

**Fred James**

Chief Regulatory Officer

Phone: 604-623-4046

Fax: 604-623-4407

[bchydroregulatorygroup@bchydro.com](mailto:bchydroregulatorygroup@bchydro.com)

August 28, 2019

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: British Columbia Utilities Commission (BCUC or Commission)  
British Columbia Hydro and Power Authority (BC Hydro)  
Mandatory Reliability Standards (MRS) Assessment Report No. 12 (Report)  
Addressing Reliability Standards for Adoption in British Columbia  
Responses to BCUC Information Request (IR) No. 1**

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Pursuant to BCUC Order No. R-16-19, BC Hydro encloses as Exhibit B-3 its responses to BCUC IR No. 1 for filing with the BCUC.

BC Hydro also takes this opportunity to comment on the current regulatory timetable for this proceeding and provide a brief response to a second letter of comment filed by Dokie General Partnership, Jimmie Creek Limited Partnership and the Toba Montrose General Partnership (collectively, the **Three Entities**) earlier today.

**Regulatory Timetable**

BC Hydro is of the view that the argument phase of this proceeding, currently scheduled for September 4, 11 and 18, 2019, may not be necessary. The only registered intervener in this proceeding, FortisBC Inc. (**FortisBC**), has previously confirmed that it has no additional comments on the Report.

The only other comments filed in this proceeding were from the Three Entities and BC Hydro submits that those letters should have no bearing on whether the BCUC adopts the Revised Standards and Revised Terms as defined and described in the Report.

In their letters of comment, the Three Entities have described compliance issues they expect to face with respect to various elements of the current PRC-025-1 reliability standard in effect, some of which they say will continue under the revised PRC-025-2 reliability standard being considered for adoption. The concerns identified by the Three

Entities amount to a public notice of their compliance relief requests which can and should be addressed by the BCUC in a separate process, if required.

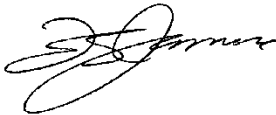
The Three Entities also request that PRC-025-2 be revised. As explained in BC Hydro's July 18, 2019 response to the letters of comment filed, the BCUC does not have the jurisdiction to revise the reliability standards as requested by the Three Entities – rather, it is obliged to adopt a reliability standard unless there is evidence before it that adoption would not be in the public interest. BC Hydro submits that no such evidence exists. While the Letters of Comment contain purported facts, those facts are unreferenced, not supported by any evidence and have not been tested by the Commission or parties to this proceeding. As such, little weight should be given to the comments provided.

BC Hydro is the only party to this proceeding that has submitted evidence and had that evidence tested through information requests. BC Hydro's Report concludes that the Revised Standards and Revised Terms outlined in the Report will preserve or enhance the reliability of the Bulk Electricity System in B.C. and will therefore serve the public interest. BC Hydro submits that its IR responses further support this conclusion. Accordingly, BC Hydro submits the BCUC can adopt the Revised Standards and Revised Terms as recommended in the Report without any further process.

If the Commission is of the view that further process is required, BC Hydro submits that the current regulatory timetable, including the dates for filing argument, will likely need to be revised.

For further information, please contact Geoff Higgins at 604-623-4121 or by email at [bchydroregulatorygroup@bchydro.com](mailto:bchydroregulatorygroup@bchydro.com).

Yours sincerely,



Fred James  
Chief Regulatory Officer

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Enclosure

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.1.1</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 3
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British</b> <b>Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

**1.0 A. STANDARD CIP-003-7 IMPLEMENTATION**

**Reference: British Columbia Hydro and Power Authority (BC Hydro) Feedback Survey Forms Exhibit B-1, Appendix C-1, p. 1; Appendix C-3, p. 9 Standard CIP-003-7 Cost Estimates**

On page 1 of Appendix C-1 in BC Hydro’s Mandatory Reliability Standards (MRS) Assessment Report No. 12 (Report), in the column titled “BC Hydro Stakeholder Comments Organizational Activities and Reliability/Suitability Impact”, Standard CIP-003-7 R1 reads:

BC Hydro has 115 transmission stations and 18 generation stations classified as low impact for which incremental protections will need to be afforded per the policy and plan requirements of CIP-003-7 (per Attachment 1 Sections 2, 3, and 5)

Cross-BC Hydro program level activities and costs are included in the respective BC Hydro business group estimates for the following:

1. Program management resources and activities: Program Manager, business analyst and subject matter experts, solutions architect, pilot audit, project administration. Calculated at 18% of all other cost
2. Change management resources and activities – includes change management analyst, organizational designer, and on-going training software and management.
3. Interest costs during construction – calculated at 4%

**GSTN and TSTN:**  
 Estimated Costs:  
 \$3,948,000 (one-time) for  
 - Creating/implementing through site verification inventories of Cyber Assets and implementing an inventory labelling system.  
 - Development of and updates to existing process documents, engineering standards and work procedures.

\$718,000 (ongoing) annually for sustainment for  
 - Annual reviews of processes and standards (25% of initial costs), and  
 - Managing Cyber Asset changes, inclusive of maintaining up-to-date inventories.

**IT:**  
 Estimated Costs:  
 \$107,000 (one-time) for  
 - Changes to compliance management system for asset inventory and work flow development;  
 \$18,000 (ongoing) annually for sustainment for  
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**PSEC:** Incremental activities and costs included as part of CIP-003-7 R2.

The corresponding entry for Standard CIP-003-7 R2 reads:

<b>British Columbia Utilities Commission</b> Information Request No. 1.1.1 Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 2 of 3
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

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**Generation and Transmission Stations (GSTN and TSTN):**

Estimated Costs:

\$10,864,000 (one-time) for

- Adding firewall panels to ~20 transmission stations,
- Adding dial up authentication to 110 transmission stations,
- Reviewing /implementing firewall access controls for 18 generation stations, and
- Development/verification of network diagrams for all 115 transmission stations and 18 generation stations.

\$2,011,000 (ongoing) annually for sustainment for

- Firewall management costs,
- Sustaining network drawings inclusive of site verifications (on a three year cyclical basis).

**Physical Security (PSEC):**

Estimated Costs:

\$9,981,000 (one-time) for

- Installation of badge card readers at physical zones (i.e. buildings and cabinets) containing low impact BES Cyber Assets,
- Rekeying baseline for restricted physical key access to physical zones contained low impact BES Cyber Assets,
- Implementation of physical key management cabinets to store and track restricted physical keys,
- Updates to physical security plan documentation, standard operating procedures for security personnel, and
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- Reviews/updates to physical security plans, standard operating procedures and training content
- Maintenance of physical access controls (i.e. badge card readers, physical key management cabinets, etc.)
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**Information Technology (IT):**

Estimated Costs:

\$130,000 (one-time) for

- Physical Access Control System (PACS) workflow updates for managing access requests, inclusive of analysis, data migration, regression testing, etc. and creating new access permission levels.
- Process documentation updates.

\$26,000 (ongoing) annually for sustainment for

- Ongoing support and management of PACS for access management/revocation
- Reviews and updates of process documentation

On page 9 of Appendix C-3, FortisBC Inc. (FBC) does not report any incremental spending changes between Standards CIP-003-7 R1 and CIP-003-7 R2 in their External Stakeholder Feedback form.

- 1.1.1 Please explain the differences between Standards CIP-003-7 R1 and R2 that necessitate BC Hydro's additional Generation and Transmission Stations and Physical Security scope of work.

<b>British Columbia Utilities Commission</b> Information Request No. 1.1.1 Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 3 of 3
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

**RESPONSE:**

The difference between R1 and R2 of the CIP-003-7 standard is that R1 requires BC Hydro to create and maintain a cyber security policy, whereas R2 requires BC Hydro to develop and implement a cyber security plan. The costs associated with developing a cyber security policy are less than the estimated costs associated with developing and implementing a cyber security plan.

In order for BC Hydro to develop and implement a cyber security plan (R2), we expect to undertake the following activities:

- Creation of an inventory list with physical and electronic locations;
- Review existing architecture and identify changes needed;
- Define physical and electronic access controls to be implemented; and
- Implement roll-out (which includes change management, training, procurement, labour charges, project delivery, etc.).

BC Hydro allocated activities and associated costs to R1 and R2 separately in its feedback to MRS Assessment report No. 12. On further review, BC Hydro notes that it allocated some activities and associated costs to R1 that are more appropriately allocated to R2. BC Hydro has added the column 'Requirements Reference' in Tables 1 and 2 in its response to BCUC IR 1.1.2 to indicate where the activities should be allocated. The total cost of implementation for CIP-003-7 standard is unaffected.



<b>British Columbia Utilities Commission</b> Information Request No. 1.1.2 Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 9
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

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The corresponding entry for Standard CIP-003-7 R2 reads:

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.1.2</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 2 of 9
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

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On page 9 of Appendix C-3, FortisBC Inc. (FBC) does not report any incremental spending changes between Standards CIP-003-7 R1 and CIP-003-7 R2 in their External Stakeholder Feedback form.

1.1.2 Please provide detailed breakdowns of the cost estimates for Standard CIP-003-7 work identified.

**RESPONSE:**

**In preparing its costs estimate for implementing CIP-003-7, BC Hydro reviewed the changes needed at its 115 transmission stations and 18 generating stations that contain low impact BES Cyber Systems.**

**BC Hydro provides two tables below: Table 1 breaks down the CIP-003-7 R1 cost estimates and Table 2 breaks down the CIP-003-7 R2 cost estimates. See**

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.1.2</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 3 of 9
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British</b> <b>Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

**BC Hydro's response to BCUC IR 1.1.1 which explains the reallocation of activities and costs to the two requirements. This reallocation is reflected in the two tables below.**



**Table 1 CIP-003-7 R1 Cost Estimates Breakdown**

	Activity Required to Meet Standard	Requirements Reference	TSTN		GSTN		Physical Security		IT	
			One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)
1	CIP policy updates	R1.2							36,000	7,000
	R1 Costs Totals								36,000	7,000

**Table 2 CIP-003-7 R2 Cost Estimates Breakdown**

	Activity Required to Meet Standard	Requirements Reference	TSTN		GSTN		Physical Security		IT	
			One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)
1	Develop and update processes and engineering standards and appropriate documents	R2	750,000	188,000	105,000	26,000				
2	Create an inventory labelling system	R2 (see assumptions 2 and 3 below)	200,000		14,000					
3	Conduct an inventory of assets; review and produce drawings; capture mandatory items in MRS Compliance System	R2 (see assumption 3 below)	2,000,000		277,000					
4	Sustainment of change control processes for assets	R2		336,000		168,000				

	Activity Required to Meet Standard	Requirements Reference	TSTN		GSTN		Physical Security		IT	
			One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)
5	Implement changes to MRS Compliance System for asset inventory	R2							55,000	11,000
6	Implement new firewalls and sustainment resources	R2, Attachment 1, section 3.1	3,000,000	1,124,000	180,000					
7	Purchase new firewall hardware	R2, Attachment 1, section 3.1	2,000,000		180,000					
8	Perform annual review activities (e.g. walkthroughs, drawing reviews, wireless network audits)	R2, Attachment 1, section 3.1	250,000	608,000	72,000	108,000				
9	Implement dial-up authentication	R2, Attachment 1, section 3.2	1,650,000							
10	Update transient devices	R2, Attachment 1, section 5	557,000	171,000						

<b>British Columbia Utilities Commission</b> Information Request No. 1.1.2 Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 7 of 9
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British</b> <b>Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

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			One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)
11	Install physical security controls - resources and site travel	R2, Attachment 1, section 2					2,202,000	3,089,000		
12	Install badge card readers and door signs	R2, Attachment 1, section 2					3,080,000			
13	Rekey locks for restricted physical keys	R2, Attachment 1, section 2					2,088,000			
14	Implement physical key management cabinets	R2, Attachment 1, section 2					150,000			
15	Update Physical Access Control Systems for managing access requests	R2, Attachment 1, section 2							130,000	26,000
16	Change management	R2, Attachment 1	287,000		144,000		287,000			

<b>British Columbia Utilities Commission</b> Information Request No. 1.1.2 Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 8 of 9
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit: B-3</b>

	Activity Required to Meet Standard	Requirements Reference	TSTN		GSTN		Physical Security		IT	
			One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)	One Time Costs (\$)	Sustainment Costs (\$)
17	Program management	R2, Attachment 1	2,063,000		196,000		1,523,000		16,000	
18	Interest during construction	n/a	769,000		118,000		651,000			
	R2 Costs Totals		13,526,000	2,427,000	1,286,000	302,000	9,981,000	3,089,000	201,000	37,000
	R2 Grand Totals								24,994,000	5,855,000

<b>British Columbia Utilities Commission</b> Information Request No. 1.1.2 Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 9 of 9
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British</b> <b>Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

In estimating R2 costs, BC Hydro made the following assumptions:

1. The cost of sustaining processes, procedures and supporting documentation is assumed to be 25 per cent of the overall cost based on costs from the NERC CIP V5 project.
2. Based on the CIP V5 WECC audit experience, WECC has shown a preference for in-scope equipment to be labelled. This has been added to the estimate, assuming a 10 per cent expense on inventory and categorization.
3. BC Hydro has determined that a Cyber Asset list is needed to ensure all Cyber Assets are physically and electronically protected and accounted for. The approximate cost of performing device inventory and classification of the CIP V5 project is \$20,000 per facility. BC Hydro has assumed that the cost for the same activity for CIP V7 will be \$15,000 per facility.
4. BC Hydro has assumed that two people will be required to implement change control for TSTN, and one person will be required for GSTN.
5. Twenty facilities will require firewall solutions. The hardware and licenses associated with implementing the firewall solutions are estimated to be \$100,000 per facility. There will also be people resources required with an estimated cost of \$150,000 per facility.
6. Annual review estimates include documentation, evidence and walkthrough costs. Assumed \$6,000 per station with 1/3<sup>rd</sup> of 133 facilities receiving walkthroughs per year.
7. One hundred and ten stations with dial-up will require an authentication solution. The hardware associated with implementing this solution is estimated to be \$5,000 per station. There will also be human resource requirements estimated at \$10,000 per station.
8. BC Hydro has assumed program management will be required. The costs associated with project management are approximately 18 per cent of overall costs.
9. The interest rate during construction has been calculated at 4 per cent and is prorated among the impacted business units based on percentage of overall costs.



<b>British Columbia Utilities Commission</b> Information Request No. <b>1.1.3</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 2
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

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British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

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On page 9 of Appendix C-3, FortisBC Inc. (FBC) does not report any incremental spending changes between Standards CIP-003-7 R1 and CIP-003-7 R2 in their External Stakeholder Feedback form.

1.1.3 Please comment on the expected accuracy of the cost estimates in the table entries above.

**RESPONSE:**

**The intention of the cost estimate is to reflect the minimum spending levels required to meet the requirements of the standard. The cost estimates, based on a bottom up estimating approach, reflect an accuracy of -30/+100 per cent.**

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.1.4</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 2
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British</b> <b>Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

**1.0 A. STANDARD CIP-003-7 IMPLEMENTATION**

**Reference: British Columbia Hydro and Power Authority (BC Hydro) Feedback Survey Forms Exhibit B-1, Appendix C-1, p. 1; Appendix C-3, p. 9 Standard CIP-003-7 Cost Estimates**

On page 1 of Appendix C-1 in BC Hydro’s Mandatory Reliability Standards (MRS) Assessment Report No. 12 (Report), in the column titled “BC Hydro Stakeholder Comments Organizational Activities and Reliability/Suitability Impact”, Standard CIP-003-7 R1 reads:

BC Hydro has 115 transmission stations and 18 generation stations classified as low impact for which incremental protections will need to be afforded per the policy and plan requirements of CIP-003-7 (per Attachment 1 Sections 2, 3, and 5)

Cross-BC Hydro program level activities and costs are included in the respective BC Hydro business group estimates for the following:

1. Program management resources and activities: Program Manager, business analyst and subject matter experts, solutions architect, pilot audit, project administration. Calculated at 18% of all other cost
2. Change management resources and activities – includes change management analyst, organizational designer, and on-going training software and management.
3. Interest costs during construction – calculated at 4%

**GSTN and TSTN:**  
 Estimated Costs:  
 \$3,948,000 (one-time) for  
 - Creating/implementing through site verification inventories of Cyber Assets and implementing an inventory labelling system.  
 - Development of and updates to existing process documents, engineering standards and work procedures.

\$718,000 (ongoing) annually for sustainment for  
 - Annual reviews of processes and standards (25% of initial costs), and  
 - Managing Cyber Asset changes, inclusive of maintaining up-to-date inventories.

**IT:**  
 Estimated Costs:  
 \$107,000 (one-time) for  
 - Changes to compliance management system for asset inventory and work flow development;  
 \$18,000 (ongoing) annually for sustainment for  
 - Reviews/updates of corporate level policies and programs

**PSEC:** Incremental activities and costs included as part of CIP-003-7 R2.

The corresponding entry for Standard CIP-003-7 R2 reads:



<b>British Columbia Utilities Commission</b> Information Request No. <b>1.1.4</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 2 of 2
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

BC Hydro has 115 transmission stations and 18 generation stations classified as low impact for which incremental protections will need to be afforded per the policy and plan requirements of CIP-003-7 (per Attachment 1 Sections 2, 3, and 5)

Cross-BC Hydro program level activities and costs are embedded in the respective BC Hydro business group estimates for the following resources and activities:

1. Program management resources and activities: Program manager, business analyst, subject matter experts, solutions architect, pilot audit, project administration. Calculated at 18% of all other cost
2. Change management resources and activities – includes change management analyst, organizational designer, and on-going training software and management.
3. Interest costs during construction – calculated at 4%

**Generation and Transmission Stations (GSTN and TSTN):**

Estimated Costs:

\$10,864,000 (one-time) for

- Adding firewall panels to ~20 transmission stations,
- Adding dial up authentication to 110 transmission stations,
- Reviewing /implementing firewall access controls for 18 generation stations, and
- Development/verification of network diagrams for all 115 transmission stations and 18 generation stations.

\$2,011,000 (ongoing) annually for sustainment for

- Firewall management costs,
- Sustaining network drawings inclusive of site verifications (on a three year cyclical basis).

**Physical Security (PSEC):**

Estimated Costs:

\$9,981,000 (one-time) for

- Installation of badge card readers at physical zones (i.e. buildings and cabinets) containing low impact BES Cyber Assets,
- Rekeying baseline for restricted physical key access to physical zones contained low impact BES Cyber Assets,
- Implementation of physical key management cabinets to store and track restricted physical keys,
- Updates to physical security plan documentation, standard operating procedures for security personnel, and
- Rollout of training and awareness on updated processes and controls.

\$3,089,000 (ongoing) annually for

- Reviews/updates to physical security plans, standard operating procedures and training content
- Maintenance of physical access controls (i.e. badge card readers, physical key management cabinets, etc.)
- Key control management reviews (i.e. inventories and authorizations)

**Information Technology (IT):**

Estimated Costs:

\$130,000 (one-time) for

- Physical Access Control System (PACS) workflow updates for managing access requests, inclusive of analysis, data migration, regression testing, etc. and creating new access permission levels.
- Process documentation updates.

\$26,000 (ongoing) annually for sustainment for

- Ongoing support and management of PACS for access management/revocation
- Reviews and updates of process documentation

On page 9 of Appendix C-3, FortisBC Inc. (FBC) does not report any incremental spending changes between Standards CIP-003-7 R1 and CIP-003-7 R2 in their External Stakeholder Feedback form.

- 1.1.4 Please discuss whether the identified scopes of work and estimated costs reflect minimum spending levels required for compliance with Standard CIP-003-7.

**RESPONSE:**

Please refer to BC Hydro's response to BCUC IR 1.1.3.

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.1.5</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 2
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

**1.0 A. STANDARD CIP-003-7 IMPLEMENTATION**

**Reference: British Columbia Hydro and Power Authority (BC Hydro) Feedback Survey Forms Exhibit B-1, Appendix C-1, p. 1; Appendix C-3, p. 9 Standard CIP-003-7 Cost Estimates**

On page 1 of Appendix C-1 in BC Hydro’s Mandatory Reliability Standards (MRS) Assessment Report No. 12 (Report), in the column titled “BC Hydro Stakeholder Comments Organizational Activities and Reliability/Suitability Impact”, Standard CIP-003-7 R1 reads:

BC Hydro has 115 transmission stations and 18 generation stations classified as low impact for which incremental protections will need to be afforded per the policy and plan requirements of CIP-003-7 (per Attachment 1 Sections 2, 3, and 5)

Cross-BC Hydro program level activities and costs are included in the respective BC Hydro business group estimates for the following:

1. Program management resources and activities: Program Manager, business analyst and subject matter experts, solutions architect, pilot audit, project administration. Calculated at 18% of all other cost
2. Change management resources and activities – includes change management analyst, organizational designer, and on-going training software and management.
3. Interest costs during construction – calculated at 4%

**GSTN and TSTN:**  
Estimated Costs:  
\$3,948,000 (one-time) for  
- Creating/implementing through site verification inventories of Cyber Assets and implementing an inventory labelling system.  
- Development of and updates to existing process documents, engineering standards and work procedures.

\$718,000 (ongoing) annually for sustainment for  
- Annual reviews of processes and standards (25% of initial costs), and  
- Managing Cyber Asset changes, inclusive of maintaining up-to-date inventories.

**IT:**  
Estimated Costs:  
\$107,000 (one-time) for  
- Changes to compliance management system for asset inventory and work flow development;  
\$18,000 (ongoing) annually for sustainment for  
- Reviews/updates of corporate level policies and programs

**PSEC:** Incremental activities and costs included as part of CIP-003-7 R2.

The corresponding entry for Standard CIP-003-7 R2 reads:

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.1.5</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 2 of 2
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

BC Hydro has 115 transmission stations and 18 generation stations classified as low impact for which incremental protections will need to be afforded per the policy and plan requirements of CIP-003-7 (per Attachment 1 Sections 2, 3, and 5)

Cross-BC Hydro program level activities and costs are embedded in the respective BC Hydro business group estimates for the following resources and activities:

1. Program management resources and activities: Program manager, business analyst, subject matter experts, solutions architect, pilot audit, project administration. Calculated at 18% of all other cost
2. Change management resources and activities – includes change management analyst, organizational designer, and on-going training software and management.
3. Interest costs during construction – calculated at 4%

**Generation and Transmission Stations (GSTN and TSTN):**  
 Estimated Costs:  
 \$10,864,000 (one-time) for

- Adding firewall panels to ~20 transmission stations,
- Adding dial up authentication to 110 transmission stations,
- Reviewing/implementing firewall access controls for 18 generation stations, and
- Development/verification of network diagrams for all 115 transmission stations and 18 generation stations.

\$2,011,000 (ongoing) annually for sustainment for

- Firewall management costs,
- Sustaining network drawings inclusive of site verifications (on a three year cyclical basis).

**Physical Security (PSEC):**  
 Estimated Costs:  
 \$9,981,000 (one-time) for

- Installation of badge card readers at physical zones (i.e. buildings and cabinets) containing low impact BES Cyber Assets,
- Rekeying baseline for restricted physical key access to physical zones containing low impact BES Cyber Assets,
- Implementation of physical key management cabinets to store and track restricted physical keys,
- Updates to physical security plan documentation, standard operating procedures for security personnel, and
- Rollout of training and awareness on updated processes and controls.

\$3,089,000 (ongoing) annually for

- Reviews/updates to physical security plans, standard operating procedures and training content
- Maintenance of physical access controls (i.e. badge card readers, physical key management cabinets, etc.)
- Key control management reviews (i.e. inventories and authorizations)

**Information Technology (IT):**  
 Estimated Costs:  
 \$130,000 (one-time) for

- Physical Access Control System (PACS) workflow updates for managing access requests, inclusive of analysis, data migration, regression testing, etc. and creating new access permission levels.
- Process documentation updates.

\$26,000 (ongoing) annually for sustainment for

- Ongoing support and management of PACS for access management/revocation
- Reviews and updates of process documentation

On page 9 of Appendix C-3, FortisBC Inc. (FBC) does not report any incremental spending changes between Standards CIP-003-7 R1 and CIP-003-7 R2 in their External Stakeholder Feedback form.

1.1.5 Please explain specifically which requirements of Standard CIP-003-7 drive each work activity listed in the Generation and Transmission Stations and Physical Security categories above. Cite specific requirements from Appendix A-2 where possible, or alternatively, explain where requirements are driven by policies developed by BC Hydro as a result of Standard CIP-003-7.

**RESPONSE:**

**Please refer to the Requirements Reference column in Tables 1 and 2 of BC Hydro’s response to BCUC IR 1.1.2.**



<b>British Columbia Utilities Commission</b> Information Request No. 1.2.1 Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 2
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British</b> <b>Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

**2.0 A. STANDARD CIP-003-7 IMPLEMENTATION**

**Reference: CIP-003-7 – Cyber Security – Security Management Controls Exhibit B-1, Appendix A-2, Attachment 1, p. 42 CIP-003-7 Required Scope of Work**

On page 42 of Appendix A-2, Attachment 1 to Standard CIP-003-7 reads:

**Section 2. Physical Security Controls:** Each Responsible Entity shall control physical access, based on need as determined by the Responsible Entity, to (1) the asset or the locations of the low impact BES [Bulk Electric System] Cyber Systems within the asset, and (2) the Cyber Asset(s), as specified by the Responsible Entity, that provide electronic access control(s) implemented for Section 3.1, if any.

**Section 3. Electronic Access Controls:** For each asset containing low impact BES Cyber System(s) identified pursuant to CIP-002, the Responsible Entity shall implement electronic access controls to:

**3.1** Permit only necessary inbound and outbound electronic access as determined by the Responsible Entity for any communications that are:

- i. between a low impact BES Cyber System(s) and a Cyber Asset(s) outside the asset containing low impact BES Cyber System(s);
- ii. using a routable protocol when entering or leaving the asset containing the low impact BES Cyber System(s); and
- iii. not used for time-sensitive protection or control functions between intelligent electronic devices (e.g., communications using protocol IEC TR-61850-90-5 R-GOOSE).

**3.2** Authenticate all Dial-up Connectivity, if any, that provides access to low impact BES Cyber System(s), per Cyber Asset capability.

1.2.1 Since it is at the discretion of the Responsible Entity to determine the need for physical access controls at BES assets and electronic access controls, please explain why BC Hydro hasn't found a need to make the proposed changes to access controls prior to Standard CIP-003-7.

<b>British Columbia Utilities Commission</b> Information Request No. 1.2.1 Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 2 of 2
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British</b> <b>Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

**RESPONSE:**

**Prior to CIP-003-7, BC Hydro’s Low Impact BES Cyber Systems were not subject to prior versions of the CIP standards (i.e. CIP Versions 1 and 3). With the adoption of CIP Version 5 and CIP-003-7 all Cyber Systems with impacts to the BES are now subject to reliability standards and require electronic and physical security protections.**

**Physical Access Controls: while the language of CIP-003-7 contains some discretionary language around Physical Access Controls, BC Hydro has received guidance from WECC regarding physical protections which BC Hydro incorporated in its feedback in Assessment Report No. 12. Prior to the CIP-003-7 standard, BC Hydro addressed Physical Access Controls by following existing practices for physical security protections of its Low Impact BES Cyber Systems.**

**Electronic Access Controls: the language of CIP-003-7 is prescriptive with respect to Electronic Access Controls which was also incorporated in BC Hydro’s feedback in Assessment Report No. 12. Prior to the CIP-003-7 standard, BC Hydro addressed BES reliability risks by following existing practices for electronic security protections of its Low Impact BES Cyber Systems.**

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.3.1</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 1
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit: B-3</b>

**3.0 A. STANDARD CIP-003-7 IMPLEMENTATION**

**Reference: BC Hydro F2020 to F2021 Revenue Requirements Application (RRA)**  
**Exhibit B-1, Section 6.5.6.1, p.6-152**  
**Standard CIP-003-7 Compliance Costs**

In BC Hydro's F2020 to F2021 RRA, Table 6-56 details planned capital expenditures to manage compliance and security for F2020 and F2021:

**6.5.6.1 Investment to Manage Compliance and Security**

**Table 6-56 Manage Compliance and Security - Plan Capital Expenditures and Additions for Fiscal 2020 to Fiscal 2021 (\$ million)**

Planning ID	Name of Project	Capital Addition Forecast F2020	Capital Addition Forecast F2021	Capital Expenditure Forecast F2020	Capital Expenditure Forecast F2021
	<b>Manage Compliance and Security</b>				
	<b>Projects Over \$2 million</b>				
T001549	End of Life Firewall Replacement	3.6	-	2.0	-
T001390	Data Centre Network Security Improvement	2.5	-	2.0	-
T002055	NERC CIPv7	2.3	-	2.3	-
	<b>Programs over \$2 million</b>				
T001913	Microsoft Enterprise Agreement True Up F2020-F2021	2.0	2.0	2.0	2.0
T001909	Infrastructure Software F2020-F2021	1.7	1.8	1.7	1.8
	<b>Projects and Programs less than \$2 million</b>	<b>7.7</b>	<b>3.8</b>	<b>5.0</b>	<b>4.3</b>
	<b>TOTAL Manage Compliance and Security</b>	<b>19.7</b>	<b>7.6</b>	<b>14.8</b>	<b>8.1</b>

1.3.1 Please confirm, or otherwise explain, whether the NERC CIPv7 project shown in Table 6-56 of the RRA was intended to include compliance with Standard CIP-003-7 only.

**RESPONSE:**

**Confirmed.**

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.3.2</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 1
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit: B-3</b>

**3.0 A. STANDARD CIP-003-7 IMPLEMENTATION**

**Reference: BC Hydro F2020 to F2021 Revenue Requirements Application (RRA)**  
**Exhibit B-1, Section 6.5.6.1, p.6-152**  
**Standard CIP-003-7 Compliance Costs**

In BC Hydro's F2020 to F2021 RRA, Table 6-56 details planned capital expenditures to manage compliance and security for F2020 and F2021:

**6.5.6.1 Investment to Manage Compliance and Security**

**Table 6-56 Manage Compliance and Security - Plan Capital Expenditures and Additions for Fiscal 2020 to Fiscal 2021 (\$ million)**

Planning ID	Name of Project	Capital Addition Forecast F2020	Capital Addition Forecast F2021	Capital Expenditure Forecast F2020	Capital Expenditure Forecast F2021
	<b>Manage Compliance and Security</b>				
	<b>Projects Over \$2 million</b>				
T001549	End of Life Firewall Replacement	3.6	-	2.0	-
T001390	Data Centre Network Security Improvement	2.5	-	2.0	-
T002055	NERC CIPv7	2.3	-	2.3	-
	<b>Programs over \$2 million</b>				
T001913	Microsoft Enterprise Agreement True Up F2020-F2021	2.0	2.0	2.0	2.0
T001909	Infrastructure Software F2020-F2021	1.7	1.8	1.7	1.8
	<b>Projects and Programs less than \$2 million</b>	<b>7.7</b>	<b>3.8</b>	<b>5.0</b>	<b>4.3</b>
	<b>TOTAL Manage Compliance and Security</b>	<b>19.7</b>	<b>7.6</b>	<b>14.8</b>	<b>8.1</b>

1.3.2 Please explain which reliability standards were included in the NERC CIPv7 project shown in Table 6-56 of the RRA.

**RESPONSE:**

**The CIP-003-7 standard is the only standard included in the NERC CIPv7 project shown in Table 6-56 of the RRA.**

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.3.3</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 1
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit: B-3</b>

**3.0 A. STANDARD CIP-003-7 IMPLEMENTATION**

**Reference: BC Hydro F2020 to F2021 Revenue Requirements Application (RRA)**  
**Exhibit B-1, Section 6.5.6.1, p.6-152**  
**Standard CIP-003-7 Compliance Costs**

In BC Hydro's F2020 to F2021 RRA, Table 6-56 details planned capital expenditures to manage compliance and security for F2020 and F2021:

**6.5.6.1 Investment to Manage Compliance and Security**

**Table 6-56 Manage Compliance and Security - Plan Capital Expenditures and Additions for Fiscal 2020 to Fiscal 2021 (\$ million)**

Planning ID	Name of Project	Capital Addition Forecast F2020	Capital Addition Forecast F2021	Capital Expenditure Forecast F2020	Capital Expenditure Forecast F2021
	<b>Manage Compliance and Security</b>				
	<b>Projects Over \$2 million</b>				
T001549	End of Life Firewall Replacement	3.6	-	2.0	-
T001390	Data Centre Network Security Improvement	2.5	-	2.0	-
T002055	NERC CIPv7	2.3	-	2.3	-
	<b>Programs over \$2 million</b>				
T001913	Microsoft Enterprise Agreement True Up F2020-F2021	2.0	2.0	2.0	2.0
T001909	Infrastructure Software F2020-F2021	1.7	1.8	1.7	1.8
	<b>Projects and Programs less than \$2 million</b>	<b>7.7</b>	<b>3.8</b>	<b>5.0</b>	<b>4.3</b>
	<b>TOTAL Manage Compliance and Security</b>	<b>19.7</b>	<b>7.6</b>	<b>14.8</b>	<b>8.1</b>

1.3.3 Please provide justification for the variance between the capital addition and capital expenditure forecast for NERC CIPv7 provided in the RRA and the costs shown in Table 3 of the Report.

**RESPONSE:**

There are two reasons for the differences between Table 6-56 from the RRA and Table 3 of the Report. The first is because the costs shown in Table 3 of the Report reflect the forecast spend for all fiscal years, whereas Table 6-56 from the RRA reflects the capital expenditure forecast estimates for fiscal 2020 and fiscal 2021 (the RRA test period) and accounts for only an initial estimate. Secondly, subsequent to the RRA filing a more detailed planning estimate was prepared as of March 31, 2019, which is Table 3 of the Report and was provided in BC Hydro's response to BCUC IR 1.123.12 of the RRA. As such Table 6-56 from the RRA does not reflect the most current estimate.

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.4.1</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 2
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British</b> <b>Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

**4.0 B. STANDARD PRC-025 COMPLIANCE**

**Reference: Request for Compliance Relief for Dokie General Partnership from PRC-025-1 Generator Relay Loadability, R1 Exhibit A2-1, pp. 1, 3 Standard PRC-025 Compliance Requirements**

In a February 25, 2019 letter to the British Columbia Utilities Commission (BCUC), Innergex Renewable Energy Inc. (Innergex) requested compliance relief for Dokie General Partnership (DGP) from MRS PRC-025-1. In the letter, Innergex states:

In October 2018 DGP engaged Lex Engineering Ltd./Phasor Engineering Inc. ("the Consultant") to carryout an assessment of the protection settings of the project's generating units and to assess them against the settings as detailed in PRC-025-1-Attachment 1: Relay Settings. The assessment concluded that out of 53 relay tags, 6 were found to be below the threshold of PRC-025-1. The Consultant reviewed these 6 relay settings against the plant design documents and equipment specifications and has recommended that the existing settings remain unchanged; as these were implemented during the plant design phase to protect the equipment from thermal overloads. The original plant design was undertaken in 2010. DGP Engineers have reviewed the assessment and have agreed with its findings.

1.4.1 Please confirm if BC Hydro's evaluation of Standard PRC-025-2 indicates that compliance with the standard is expected to increase BES reliability.

**RESPONSE:**

**Confirmed. BC Hydro's evaluation of the PRC-025-2 standard is that it will increase BES reliability because it addresses four specific problems with PRC-025-1 that were identified in the NERC standard drafting consultation process (Standard Authorization Request) as follows:**

- 1. Prevent instances of non-compliance for conditions where the Generator Owner may be prevented from achieving the margin specified by the standard for dispersed generation resources.**
- 2. Prevent a lowering of reliability and potential non-compliance where the Generator Owner might apply a non-standard relay element application and undermine the goal of the standard.**



<b>British Columbia Utilities Commission</b> Information Request No. <b>1.4.1</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 2 of 2
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

3. **Prevent a lowering of reliability where the Generator Owner might only apply part of the Table 1 application(s) thereby misapplying the loadability margins to relays for the stated application(s).**
4. **Prevent a lowering of dependability of protective relays directional toward the transmission system at generating facilities that are remote to the transmission network.**

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.4.2</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 1
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British</b> <b>Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

**4.0 B. STANDARD PRC-025 COMPLIANCE**

**Reference: Request for Compliance Relief for Dokie General Partnership from PRC-025-1 Generator Relay Loadability, R1 Exhibit A2-1, pp. 1, 3 Standard PRC-025 Compliance Requirements**

In a February 25, 2019 letter to the British Columbia Utilities Commission (BCUC), Innergex Renewable Energy Inc. (Innergex) requested compliance relief for Dokie General Partnership (DGP) from MRS PRC-025-1. In the letter, Innergex states:

In October 2018 DGP engaged Lex Engineering Ltd./Phasor Engineering Inc. (“the Consultant”) to carryout an assessment of the protection settings of the project's generating units and to assess them against the settings as detailed in PRC-025-1-Attachment 1: Relay Settings. The assessment concluded that out of 53 relay tags, 6 were found to be below the threshold of PRC-025-1. The Consultant reviewed these 6 relay settings against the plant design documents and equipment specifications and has recommended that the existing settings remain unchanged; as these were implemented during the plant design phase to protect the equipment from thermal overloads. The original plant design was undertaken in 2010. DGP Engineers have reviewed the assessment and have agreed with its findings.

1.4.2 Has BC Hydro accepted generator operator settings for DPG, or any other registered entity, which do not comply with Standard PRC-025-1? If so, in what circumstances would that be acceptable? Please describe.

**RESPONSE:**

**BC Hydro confirmed that relay settings provided by DPG were acceptable in the context of the relay settings not affecting BC Hydro’s equipment. BC Hydro was clear with DPG that it could not confirm its compliance with NERC standards. BC Hydro does not conduct MRS compliance assessments for registered entities.**

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.4.3</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 1
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

**4.0 B. STANDARD PRC-025 COMPLIANCE**

**Reference: Request for Compliance Relief for Dokie General Partnership from PRC-025-1 Generator Relay Loadability, R1 Exhibit A2-1, pp. 1, 3 Standard PRC-025 Compliance Requirements**

In a February 25, 2019 letter to the British Columbia Utilities Commission (BCUC), Innergex Renewable Energy Inc. (Innergex) requested compliance relief for Dokie General Partnership (DGP) from MRS PRC-025-1. In the letter, Innergex states:

In October 2018 DGP engaged Lex Engineering Ltd./Phasor Engineering Inc. (“the Consultant”) to carryout an assessment of the protection settings of the project's generating units and to assess them against the settings as detailed in PRC-025-1-Attachment 1: Relay Settings. The assessment concluded that out of 53 relay tags, 6 were found to be below the threshold of PRC-025-1. The Consultant reviewed these 6 relay settings against the plant design documents and equipment specifications and has recommended that the existing settings remain unchanged; as these were implemented during the plant design phase to protect the equipment from thermal overloads. The original plant design was undertaken in 2010. DGP Engineers have reviewed the assessment and have agreed with its findings.

1.4.3 Please discuss whether any other registered entities have raised concerns with BC Hydro regarding 100 percent compliance with Standards PRC-025-1 and /or PRC-025-2.

**RESPONSE:**

**No other registered entities have raised concerns with BC Hydro regarding 100 per cent compliance with PRC-025-1 and PRC-025-2 standards. Refer to stakeholder feedback in Assessment Report No. 8 (assessment of PRC-025-1) and Assessment Report No. 12 (assessment of PRC-025-2).**

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.4.4</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 1
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British</b> <b>Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

**4.0 B. STANDARD PRC-025 COMPLIANCE**

**Reference: Request for Compliance Relief for Dokie General Partnership from PRC-025-1 Generator Relay Loadability, R1 Exhibit A2-1, pp. 1, 3 Standard PRC-025 Compliance Requirements**

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1.4.4 Please identify what portion of registered entities that may be affected by Standard PRC-025-2 have provided feedback to BC Hydro regarding 100 percent compliance.

**RESPONSE:**

**BC Hydro requested feedback from 29 MRS registered entities with respect to the standards assessed in Assessment Report No. 12. The five registered entities that provided feedback on the PRC-025-2 standard are Catalyst Paper (on behalf of three registered entities), FortisBC and Northwood Pulp Mill.**

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.4.5</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 2
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

**4.0 B. STANDARD PRC-025 COMPLIANCE**

**Reference: Request for Compliance Relief for Dokie General Partnership from PRC-025-1 Generator Relay Loadability, R1 Exhibit A2-1, pp. 1, 3 Standard PRC-025 Compliance Requirements**

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1.4.5 Please identify, or otherwise explain, what risk to the BES may exist, if any, if less than 100 percent generator operator protection settings do not comply with Standard PRC-025-2.

**RESPONSE:**

**The PRC-025-1 and subsequent PRC-025-2 standards were developed to address the following risks observed during the August 14, 2003 blackout and other subsequent system events:<sup>1</sup>**

- **Improper generator relay loadability settings may result in the premature or unnecessary tripping of generators during a system disturbance. The premature or unnecessary tripping of generators during the transient period of a disturbance results in the loss of Real Power and the loss of dynamic Reactive Power, which will exacerbate the severity of the disturbance.**

<sup>1</sup> NERC PRC-025-1 Guideline and Technical Basis document.

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.4.5</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 2 of 2
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

- **As provided by NERC, “[t]o achieve the reliability objective of this standard it is necessary to include all load-responsive protective relays that are affected by increased generator output in response to system disturbances.”**

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.4.6</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 1
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

**4.0 B. STANDARD PRC-025 COMPLIANCE**

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1.4.6 Please confirm if these risks would be limited to the Generator Owner/Generator Operator (GO/GOP) side of the relays or if this would potentially affect BES assets beyond the GO/GOP asset.

**RESPONSE:**

**BC Hydro confirms that the risks associated with the generator relay loadability settings could potentially affect BES assets beyond the GO/GOP assets.**

<b>British Columbia Utilities Commission</b> Information Request No. <b>1.5.1</b> Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 1 of 2
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British Columbia</b>	<b>Exhibit: B-3</b>

**5.0 C. MRS EFFECTIVE DATES**

**Reference: Summary of Final Assessment of the Standards Assessed in the Report**  
**Exhibit B-1, Section 5.3, p. 19-24**  
**Recommended Effective Date**

Table 3 on pages 19-24 of the Report details recommended effective dates for each of the standards along with recommendations from other stakeholders, as summarized in BCUC Staff Table 1 below:

<b>BCUC Staff Table 1: Summary of Differences in Recommended Effective Dates</b>		
<b>Standard</b>	<b>BC Hydro Recommended Effective Date</b>	<b>Other Stakeholders' Recommended Effective Date</b>
CIP-003-7	First day of the first calendar quarter after BCUC adoption.	<del>Alberni, Powell River</del> —One year after BCUC adoption. FBC—24-36 months after BCUC adoption.
EOP-004-4	First day of the first calendar quarter, 12 months after BCUC adoption.	FBC—Immediately after BCUC approval.
EOP-005-3	First day of the first calendar quarter, 12 months after BCUC adoption.	FBC—Immediately after BCUC approval.
EOP-008-2	First day of the first calendar quarter, 12 months after BCUC adoption.	FBC—R1, R2 and R4-R8: Immediately after BCUC approval.
PER-003-2	First day of the first calendar quarter, 6 months after BCUC adoption.	FBC—R2: Immediately after BCUC approval.
PER-006-1	First day of the first calendar quarter, 24 months after BCUC adoption.	FBC—Immediately after BCUC approval.

1.5.1 For each proposed standard listed in BCUC Staff Table 1, please identify any negative impacts on BC Hydro that would result from using FBC's proposed effective dates.

**RESPONSE:**

In MRS Assessment Report No. 12, BC Hydro took into consideration internal and external responses from B.C. registered entities (refer to section 5.3 of MRS Assessment Report No. 12), as well as the time lines allowed for in the U.S. when making its recommendation with respect to effective dates. Further, in its comments dated July 5, 2019, FortisBC confirmed that its feedback is reflected in BC Hydro's Assessment Report No. 12 and that they have no additional comments regarding the report.



<b>British Columbia Utilities Commission</b> Information Request No. 1.5.1 Dated: <b>August 7, 2019</b> British Columbia Hydro & Power Authority Response issued <b>August 28, 2019</b>	Page 2 of 2
British Columbia Hydro & Power Authority <b>Mandatory Reliability Standard Assessment Report No. 12</b> <b>Addressing Reliability Standards for Adoption in British</b> <b>Columbia</b>	<b>Exhibit:</b> <b>B-3</b>

Overall, FortisBC's proposed effective dates will not provide BC Hydro with sufficient time to implement the standards listed in BCUC Staff Table 1 to become compliant; including time to review and strengthen internal controls for a strong sustainment program. Further, the time allowed for implementation as proposed in MRS Assessment Report No. 12 aligns with the time lines allowed for in the U.S. BC Hydro also notes the following additional standard specific issues:

**CIP-003-7:** The CIP-003-7 Implementation Plan provided in Assessment Report No. 12 sets out the initial compliance dates of each requirement within CIP-003-7 subsequent to its effective date. The CIP-003-7 implementation Plan incorporates the additional time requested by entities in their feedback.

**EOP-004-4:** Immediate adoption will not allow sufficient time to review and revise the event reporting plan documentation to align with the standard revisions.

**EOP-005-3:** Immediate adoption will not allow sufficient time to review and revise the restoration process (submission, communication, etc.) documentation to align with the standard revisions.

**EOP-008-2:** Immediate adoption will not allow sufficient time to review and revise the operating plan for loss of control centre functionality documentation to align with the standard revisions. This time allowance is for both the Reliability Coordinator function as well as BC Hydro's Balancing Authority and Transmission Operator functions.

**PER-006-1:** Immediate adoption will not allow sufficient time to review internal controls and strengthen where needed, develop/revise training materials to align with the new standard and roll out the training to the plant personnel as specified in the standard.