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CIMFP Exhibit P-02045

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LCP Ref. No. L010-D010-202-010642-00001

April 23, 2014

The Honourable Derrick Dalley  
Minister, Department of Natural Resources  
Government of Newfoundland and Labrador  
50 Elizabeth Avenue  
P. O. Box 8700  
St. John's, NL A1B 4J6



Dear Minister Dalley:

This letter is in relation to correspondence you have received from Mr. Cabot Martin in relation to the North Spur at the Muskrat Falls site and issues relating to dam safety. Mr. Martin makes a number of allegations in relation to the development and I believe it is important to correct these points.

At the outset, I would note that some of Mr. Martin's requests in relation to safety of works, dam safety review reports, and emergency preparedness plans are somewhat premature. While I fully understand with the requirement for such plans pursuant to the *Water Resources Act*, these documents are required prior to impoundment of the reservoir, not with the start of construction. More specifically, completion of a dam safety review would be predicated on the actual completion of construction of the dam.

In accordance with the *Act* and also with commitments made during the environmental assessment for the project, the aforementioned plans and reports will be submitted to the Province prior to impoundment of the reservoir. Our previous documentation relating to dam safety was made available to the public during the environmental assessment process, and we would make our final submissions to the Province public as a matter of course.

While Mr. Martin makes several references to dam break analysis completed during the environmental assessment process, it is important to clarify that these analyses were based on planning information, and that final versions of these documents, based on completed detailed engineering and final specifications, will be filed in accordance with the permitting requirements and conditions of EA release for the project.

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In relation to the comments offered by Dr. Stig Bernander, I believe that it is important to highlight his first comment, as contained in his letter attached to Mr. Martin's letter:

*"My points of view in this context are of a general character considering the fact that I still have no precise data regarding soil structure and soil properties in the North Spur. Furthermore, I have not performed any progressive analyses of my own in respect of possible slope failures in the down-slope direction. Hence, my comments will just reflect my some 40 years overall experience of landslides in normally consolidated very sensitive clays."*

General comments in this regard do not inform the design and planning of works at the site. Furthermore, the potential for progressive slides at Muskrat Falls has been a design consideration since the mid 1960's and in this regard, Dr. Bernander's comments do not raise any new issues in relation to the North Spur.

Extensive works to stabilize the North Spur have been proposed, with an ultimate objective of achieving the same safety margins for the North Spur as for an engineered dam. The measures planned include:

- Flattening both the upstream and downstream slopes to increase the overall safety factor against sliding failures.
- Placement of rockfill and riprap slope erosion protection on all areas of the upstream and downstream slopes, along with placement of stabilizing fill in selected areas of the downstream slope to improve local toe stability and reduce potential for retrogressive failures in sensitive marine clays of the Upper Clay unit.
- Construction of an impervious fill blanket at the upstream slope and installation of a cut-off wall at the base of the blanket. This combined barrier will block water seepage into the spur from the reservoir. The cut-off wall (plastic cement slurry wall) will be connected to the impervious lower clay formation that extends beneath the river level.
- Construction of a second cut-off wall across the north end of the spur to cut off seepage from the high ground north of the river. The upstream end of this wall will be connected to the cut-off wall of the upstream slope.
- Construction of toe relief drains and a major drainage trench to further lower the water table.
- Long term monitoring of the piezometric conditions within the spur during operation of the reservoir. It is planned to augment the existing network of 29 piezometers with 15 additional ones. All piezometers will be instrumented with electronic sensors and data will be recorded on a continuous basis and transmitted to Nalcor's headquarters in St John's.





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The engineering design for the North Spur has been undertaken by qualified geotechnical engineers with SNC Lavalin, and has the benefit of extensive field investigations to support the engineering design. Given the importance of the North Spur, this area has also been reviewed by MWH Canada, the project's independent engineer, and also by a separate Cold Eye Review undertaken by Hatch.

In its report, MWH offered the following comments:

*The stabilization works have been designed in accordance with currently accepted geotechnical design practices and will effectively stabilize the north spur when the reservoir is impounded. The upstream impervious blanket and the plastic cement slurry cut-off walls will control seepage and piezometric levels in the spur. Slope flattening excavations and the placement of lower slope weighting berms will enhance slope stability. Erosion control blankets of rockfill and rip rap will be placed on the upstream and downstream slopes to prevent natural erosion that would contribute to slope degradation and instability over time. The planned long term monitoring program is an important component of the works which will ensure safe operation of the reservoir and detect on a timely basis any anomalous behavior that may affect safe operations.*

*The IE has reviewed various aspects of the geotechnical designs and planned works. Detailed and rigorous investigations and laboratory testing of samples have provided accurate geotechnical and hydrogeological data. Limit Equilibrium stability analyses have been carried out for the final slopes. Various materials assessments have been done to determine gradations of the various fill materials that will be used. These works have been augmented by a seismicity study, 2D seepage analysis and reservoir landslide generated wave height studies. All of this work has been carried out to a high standard.*

*Geotechnical design work continues at the time of writing and the final design report has not yet been issued. The recently issued "Cold Eye Review of Design and Technical Specifications, North Spur Stabilization Works" by Hatch has indicated that, among other things, additional investigations and analyses are recommended to further enhance the design parameters for the sensitive clays and the overall seepage analysis assessment of the spur. The recommended work includes further investigations of the properties of the sensitive clays with respect to cyclic softening, more detailed stability*



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*analyses to assess the impact of earthquake ground motions and further seepage analyses. The IE was advised that Nalcor is following the recommendations provided by the Cold Eye reviewers. The IE has not yet been advised of details of the planned work.*

*The IE agrees with the Cold Eye recommendations and understands that work is proceeding on them. This supplementary work will further enhance confidence in the current design and should not result in any significant modifications to the planned work.<sup>1</sup>*

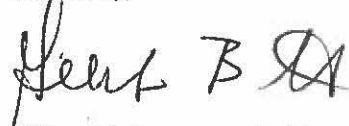
The Cold Eye review undertaken by Hatch reached a similar conclusion:

*The basis of design is in general robust and all the main elements for the most part have been considered.*

The Cold Eye Review has recommended that the development of a hydrogeologic model with 3D seepage analysis be undertaken, and also that additional analysis of the sensitive clays in the area when subjected to seismic loading be taken. We agree with both of these recommendations and have initiated this work.

We have also engaged with the Water Resources Division, Department of Environment and Conservation to review the work undertaken to date and our plans for the site. We will continue to cooperate with the Province on this matter, as we all have a strong interest in ensuring the safety and integrity of the facilities under construction at Muskrat Falls.

Sincerely,



**Gilbert J. Bennett, P. Eng.**

Vice President, Lower Churchill Project

cc. Hon. Joan Shea, Minister, Department of Environment and Conservation  
Ms. Marion Organ, Lower Churchill Project

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<sup>1</sup> Interim Independent Engineer's Report, Lower Churchill Project, Section 2.3.4, p.

