January 2008. A copy of my *curriculum vitae* is attached to this my Affidavit as **Exhibit A**.
3. I was retained to assist Grand Riverkeeper with its preparation for and participation in the environmental assessment conducted by the Joint Review Panel (“the Panel”) of the proposed Lower Churchill Generation Project. The Panel conducted its assessment jointly under the Canadian Environmental Assessment Act (“CEAA”) and provincial legislation. The Panel’s mandate is confirmed and further articulated in the Joint Panel Agreement and Terms of Reference, which is appended as Appendix 2 of the Panel’s Report.

4. In my Affidavit, I provide evidence on three topics under three separate headings. First, I provide evidence of some key developments that provide the context for understanding the approach ultimately taken by the Panel, in its Report, to the factors of **need, rationale and alternatives**. I provide this background, contextual evidence to help the Court understand how it was that the Panel came to defer the factors of need, rationale and alternatives to other actors or processes extrinsic to the statutory environmental assessment under the CEAA.
5. Second, I provide evidence about **two extrinsic processes**, one that is ongoing and one that has concluded. These extrinsic processes have narrow mandates to look at specific questions related to – but not exhaustive of – the factors of need, rationale and alternatives. The ongoing process is a review by the provincial Public Utilities Board (“PUB”) in Newfoundland and Labrador. The concluded process, which led to a report by Navigant Consultants in September 2011, which was initiated by Nalcor Energy (“the Proponent”), excluded any public involvement. Navigant Consultants was retained by the Proponent to prepare this report.
6. To be clear, I only provide evidence about these extrinsic processes so as to respond to any argument that these extrinsic processes can somehow take the place of the Panel’s assessing and reaching conclusions on need, rationale and alternatives. I would disagree strongly with such an argument. As I describe below, factually speaking, these two processes do not have the same mandate, independence, public participation and/or funding support as the Panel under CEAA. Furthermore, these processes rely on evidence and documents which, with few exceptions, has not been put before the Panel.
7. Finally, I provide evidence about **transmission projects that are closely-related** to the Lower Churchill Generation Project, and indeed that form part of the larger “Lower Churchill Project”, but which were not assessed by the Panel as part of any cumulative effects assessment.

A. Factual Background to the Panel's Approach to Need/Rationale and to Alternatives

8. I confirm here, at the outset of this section of my Affidavit, that all of the evidence in this section regarding the background to the Panel's decision to defer assessment of need, rationale and alternatives to other entities is part of the record before the Panel. In particular, Exhibits B, C, D, E-1, E-2, F-1, F-2, G, H and I, described and appended in this section of my Affidavit, are all on the record.
9. Section 4 of the Panel's Report addresses "Project Need and Alternatives". Section 4.1 addresses "Need, Purpose and Rationale", while section 4.2 addresses "Alternatives to the Project."
10. Section 4.1 on the Report on Need, Purpose and Alternatives concludes at pages 24-25 with the following findings and recommendation:

Whether the Project is considered as a whole or as separate generating facilities, the Panel finds that there are two significant outstanding questions. The first is whether the Project is the best alternative for meeting domestic demand. This is addressed in Section 4.2, Alternatives to the Project. The second has to do with the availability of transmission access to deliver a significant portion of the Project's energy to export markets, whether markets would be available, which markets, when, and at what price could the power be sold. Nalcor's proposal for Muskrat Falls includes export capability of part of the output via the planned Maritime Link. However, no certain transmission capability has been identified for the much larger energy output of Gull Island.

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 were met.

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. (bolding in the original, underlining added)

11. Section 4.2 of the Report (Alternatives to the Project) concludes at page 34 with the following findings:

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

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

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

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

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

12. Section 4.2 of the Report, at pages 34-35, makes the following recommendation:

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. (bolding in original, underlining added)

13. Without the benefit of a completed assessment of need and alternatives, the Panel did not provide a conclusion or a recommendation as to whether the proposed Lower Churchill Generation Project is justified and in the public interest, or not. At section 17.9 of its Report, rather than making a final recommendation, the Panel presented the following “concluding thoughts on the final project decision”:

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

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

14. I agree with the conclusion that, on the limited evidence before the Panel, the Project should “likely” not be permitted to proceed. However, I believe that, had the Panel been able to complete the assessments of financial need and alternatives that it concluded were necessary, it would have been able to reach a firm and unambiguous conclusion. As I describe in the rest of this section of my Affidavit, the Panel’s inability to reach anything more than this “contingent” conclusion and recommendation on whether the Project is justified and should proceed resulted from the Panel’s failure to ensure that the Proponent produced sufficiently complete information on need and alternatives for the public hearings in March and April 2011.

15. On February 28, 2011, on behalf of Grand Riverkeeper, I submitted a written brief to the Panel entitled “Comments on the Justification of the Proposed Lower Churchill Project.” I continue to

hold the opinions, concerns and conclusions expressed in my brief, regarding the Proponent's inappropriate approach to and inadequate information for demonstrating justification generally, and to demonstrating purpose, need and alternatives more specifically. A copy of my February 28, 2011 written brief is attached to this my Affidavit as **Exhibit B**.

16. On March 7, 2011, I testified before the Panel in its public hearings in Happy Valley-Goose Bay. I testified as an expert witness on the issue of justification, in the topic-specific hearing on need, purpose and alternatives. As part of my oral testimony, I presented the written brief at Exhibit B. In this oral presentation, I raised concerns with the inadequate information and data provided by the Proponent on topics related to the Project's justification, including on the issues of need, purpose and alternatives.
17. During my presentation to the Panel, I also relied on a Powerpoint presentation. At pages 9-10, that Powerpoint presentation addressed the issue of alternatives to the proposed Project in somewhat greater detail than did my written brief. A copy of the Powerpoint presentation that I presented to the Panel on March 7, 2011 is attached to this my Affidavit as **Exhibit C**.
18. On March 7, 2011, representatives of the Proponent also testified in the topic-specific hearings on need, purpose and alternatives, and in the course of their presentation they also relied on a Powerpoint presentation. A copy of the Proponent's Powerpoint presentation on need, purpose and alternatives is attached to this my Affidavit as **Exhibit D**.
19. On March 14, 2011, I wrote to the Panel concerning an undertaking I had made at the March 8 hearing, and to make suggestions as to additional information that the Panel might request from the Proponent with respect to the issues raised in these hearings. A copy of my letter of March 14, 2011 is attached to this my Affidavit as **Exhibit E-1**.
20. One week later, the Panel wrote the Proponent to "request additional financial and other information to allow the Panel to better understand the economic justification of the Project and to compare electricity generation options to meet the Island demand with and without power from Labrador." Much of the information requested by the Panel was information that, in my

written materials and oral testimony, I had indicated was necessary but absent from the record. In addition, the Panel concluded its letter by inviting the Proponent to comment on any of the questions raised at the end of my letter of March 14, 2011 (Exhibit E-1). The Panel requested that the Proponent provide the information requested by the end of March 2011, in order to permit its review and discussion at a general hearing session in April. A copy of this letter from the Panel, dated March 21, 2011, is attached to this my Affidavit as **Exhibit E-2**.

21. On April 1, 2011, the Proponent responded to the Panel's Information Request by providing a 37-page document ("April 1, 2011 Written Response"). A copy of the Proponent's April 1, 2011 Written Response is attached to my Affidavit as **Exhibit F-1**.
22. In early April 2011, the Panel added an additional hearing session to address this document (Exhibit F-1), which it scheduled for April 13, 2011. At this hearing, the Proponent's witnesses presented and elaborated on their April 1, 2011 Written Response.
23. Having reviewed the Proponent's April 1, 2011 Written Response and its oral presentation at the April 13, 2011 hearing, it was my opinion that the Proponent's information was largely non-responsive to the Panel's March 21, 2011 Information Request and was inadequate to support an assessment of need/rationale and alternatives. I believed that the Panel should be informed of the weaknesses and inadequacies of the April 1, 2011 Written Response and of the additional information presented orally. I also believed that the Panel should be made aware of additional information that supplemented or contradicted the information submitted by the Proponent, such as on the existence of alternatives to the Lower Churchill Generation Project.
24. While I wished to make a presentation to the Panel, taking into account the new information provided in Exhibit F-1, the Panel did not provide for this in its schedule. I was however permitted to ask questions of the Proponent's witnesses, to make comments and to submit additional documents until 4 pm of the same day. The hearing ended at 1:20 pm. That afternoon, Grand Riverkeeper submitted my comments on the Proponent's new information that purported to respond to the Panel's March 21, 2011 Information Request. A copy of my April 13, 2011 submission is attached to this my Affidavit as **Exhibit F-2**.

25. At pages 1-3 of Exhibit F-2, I summarized the Panel's March 21, 2011 Information Requests, described the Proponent's April 1, 2011 Written Response, and commented on its inadequacy. I continue to hold the same opinions, concerns and conclusions as I provided in Exhibit F-2. However, as I had only a few hours in which to finalize Exhibit F-2 after the Proponent's oral presentation on April 13, 2011, some of my analysis presented therein is necessarily preliminary.

26. The introductory paragraphs of Exhibit F-2 read as follows:

As I emphasized in my Initial Comments (February 28, 2011), timely access to complete information is a prerequisite for any environmental assessment process. In those Comments, I identified serious failings in this regard with respect to the information provided by the Proponent, in particular with respect to the scenario where only the Muskrat Falls project might be built.

Fortunately, the Panel recognized this failing. In its letter of March 21, 2011, it requested significant new information from the Proponent, who responded on April 1. Unfortunately, the Proponent's response failed to provide much of the information requested by the Panel. In this first section, I summarize the Panel's questions, describe the Proponent's written responses and comment on their adequacy.

27. At pages 10-11 of Exhibit F-2, I addressed my concerns with how the Proponent had ignored wind energy altogether in its analysis of alternatives. Continuing on, at pages 11-14, I presented a very preliminary analysis suggesting that a large wind project on the Avalon Peninsula could display many of the benefits of the Muskrat Falls project, at a lower cost. If I had had more time, I would have been able to present a much more thorough analysis.

28. On April 14, 2011, I made some closing remarks to the Panel on behalf of Grand Riverkeeper. My remarks addressed whether there exists adequate justification for the proposed Lower Churchill Generation Project, and the information gaps limiting the answer to that question. A copy of the transcript of my closing remarks is attached to this my Affidavit as **Exhibit G**.

29. Among the issues I addressed in my remarks was my concern that the Proponent's assertion that there are no viable alternatives to the proposed project, in particular with respect to Conservation and Demand Management (CDM) and wind power (Exhibit G, page 12-19), was not credible.

30. I also addressed my concern that the evidentiary record was missing:

- any thorough study of the options for Holyrood, given that this issue was at the heart of the Proponent's position on justification (Exhibit G, p.24),
- any analysis of an alternative scenario based on traditional cost-of-service pricing for the Muskrat Falls power (Exhibit G, p. 29), and
- any information about transmission to from Labrador to the Island (Exhibit G, p. 30).

31. I also sought to explain that the lack of justification-related information showed that the Project's clearly demonstrated burdens could not be "outweighed" by its undemonstrated benefits:

The project has substantial economic costs, environmental and social externalities, and these environmental and social externalities should be incurred only if either the project meets a need that cannot be met at lower economic, environment and social costs or if it produces benefits that are so great as to outweigh these externalities, including the equity issues where the people who receive the benefits are different from those who bear the costs.

From what I've seen, neither of these is the case. There is no reliable evidence that the needs to be met by the project, that is to say, serving island electric needs and reducing or eliminating the use of Holyrood, cannot be met at lower economic and environmental costs by alternate solutions involving wind efficiency and probably a peaking plant or a transmission line, or in the worst case, the occasional use of Holyrood.

The financial benefits are strictly the result of using the monopoly situation to extract funds from ratepayers in excess of the actual cost of the project, and I think economically that's not a benefit, it's a really awash [sic], and for these reasons, in my view, the project should not be authorized. (Transcript, pages 33-34)

32. Just to be clear, and to ensure that the evidence before this Court is correct, I did not say "awash" but rather I said "a wash".

33. On April 15, 2011, an e-mail was sent on behalf of the Panel advising that the public hearing had ended that day and that “[t]herefore the record has closed and no additional information will be considered by the Panel.” A copy of this e-mail is attached to this my Affidavit as **Exhibit H**.
34. The Panel’s position disallowing any additional information was consistent with the Public Hearing Procedures which the Panel had earlier adopted. Paragraph 1.7.6 of the Panel’s Public Hearing Procedures provides that “[a]t the end of the public hearings, the Panel will close the record of the review process and no additional new information will be considered.” A copy of the Panel’s Public Hearing Procedures is attached to this my Affidavit as **Exhibit I**.
35. Thus the Panel adopted a process that precluded me from submitting more fulsome comments responding to the Proponent’s new information presented on April 13, 2011. Had the Panel not so clearly foreclosed the use of its powers to accept additional information after the end of the public hearings, I would have been able to submit a thorough response to the new information. At Appendix 2 of the Report, the Joint Panel Agreement and Terms at Reference grants the Panel all the powers in sections 64 and 65 of the Environmental Protection Act (“EPA”) and applicable regulations.
36. If given more time, I would have submitted further analysis and evidence on need and alternatives in order to assist the Panel in making its own assessment and conclusions on need and alternatives, rather than deferring the assessment of these factors to others.
37. In addition, the Panel’s decision to defer the issues of need and alternatives to other entities undermined the Panel’s ability to comply with its own Justification Framework. After consulting with participants including the Proponent on draft hearing guidelines in 2010, the Panel finalized guidelines entitled *Framework for Determining Whether Significant Adverse Environmental Effects are Justified and Whether the Project Should be Approved* (“Justification Framework”). The Panel’s Justification Framework states that at “the heart of the decision-making framework is the concept that ... the Project should result in net environmental, social and economic benefits.” The Panel’s Justification Framework is located at Appendix 8 of the Panel’s Report.

38. Despite creating this explicit Justification Framework, the Panel did not reach a conclusion or recommendation on whether the Lower Churchill Generation Project and its significant adverse environmental effects are justified. As made clear from the Report's "concluding thoughts" excerpted above at paragraph 13 of my Affidavit, the Panel could not conclude or recommend whether the Project was justified or should be approved due to the absence of information allowing an assessment of need and alternatives.

39. Based on my years of experience participating in environmental and regulatory reviews of proposed energy projects, it is my opinion that any appropriate, effective environmental assessment requires the production of relevant information *before* that information is scheduled to be tested, whether in hearings or otherwise. In my experience in environmental assessments of proposed energy projects, I have never before seen a Panel permit a Proponent to so blatantly "run out the clock".

B. Assessments "extrinsic" to the Panel – the Public Utilities Board review and the Navigant Report

1. The Public Utilities Board review

40. In anticipation that the Proponent may raise the existence of the PUB Review of Muskrat Falls as a reason not to require the Panel to complete its assessment under CEAA, below I briefly describe what I know of the PUB process and what I know of the PUB's experience to date in attempting to perform its mandate, based largely on my review of the PUB website.

41. Before the Panel had completed its Report, the Province of Newfoundland and Labrador announced on June 17, 2011 that it had mandated the provincial Public Utilities Board ("PUB") to conduct a review of the Muskrat Falls component of the Lower Churchill Generation Project and the Labrador-Island Link transmission line ("PUB Review of Muskrat Falls"). I located the Province's June 17, 2011 press release and backgrounder at <http://www.releases.gov.nl.ca/releases/2011/nr/0617n04.htm>. A copy of this June 17, 2011 press release and backgrounder is attached to this my Affidavit as **Exhibit J**.

42. Exhibit J also contains within it the “Terms of Reference and Reference Question”. The Reference Question that the Province referred to the PUB is that “[t]he 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 of 2011-2067, as compared to the Isolated Island Option”. This Isolated Island Option is not defined in Exhibit J. However, it is defined in a Schedule B of the full Terms of Reference and Reference Question, found on the PUB website at <http://www.pub.nf.ca/applications/MuskratFalls2011/files/corresp/TermsOfReference.pdf>. A copy of this document is attached to this my Affidavit as **Exhibit K**.
43. Thus the stated Reference Question for the PUB Review of Muskrat Falls is different from and narrower than the questions and factors which the Panel concluded were necessary to assess alternatives under CEAA (as excerpted in my Affidavit above at paragraphs 11 and 12.) The PUB Review of Muskrat Falls looks at only one alternative scenario, the so-called Isolated Island Scenario. Most notably, the mandate of the PUB Review of Muskrat Falls clearly does not include comparison with other economically viable and more environmentally sustainable alternatives, such as Conservation and Demand Management (“CDM”) and wind power, beyond the modest levels retained by the Proponent in its Isolated Island Scenario.
44. Because of the narrow nature of the mandate given to the PUB by the Province of Newfoundland and Labrador, it is unlikely that the PUB’s ultimate report, if and when it is released, will contain sufficient information to respond to the questions and concerns raised by the Panel regarding alternatives.
45. In addition, even if the PUB’s future report does contain some information responsive to the Panel’s recommended alternatives assessment, there is currently no process for putting the PUB’s report back before the Panel. From my experience in environmental assessment and regulatory review of proposed energy projects, it makes no sense to “parse out” from the Panel’s overall assessment such a fundamental factor as alternatives. Alternatives is a key factor in any

justification analysis of proposed energy projects. Normally, alternatives would be weighed as part of the overall mix of “benefits and burdens” caused by a proposed energy project.

46. From my review of the PUB website, it is apparent that not all of the information considered by the PUB is available to the public. Some exhibits have been redacted before being made public. Furthermore, some of the Proponent’s responses to requests for information have not been made public, even in redacted form. This contrasts with the Joint Panel Review’s process where, to the best of my knowledge, all of the information submitted to the Panel was available to all participants and to the public, through the CEA Registry.
47. From my review of the PUB website and from conversations with Grand Riverkeeper, I have been able to find no indication, to date, that any participant funding will be made available to allow concerned parties to participate fully and effectively in the PUB process. This contrasts with the Joint Review Panel’s process which featured a Participant Funding Program.
48. On January 27, 2012, I printed from the PUB website a list of the publically available exhibits in the PUB Review of Muskrat Falls, as well as a list of the exhibits submitted in the PUB Review of Muskrat Falls which have been abridged and/or redacted to protect confidential information. I located these lists on the PUB website at <http://www.pub.nf.ca/applications/MuskratFalls2011/nalcordocs.htm> and at <http://www.pub.nf.ca/applications/MuskratFalls2011/abridge.htm>. To the best of my knowledge, based on my participation in the Panel’s assessment and my review of the CEA Registry website listing all documents submitted to the Panel during its assessment, only a few of the hundreds of documents on this list were ever provided by the Proponent to the Panel in support of the Proponent’s analysis comparing its preferred Muskrat Falls scenario with its alternative Isolated Island scenario. A copy of this list is attached to this my Affidavit as **Exhibit L**.
49. Based on these facts, not only am I concerned about the artificially narrow mandate given to the PUB, in contrast to that of the Joint Review Panel, but I am concerned that the PUB procedural rights are less than those to which Grand Riverkeeper and other participants were entitled in the

Panel's public hearings. Unlike the Panel, some documents considered by the PUB are kept confidential and it does not appear that there is a participant funding program.

50. I am also concerned that the Proponent has tendered evidence before the PUB that it did not make available to the Panel. I believe that the evidence and documentation provided by the Proponent to the PUB, and the PUB's ultimate report, would contribute to the Panel being able to conclude its assessment of need and alternatives.
51. In addition, as I describe below, the PUB Review of Muskrat Falls has been deprived by the Province of the time that the PUB says it requires to conduct public consultations.
52. On September 22, 2011, the PUB wrote to the Province to advise that it would require an extension of its reporting deadline, fixed in Exhibit K at December 30, 2011. I located this letter on the PUB website at <http://www.pub.nf.ca/applications/MuskratFalls2011/files/corresp/PUB-Letter-Minister-Sept22-11.pdf>. In the letter, the PUB points out that the initial timeframe was ambitious, and that it was already clear that it would not be able to complete the review by year end. It did not at that time request a formal extension, stating that it was unable to provide a realistic alternate date until it had a better idea when Nalcor would provide the information that had been requested. A copy of the PUB's letter of September 22, 2011 is attached to this my Affidavit as **Exhibit M**.
53. In a letter sent on December 12, 2011, the Province responded that it was "imperative that we receive the report by March 31, 2012". I located this letter on the PUB website at <http://www.pub.nf.ca/applications/MuskratFalls2011/files/corresp/Minister-Letter-Dec12-11.pdf>. Rather than give the PUB the time it said it needed, the Province only granted an extension to March 31, 2012. A copy of the Province's letter of December 12, 2011 is attached to this my Affidavit as **Exhibit N**.
54. On December 16, 2011, the PUB again wrote to the Province and made a formal request to extend its reporting deadline to June 30, 2012. I located a copy of this letter on the PUB website

at <http://www.pub.nf.ca/applications/MuskratFalls2011/files/corresp/PUB-Letter-Minister-Dec16-11.pdf>. The PUB sets out a more detailed tentative schedule, which contemplates the filing of Manitoba Hydro International's report by January 27, a Notice of Public Consultation by January 30, 2012, and Public Consultations from April 2-13, 2012. A copy of the PUB's letter of December 16, 2011 is attached to this my Affidavit as **Exhibit O**.

55. Today, on January 31, 2012, I checked the PUB website. There was no indication that Manitoba Hydro International has filed its report, and no Notice of Public Consultation has been posted, as had previously been anticipated by the PUB on December 16, 2011.

56. The PUB's letter of December 16, 2011, at Exhibit O, states in part that:

The reason this extension is necessary is Nalcor's failure to provide the required information in a timely fashion. This review began in June but as of late November Nalcor was still filing significant new information. Between November 10 and November 24, 2011 Nalcor filed its submission as required by the Terms of Reference, a detailed study in relation to reliability, responses to 115 requests for information and 12 additional exhibits.

Given Government's desire to have this review completed in March we have reconsidered the work that remains to be done to see if there are opportunities to make up for the time lost as a result of the late filings by Nalcor. Unfortunately, I must advise that it is not possible for this review to be completed any earlier than the end of June 2012, The full and fair participation of the Consumer Advocate as well as the public hearing required by section 5 of the *Electrical Power Control Act, 1994*, SNL 1994, c. E-5.1 will dictate the schedule until late spring and it is only then that the Board can begin to write its report. (emphasis added)

57. On December 23, 2011, the Province wrote a letter denying the PUB's request. The Province's letter stated that "given that the Terms of Reference are confined to a review of whether Nalcor's proposal represents the least-cost option for the supply of power to island connected customers. Government queries whether all the processes contemplated" by the PUB are necessary. I located a copy of this letter on the PUB website at <http://www.pub.nf.ca/applications/MuskratFalls2011/files/corresp/Minister-Letter-Dec23-11.pdf>. A copy of this letter of December 23, 2011 is attached to this my Affidavit as **Exhibit P**.

58. On January 6, 2012, the PUB wrote a reply letter. The PUB advised that while it would “work towards” the March 30 [sic], 2012 deadline, it has had to revise its planned activities to abridge the process. In particular, the PUB advises that public hearings would now be limited to St. John’s, Newfoundland, and that they may be time-limited. I located this letter on the PUB website at <http://www.pub.nf.ca/applications/MuskratFalls2011/files/corresp/PUB-Letter-Minister-Jan6-12.pdf>. A copy of the PUB’s letter of January 6, 2012 is attached to this my Affidavit as **Exhibit Q**.

2. The Navigant Report

59. In addition to the PUB Review of Muskrat Falls, another “independent” assessment that may be relied on to excuse the Panel’s failure to assess need or alternatives is the Navigant report.

60. On September 15, 2011, the Proponent made public a report by Navigant Consultants. The report reviewed the Proponent’s process and choice in selecting the Muskrat Falls project with the Labrador-Island Link as its preferred option for energy supply to Newfoundland. A copy of the Proponent’s September 15, 2011 Press Release entitled *Nalcor Energy releases independent review of Muskrat Falls development* is attached to this my Affidavit as **Exhibit R**. A copy of the report by Navigant Consultants entitled *Independent Supply Decision Review* is attached to this my Affidavit as **Exhibit S**.

61. This report is identified in Exhibit R, at page 1, as part of the Proponent’s “quality assurance” with respect to Nalcor’s recent decision to pass the project through its “Decision Gate #2”.

62. As indicated in Exhibit S, at page 2, the Proponent retained Navigant to “review the reasonableness of: 1) the long-term island supply options considered by Nalcor; 2) Nalcor’s assumptions associated with island supply options; and 3) the process followed to screen and evaluate the supply options. Navigant was then to provide an opinion on: 1) whether the Interconnected Island alternative represents the least-cost option that also fulfills the additional

criteria requirements of security of supply and reliability, environmental responsibility, and risk and uncertainty; and 2) the accuracy of rate projections.”

63. While Nalcor and Navigant describe this effort as an “independent review,” it is not independent in the same sense as a Panel review is independent. It was conducted a consultant selected by Nalcor and was based on “assumptions, inputs and analysis undertaken by Nalcor” (Exhibit S, page 2).
64. The mandate for the Navigant review does not respond to the Panel’s findings and recommendations at Section 4.2 of its Report, replicated at paragraphs 11-12 of my Affidavit. This mandate, which as noted in paragraph 61 above was limited to reviewing the reasonableness of the long-term island supply options considered by Nalcor, as well as Nalcor’s assumptions associated with island supply options and the process it followed to screen and evaluate these options, is much narrower than the alternatives assessment which the Panel concluded was necessary.
65. In carrying out this mandate, the Navigant report does not respond to most of the questions on alternatives that the Panel identified but did not answer (as I have set out above in paragraph 12 of my Affidavit).
66. Furthermore, it does not incorporate environmental or social externalities and considerations into the analysis (other than greenhouse gas pricing, in a sensitivity analysis, Exhibit S at page 59-60). Specific limitations of the Navigant report include 1) its reliance on a 2004 Nalcor study which found that additional wind power might lead to spilling to eliminate scenarios with higher levels of wind penetration, without evaluating the overall economic implications of such scenarios (pages 23-27); 2) its reliance on an outdated study to limit conservation and demand management (“CDM”), despite the fact that avoided costs have increased greatly (pages 34-37); and 3) its inappropriate exclusion of certain combinations in its sensitivity analyses, such as the combination of greater CDM and additional wind power (pages 62-63).

67. There was no opportunity for me, or for Grand Riverkeeper, other participants or the Panel itself, to identify, consider, challenge or test flawed assumptions in the Navigant report. No process allowed for that. Unlike the Panel's environmental assessment, the Navigant report was created by the Proponent's consultants through an internal process closed to outside participation or comment.

68. No draft of the Navigant report was ever provided to the Panel. The stated inputs for Navigant's review included "all necessary financial and engineering models, reports, and discussions with management and personnel" (Exhibit S, page 15). To the best of my knowledge, no financial or engineering models were shared with or provided to the Panel or its participants.

69. Since the Navigant report was released, university economists have questioned the need for the proposed Lower Churchill Generation Project. For example, the C.D. Howe Institute published a study by Memorial University of Newfoundland economics professor James Feehan concluding that it would be premature to authorize the Muskrat Falls facility without reforms to the Province's electricity pricing regime. A copy of Prof. Feehan's paper entitled *Newfoundland's Electricity Options: Making the Right Choice Requires an Efficient Pricing Regime* is attached to this my Affidavit as **Exhibit T**.

70. In the event that the Panel were reconstituted and directed or requested to assess, provide rationales and make recommendations on the need/rationale for the Project or on alternatives to the Project, Grand Riverkeeper has asked me and I have agreed to provide expert analysis to the Panel, through written and oral testimony. I would also review and, where appropriate, critique the Proponent's information and analysis.

C. The Proponent's closely-related projects were not subject to cumulative effects assessment

71. In addition to its proposed Lower Churchill Generation Project, the Proponent is also proposing what it sometimes refers to as the Lower Churchill Transmission Project (or alternatively, the Labrador-Island Transmission Link Project). The proposed Labrador-Island Transmission Link would link the power generated from the Generation Project in Labrador to the Island of

Newfoundland. Its transmission lines are proposed to traverse Southern Labrador, cross the ocean by subsea cable, and continue through Newfoundland until they connect with the grid.

72. However, the Lower Churchill Transmission Project was not part of the environmental assessment by the Panel. Notably, the Panel did not assess any cumulative environmental effects of the proposed Generation Project in combination with the proposed Transmission Project. Section 16 of the Panel's Report, regarding cumulative effects, is completely silent on any closely-related transmission projects like the Labrador-Island Transmission Link.
73. Thus, the Proponent, Nalcor Energy, is also a proponent of closely-related transmission projects, including the Labrador-Island Transmission Link Project. I have reviewed the portion of the Proponent's website addressing the "Lower Churchill Project." The "home page" for the Lower Churchill Project is <http://www.nalcorenergy.com/lower-churchill-project.asp>. From there, one can link either to a webpage on the Lower Churchill Generation Project, found at <http://nalcorenergy.com/generation-project.asp>, or a webpage on the Lower Churchill Transmission Project, found at <http://nalcorenergy.com/transmission-project.asp>. A copy of the Proponent's "home page" for the Lower Churchill Project, and copies of its webpages for the Generation and Transmission Projects, are together attached to this my Affidavit as **Exhibit U**.
74. As Exhibit U states, the Lower Churchill Project "consists of two sub-projects: Generation and Transmission". The Lower Churchill Generation Project and the Lower Churchill Transmission Project (which the site also refers to as the Labrador-Island Transmission Link Project) are two components of one larger development project known as the Lower Churchill Project.
75. That the Generation Project and transmission projects are closely related is also reflected in the Proponent's Annual Report for 2010. Page 36 of Nalcor's Annual 2010 Report gives a visual representation mapping the Generation Project with all the related transmission projects. A copy of excerpts of Nalcor's Annual 2010 Report is attached to my Affidavit as **Exhibit V**.

76. During the same time that the proposed Lower Churchill Generation Project was going through its assessment, two federal departments responsible for its assessment were also aware of and responsible for the proposed Labrador-Island Transmission Link Project. On November 26, 2009, the original "Notice of Commencement" for a separate screening-level assessment of the proposed Labrador-Island Transmission Link Project was published on the CEA Registry. I located it online at <http://ceaa.gc.ca/050/details-eng.cfm?evaluation=51746&ForceNOC=Y>. Fisheries and Oceans Canada, Transport Canada and Environment Canada are listed as responsible authorities. A copy of the original November 26, 2009 Notice of Commencement for the Labrador-Island Transmission Link Project is attached to this my Affidavit as **Exhibit W**.
77. Exhibit W had to be amended on April 28, 2010, in response to the Supreme Court of Canada's decision in *MiningWatch v. Canada (Minister of Fisheries and Oceans et al)*. From that date, while the proposed Labrador-Island Transmission Link Project continued to be assessed separately from the related Generation Project, it is now subject to a comprehensive study assessment and not just a screening assessment. I located the amended Notice of Commencement for the Labrador-Island Transmission Link Project published on the CEA Registry at <http://ceaa.gc.ca/050/details-eng.cfm?evaluation=54751&ForceNOC=Y>. A copy of the amended April 28, 2010 Notice of Commencement is attached to this my Affidavit as **Exhibit X**.
78. Natural Resources Canada also acknowledges that the Lower Churchill Generation Project is not a "stand-alone" project. A backgrounder published by Natural Resources Canada on its website, entitled *Lower Churchill Clean Energy Projects*, characterizes the Generation Project as part of the "lower Churchill River projects". The backgrounder states that "[i]n November 2010, Nalcor Energy, Newfoundland and Labrador's Crown-owned energy company, and Emera Incorporated of Nova Scotia announced plans to develop the lower Churchill River projects, which consist of a new hydroelectric generating station at Muskrat Falls and three transmission lines." The three transmission lines stated to form part of the lower Churchill River projects are the Labrador Transmission Interconnection Project, the Labrador-Island Transmission Link Project, and the Maritime Subsea Link Project. This backgrounder is published at <http://www.nrcan.gc.ca/media-room/news-release/2011/77a/1813> and a copy of it is attached to my Affidavit as **Exhibit Y**.

79. Finally, the Province of Newfoundland and Labrador also acknowledges, in information published on its website, that the Muskrat Falls dam and the Labrador-Island Link projects are related. For example, the Province's announcement on June 17, 2011, at Exhibit J, indicates that the PUB will review the Muskrat Falls dam and the Labrador-Island Link transmission line together and assess them against the "Isolated Island" development option.

80. In addition to the need to assess the proposed Labrador-Island Transmission Link and other related transmission projects in a cumulative environmental effects assessment, the alleged economic benefits of and need for the proposed Lower Churchill Generation Project cannot, in my view, be meaningfully or fairly assessed without including the economic cost of power transmission. By excluding the proposed transmission projects from the assessment of the generation project, the economic costs of the generation project can appear to be much less than what they are reasonably anticipated to be. This concern has been echoed by the media in Newfoundland, such as in an article published in the Telegram on January 19, 2012 entitled "Questions Linger around Muskrat". I found an on-line copy of this article on the Telegram's website, at <http://www.thetelegram.com/News/Local/2012-01-19/article-2868171/Questions-linger-around-Muskrat/1>. A copy of this January 19, 2012 Telegram article is attached to this my Affidavit as **Exhibit Z**.

81. I provide this Affidavit in support of Grand Riverkeeper's application for judicial review and for no other or improper purpose.

SOLEMNLY AFFIRMED BEFORE)
ME at the City of Montréal, in the)
Province of Québec, on this 31st)
day of January, 2012)
)

Philip Raphals