Information Note
Department of Environment and Conservation

Title: Permit to Alter a Body of Water - Lower Churchill Project (LCP)

Issue: Issues raised with the issuance of the permit to Nalcor to alter a body of water under section 48 of the *Water Resources Act*.

Background and Current Status:

- Two permits to alter a body of water have been issued under Section 48 of the *Water Resource Act*, relating to the construction of dams at the LCP at Muskrat Falls:
  - ALT6700– Lower Churchill Muskrat Falls- Bulk Excavation and Associated Civil Works (Oct 31, 2012); and,
  - ALT6933– Lower Churchill Muskrat Falls- Dams, Powerhouse, Spillway and North Spur Stabilization (July 10, 2013).

- ENVC received Nalcor's application for the final dam structure on March 25, 2013. The application included appropriate application schedules and technical design information. Requested information in the application form on an Emergency Preparedness Plan and Dam Safety Review were addressed in the terms and conditions of the Permit ALT 6933.

- All applications for dams are thoroughly reviewed by ENVC from a hydrotechnical perspective as per the requirements of the Canadian Dam Association (CDA) *Canadian Dam Safety Guidelines, 2007*. The established consultation and technical review protocols were followed in reviewing the application and issuing the permit.

- Under the terms and conditions in permit ALT6933 an Emergency Preparedness Plan for the dams is required prior to reservoir filling. This plan will be submitted to ENVC for review in early 2015. A *Project Wide Emergency Response Plan* was provided by Nalcor as required by the release from the Environmental Assessment (EA) process. Permit ALT6933 also stipulates that a Dam Safety Review Report is required two years after the start of reservoir filling and every five years thereafter.

- On August 15, 2013, the Nunatsiavut Government (NG) filed an application for the judicial review of permit ALT6933 issued by ENVC. The application will be heard by the Supreme Court of NL, General Division in St. John's, September 23-26, 2014.

- The NG has concerns that the partial wood cutting and impoundment of water in the reservoir may result in increases in methyl mercury downstream which may affect the safety of fish consumption. The NG claims that without full reservoir vegetation clearing to decrease the level of methyl mercury produced, any mitigation that would include the issuance of consumption advisories for fish and seals and other country foods would be a direct violation of Inuit human, treaty and individual rights.

- The NG claims GNL did not thoroughly assess the options of full versus partial clearing for the reservoir during the environmental assessment review process. The NG claims that during the

panel EA review process, it expressed concerns that the guidelines for the Environmental Impact Statement (EIS) issued by the Minister of ENVC needed to include a study area encompassing the Settlement Area in the Lake Melville area to ensure any downstream effects could be assessed. The final EIS guidelines required the proponent to justify the study area for the project and therefore did not include the Lake Melville area.

- Recommendation #6.7 of the Joint Environmental Review Panel requires Nalcor to assess downstream effects of mercury over time. Nalcor is required to collect information on mercury levels prior to impoundment and will continue to do so during the construction and post-construction phases of the project.

- Appropriate monitoring regimes are in place by Nalcor to monitor downstream impact of the reservoir clearing and flooding.

- On February 24, 2014, Mr. Cabot Martin wrote to ENVC Minister Joan Shea regarding dam safety issues at Muskrat Falls. NR Minister Derrick Dalley responded on her behalf outlining the measures proposed to stabilize the North Spur as well as the geotechnical and engineering expertise engaged in the project modeling, design and review.

- In July 2014, Mr. Cabot Martin published his book *Muskrat Madness* about the key issues in the history of the development of the Muskrat Falls project. In his letter and book, Mr. Martin expresses concern over the stability of the dam (particularly the North Spur portion) due to marine clays present in the surficial geology of the lower Churchill River valley. Marine clays are prone to landslides.

- The presence of "quick clay" in the North Spur area was initially identified back in the 1960's. While there is evidence of landslides both upstream and downstream of the North Spur, the main trigger for all landslides in the area has been toe erosion of stream banks.

- Mr. Martin subsequently wrote the Deputy Minister of ENVC and requested info on the permit and highlighted that a landslide occurred approximately 9.5 km downstream of Muskrat Falls during the summer of 2014. The landside was subsequently reported in the media. The Deputy Minister's response outlined the provision of the appropriate permits for the various alteration, construction and stabilization components related to the project. It also outlines the Dam Safety Review process and the project's completion of a project wide Emergency Response Plan.

- Nalcor undertook various dam break studies that examined numerous dam failure scenarios. The CDA *Dam Safety Guidelines, 2007* require evaluation of the failure scenario that would result in the worst case consequences. The *Muskrat Falls Dam Break Study, 2010* selected monolithic failure of the North Roller Compacted Concrete Dam by overturning or sliding as the worst case scenario. Failure of the North Spur portion of the Muskrat Falls dam was not considered the scenario that would result in the worst case consequences, and was therefore not evaluated as part of the dam break studies to date.

- Nalcor has undertaken a comprehensive dam safety hazard analysis and assessment. As part of this assessment Nalcor has evaluated a number of elements, including: hydro-technical, seismic, geotechnical, flood, dam break, ice and North Spur stabilization considerations.

- The design for the North Spur has been undertaken by qualified geotechnical engineers with SNC Lavalin. The design includes several preventative barriers and practices that will help to address the issue of the stability of the North Spur.

- The North Spur engineering design has also been reviewed by independent third parties including MWH International, and a Cold Eye Review undertaken by Hatch. Opinion from these reviews is that the current design is adequate.

- The design of the Muskrat Falls dam has been an iterative process that has occurred over decades. This timeframe has ensured that the design is as robust as possible, ensuring a standard of care equivalent to that of the risk posed by the dam. Initial field work and investigations have been repeated and expanded to provide a comprehensive hazard assessment.

Action Being Taken:

- ENVC will monitor compliance with all terms and conditions established in permits ALT6700 and ALT6933.

- Vegetation removal currently underway prior to reservoir filling will reduce the resulting methyl mercury levels. Continuous monitoring by Nalcor through an approved Human Health Environmental Effects Monitoring Program will monitor methyl mercury levels and assure the safety of fish consumption. Advisories will be issued by Nalcor if necessary in keeping with established Health Canada and the Canadian Council of Ministers of the Environment.

- ENVC will continue to review reports produced by Nalcor that deal with hydrotechnical aspects of the LCP at Muskrat Falls, and will work with Nalcor to address any issues.

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Reviewed by: I. O'Shea/T. King, Cabinet Secretariat
Ministerial approval: Received from Hon. Vaughn Granter

September 12, 2014

Cabinet Secretariat Comment:

- LAAO and NR have reviewed and have no concerns.