

**Fred James**

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February 9, 2018

Mr. Patrick Wruck
Commission Secretary and Manager
Regulatory Support
British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, BC V6Z 2N3

Dear Mr. Wruck:

**RE: Project No. 1598932
British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
Mandatory Reliability Standards (MRS) TPL-001-4 Assessment Report
Responses to Commission Information Request No. 1**

BC Hydro writes in compliance with Commission Order No. R-48-17 to provide, as Exhibit B-4, its responses to Commission Information Request No. 1.

For further information, please contact Geoff Higgins at 604-623-4121 or by email at bchydroregulatorygroup@bchydro.com.

Yours sincerely,

(for) Fred James
Chief Regulatory Officer

st/ma

Enclosure

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1.0 A. TERMS OF BC HYDRO TPL-001-4 ASSESSMENT REPORT

Reference: BC HYDRO IMPLEMENTATION COSTS OF MRS TPL-001-4 British Columbia Hydro and Power Authority (BC Hydro) Mandatory Reliability Standard (MRS) TPL-001-4 Assessment Report, Section 3, p. 7; BC Hydro’s Adoption Recommendation, Section 5.2, p. 17, Table 3 Revised Standard Final Assessment Summary

On page 7 of the Assessment Report, BC Hydro states the one-time and ongoing implementation costs of TPL-001-4 as:

BC Hydro estimates that the cumulative cost for B.C. registered entities to achieve and maintain compliance with the Revised Standard (TPL-001-04) and the TPL-001-04 Terms being recommended for adoption in B.C. will be at least \$496,000 with respect to one-time costs, and at least \$43,000 on an annual ongoing basis.

On page 17, Table 3, of the Assessment Report, FortisBC Inc. (FBC) states the one-time and ongoing implementation costs of TPL-001-4 as:

One-time Costs (\$) – R1-R6, R8: \$30,000-\$50,000 total; studies using short circuit models with any planned generation and transmission facilities in service which could impact the study area will need to be developed and maintained. Minor modifications to the annual Fortis BC planning study will be required.

Ongoing Costs (\$/year) – R1-R6, R8: \$15,000 - \$20,000; new short circuit analyses will be required annually.

1.1.1 These provided one-time and annual costs are related to the incremental manpower required to demonstrate TPL-001-04 compliance. Please address the costs/benefits of needed incremental system enhancements to meet the performance requirements of the Revised Standard, particularly as they relate to Non-Consequential Load Loss (NCLL) as stated in footnote 12 on page 5 of the Assessment Report and the Spare Equipment Strategy Requirements (R2.1.5).

RESPONSE:

BC Hydro’s submitted TPL-001-4 assessment incremental costs were only addressing estimated costs to develop system models per Requirement 1 (\$10,000), to perform initial studies per Requirement 2 (\$56,000) and ongoing studies (\$28,000 annually), and the NCLL related Stakeholder Engagement Processes as set out in Attachment 1 of TPL-001-4 (Stakeholder Process), of

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which preliminary assessments estimated four such Stakeholder Processes (\$100,000 per engagement for a total of \$400,000). Estimated costs for incremental system enhancements were not included in BC Hydro's TPL-001-4 assessment feedback due to the unknown outcome of Stakeholder Processes and subsequent corrective action. BC Hydro consolidated FortisBC's assessed incremental costs with its own to arrive at the overall cumulative cost for B.C. registered entities to achieve and maintain compliance with TPL-001-4.

BC Hydro's preliminary assessment using TPL-001-4 identifying potential use of NCLL and potential system enhancements in lieu of NCLL are described in BC Hydro's response to BCUC IR 1.4.2.

BC Hydro has existing spare equipment strategies for major transmission equipment with long delivery times. Therefore, the Spare Equipment Strategy Requirements (Requirement 2.1.5) is not anticipated to materially change BC Hydro's Spare Equipment Strategy.

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1.0 A. TERMS OF BC HYDRO TPL-001-4 ASSESSMENT REPORT

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Ongoing Costs (\$/year) – R1-R6, R8: \$15,000 - \$20,000; new short circuit analyses will be required annually.

1.1.2 The purpose of TPL-001-04 studies is to identify reliability weaknesses. Does the Revised Standard identify new system performance issues that the previous Standard does not? If so, please list the reliability issues that the TPL-001-04 studies will identify and whether a budget has been allocated for associated system/equipment upgrade costs to address these reliability issues. If so, please provide a preliminary budget.

RESPONSE:

The new planning standard TPL-001-4 is more stringent than the currently adopted planning standards due to its additional performance requirements as described in BC Hydro’s response to BCUC IR 1.5.1.

As discussed in BC Hydro’s response to BCUC IR 1.4.2, BC Hydro conducted a preliminary assessment and identified potential projects it may have to undertake. BC Hydro has not allocated any budgets nor developed schedules at this time

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because TPL-001-4 has not been adopted in B.C. Once adopted, BC Hydro will commence the planning process to identify BES performance issues and potential corrective action plans.

It is possible that future detailed assessments using TPL-001-4 may identify additional system performance requirements and associated system upgrades.

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Ongoing Costs (\$/year) – R1-R6, R8: \$15,000 - \$20,000; new short circuit analyses will be required annually.

1.1.3 How would identified reliability issues from TPL-001-04 studies be addressed and what would be the schedule to correct these issues in order to become compliant with TPL-001-04? Please provide existing mechanisms and mitigation plans to ensure the system meets the reliability requirements of TPL-001-04.

RESPONSE:

Please refer to BC Hydro’s response to BCUC IRs 1.1.1 and 1.1.2.

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2.0 A. TERMS OF BC HYDRO TPL-001-4 ASSESSMENT REPORT

Reference: MRS TPL-001-4 EFFECTIVE DATES
BC Hydro MRS TPL-001-4 Assessment Report, Section 5.3, p. 17, Table 3,
Summary of Final Assessment of the Revised Standard TPL-001-4 —
Transmission System Planning Performance Requirements, Section A, p. 1
Introduction – Effective dates

On page 17, in Table 3 of the Assessment Report, BC Hydro states the effective dates for TPL-001-4 requirements as:

R1: First day of first calendar quarter, two years after BCUC adoption.

R2-R6, R8: First day of first calendar quarter, three years after BCUC adoption.

For 84 calendar months beginning the first day of the first calendar quarter following BCUC approval, Corrective Action Plans applying to the following categories of Contingencies and events identified in TPL-001-4.

On Page 1 of TPL-001-4, NERC outlines the effective dates for TPL-001-4 R1 through R7 as:

Requirements R1 and R7 as well as the definitions shall become effective on the first day of the first calendar quarter, 12 months after applicable regulatory approval.

Requirements R2 through R6 and Requirement R8 shall become effective on the first day of the first calendar quarter, 24 months after applicable regulatory approval.

1.2.1 The reported manpower requirements by BC Hydro and FBC associated with TPL-001-04 requirements do not appear consistent with a three-year implementation period, nor do they appear consistent with implementation dates of other jurisdictions. Please explain why the effective dates are approximately 2 to 3 times longer than the TPL-001-04 recommendation.

RESPONSE:

Subsequent to the filing of BC Hydro’s TPL-001-4 Assessment Report, BC Hydro reviewed components of its data modelling per TPL-001-4 Requirement 1 in anticipation of the standard being adopted by the Commission. From BC Hydro’s perspective, we are now comfortable with an implementation timeframe being the first day of the first calendar quarter, 12 months after Commission approval.

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Given the forgoing, BC Hydro now recommends an effective date being the first day of the first calendar quarter, 24 months after Commission approval for Requirements 2 through 6 and Requirement 8 since these requirements are dependent on the establishment of data models per Requirement 1.

BC Hydro consulted with FortisBC in regard to this IR. FortisBC has confirmed that it needs to formalize TPL-001-4 short circuit analysis studies, and can do so within BC Hydro's adjusted timelines described above.

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Requirements R1 and R7 as well as the definitions shall become effective on the first day of the first calendar quarter, 12 months after applicable regulatory approval.

Requirements R2 through R6 and Requirement R8 shall become effective on the first day of the first calendar quarter, 24 months after applicable regulatory approval.

1.2.2 Are the extended effective dates due to multiple reliability issues anticipated in TPL-001-04 studies? If so, please list the reliability issues, their upgrade requirements, associated costs and existing reliability mechanisms that address these issues.

RESPONSE:

The effective dates originally communicated as part of the TPL-001-4 assessment were not due to multiple reliability issues; they were based on anticipated timelines required to develop models per TPL-001-4 Requirement 1. Please refer to BC Hydro’s response to BCUC IR 1.2.1.

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3.0 B. TECHNICAL REVIEW

Reference: MRS TPL-001-4 REQUIREMENT R7 PLANNING AUTHORITY / PLANNING COORDINATOR BC Hydro MRS TPL-001-4 Assessment Report, Section 2.1, p. 2, Reliability Standards with Reliability Related Requirements for Planning Authority (PA)/ Planning Coordinator (PC); Standard TPL-001-4 — Transmission System Planning Performance Requirements, Section B, p. 7, Requirements

Regarding requirement R7 of TPL-001-4 for PA/PC, on page 2 of the Assessment Report, BC Hydro states:

BC Hydro recommends that Requirement 7 of the Revised Standard be ordered by the Commission to be held in abeyance and be of no force or effect in B.C. until the PC matter as it pertains to B.C. is resolved.

NERC TPL-001-4 outlines requirement R7 as:

Each Planning Coordinator, in conjunction with each of its Transmission Planners, shall determine and identify each entity's individual and joint responsibilities for performing the required studies for the Planning Assessment.

- 1.3.1 Please describe the advantages and disadvantages to BC Hydro system reliability if TPL-001-04 requirement R7 were adopted, and explain how the reliability of BC Hydro systems experiences a degradation or improvement from requirement R7. In your response, please address the British Columbia Utilities Commission's (Commission) legal jurisdiction to order such an adoption.

RESPONSE:

Due to the PC for the B.C. footprint and associated scope of responsibilities being undefined at this time, BC Hydro has recommended that Requirement 7 be held in abeyance. This approach is consistent with the approach taken for other reliability standards that reference the PC function. BC Hydro and registered entities will assess the PC requirements currently held in abeyance once the PC footprints and responsibilities are defined in B.C.

The Commission's legal jurisdiction to order adoption of MRS in B.C. is found in section 125.2 of the *Utilities Commission Act*.

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NERC TPL-001-4 outlines requirement R7 as:

Each Planning Coordinator, in conjunction with each of its Transmission Planners, shall determine and identify each entity's individual and joint responsibilities for performing the required studies for the Planning Assessment.

1.3.2 Please determine the costs, labour and schedule for BC Hydro to implement TPL-001-04 requirement R7.

RESPONSE:

BC Hydro is unable to determine costs, labour and schedule to implement TPL-001-4 Requirement 7 due to the PC for the B.C. footprint and associated scope of responsibilities being undefined at this time.

Please refer to BC Hydro's response to BCUC IR 1.3.1.

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4.0 B. TECHNICAL REVIEW

**Reference: MRS TPL-001-4 NON-CONSEQUENTIAL LOAD LOSS
BC Hydro MRS TPL-001-4 Assessment Report, Section 3, p. 5,
Planned NCLL in BC; *Utilities Commission Act (UCA)*,
Section 125.2(6) Non-Consequential Load Loss - 75 MW limit**

Regarding footnote 12, for NCLL and a 75MW hard-cap, on page 5 of the Assessment Report, BC Hydro states:

The Revised Standard, under footnote ‘12’, sets a limit of 75 MW of planned NCLL for US registered entities. BC Hydro is not a US registered entity, and it follows that if the Revised Standard is adopted as proposed, the 75 MW hard-cap on the use of NCLL will not be applicable to BC Hydro.

[I]information regarding the planned use and the amount of NCLL will be provided to the Commission as part of the Stakeholder Process and any Regulatory Review. In this regard, the Commission will be informed of the planned use of NCLL in B.C., so that it can direct its implementation, as required, on a case-by-case basis.

Section 125.2(6) of the UCA states the need for consistency with other jurisdictions for adopting Mandatory Reliability Standards:

After complying with subsection (5), the commission, subject to subsection (7), must, by order, adopt the reliability standards addressed in the report if the commission considers that the reliability standards are required to maintain or achieve consistency in British Columbia with other jurisdictions that have adopted the reliability standards.

1.4.1 If BC Hydro believes the TPL-001-4 NCLL of a 75 MW limit is not applicable, what is the largest NCLL BC Hydro anticipates needing and does BC Hydro wish to implement this value as the NCLL limit?

RESPONSE:

Under TPL-001-4 Table 1, where the use of NCLL is ‘No’ with a footnote 12 reference, BC Hydro’s underlying planning principle would be to not use NCLL. However it may be needed in limited circumstances as detailed in footnote 12. In B.C., this could be for instances where the implementation of a project has long lead times, or if BC Hydro considers a proposed project to not be in the interests of ratepayers. When the use of NCLL under footnote 12 is being considered, BC Hydro would follow the Stakeholder Process, which includes the Commission at all material times.

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The largest potential use of NCLL BC Hydro has currently identified, based on preliminary planning studies, is 88 MW as described in BC Hydro's response to BCUC IR 1.4.2. BC Hydro does not support a NCLL upper-limit as it would reduce flexibility and may increase cost with minimal effect on system reliability. Please also refer to BC Hydro's response to BCUC IR 1.4.9.

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1.4.2 As BC Hydro wishes to implement NCLL on a case by case basis, please list the anticipated contingencies that require NCLL, the load levels, the impacted entities and associated costs.

RESPONSE:

The current potential candidates for NCLL are provided below.¹

1. Loss of 2L19 or Bridge River Terminal (BRT) T4

In the Bridge River area, loss of a 230 kV transmission line 2L19 or loss of a 360/230 kV transformer T4 at BRT (P1 event in TPL-001-4) would require up to 16 MW of NCLL to secure the system. The community of Lillooet would be

¹ BC Hydro notes that in the Peace Region, the maximum load shedding requirement would be up to approximately 215 MW prior to Peace Region Electricity Supply (PRES) in-service. If the PRES project is implemented it will remove the need to use NCLL in the Peace Region.

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affected. One alternative to eliminate NCLL is to install a 230/60 kV, 75 MVA transformer at Carquille (CRQ) substation and loop 230 kV transmission line 2L92 into CRQ substation. Order of magnitude cost is approximately \$60 million.

2. Loss of Malaspina (MSA) Substation T5

On the Sunshine Coast, loss of a 230/138 kV transformer T5 at MSA substation (P3 event in TPL-001-4) would require up to 15 MW of NCLL to secure the system. The community of Pender Harbour would be affected. One alternative to eliminate NCLL is install 25 kV 2 x 10 Mvar mechanically switched shunt capacitor banks at Sechelt (SEC) substation. Order of magnitude cost is approximately \$5 million.

3. Loss of 5L92

In the Southern Interior, loss of a 500 kV transmission line 5L92 (a P1 or P2 event in TPL-001-4) would require up to 88 MW of NCLL to secure the system. A large industrial customer's four stations and the community of Elkford near the B.C.-A.B. border would be affected. One alternative to eliminate NCLL is to install a 230 kV 45 Mvar mechanically switched shunt capacitor bank at Cranbrook (CBK) substation. Order of magnitude cost is approximately \$10 million.

4. South Vancouver Island and the Lower Mainland

Based on preliminary findings, transmission issues are emerging at the end of the long-term planning horizon due to Category P3 (e.g., loss of a generator and a transmission line). The communities of South Vancouver Island and the Lower Mainland would be affected. Given that the planning assessment is preliminary in nature under the new planning standard, solutions to the transmission issues have not been developed at this time.

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Regarding footnote 12, for NCLL and a 75MW hard-cap, on page 5 of the Assessment Report, BC Hydro states:

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[I]information regarding the planned use and the amount of NCLL will be provided to the Commission as part of the Stakeholder Process and any Regulatory Review. In this regard, the Commission will be informed of the planned use of NCLL in B.C., so that it can direct its implementation, as required, on a case-by-case basis.

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1.4.2 As BC Hydro wishes to implement NCLL on a case by case basis, please list the anticipated contingencies that require NCLL, the load levels, the impacted entities and associated costs.

1.4.2.1 Please provide a detailed analysis on how BC Hydro systems reliability would be affected if NCLL is not allowed.

RESPONSE:

BC Hydro assumes this question refers to not allowing the use of any NCLL under TPL-001-4 footnote 12. If NCLL is not allowed, more transmission reinforcement projects would be required to meet the performance requirements, such as those described in BC Hydro's response to BCUC IR 1.4.2. Further, BC Hydro notes that TPL-001-4 as drafted does allow the use of NCLL under footnote 12.

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1.4.3 Pursuant to Section 125.2(6), where it is stated that reliability standards are to be adopted to maintain or achieve consistency with other jurisdictions, please justify why BC Hydro does not believe the 75 MW limit from the Revised Standard (TPL-001-4) is applicable and why it would have the Commission evaluate NCLL on a case by case basis.

RESPONSE:

The adoption by the Commission of TPL-001-4, as assessed by BC Hydro, will ensure that B.C.’s MRS are consistent with other jurisdictions because BC Hydro does not seek (and the Commission could not in law adopt) any amendment or revision of the substantive terms of the standard. In particular, the quoted words from footnote 12 - “In no case can the planned NCLL under footnote 12 exceed 75 MW for U.S. registered entities” - will be the same in every jurisdiction that is adopting NERC’s TPL-001-4.

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Adoption of TPL-001-4 will ensure North-American consistency: U.S. entities will be subject to an NCLL upper-limit of 75 MW in all cases; non-U.S. entities are not subject to any upper-limit of NCLL. The reason the 75 MW upper-limit is not applicable to BC Hydro is because the quoted words of the standard apply only to U.S. registered entities. Please refer to BC Hydro's response to BCUC IR 1.4.9.

The adoption of TPL-001-4 will not result in any material differences in reliability of the B.C. BES compared to the North American BES. That's because despite the lack of a 75 MW upper-limit being applicable in B.C., the expectation is that use of NCLL would only be in limited circumstances and is subject to Commission oversight under Attachment 1 of the standard.

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4.0 B. TECHNICAL REVIEW

Reference: MRS TPL-001-4 NON-CONSEQUENTIAL LOAD LOSS BC Hydro MRS TPL-001-4 Assessment Report, Section 3, p. 5, Planned NCLL in BC; *Utilities Commission Act (UCA)*, Section 125.2(6) Non-Consequential Load Loss - 75 MW limit

Regarding footnote 12, for NCLL and a 75MW hard-cap, on page 5 of the Assessment Report, BC Hydro states:

The Revised Standard, under footnote '12', sets a limit of 75 MW of planned NCLL for US registered entities. BC Hydro is not a US registered entity, and it follows that if the Revised Standard is adopted as proposed, the 75 MW hard-cap on the use of NCLL will not be applicable to BC Hydro.

[I]information regarding the planned use and the amount of NCLL will be provided to the Commission as part of the Stakeholder Process and any Regulatory Review. In this regard, the Commission will be informed of the planned use of NCLL in B.C., so that it can direct its implementation, as required, on a case-by-case basis.

Section 125.2(6) of the UCA states the need for consistency with other jurisdictions for adopting Mandatory Reliability Standards:

After complying with subsection (5), the commission, subject to subsection (7), must, by order, adopt the reliability standards addressed in the report if the commission considers that the reliability standards are required to maintain or achieve consistency in British Columbia with other jurisdictions that have adopted the reliability standards.

1.4.4 Under BC Hydro's proposed standard for adoption, how frequently does BC Hydro expect NCLL to occur? Please explain your response including the factors under which NCLL would be anticipated in BC as a whole.

RESPONSE:

The potential candidates for the use of NCLL are described in BC Hydro's response to BCUC IR 1.4.2. As described in BC Hydro's response to BCUC IR 1.4.1, the underlying planning principle is that BC Hydro would not plan to use NCLL except in limited circumstances such as where the implementation of a project has long lead times, or if BC Hydro considers a project proposal not to be in the interest of ratepayers.

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4.0 B. TECHNICAL REVIEW

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BC Hydro MRS TPL-001-4 Assessment Report, Section 3, p. 5,
Planned NCLL in BC; *Utilities Commission Act (UCA)*,
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1.4.5 In the absence of a NCLL limit, how would BC Hydro envision the Commission evaluate each NCLL and their effects on the Bulk Electric System (BES) on a case by case basis?

RESPONSE:

BC Hydro envisions that the Commission would evaluate the use of NCLL through the processes set out in Attachment 1 of TPL-001-4. In instances where the use of NCLL is proposed, the Commission will be informed when BC Hydro undertakes a Stakeholder Process in a study area. The outcome of the stakeholder engagement will assist the Commission in determining if the use of NCLL is suitable for planning the BES. Attachment 1 sets out instances for which Regulatory Review of the use of NCLL is required (section III Attachment 1 of TPL-001-4).

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4.0 B. TECHNICAL REVIEW

Reference: MRS TPL-001-4 NON-CONSEQUENTIAL LOAD LOSS BC Hydro MRS TPL-001-4 Assessment Report, Section 3, p. 5, Planned NCLL in BC; *Utilities Commission Act (UCA)*, Section 125.2(6) Non-Consequential Load Loss - 75 MW limit

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[I]information regarding the planned use and the amount of NCLL will be provided to the Commission as part of the Stakeholder Process and any Regulatory Review. In this regard, the Commission will be informed of the planned use of NCLL in B.C., so that it can direct its implementation, as required, on a case-by-case basis.

Section 125.2(6) of the UCA states the need for consistency with other jurisdictions for adopting Mandatory Reliability Standards:

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1.4.6 In the absence of the 75 MW limit, would the Commission take on any responsibility for the reliability of each NCLL in BC? Please explain your response.

RESPONSE:

Regardless of whether the Commission orders the adoption of TPL-001-4 as requested, it will "take on... responsibility" for reliability in the same way that it "takes on responsibility" for any exercise of its powers (or any decision to not exercise its powers). Section 56 of the *Administrative Tribunals Act* states that:

"56 (1) In this section, "decision maker" includes a tribunal member, adjudicator, registrar or other officer who makes a decision in an application or an interim or preliminary matter, or a person who conducts a facilitated settlement process.

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(2) Subject to subsection (3), no legal proceeding for damages lies or may be commenced or maintained against a decision maker, the tribunal or the government because of anything done or omitted

(a) in the performance or intended performance of any duty under an enactment governing an application, or

(b) in the exercise or intended exercise of any power under an enactment governing an application.

(3) Subsection (2) does not apply to a person referred to in that subsection in relation to anything done or omitted by that person in bad faith.”

Section 56 of the *Administrative Tribunals Act* is applicable to the Commission by virtue of section 2.1(j) of the *Utilities Commission Act*.

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4.0 B. TECHNICAL REVIEW

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[I]information regarding the planned use and the amount of NCLL will be provided to the Commission as part of the Stakeholder Process and any Regulatory Review. In this regard, the Commission will be informed of the planned use of NCLL in B.C., so that it can direct its implementation, as required, on a case-by-case basis.

Section 125.2(6) of the UCA states the need for consistency with other jurisdictions for adopting Mandatory Reliability Standards:

After complying with subsection (5), the commission, subject to subsection (7), must, by order, adopt the reliability standards addressed in the report if the commission considers that the reliability standards are required to maintain or achieve consistency in British Columbia with other jurisdictions that have adopted the reliability standards.

1.4.7 Although TPL-001-4 allows for regulatory jurisdiction regarding NCLL levels, removing the NCLL limit may run counter to the overall planning objective of TPL-001-4, which is to “minimize the likelihood and magnitude of Non-Consequential Load Loss following planning events.” Please provide BC Hydro’s justifications for removing the NCLL limit, how this would affect the reliability of BC Hydro systems and if BC Hydro has a preferred NCLL limit.

RESPONSE:

There is no stated upper-limit for the use of NCLL for non-U.S. registered entities, and thus there is no proposal “to remove the NCLL limit”. BC Hydro does not believe setting an upper-limit of NCLL will materially affect the reliability of BC Hydro’s BES. Please refer to BC Hydro’s response to BCUC IRs 1.4.1 and 1.4.8.

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4.0 B. TECHNICAL REVIEW

**Reference: MRS TPL-001-4 NON-CONSEQUENTIAL LOAD LOSS
BC Hydro MRS TPL-001-4 Assessment Report, Section 3, p. 5,
Planned NCLL in BC; *Utilities Commission Act (UCA)*,
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[I]information regarding the planned use and the amount of NCLL will be provided to the Commission as part of the Stakeholder Process and any Regulatory Review. In this regard, the Commission will be informed of the planned use of NCLL in B.C., so that it can direct its implementation, as required, on a case-by-case basis.

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After complying with subsection (5), the commission, subject to subsection (7), must, by order, adopt the reliability standards addressed in the report if the commission considers that the reliability standards are required to maintain or achieve consistency in British Columbia with other jurisdictions that have adopted the reliability standards.

1.4.8 Please provide an assessment regarding whether the reliability of BC Hydro systems would degrade or improve if the NCLL of a 75 MW limit is adopted and describe how such an adoption might be implemented.

RESPONSE:

BC Hydro believes the reliability of BC Hydro system would neither materially degrade nor improve if a 75 MW NCLL upper-limit were to be adopted. Please refer to BC Hydro's response to BCUC IR 1.4.1.

Where BC Hydro is considering the use of NCLL under TPL-001-4 it will perform an evaluation which would include the possibility of capital investments to mitigate the use of NCLL or other corrective action plans.

Please also refer to BC Hydro's response to BCUC IR 1.4.9.

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4.0 B. TECHNICAL REVIEW

**Reference: MRS TPL-001-4 NON-CONSEQUENTIAL LOAD LOSS
BC Hydro MRS TPL-001-4 Assessment Report, Section 3, p. 5,
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[I]information regarding the planned use and the amount of NCLL will be provided to the Commission as part of the Stakeholder Process and any Regulatory Review. In this regard, the Commission will be informed of the planned use of NCLL in B.C., so that it can direct its implementation, as required, on a case-by-case basis.

Section 125.2(6) of the UCA states the need for consistency with other jurisdictions for adopting Mandatory Reliability Standards:

After complying with subsection (5), the commission, subject to subsection (7), must, by order, adopt the reliability standards addressed in the report if the commission considers that the reliability standards are required to maintain or achieve consistency in British Columbia with other jurisdictions that have adopted the reliability standards.

1.4.9 Does BC Hydro believe the Commission has the legal jurisdiction to order the NCLL of a 75 MW hard-cap on BC MRS registrants? Please explain.

RESPONSE:

BC Hydro does not believe that the Commission is empowered to impose the 75 MW upper-limit on B.C. registered entities as set out in TPL-001-4 (where it is expressly stated to be applicable “for US registered entities”). It must adopt the standard unless it finds it to not be in the public interest. Pursuant to the standard, the upper-limit is not applicable to non-U.S. registered entities. Modifying the standard would conflict with the requirements of section 125.2(12) of the *Utilities Commission Act*:

(12) The commission, without the approval of the minister responsible for the administration of the *Hydro and Power Authority Act*, may not set a standard or rule under section 26 of this Act with respect to a matter addressed by a reliability standard assessed in a report submitted to the commission under subsection (3) of this section.

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5.0 B. TECHNICAL REVIEW

**Reference: TPL-001-4 ADOPTION RECOMMENDATION
 BC Hydro MRS TPL-001-4 Assessment Report, Section 2.1,
 p. 2, Reliability Standards with Reliability Related
 Requirements for PA/PC; Section 7, p. 25 Conclusions**

On page 2, BC Hydro's final assessment of the Revised Standard (TPL-001-4) states:

BC Hydro recommends that Requirement 7 of the Revised Standard be ordered by the Commission to be held in abeyance and be of no force or effect in B.C. until the PC matter as it pertains to B.C. is resolved. As for the remaining Revised Standard requirements, BC Hydro does not see any adverse reliability risk at this time preventing a recommendation for adoption.

On page 17, Table 3 of the Assessment Report, BC Hydro states the effective dates for TPL-001-4 requirements as:

BC Hydro has assessed the Revised Standard adopted by FERC in the U.S. during the 2014 Assessment Period. BC Hydro has concluded that the Revised Standard will preserve or enhance the reliability of the BES in B.C., and thus will serve the public interest and is suitable for adoption in B.C. with the exception of TPL-001-4, Requirement 7, which is recommended to be held in abeyance until the PC matter as it pertains to B.C. is resolved. BC Hydro recommends that the Revised Standard, be adopted by the Commission.

1.5.1 Please explain and provide evidence on how BC Hydro determined that the Revised Standard (TPL-001-4) is not less stringent than the existing Standards that it would be replacing (i.e. TPL-001-0.1, TPL-002-0b, TPL-003-0b, and TPL-004-0a) and therefore would not result in adverse reliability consequences.

RESPONSE:

The revised standard (TPL-001-4) is more stringent than the existing standards that it would be replacing (TPL-001-0.1, TPL-002-0b, TPL-003-0b, and TPL-004-0). TPL-001-4 requires a higher system performance, and includes additional contingency planning events compared to the existing standards. Therefore, TPL-001-4 would not result in adverse reliability consequences.

A few notable modifications are listed below:

- **Higher system performance for extra high voltage contingency events, such as Extra High Voltage (EHV) bus faults, internal breaker faults, N-1-1**

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Contingency events that involve a generator (Table 1 in the TPL-001-4 standard);

- **Addition of shunt device Contingency events (Table 1 - P1.4, P3.4, P4.4, P5.4, P6.3);**
- **Opening of a line section without a fault (Table 1 - P2.1);**
- **Differentiation between Bus-tie and non-Bus-tie breakers (Table 1 - P2 & P4);**
- **Addition of generation plus additional Element Contingency events (Table 1 - P3);**
- **Obligation to consider both stuck breaker and system protection relay failure events (Table 1 - P4 & P5); and**
- **Additional extreme event contingency events, such as loss of two Elements without system adjustment (N-2), loss of two generating plants (Table 1 - Extreme Events).**

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5.0 B. TECHNICAL REVIEW

**Reference: TPL-001-4 ADOPTION RECOMMENDATION
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1.5.2 BC Hydro's final assessment of the Revised Standard (TPL-001-4) states no foreseeable adverse reliability risks preventing a recommendation for adoption. Please provide supporting evidence on how BC Hydro concluded that the adoption of the Revised Standard (TPL-001-4) will not have any "Adverse Reliability Consequences", while replacing legacy reliability standards, and would improve the reliability of the Bulk Electric System (BES).

RESPONSE:

TPL-001-4 requires a higher system performance, and includes additional contingency planning events compared to the existing standards, as discussed in BC Hydro's response to BCUC IR 1.5.1. BC Hydro's assessment also included a preliminary study following the new standard which identified additional contingency events. Therefore, BC Hydro's recommendation to the Commission was to adopt the new standard, as TPL-001-4 will not result in adverse reliability consequences.

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5.0 B. TECHNICAL REVIEW

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1.5.3 Please explain how TPL-001-4 would improve reliability and not degrade existing BES, when BC Hydro is not compliant with footnote 12, on page 5 of the Assessment Report, for NCLL (75MW limit) and requirement R7. In addition, please describe the benefit for the reliability of the BES if BC Hydro was compliant with footnote 12 and R7.

RESPONSE:

If TPL-001-4 is adopted as proposed, BC Hydro would be compliant with footnote 12 because the upper-limit of 75 MW of planned NCLL is for U.S. registered entities. Please refer to BC Hydro's response to BCUC IR 1.4.9.

The absence of a 75 MW upper-limit on the use of NCLL does not necessarily degrade BES reliability. Please refer to BC Hydro's response to BCUC IR 1.4.1.

Please also refer to BC Hydro's response to BCUC IR 1.3.1 for a discussion on Requirement 7.