BC hydro
FOR GENERATIONS

Janet Fraser
Chief Regulatory Officer
Phone: 604-623-4046
Fax: 604-623-4407
bchydroregulatorygroup@bchydro.com

September 30, 2013

Ms. Erica Hamilton
Commission Secretary
British Columbia Utilities Commission
Sixth Floor – 900 Howe Street
Vancouver, BC V6Z 2N3

Dear Ms. Hamilton:

RE: British Columbia Utilities Commission (BCUC)
British Columbia Hydro and Power Authority (BC Hydro)
Mandatory Reliability Standards (MRS)
Addendum to Assessment Report No. 6

BC Hydro writes to the BCUC to provide its Addendum to MRS Assessment Report No. 6 (**the Addendum**) dated September 30, 2013 pursuant to section 125.2(3) of the *Utilities Commission Act*. BC Hydro is providing an electronic copy of the Addendum to registered entities in the British Columbia (**B.C.**) MRS program.

Overview of Addendum

The Addendum assesses PRC-004-2a which was adopted in the United States (**U.S.**) by the Federal Energy Regulatory Commission and became enforceable in the U.S. on April 1, 2012.

BC Hydro filed MRS Assessment Report No. 6 (**the Report**) on May 24, 2013. In the Report, BC Hydro concluded that PRC-004-2a could not be properly assessed because it made reference to "regional entity's procedures" which had not, at that time, been clarified by the BCUC. In a letter dated July 3, 2013, the BCUC provided BC Hydro with the Western Electricity Coordinating Council's criteria PRC-003-WECC-CRT-1.2 and confirmed that this criteria described the procedures for reporting under PRC-004-2a. The BCUC requested that BC Hydro provide a further assessment of PRC-004-2a as an addendum to the Report. On July 25, 2013, the BCUC issued Order No. R-30-13 in which it directed BC Hydro to provide this addendum by September 30, 2013. The Addendum is being filed in compliance with this directive.

The Addendum presents the reliability impacts, suitability and potential costs of adopting PRC-004-2a for the bulk electric system in B.C. In the Addendum, BC Hydro recommends that PRC-004-2a is suitable for adoption in B.C.

Appendix D of the Addendum includes a revised version of the draft Order that was attached to the Report. It includes a modified table summary of the standards that would be in force in B.C. if the BCUC adopts the Standards as assessed in the Report and Addendum.

BC Hydro has posted the Addendum to the BC Hydro website and notified all registered entities advising them of the Addendum filing on this day September 30, 2013.

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

Yours sincerely,

Janet Fraser
Chief Regulatory Officer

st/ma

Enclosures (8)

Copy to: B.C. MRS Program Registered Entities.

BC hydro

Mandatory Reliability Standards
Assessment Report No. 6 Addendum

September 2013

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1 Introduction

1.1 Purpose of Addendum

Pursuant to the requirements of section 125.2(3) of the Utilities Commission Act (**the UCA**), on May 24, 2013 British Columbia Hydro and Power Authority (**BC Hydro**) submitted Mandatory Reliability Standards (**MRS**) Assessment Report No. 6 (**the Report**) to the British Columbia Utilities Commission (**BCUC**) for consideration. Among other things, the Report assessed the suitability, and potential costs of adopting nine revised reliability standards (**the Revised Standards**), including standard PRC-004-2a. The Report recommended that PRC-004-2a not be adopted at that time since it made reference to 'Regional Entity's Procedures', which had not been clarified by the BCUC at that time. BC Hydro requested the BCUC clarify the 'Regional Entity's Procedures' and recommended that this standard should be assessed in the future MRS assessment report.

On July 3, 2013, the BCUC issued a letter (**the Letter**) to BC Hydro to which it attached the Western Electricity Coordinating Council's (**WECC's**) regional criteria PRC-003-WECC-CRT-1.2 with errata dated June 26, 2013, and a corresponding reporting template (together, the **WECC Criteria**) and clarified that the WECC Criteria describe the procedures for reporting under PRC-004-2a. The Letter also requested BC Hydro to complete its assessment of PRC-004-2a using the WECC Criteria and provide its recommendations as soon as possible as an addendum to the Report. The BCUC subsequently ordered (through Order No. R-30-13) that the addendum be filed by Monday September 30, 2013 and established a process for review of the Report and addendum.

BC Hydro submits this Addendum (**the Addendum**) as directed in the BCUC Order No. R-30-13.

1.2 Revised Draft Order

The draft order included as Appendix D to the Report has been revised to reflect the recommendations contained in this Addendum and is attached as Appendix D to this Addendum. The draft order includes a revised Attachment A which is a table that lists the BCUC approved standards that are being superseded by the Revised Standards. In order to provide registered entities sufficient time to adjust business processes to achieve and maintain compliance with the Revised Standards, the table includes recommended effective dates for each of the Revised Standards, including PRC-004-2a.

2 Report 6 – Special Considerations

This Addendum supersedes the Special Considerations referred to in section 2.3 of the Report. Sections 2.1 and 2.2 of the Report remain unchanged.

3 Summary

By way of this Addendum, BC Hydro is recommending PRC-004-2a for adoption in B.C., having been approved by FERC, and becoming enforceable in the U.S. during the period covered by the Report – December 1, 2011 to November 30, 2012 (the **2012 Assessment Period**).

PRC-004-2a would entirely supersede standard PRC-004-1a as adopted in B.C. by Order No. R-1-13.[1]

Using the same methodology that was employed in previous MRS assessment reports, BC Hydro has concluded that PRC-004-2a will preserve or enhance the reliability of the bulk electric system in B.C., and thus is in the public interest and suitable for adoption in B.C.

[1] PRC-004-2 was approved by FERC on January 10, 2011 and was expected to be effective on April 1, 2012. During this interim period, FERC approved an interpretation to R1 and R3 of PRC-004-1. NERC decided to append the interpretation to the approved PRC-004-1 (resulted in version PRC-004-1a) until version 2 became effective. Once PRC-004-2 became effective, NERC renamed it PRC-004-2a to reflect the addition of the interpretation. Since PRC-004-2 did not come into effect in the U.S., BC Hydro has not assessed it. However, all of the changes approved in PRC-004-2 are included in the assessed PRC-004-2a.

BC Hydro has assessed its estimated incremental one-time and ongoing annual costs of achieving and maintaining compliance with PRC-004-2a as mandatory in B.C. Consistent with the approach taken in previous MRS assessment reports, BC Hydro has also sought input from B.C. MRS registered entities regarding their estimated incremental one-time and annual ongoing costs associated with achieving and maintaining compliance with PRC-004-2a.

A complete list of the registered entities with whom BC Hydro consulted (**Registered Entity List**) is provided in Table 1, section 4.2 of the Addendum. A detailed breakdown of the estimated incremental one-time and ongoing costs reported by BC Hydro and the registered entities is provided in Table 3, section 5.3 of the Addendum. Registered entities' responses are reproduced in full in Appendix C-4.

On the basis of BC Hydro's own assessment and the responses received from those registered entities providing cost estimates, BC Hydro estimates that the cumulative cost for B.C. registered entities to achieve and maintain compliance with PRC-004-2a and the WECC Criteria will be in the order of a minimum of $75,500 with respect to one-time costs, and a minimum of $11,000 on an annual ongoing basis:

- BC Hydro reported estimated incremental one-time costs of $40,500. Annual ongoing costs are estimated at $9,000.
- Catalyst Paper Divisions (Crofton, Port Alberni, and Powell River) reported estimated incremental one-time costs of $10,000. Annual ongoing costs are estimated at $0.
- FortisBC Inc. reported estimated $0 in incremental one-time costs and estimated annual ongoing costs as indeterminate (subject to the type and extent of the PRC-004-2a misoperation)
- Powell River Energy Inc. reported estimated incremental one-time costs of $5,000, and $2,000 annual ongoing costs

- Teck Metals Ltd. reported estimated incremental one-time costs of $10,000. Annual ongoing costs are estimated to be $0.
- Tembec – Chetwynd Operations (LAP) reported estimated incremental one-time costs of $10,000. Annual ongoing costs are estimated at $0.
- V.I. Power Limited Partnership reported $0 in estimated incremental one-time costs and annual ongoing costs

With respect to the costs described above, BC Hydro is of the view that these expenditures are necessary, given that the analysis and mitigation of protection system misoperations are important to the reliable operation of the bulk electric system and will help to avoid future misoperations of a similar nature. The majority of the costs to be incurred relate to adapting existing procedures to accommodate the WECC Criteria.

3.1 Contents of the Addendum

The Addendum is organized in the same manner as the Report. Where a Report section is not required for the Addendum, it is marked “Reserved” in order to preserve the numbering sequence. The Addendum is organized as follows:

Section 4 explains BC Hydro’s standards assessment process, including its consultation with stakeholders.

Section 5 summarizes BC Hydro’s analytical approach to assessing reliability standards and the results of that assessment for PRC-004-2a.

Section 6 Reserved.

Section 7 deals with BC Hydro’s recommendations related to the sequencing of the replacement of PRC-004-1a that was previously adopted by the BCUC.

Section 8 Reserved.

Section 9 Reserved.

Section 10 presents the conclusions of BC Hydro’s assessment of PRC-004-2a.

The Appendices to the Addendum are as follows:

- Appendix A-1 Standard Assessed, FERC Approval, and Effective Dates
- Appendix A-2 NERC Standard and WECC Regional Criteria Assessed by BC Hydro
- Appendix B Reserved
- Appendix C-1 Feedback Tracking Log
- Appendix C-2 Instructions for Registered Entities
- Appendix C-3 External Stakeholder Feedback Survey Form
- Appendix C-4 External Stakeholder Feedback
- Appendix D Revised Draft Order

3.2 Proposed Process

The BCUC has included the review of the contents of this Addendum in the process established for the review of the Report through Order No. R-30-13, issued on July 25, 2013. BC Hydro was directed to provide an Addendum to the Report addressing PRC-004-2a by Monday, September 30, 2013. Review of this Addendum and the Report will then continue as set out in the Regulatory Timetable from BCUC Order No. R-30-13.

4 Standards Assessment Process used in the Addendum

4.1 Identification of Standards for Review and Inclusion in the Addendum

PRC-004-2a became enforceable in the U.S. during the 2012 Assessment Period and is a revision to PRC-004-1a, a previously adopted reliability standard in B.C.

Appendix A-1 includes a reference to the FERC Order approving PRC-004-2a along with the date of the Order, and the effective date on which the Revised Standard became enforceable in the U.S.[2]

Appendix A-2 includes a summary of the NERC version history for PRC-004-2a, clean and red-lined copies of PRC-004-2a, as well as the WECC Criteria.

4.2 Consultation

BC Hydro consulted with the registered entities listed below in Table 1. These registered entities include independent power producers, industrial generators, transmission voltage customers, marketers and municipal distribution utilities, based on the BCUC Registered Entity List.

Table 1 B.C. MRS Program Registered Entity List

Bear Mountain Wind Limited Partnership	British Columbia Hydro and Power Authority
Canexus	Cariboo Pulp & Paper Company
Catalyst Paper - Crofton Division	Catalyst Paper - Elk Falls Division
Catalyst Paper - Port Alberni Division	Catalyst Paper - Powell River Division
Clowhom Power L.P.	Dokie General Partnership
Domtar Kamloops	FortisBC Energy Inc.
FortisBC Inc.	Howe Sound Pulp & Paper Corporation
Innergex Renewable Energy Inc.	Intercontinental Pulp Mill
Lehigh Cement	Mackenzie Pulp Mill
Northwood Pulp Mill	Powell River Energy Inc.
Powerex Corp.	Prince George Pulp & Paper Mill
Quesnel River Pulp and Paper	Rio Tinto Alcan
Shell Energy North America (Canada) Inc.	Shell Energy North America (U.S.) L.P.
Teck Coal Ltd.	Teck Metals Ltd.

[2] The FERC approval of PRC-004-2a includes the approval of PRC-004-2 as well as the approval of the interpretations to R1 and R3 of PRC-004-1 which were ultimately appended to PRC-004-2 in the renamed PRC-004-2a.

Tembec CRS	Tembec LAP
Toba Montrose General Partnership	Tolko Industries Limited
TransAlta Energy Marketing Corp	TransCanada Energy Sales Ltd.
V.I. Power Limited Partnership	WESCUP
Zeballos Lake Hydro Limited Partnership	

Each registered entity on the list was advised by email on July 19, 2013 that PRC-004-2a and the WECC Criteria would be assessed in the Addendum. BC Hydro included an email package containing instructions and a survey form to be completed by registered entities by August 9, 2013. The cut-off date for completion of the survey was later extended to August 16, 2013 (via an email to all registered entities on August 7, 2013) at the request of certain registered entities. The registered entities were asked to provide information for PRC-004-2a as follows:

(a) Provide a list of high-level incremental activities required to reach compliance

(b) For each incremental activity, assign incremental estimated costs and state the assumptions used in developing this estimate. Only consider the following costs:

- Activities where a one-time capital cost will incur (e.g., for the purchase of new assets)
- Activities where there are ongoing annual costs associated with compliance (e.g., compliance would require the hiring of additional staff or similar resources)

(c) Include an assessment of the amount of time reasonably required to come into compliance with PRC-004-2a once adopted by the BCUC

Including BC Hydro, a total of 38 registered entities were contacted, and seven responses were received representing nine registered entities. Catalyst Paper Corporation's Crofton, Port Alberni, and Powell River Divisions provided a single

consolidated survey response. Registered entities' responses are attached in full in Appendix C-4.

5 Assessment of Individual Standard

As noted previously, PRC-004-2a is provided in Appendix A-2. BC Hydro has assessed PRC-004-2a against the criteria stipulated by legislation in B.C. (section 125.2(3) of the *UCA*).

Section 5.1 summarizes BC Hydro's approach to addressing this assessment. Section 5.2 provides a description of PRC-004-2a and an explanation of the reliability and suitability issues of adopting it in B.C. along with BC Hydro's conclusions. Section 5.3 addresses the cost assessment of adopting PRC-004-2a in B.C. and summarizes BC Hydro's final assessment of PRC-004-2a.

5.1 Analytical Approach to Assessment of Reliability Impact, Suitability and Cost of Adoption

The analytical approach taken to evaluate PRC-004-2a against the legislated assessment criteria has not changed from that used in previous MRS assessment reports. In those reports, it was determined that the compliance-related provisions included in the NERC and WECC reliability standards are not applicable to the meaning of "reliability standards" defined in section 125.2 of the *UCA*. As a result, BC Hydro did not assess the compliance-related provisions associated with the NERC reliability standards being assessed. Nevertheless, the compliance-related provisions were subsequently adopted by the BCUC. To indicate that the compliance-related provisions of PRC-004-2a have not been assessed by BC Hydro, section D – Compliance – has been struck-through in the redline version of PRC-004-2a included in Appendix A-2.

In addition, BC Hydro is of the opinion that the effective date stated in PRC-004-2a is likewise not applicable. Accordingly, a strike-through of section A.5 – Effective Date – is included in the redlined version of PRC-004-2a in Appendix A-2.

5.1.1 Analytical Approach in Assessing Adverse Reliability Impacts

BC Hydro has used the same approach in assessing adverse reliability impacts used in prior MRS assessment Reports. This approach relies on a determination that those NERC and WECC standards that have either (i) performance requirements that are not currently employed in B.C., or (ii) requirements as stringent as, or more stringent, than requirements or practices currently employed in B.C. that will, by definition, have neutral or positive impacts on the reliability of the bulk electric system in B.C. Consequently, BC Hydro's approach is to identify performance requirements associated with new, or revisions to, NERC and WECC reliability standards that are less stringent than the existing reliability standards already adopted in B.C., or practices otherwise mandated in utility tariffs or business practices approved or endorsed by the BCUC.

5.1.2 Analytical Approach for the Suitability Assessment

The Addendum uses the same criteria to assess PRC-004-2a that were developed for the previous MRS assessment reports. The two criteria used for this analysis are set out below:

(a) "Administrative suitability" means that the requirements in the standard are fit and appropriate for implementation in light of the policy and regulatory framework in B.C. The requirements can be implemented without requiring the ongoing involvement of NERC, the U.S. Government, or other extra-jurisdictional entities in such a manner as would impair the operation and enforcement of the requirement in B.C. If one or more of the requirements in the standard incorporate by reference reliability standards not yet adopted in other jurisdictions, the remaining requirements in the standard can still be implemented presently in B.C. without giving effect to the particular requirement(s) containing the cross reference.

(b) "Technical suitability" means that the requirements in the standard are fit and appropriate for implementation in B.C., taking into consideration the unique

geographical, structural, design, and functional aspects of the B.C. bulk electric system and the assets that support the reliable operation of this system

In addition, the suitability assessment of PRC-004-2a considered WECC's Criteria as directed by the Letter and subsequently in BCUC Order No. R-30-13 since the WECC Criteria constitute the "regional entity procedures" referred to in PRC-004-2a.

5.1.3 Analytical Approach for the Cost Assessment

BC Hydro's approach used in this Addendum for assessing the potential costs of adopting PRC-004-2a in B.C is consistent with the approach used to assess standards in previous MRS assessment reports. The objective is to provide an estimate of the costs of adopting NERC and WECC reliability standards in B.C. sufficient to inform the BCUC's public interest assessment. Accordingly, only the costs that B.C. entities will potentially incur to achieve and maintain full compliance with PRC-004-2a were assessed. Any costs associated with B.C. entities attaining or maintaining compliance with pre-existing reliability requirements in B.C. were excluded.

5.2 Initial Screening of the Standards for Adverse Reliability Impacts and Suitability

In terms of the assessment of PRC-004-2a against the reliability and suitability criteria, BC Hydro first performed an initial screening of the standard against the criteria described in section 5.1 to identify issues for further examination. This initial screening does not purport to be BC Hydro's final assessment of PRC-004-2a.

The results of BC Hydro's initial screening of PRC-004-2a for potential issues regarding adverse reliability impacts and suitability are summarized below in Table 2, which includes:

- the "Standard" column, which identifies that PRC-004-2a was assessed
- the "Adverse Impact" column, which identifies potential issues relating to adverse reliability impact

- the "Changed from BCUC Approved Standard" column, which identifies potential suitability issues related to PRC-004-2a superseding approved standard PRC-004-1a

Table 2 Initial Screening for Adverse Reliability Impact and Suitability

Standard	Adverse Impact	Suitability Issues					
		Requires NERC Approval/ Participation	Requires Provisions of Information to NERC or WECC		Refers to Standard not yet FERC Approved	Other Suitability Issues	Changed from BCUC Approved Standard
			To NERC	To WECC			
PRC-004-2a	No	No	No	Yes	No	No	Yes

PRC-004-2a supersedes BCUC approved standard PRC-004-1a and deals with Analysis and Mitigation of Transmission and Generation Protection System Misoperations.

5.3 Summary of Final Assessment of Reliability Standard PRC-004-2a

BC Hydro's final assessment of PRC-004-2a, based on internal and external B.C. responses from registered entities, is summarized below in Table 3, which includes:

- BC Hydro's final assessment as to whether PRC-004-2a will give rise to adverse reliability consequences
- BC Hydro's final assessment as to the suitability of PRC-004-2a, based on the criteria described in section 5.1.2 and the WECC Criteria
- BC Hydro's and registered entities' estimated incremental one-time and ongoing annual costs to achieve and maintain compliance associated with PRC-004-2a
- BC Hydro's recommended effective date, based on comments made by registered entities who responded to the stakeholder survey, for PRC-004-2a. BC Hydro recommends that the recommended effective date be adopted by the BCUC to replace section A.5-Effective Date in PRC-004-2a.

Table 3 Final Assessment Summary

Standard	Adverse Impact	Suitability Issues	One-time Cost ($)	Ongoing Cost ($/year)	Recommended Effective Date
PRC-004-2a	None	None	BC Hydro - $40,500 Catalyst Paper (Crofton, Port Alberni, Powell River) - $10,000 PREI - $5,000 Tembec Chetwynd (LAP) - $10,000 Teck Metals - $10,000	BC Hydro - $9,000 PREI - $2,000 Fortis BC - The ongoing cost associated with the reporting of a misoperation would vary and depend on the type and extent of the occurrence.	BC Hydro Consolidated Response: 6 months after BCUC adoption

BC Hydro's assessment is that the PRC-004-2a will either maintain or promote the reliability of the bulk electric system in B.C.

The total cost required to adopt PRC-004-2a in B.C. is estimated to be at least $75,500 for implementation, with ongoing annual costs of at least $11,000 to maintain compliance (both cumulative). The cost estimates are the cumulative costs provided by the stakeholders that responded to the survey, including BC Hydro.

6 Reserved

7 Replacement of Approved Standard

With respect to the approval for adoption in B.C. of PRC-004-2a, BC Hydro suggests that, to avoid duplication, PRC-004-1a be ordered to remain in effect until the effective date of PRC-004-2a.[3]

8 Reserved

9 Reserved

[3] BC Hydro notes that since PRC-004-2 was not in effect in the U.S. and as a result was not adopted in B.C., it is appropriate for PRC-004-1a to remain in effect pending the adoption of PRC-004-2a in B.C.

10 Conclusions

BC Hydro has assessed reliability standard PRC-004-2a as a standard that became effective in the U.S. during the 2012 Assessment Period. BC Hydro has concluded that PRC-004-2a will preserve or enhance the reliability of the bulk electric system in B.C., and thus will serve the public interest and is suitable for adoption in B.C. based on the criteria applied in the assessment of the standard.

BC Hydro recommends that PRC-004-2a be adopted by the BCUC and further recommends that its effective date should be based on the recommended effective date included in Table 3, section 5.3.

Further, on May 16, 2013, the BCUC issued Letter No. L-28-13, requesting that BC Hydro review the extent to which WECC regional criteria may be sufficiently developed to enable standards requirements that refer to those not-yet-approved standards to be brought into force in BC. This review will assist in determining the applicability of regional criteria and not-yet-approved standards in future MRS assessment reports.

As suggested in BC Hydro's submission in response to BCUC issued Letter No. L-28-13, BC Hydro recommends that the BCUC adopt PRC-004-2a and, to the extent it agrees with BC Hydro's submission, that the BCUC issue an order directing B.C. registered entities to comply with the WECC Criteria in order to demonstrate compliance with PRC-004-2a.

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Appendix A-1

Standard Assessed,
FERC Approval, and Effective Date

Table 1 Reliability Standard Assessed

Standard	Standard Name	FERC Order Approving[1]	U.S. Effective Date[2]	Type	BCUC Approved Standard[3]
PRC-004-2a	Analysis and Mitigation of Transmission and Generation Protection System Misoperations	61,015 Docket: RD10-15-000 January 10, 2011[4] 61,208 Docket: RD11-5-000 September 26, 2011	April 1, 2012	Revised	PRC-004-1a

1 The date of the FERC Order Approving does not necessarily match the date shown under Version History within the Standard.

2 U.S. Effective Date is the effective date shown in the Standard corresponding to jurisdictions where regulatory approval is required.

3 BCUC Approved Standard is the standard being superseded by a revised Standard.

4 PRC-004-2 was approved by FERC on January 10, 2011 and was expected to be effective on April 1, 2012. During this interim period, FERC approved an interpretation to R1 and R3 of PRC-004-1. NERC decided to append the interpretation to the approved PRC-004-1 (resulted in version PRC-004-1a) until version 2 became effective. Once PRC-004-2 became effective, NERC renamed it PRC-004-2a to reflect the addition of the interpretation. Since PRC-004-2 did not come into effect in the U.S., BC Hydro has not assessed it. However, all of the changes approved in PRC-004-2 are included in the assessed PRC-004-2a.

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Appendix A-1

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Appendix A-2

NERC Standard and WECC Regional Criteria
Assessed by BC Hydro

Description of the Requirements to PRC 004 2a Assessed by BC Hydro

PRC-004-2a is as a replacement standard. Following the table below is the standard itself, with new or changed text in the body highlighted:

1. Section A.5 (Effective dates) may not apply. Effective dates in British Columbia will be as ordered by the BCUC.

2. Section D (Compliance); the following apply:
   - Compliance Enforcer: British Columbia Utilities Commission
   - Compliance Enforcer's Administrator and Regional Entity: Western Electricity Coordinating Council.

Standard	Description
PRC-004-2a	**Replacement Standard:** · PRC-004-2 replaced the reference to PRC-003 with Regional Entity's procedures · PRC-004-2a appended FERC-approved interpretation of R1 and R3 to PRC-004-2

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Appendix A-2

NERC Standard Assessed by BC Hydro

Clean

Standard PRC-004-2a – Analysis and Mitigation of Transmission and Generation Protection System Misoperations

A. Introduction

1. Title: Analysis and Mitigation of Transmission and Generation Protection System Misoperations

2. Number: PRC-004-2a

3. Purpose: Ensure all transmission and generation Protection System Misoperations affecting the reliability of the Bulk Electric System (BES) are analyzed and mitigated.

4. Applicability

4.1. Transmission Owner.

4.2. Distribution Provider that owns a transmission Protection System.

4.3. Generator Owner.

5. (Proposed) Effective Date: The first day of the first calendar quarter, one year after applicable regulatory approval; or in those jurisdictions where no regulatory approval is required, the first day of the first calendar quarter one year after Board of Trustees' adoption.

B. Requirements

R1. The Transmission Owner and any Distribution Provider that owns a transmission Protection System shall each analyze its transmission Protection System Misoperations and shall develop and implement a Corrective Action Plan to avoid future Misoperations of a similar nature according to the Regional Entity's procedures.

R2. The Generator Owner shall analyze its generator Protection System Misoperations, and shall develop and implement a Corrective Action Plan to avoid future Misoperations of a similar nature according to the Regional Entity's procedures.

R3. The Transmission Owner, any Distribution Provider that owns a transmission Protection System, and the Generator Owner shall each provide to its Regional Entity, documentation of its Misoperations analyses and Corrective Action Plans according to the Regional Entity's procedures.

C. Measures

M1. The Transmission Owner, and any Distribution Provider that owns a transmission Protection System shall each have evidence it analyzed its Protection System Misoperations and developed and implemented Corrective Action Plans to avoid future Misoperations of a similar nature according to the Regional Entity's procedures.

M2. The Generator Owner shall have evidence it analyzed its Protection System Misoperations and developed and implemented Corrective Action Plans to avoid future Misoperations of a similar nature according to the Regional Entity's procedures.

M3. Each Transmission Owner, and any Distribution Provider that owns a transmission Protection System, and each Generator Owner shall have evidence it provided documentation of its Protection System Misoperations, analyses and Corrective Action Plans according to the Regional Entity's procedures.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

Regional Entity.

1.2. Compliance Monitoring Period and Reset Time Frame

Not applicable.

1.3. Compliance Monitoring and Enforcement Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

1.4. Data Retention

The Transmission Owner, and Distribution Provider that own a transmission Protection System and the Generator Owner that owns a generation Protection System shall each retain data on its Protection System Misoperations and each accompanying Corrective Action Plan until the Corrective Action Plan has been executed or for 12 months, whichever is later.

The Compliance Monitor shall retain any audit data for three years.

1.5. Additional Compliance Information

The Transmission Owner, and any Distribution Provider that owns a transmission Protection System and the Generator Owner shall demonstrate compliance through self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.

2. Violation Severity Levels (no changes)

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
1	December 1, 2005	1. Changed incorrect use of certain hyphens (-) to "en dash" (–) and "em dash (—)." 2. Added "periods" to items where appropriate. Changed "Timeframe" to "Time Frame" in item D, 1.2.	
2	August 5, 2010	Adopted by the NERC Board of Trustees	
1a	February 17, 2011	Added Appendix 1 - Interpretation regarding applicability of standard to protection of radially connected transformers	Project 2009-17 interpretation
1a	February 17, 2011	Adopted by the NERC Board of Trustees	

Standard PRC-004-2a – Analysis and Mitigation of Transmission and Generation Protection System Misoperations

1a	September 26, 2011	FERC Order issued approving the interpretation of R1 and R3 (FERC's Order is effective as of September 26, 2011)	
2a	September 26, 2011	Appended FERC-approved interpretation of R1 and R3 to version 2	

Standard PRC-004-2a – Analysis and Mitigation of Transmission and Generation Protection System Misoperations

Appendix 1

Requirement Number and Text of Requirement
R1. The Transmission Owner and any Distribution Provider that owns a transmission Protection System shall each analyze its transmission Protection System Misoperations and shall develop and implement a Corrective Action Plan to avoid future Misoperations of a similar nature according to the Regional Reliability Organization's procedures developed for Reliability Standard PRC-003 Requirement 1. **R3**. The Transmission Owner, any Distribution Provider that owns a transmission Protection System, and the Generator Owner shall each provide to its Regional Reliability Organization, documentation of its Misoperations analyses and Corrective Action Plans according to the Regional Reliability Organization's procedures developed for PRC-003 R1.
Question:
Is protection for a radially-connected transformer protection system energized from the BES considered a transmission Protection System subject to this standard?
Response:
The request for interpretation of PRC-004-1 Requirements R1 and R3 focuses on the applicability of the term "transmission Protection System." The NERC Glossary of Terms Used in Reliability Standards contains a definition of "Protection System" but does not contain a definition of transmission Protection System. In these two standards, use of the phrase transmission Protection System indicates that the requirements using this phrase are applicable to any Protection System that is installed for the purpose of detecting faults on transmission elements (lines, buses, transformers, etc.) identified as being included in the Bulk Electric System (BES) and trips an interrupting device that interrupts current supplied directly from the BES. A Protection System for a radially connected transformer energized from the BES would be considered a transmission Protection System and subject to these standards only if the protection trips an interrupting device that interrupts current supplied directly from the BES and the transformer is a BES element.

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Appendix A-2

NERC Standard Assessed by BC Hydro

Red-lined

Standard PRC-004-~~1a~~ 2a — Analysis and Mitigation of Transmission and Generation Protection System Misoperations

A. Introduction

1. Title: **Analysis and Mitigation of Transmission and Generation Protection System Misoperations**

2. Number: PRC-004-~~1a~~ 2a

3. Purpose: Ensure all transmission and generation Protection System Misoperations affecting the reliability of the Bulk Electric System (BES) are analyzed and mitigated.

4. Applicability

4.1. Transmission Owner.

4.2. Distribution Provider that owns a transmission Protection System.

4.3. Generator Owner.

5. (Proposed) Effective Date: ~~The first day of the first calendar quarter, one year after applicable regulatory approval; or in those jurisdictions where no regulatory approval is required, the first day of the first calendar quarter one year after Board of Trustees' adoption.~~
~~To be determined~~

B. Requirements

R1. The Transmission Owner and any Distribution Provider that owns a transmission Protection System shall each analyze its transmission Protection System Misoperations and shall develop and implement a Corrective Action Plan to avoid future Misoperations of a similar nature according to the Regional Entity's procedures ~~Regional Reliability Organization's procedures developed for Reliability Standard PRC-003 Requirement 1~~.

R2. The Generator Owner shall analyze its generator Protection System Misoperations, and shall develop and implement a Corrective Action Plan to avoid future Misoperations of a similar nature according to the Regional Entity's procedures~~Regional Reliability Organization's procedures developed for PRC-003 R1~~.

R3. The Transmission Owner, any Distribution Provider that owns a transmission Protection System, and the Generator Owner shall each provide to its Regional Reliability Organization, documentation of its Misoperations analyses and Corrective Action Plans according to the Regional Entity's procedures~~Regional Reliability Organization's procedures developed for PRC-003 R1~~.

C. Measures

M1. The Transmission Owner, and any Distribution Provider that owns a transmission Protection System shall each have evidence it analyzed its Protection System Misoperations and developed and implemented Corrective Action Plans to avoid future Misoperations of a similar nature according to the Regional Entity's procedures ~~Regional Reliability Organization procedures developed for PRC-003 R~~1.

M2. The Generator Owner shall have evidence it analyzed its Protection System Misoperations and developed and implemented Corrective Action Plans to avoid future

Misoperations of a similar nature according to the Regional Entity's procedures~~Regional Reliability Organization's procedures developed for PRC-003 R1~~.

M3. Each Transmission Owner, and any Distribution Provider that owns a transmission Protection System, and each Generator Owner shall have evidence it provided documentation of its Protection System Misoperations, analyses and Corrective Action Plans according to the Regional Entity's procedures~~Regional Reliability Organization procedures developed for PRC-003 R1~~.

~~D.~~ ~~Compliance~~

~~1.~~ ~~Compliance Monitoring Process~~

~~1.1.~~ ~~Compliance Monitoring Responsibility~~

~~Regional Reliability Organization~~Entity~~.~~

~~1.2.~~ ~~Compliance Monitoring Period and Reset Time Frame~~

~~One calendar year~~Not applicable~~.~~

~~1.3. Compliance Monitoring and Enforcement Processes:~~

~~Compliance Audits~~
~~Self-Certifications~~
~~Spot Checking~~
~~Compliance Violation Investigations~~
~~Self-Reporting~~
~~Complaints~~

~~1.3~~4~~.~~ ~~Data Retention~~

~~The Transmission Owner, and Distribution Provider that own a transmission Protection System and the Generator Owner that owns a generation Protection System shall each retain data on its Protection System Misoperations and each accompanying Corrective Action Plan until the Corrective Action Plan has been executed or for 12 months, whichever is later.~~

~~The Compliance Monitor shall retain any audit data for three years.~~

~~1.4~~5~~.~~ ~~Additional Compliance Information~~

~~The Transmission Owner, and any Distribution Provider that owns a transmission Protection System and the Generator Owner shall demonstrate compliance through self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.~~

~~2.~~ ~~Violation Severity Levels (no changes)Levels of Non-Compliance for Transmission Owners and Distribution Providers that own a Transmission Protection System:~~

~~2.1. Level 1: Documentation of Misoperations is complete according to PRC-~~

~~004 R1, but documentation of Corrective Action Plans is incomplete.~~

~~**2.2. Level 2:** Documentation of Misoperations is incomplete according to PRC-004 R1 and documentation of Corrective Action Plans is incomplete.~~

~~**2.3. Level 3:** Documentation of Misoperations is incomplete according to PRC-004 R1 and there are no associated Corrective Action Plans.~~

~~**2.4. Level 4:** Misoperations have not been analyzed and documentation has not been provided to the Regional Reliability Organization according to Requirement 3.~~

~~**3. Levels of Non-Compliance for Generator Owners**~~

~~**3.1. Level 1:** Documentation of Misoperations is complete according to PRC-004 R2, but documentation of Corrective Action Plans is incomplete.~~

~~**3.2. Level 2:** Documentation of Misoperations is incomplete according to PRC-004 R2 and documentation of Corrective Action Plans is incomplete.~~

~~**3.3. Level 3:** Documentation of Misoperations is incomplete according to PRC-004 R2 and there are no associated Corrective Action Plans.~~

~~**3.4. Level 4:** Misoperations have not been analyzed and documentation has not been provided to the Regional Reliability Organization according to R3.~~

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
1	December 1, 2005	1. Changed incorrect use of certain hyphens (-) to "en dash" (–) and "em dash (—)." 2. Added "periods" to items where appropriate. Changed "Timeframe" to "Time Frame" in item D, 1.2.	~~01/20/06~~
2	August 5, 2010	Adopted by the NERC Board of Trustees	
1a	February 17, 2011	Added Appendix 1 - Interpretation regarding applicability of standard to protection of radially connected transformers	Project 2009-17 interpretation
1a	February 17, 2011	Adopted by the Board of Trustees	
1a	September 26, 2011	FERC Order issued approving the interpretation of R1 and R3 (FERC's Order is effective as of September 26, 2011)	
2a	September 26, 2011	Appended FERC-approved interpretation of R1 and R3 to version 2	

Appendix 1

Requirement Number and Text of Requirement

R1. The Transmission Owner and any Distribution Provider that owns a transmission Protection System shall each analyze its transmission Protection System Misoperations and shall develop and implement a Corrective Action Plan to avoid future Misoperations of a similar nature according to the Regional Reliability Organization's procedures developed for Reliability Standard PRC-003 Requirement 1.

R3. The Transmission Owner, any Distribution Provider that owns a transmission Protection System, and the Generator Owner shall each provide to its Regional Reliability Organization, documentation of its Misoperations analyses and Corrective Action Plans according to the Regional Reliability Organization's procedures developed for PRC-003 R1.

Question:

Is protection for a radially-connected transformer protection system energized from the BES considered a transmission Protection System subject to this standard?

Response:

The request for interpretation of PRC-004-1 Requirements R1 and R3 focuses on the applicability of the term "transmission Protection System." The NERC Glossary of Terms Used in Reliability Standards contains a definition of "Protection System" but does not contain a definition of transmission Protection System. In these two standards, use of the phrase transmission Protection System indicates that the requirements using this phrase are applicable to any Protection System that is installed for the purpose of detecting faults on transmission elements (lines, buses, transformers, etc.) identified as being included in the Bulk Electric System (BES) and trips an interrupting device that interrupts current supplied directly from the BES.

A Protection System for a radially connected transformer energized from the BES would be considered a transmission Protection System and subject to these standards only if the protection trips an interrupting device that interrupts current supplied directly from the BES and the transformer is a BES element.

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Appendix A-2

WECC Regional Criteria Assessed by BC Hydro

Document name	**Analysis, Reporting, and Mitigation of Transmission and Generation Protection Systems and Remedial Action Schemes Misoperations Procedure PRC-003-WECC-CRT-1.2 WECC Criterion**
Category	( ) Regional Reliability Standard (X) Regional Criterion ( ) Regional Business Practice ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	June 22, 2011
Adopted/approved by	WECC Board of Directors
Date adopted/approved	June 22, 2011
Custodian (entity responsible for maintenance and upkeep)	OC
Stored/filed	Physical location: NA Web URL: Approved Regional Criterion page
Previous name/number	(if any) NA
Status	(X) in effect October 1, 2011

Version Control

Version	Date	Action	Change Highlights
1	3/3/2011	Operating Committee Approval	Final
1	6/22/2011	WECC Board of Directors Approval	Final
1	1/28/2013	Format change	Conformed to CRT Template
1.1	6/26/1013	Errata Changes	1) Removed specific version and requirement references so document would not become outdated. 2) Clarified that potential NERC penalties are for U.S. Entities only in the Purpose section. 3) Removed references to retired documents in the Applicability section
1.2	7/2/2013	Errata Changes	1) The Purpose statement was changed deleting version references to NERC Standards. 2) The Purpose statement was changed clarifying that the application of penalties. 3) The Facilities section references were brought current. 4) In the Background section, present/past participles were corrected.

A. Introduction

1. Title: Analysis, Reporting, and Mitigation of Transmission and Generation Protection System and Remedial Action Scheme Misoperations Procedure
WECC Criterion

2. Number: PRC-003-WECC-CRT-1.2

3. Purpose: To define and document the Western Electricity Coordinating Council (WECC) procedures required by PRC-003-1 R1 (cross- referenced in PRC-004) and PRC-012 for analyzing, reporting, and mitigating Misoperations of the Protection Systems and Remedial Actions Schemes (RAS) on the Bulk Electric System (BES).

This regional criterion was developed to meet North American Electric Reliability Corporation (NERC) Reliability Standard PRC-003-1, R1 (Regional Procedure for Analysis of Misoperations of Transmission and Generation Protection Systems). Failure to follow the requirements in this regional criterion may lead to penalties or sanctions to U.S. entities imposed by NERC for violation of requirements in PRC-003-1, PRC-004, and PRC-016, the associated NERC Reliability Standards.

4. Applicability

4.1. Functional Entities

4.1.1 Distribution Provider that owns a transmission Protection System

4.1.2 Generator Owner

4.1.3 Reliability Assurer (WECC)

4.1.4 Transmission Owner

4.2. Facilities

In addition to this criterion, WECC major transmission path facilities listed in the table titled “Major WECC Transfer Paths in the Bulk Electric

System” and RAS listed in the table titled “Major WECC Remedial Action Schemes (RAS)” referenced in PRC-004-WECC are subject to those standards.

The requirements below apply to Protection System and RAS Misoperations for:

4.2.1. All BES Elements

4.2.2. Individual generating units greater than or equal to 20 MVA where the generator step-up transformer is directly connected to the BES

4.2.3. Generating plants with an aggregate capacity greater than or equal to 75 MVA where the generator or plant step-up transformers are directly connected to the BES

4.2.4. Non-BES Elements on which RAS are applied to ensure the reliability of the BES

5. Effective Date: October 1, 2011

6. Background:

Project WECC-0059: NERC Reliability Standard PRC-003-1 Requirement R1 mandates that each Regional Reliability Organization (RRO) establish, document, and maintain its procedures for review, analysis, reporting, and mitigation of transmission and generation Protection System Misoperations. There were originally two separate Western Electricity Coordinating Council (WECC) documents that addressed this requirement (PRC-STD-003-1 and MORC – Section 2.A.4). The Project WECC-0059Criterion Drafting Team [Relay Work Group (RWG)] was assigned to clarify WECC’s current Protection System Misoperation procedures. However, in October 2010, the ERO Reliability Assessment and Performance Analysis Group released a Proposed Protection System and Misoperation Reporting methodology so that reporting of Misoperations will be consistent throughout NERC.

B. Requirements and Measures

WR1. For each Misoperation of a Protection System or RAS that it owns and is applied to an Element described in Section A4.2. "Facilities," each Transmission Owner, each Distribution Provider that owns one or more transmission Protection Systems, and each Generator Owner shall:

1. Review and analyze the Protection System or RAS Misoperation,

2. Document each of the items in PRC-003-WECC-CRT-1 Attachment A,

3. Develop and implement a Corrective Action Plan,

4. Report the Misoperation investigation results to the Regional Entity (WECC) in the WECC-approved format within two months following the end of each quarter in which the Misoperation occurred and provide quarterly updates until the Corrective Action Plans are fully implemented.

WM1. Each Transmission Owner, each Distribution Provider that owns one or more transmission Protection Systems or RAS, and each Generator Owner shall have and provide upon request, documentation per R1 that it reviewed, analyzed, and developed a Corrective Action Plan, and reported the Protection System and RAS Misoperations of Elements it owns as described in Section A.4.2 Facilities (above).

WR2. The Reliability Assurer (WECC) shall designate the Operating Committee to review and recommend approval of any changes to this "Analysis, Reporting, and Mitigation of Transmission and Generation Protection System and Remedial Action Scheme Misoperations Procedure."

WM2. The Reliability Assurer (WECC) shall have and provide upon request, written documentation that the Operating Committee has been designated to review and approve all proposed changes to this criterion per R2.

WR3. The Reliability Assurer (WECC) shall designate the Relay Work Group (RWG), or any other group that the WECC Operating Committee designates, to be responsible for developing and posting any changes to this criterion.

WM3. The Reliability Assurer (WECC) shall have and provide upon request, written documentation that the RWG or any other group that the WECC Operating Committee designates is responsible for developing and posting any proposed changes to this criterion per R3.

WR4. The Reliability Assurer (WECC) shall designate the Relay Work Group (RWG), or any other group that the WECC Operating Committee designates, to review this criterion at least once every five years and update as necessary.

WM4. The Reliability Assurer (WECC) shall have and provide upon request, documentation that the RWG or any other group that the WECC Operating Committee designates, has reviewed this criterion at least once every five years and updated the criterion as necessary per R4.

WR5. The Reliability Assurer (WECC) shall distribute any changes to this procedure to the affected Transmission Owners, Distribution Providers, and Generation Owners within 30 days after approval by the WECC Board.

WM5. The Reliability Assurer (WECC) shall have and provide upon request, documentation that it distributed notice of any changes to this procedure to the affected Transmission Owners, Distribution Providers, and Generation Owners within 30 days after approval by the WECC Board of Directors per R5.

PRC-003-WECC-CRT-1 — Attachment A

Required Information in the Review, Analysis, and Reporting of Misoperations

Purpose: To establish a list of items to be included in the documented results of the review, analysis, and reporting of each transmission and generation Protection System and Remedial Action Scheme (RAS) Misoperation.

If more than one protection system or RAS misoperation occurs during an event, report each misoperation separately. The review, analysis, and reporting shall include all of the following:

Data Item		Explanation of necessary Information
1	Reporting Entity	Identify the entity reporting the misoperation event.
2	Misoperation Date	
3	Misoperation Time in 24-hour HH:MM:SS format	
4	Time Zone of Misoperation Time	
5	Facility Name where the Misoperation occurred	Provide the substation or other location name(s). For a RAS misoperation, give the name of the RAS and the location(s) where the misoperation occurred.
6	Equipment Name (protected by Protection System that Misoperated)	For a RAS misoperation, “BES performance” (or a similar phrase) is often the object of protection rather than specific equipment. Enter an appropriate description.
7	Equipment Type (Generator, Line, Transformer, Bus, etc.)	This is associated with Equipment Name. For a RAS misoperation, identify “RAS.”
8	Facility Voltage (kV; if transformer, use high-side voltage)	Report the highest system or equipment voltage involved in the misoperation.

9	Equipment Removed	Report loss of generators, lines (de-energized), transformers (de-energized), etc. For a RAS misoperation, do not report intentional load shedding or operation of shunt devices controlled by the RAS here (include these as appropriate under Description of the Event).
10	Description of the event	
11	Protection Systems that Misoperated (include component types and protection schemes)	For a RAS misoperation, enter RAS name plus any appropriate description.
12	Misoperation Category (Failure to Trip, Slow Trip, Unnecessary Trip During Fault, Unnecessary Trip Other than Fault, Under Review, etc.)	For RAS misoperations, interpret “Trip” as “Operation.”
13	Cause(s) of Misoperation (Identification of root cause(s) of the Misoperation)	
14	Relay Type	Electromechanical, Solid State, or Micro Processor
15	Analysis and Corrective Action Status	
16	Corrective Action Plan (CAP) and Investigation	
17	Proposed Completion Date of CAP	
18	Completion Date of CAP	
19	Name of Person Reporting the Misoperation	
20	Phone Number of Person Reporting the Misoperation	
21	E-mail of Person Reporting the Misoperation	
22	Date the Misoperation was reported to the Region	

Guideline and Technical Basis

Below is a cross-reference of PRC-003-WECC-CRT-1 to NERC Reliability Standard PRC-003-1. The PRC-003-WECC-CRT-1 criterion also fulfills the reporting requirements request by NERC in the ERO Reliability Assessment and Performance Analysis (ERO-RAPA) Group letter of October 12, 2010.

NERC Requirement	WECC Criterion
R1. Each Regional Reliability Organization shall establish, document and maintain its procedures for, review, analysis, reporting and mitigation of transmission and generation Protection System Misoperations. These procedures shall include the following elements:	
R1.1 The Protection Systems to be reviewed and analyzed for Misoperations (due to their potential impact on BES reliability).	Applicability Section regarding Facilities, A.4.2. as indicated in R1.
R1.2 Data reporting requirements (periodicity and format) for Misoperations. and **R1.3** Process for review, analysis, follow up, and documentation of Corrective Action Plans for Misoperations. **And PRC-012-0** **R1.7** Requirements for analysis and documentation of corrective action plans for all SPS misoperations.	R1. For each Misoperation of a Protection System or RAS that it owns and is applied to an Element described in Section A4.2. "Facilities," each Transmission Owner, each Distribution Provider that owns one or more transmission Protection Systems, and each Generator Owner shall: 1. Review and analyze the Protection System or RAS Misoperation 2. Document each of the items in PRC-003-WECC-CRT-1 Attachment A 3. Develop and implement a Corrective Action Plan 4. Report the Misoperation investigation results to the Regional Entity (WECC) in the WECC-approved format within two months following the end of each quarter in which the Misoperation occurred and provide quarterly updates until the Corrective Action Plans are fully implemented.

NERC Requirement	WECC Criterion
R1.4 Identification of the Regional Reliability Organization group responsible for the procedures and the process for approval of the procedures.	**R2.** The Reliability Assurer (WECC) shall designate the Operating Committee to review and recommend approval of any changes to this "Analysis, Reporting, and Mitigation of Transmission and Generation Protection System and Remedial Action Scheme Misoperations Procedure." And **R3.** The Reliability Assurer (WECC) shall designate the Relay Work Group (RWG), or any other group that the WECC Operating Committee designates, to be responsible for developing and posting any changes to this criterion.
R2. Each Regional Reliability Organization shall maintain and periodically update documentation of its procedures for review, analysis, reporting, and mitigation of transmission and generation Protection System Misoperations.	**R4.** The Reliability Assurer (WECC) shall designate the RWG, or any other group that the WECC Operating Committee designates, to review this criterion at least once every five years and update as necessary.
R3. Each Regional Reliability Organization shall distribute procedures in Requirement 1 and any changes to those procedures, to the affected Transmission Owners, Distribution Providers that own transmission Protection Systems, and Generator Owners within 30 calendar days of approval of those procedures.	**R5.** The Reliability Assurer (WECC) shall distribute any changes to this procedure to the affected Transmission Owners, Distribution Providers, and Generation Owners within 30 days after approval by the WECC Board.

Quarterly Misoperation Reporting Form

Regional Entity	Entity Name	Misoperation Date	Misoperation Time	Time zone	Facility Name (Location of Misoperation)	Equipment Name (protected by Protection System that Misoperated)	Equipment Type	Facility Voltage	Equipment Removed from Service (Permanently or Temporarily)	Event Description	Protection Systems/Components that Misoperated	Misoperation Category	Cause(s) of Misoperation	Is this a TADS reportable outage?	Corresponding TADS Cause Code	Enter one or more TADS "Event IDs" if this is a TADS reportable outage?	Relay Type	Analysis and Corrective Action Status	Corrective Action Plan	Corrective Action Plan Target Completion Date	Actual Completion Date	Reported By	Phone	E-Mail	Date Reported
Enter Regional Entity from the drop down choices	Enter entity name	Enter the date of the Misoperation in this YYYY/MM/DD format. When copying, use "Paste_Values" to retain format.	Enter the time of the misoperation in (24 hr.) HH:MM:SS format	Pick Time zone from the list. Definitions are defined under the next sheet "Drop Down".	Identify the name of the facility (i.e., substation or generating station) where the Misoperation occurred.	Identify by name the generator, transmission line, transformer, bus or equipment protected by the Protection System that Misoperated.	Type of equipment being protected (e.g., Line, Transformer, etc.)	System voltage (in kV) of the protected element (if transformer, high side kV).	Names of the equipment becoming unavailable due to the event (Equipment only refers to circuits, transformers, busses, but not breakers UNLESS the breaker is the only element).	Provide a brief description of the event and detailed description of Misoperation root causes (see cause code in Column N).	Only provide information on the components/protection systems that misoperated. If misoperated components are relays, list relay models (types) (models) and protection schemes.	Categories include: Failure to Trip, Slow Trip, Unnecessary Trip During Fault, Unnecessary Trip Other than Fault.	Identification of the root cause(s) of the Misoperation.	Yes or No from drop-down list.	If Statement conditional for columns N and O.	Create a TADS Event ID using TADS Form 5 (Typically, a TADS Event does not last for more than 5-10 minutes. If a Misoperation lasts for 30 minutes or more, there will likely be more than one TADS Event ID to be entered in this column. The TADS Form 5 "Event IDs" can be entered by the TO (or his delegated reporting entity; i.e. TOP or relay technician) at any time of the day or night. TADS is always running . . .for those Users who wish to do partial data entry on the same day as the Event)	Select Electromechanical, Solid State, or Micro Processor from drop-down list	Select the status from drop-down list. In general, misoperation analysis is conducted first, then a Corrective Action Plan will be developed and implemented to mitigate the misoperation.	Identify the corrective actions	If corrective actions are not complete, estimate when they will be complete. Enter date in this YYYY/MM/DD format. When copying, use "Paste Values" to retain format.	If corrective actions are complete, enter the completion date in this YYYY/MM/DD format. When copying, use "Paste Values" to retain format.	Enter the name of the person filling out the report.	Enter the reporting person's phone number.	Enter the reporting E-MAIL address.	The date that the Misoperation is/was reported to the Region. Enter date in this YYYY/MM/DD format. When copying, use "Paste Values" to retain format. If corrective actions are not complete, estimate when they will be complete.

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Appendix B

Reserved

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Appendix C-1

BC Hydro Feedback Tracking Log

Disclaimer: This information has been prepared as input into BC Hydro's sixth assessment report on Mandatory Reliability Standards and is based on information available to BC Hydro as of the date sent. It should not be relied upon for any other purpose.

Feedback #	Current BCUC Adopted NERC Standard (Column "B")	BCUC Adopted NERC Standard Name	BCUC Adopted Standard Description	FERC Approved Revised NERC Standard	FERC Approved Revision(s) to NERC Standard listed in Column "B"	FERC Order No. and Order Issue Date of Approved Revised NERC Standard	NERC Enforcement Date of FERC Approved Revised Standard	Stakeholder Comments Please indicate whether BC Hydro is currently compliant, or state what high-level incremental activities or new activities need to be completed in order to become compliant. (Column "M")	Estimated Incremental Cost Associated with Revision, if any. Please indicate which costs are one-time versus ongoing, and identify the assumptions associated with each estimate (Press Alt-Enter to insert a carriage return in a cell) (Column "N")	BCUC Implementation Time/Recommended Effective Date Please include an assessment of the amount of time reasonably required to come into compliance with the standard once adopted by the BCUC. BC Hydro will use this information to develop Effective Date recommendations for inclusion in the Report. The Effective Date is the date from which compliance would be monitored by the BCUC. (Column "O")
1	**PRC-004-1a**	Analysis and Mitigation of Transmission and Generation Protection System Misoperations	Ensure all transmission and generation Protection System Misoperations affecting the reliability of the Bulk Electric System (BES) are analyzed and mitigated.	**PRC-004-2a**	2a - Appended FERC-approved interpretation of R1 and R3 to version 2	Docket No. RD11-5-000; September 26, 2011	01-Apr-12	**Generation:** The big change in the new standard is associated with the amount and format of information that needs to be documented and reported to WECC (ie. need to fill in a template). Generation does not presently document the following information on the Forced Outage Reports: - Reporting Entity; - Time Zone of Misoperation Time; - Equipment Name; - Facility Voltage; - Misoperation Category; - Relay Type; - Name of Person Reporting the Misoperation; - Phone Number of Person Reporting the Misoperation; and - Date the Misoperation was Reported to the Region. Generation seeks clarification on the purpose of reporting the phone number of the person reporting the misoperation? Can Generation employees expect to receive phone calls directly from WECC if they have a question re a particular protection misoperation? Generation is not sure this is something BC Hydro should endorse? **T&D:** **R1 -** The incremental effort to remain compliant is simply to adopt the new reporting documentation and change the reporting frequency. **R3 -** To remain complaint BC Hydro will have to identify proper reporting contacts to liase with T&D and Generation SMEs for enhanced reporting documentation and frequency.	**Generation:** There will be one-time internal costs associated with updating GOO 1G-54A, which would likely take 1-2 weeks depending how much coordination / discussion is required to develop the process for BC Hydro to report the required information (estimate: $10k). There will also be one-time internal costs associated with training site staff (ie. Plant Managers, Maintenance Engineers, CPC Techs, etc) on the new process required for reporting on protection misoperations. Ideally, Generation and T&D should agree to the same process to ensure the CPC Techs don't have two different procedures to follow for Generation vs T&D protection misoperations (Assume: 60ppl for trng 1hr trng + development. Estimate: $8k.). There will be ongoing internal costs associated with each protection misoperation, due to the additional reporting requirements. Generation doesn't have a lot of protection misoperations, so it could take upto 10-20% longer to complete the reporting requirements if process familiarization is required for each protection misoperation (Estimate: $2k/year). **T&D:** **R1 -** Initial costs related to training on new processes are ~ $20k,estimated to take 1-2 weeks total. Ongoing cost difference negligible compared to existing process (~$5k per year). **R3 -** Expected there will be a one-time cost with initial training for the reporting parties (~$2500). There will be some small ongoing internal costs with reporting requirements (~$2000 per year).	**Generation**: BC Hydro estimates that GOO 1G-54A could be updated and training completed in 6 months. **T&D:** **R1 -** Estimate 2 months to revise documentation and deliver training. **R3 -** Expected that the training would only involve 1 primary contact and a back up. All documents updated and trained within 1 to 2 weeks.

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Instructions for Registered Entities

INSTRUCTIONS FOR EXTERNAL STAKEHOLDERS

To Registered Entities – British Columbia Mandatory Reliability Standards program,

Please review each revised standard and its corresponding redline attached to this email package and complete the **'Feedback Survey Form'** worksheet in this spreadsheet by clicking on the appropriate tab below. For each standard assessed, please complete the following fields highlighted in **yellow:**

a. Insert the name and applicable functions of your registered entity at the top of the **'Feedback Survey Form'** Worksheet as indicated by the **red text**.

b. Stakeholder Comments (Column "K"): Please describe a list of high-level incremental activities required to reach compliance.

c. T**he Estimated Incremental cost (Column "L"**), if any associated with:
- a revision to a standard compared to the immediately preceding version where a standard is being revised.
- a replacement standard compared to latest revision of the standard being replaced; or
- the adoption of a new standard.

Please indicate which costs are one-time versus ongoing, and identify the assumptions associated with each estimate. BC Hydro will use this information to develop recommendations to the BCUC regarding the potential impacts of each reliability standard on registered entities for inclusion in the Report.

d. BCUC implementation time/Recommended Effective Date (Column "M"):
Please include an assessment of the amount of time your organization would reasonably require to come into compliance with the standard once adopted by the BCUC. BC Hydro will use this information to develop effective date recommendations for inclusion in the Report.

Regards,

Patricia Robertson
Reliability Compliance Manager
British Columbia Hydro and Power Authority
(604)-455-1831
patricia.robertson@bchydro.com

Vijay Raghunathan
Reliability Compliance Engineer
British Columbia Hydro and Power Authority
(604)-623-3926
vijay.raghunathan@bchydro.com

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Appendix C-3

External Stakeholder Feedback Survey Form

FERC Approved Standard Changes for Assessment Reporting to BC Utilities Commission

Summary of Revisions and Errata Changes to Reliability Standards Approved by FERC - Survey Form

INSERT NAME OF REGISTERED ENTITY HERE

INSERT APPLICABLE FUNCTION(S) HERE (i.e. TO, GO, GOP, TOP, TP, DP, LSE, etc.)

Disclaimer: This information has been prepared as input into BC Hydro's sixth assessment report on Mandatory Reliability Standards and is based on information available to BC Hydro as of the date sent. It should not be relied upon for any other purpose.

Current BCUC Adopted NERC Standard (Column "B")	BCUC Adopted NERC Standard Name	BCUC Adopted Standard Description	FERC Approved Revised NERC Standard	FERC Approved Revision(s) to NERC Standard listed in Column "B"	Functional Applicability - Stakeholder Comment Required From (Column "G")	FERC Order No. and Order Issue Date of Approved Revised NERC Standard	NERC Implementation Time Provided	NERC Enforcement Date of FERC Approved Revised Standard	Stakeholder Comments Please state what high-level incremental activities or new activities need to be completed in order to become compliant. (Column "K")	Estimated Incremental Cost Associated with Revision, if any. Please indicate which costs are one-time versus ongoing, and identify the assumptions associated with each estimate (Press Alt-Enter to insert a carriage return in a cell) (Column "L")	BCUC Implementation Time/Recommended Effective Date Please include an assessment of the amount of time reasonably required to come into compliance with the standard once adopted by the BCUC. BC Hydro will use this information to develop Effective Date recommendations for inclusion in the Report. The Effective Date is the date from which compliance would be monitored by the BCUC. (Column "M")
PRC-004-1a	Analysis and Mitigation of Transmission and Generation Protection System Misoperations	Ensure all transmission and generation Protection System Misoperations affecting the reliability of the Bulk Electric System (BES) are analyzed and mitigated.	PRC-004-2a	2a - Appended FERC-approved interpretation of R1 and R3 to version 2	TOP, DP (that owns a Trans Protection System), GO	Docket No. RD11-5-000, September 26, 2011	1st day of the first calendar quarter, 1 year after FERC approval	01-Apr-12			

BC hydro

Mandatory Reliability Standards
Assessment Report No. 6 Addendum

Appendix C-4

External Stakeholder Feedback

Summary of Revisions and Errata Changes to Reliability Standards Approved by FERC - Survey Form

Catalyst Paper - Crofton Division (CPCD), Port Alberni Division (CPPAD), Powell River Division (CPPR)

DP, LSE, TO, TOP

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Summary of Revisions and Errata Changes to Reliability Standards Approved by FERC - Survey Form

FortisBC Inc.

TO, GO, GOP, TOP, TP, DP, LSE, PSE, RP, TSP

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Summary of Revisions and Errata Changes to Reliability Standards Approved by FERC - Survey Form

Powell River Energy Inc.

GO, GOP

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PRC-004-1a	Analysis and Mitigation of Transmission and Generation Protection System Misoperations	Ensure all transmission and generation Protection System Misoperations affecting the reliability of the Bulk Electric System (BES) are analyzed and mitigated.	PRC-004-2a	2a - Appended FERC-approved interpretation of R1 and R3 to version 2	TOP, DP (that owns a Trans Protection System), GO	Docket No. RD11-5-000; September 26, 2011	1st day of the first calendar quarter, 1 year after FERC approval	01-Apr-12	In order to complete the new incremental activities / new activities, PREI will need to adjust their processes so that they will be able to track the changes of all documentation associated to the BCUC and WECC.	One-Time Costs - $ 5,000 On-Going Costs - $2,000	01-Jan-14

Summary of Revisions and Errata Changes to Reliability Standards Approved by FERC - Survey Form

Teck Metals Ltd.

GO, GOP, TO, TOP

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Summary of Revisions and Errata Changes to Reliability Standards Approved by FERC - Survey Form

Tembec - Chetwynd Operations (TLAP)

DP, LSE

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Summary of Revisions and Errata Changes to Reliability Standards Approved by FERC - Survey Form

V.I. Power Limited Partnership

GO, GOP

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BC hydro

Mandatory Reliability Standards
Assessment Report No. 6 Addendum

Appendix D

Revised Draft Order

BRITISH COLUMBIA UTILITIES COMMISSION

ORDER NUMBER R-

SIXTH FLOOR, 900 HOWE STREET, BOX 250
VANCOUVER, BC V6Z 2N3 CANADA
web site: http://www.bcuc.com

TELEPHONE: (604) 660-4700
BC TOLL FREE: 1-800-663-1385
FACSIMILE: (604) 660-1102

IN THE MATTER OF
the Utilities Commission Act, R.S.B.C. 1996, Chapter 473

and

British Columbia Hydro and Power Authority (BC Hydro)
Mandatory Reliability Standards (MRS) Assessment Report No. 6
and the Determination of Reliability Standards for Adoption in British Columbia

BEFORE:

, 2013

ORDER

WHEREAS:

A. Pursuant to section 125.2(2) of the *Utilities Commission Act* (the Act) the British Columbia Utilities Commission (the Commission) has exclusive jurisdiction to determine whether a "reliability standard" as defined in the Act, is in the public interest and should be adopted in British Columbia (B.C.);

B. Ministerial Order No. MO39 dated February 22, 2009 made a MRS Regulation which prescribes the parties that are subject to reliability standards adopted under section 125.2(6) of the Act;

C. In order to facilitate the Commission's consideration of reliability standards, BC Hydro is required under section 125.2(3) of the Act to review each reliability standard and provide the Commission with a report assessing:

   (a) any adverse impact of the reliability standard on the reliability of electricity transmission in British Columbia if the reliability standard were adopted;

   (b) the suitability of the reliability standard for British Columbia;

   (c) the potential cost of the reliability standard if it were adopted; and

   (d) any other matter prescribed by regulation or identified by order of the Commission.

D. The approach taken to evaluate reliability standards has not changed from that used in previous MRS assessment reports. In those reports, the NERC and WECC standards were viewed as having

two components. The first component determines applicability and mandates the types of activities that are required to maintain system reliability. As per Assessment Report No. 1 dated March 27, 2009, British Columbia Transmission Corporation (now BC Hydro) was of the view that this portion alone is the "reliability standard" contemplated in section 125.2 of the Act, and is therefore the only component of the reliability standard assessed by BC Hydro. The second component includes the compliance provisions, which are not assessed by BC Hydro;

E. Where reliability standards are developed with staged requirement effective dates, BC Hydro assesses those standards that contain at least one requirement that is enforceable in the United States (U.S.) in the annual MRS assessment report. The assessed standard will contain the language of all of the requirements however, BC Hydro will not assess those requirements that have not become enforceable in the U.S. or assign effective dates to them. Those requirements will be assessed in the appropriate MRS assessment report once they become enforceable in the U.S.;

F. The Act does not provide for alterations of reliability standards prior to their adoption in B.C.;

G. On October 21, 2011, the Commission issued Order No. G-162-11 adopting 28 reliability standards including reliability standard PRC-023-1;

H. On October 28, 2011, the Commission issued Order No. G-175-11 adopting six reliability standards including reliability standard MOD-004-1 that was intended to replace previously adopted reliability standards MOD-006-0.1 and MOD-007-0;

I. On April 18, 2013, BC Hydro advised the Commission that since there is no Planning Coordinator (**PC**) functional registration in the B.C. MRS Program Rules of Procedure, there are no entities in B.C. registered as PC and responsible for compliance with any requirements imposed on PCs. BC Hydro suggested that the effective date for PRC-023-1 R3 (applicable only to the PC funtion) be delayed pending the outcome of a proposed process to facilitate PC functional registration in B.C.;

J. On May 16, 2013, the BCUC issued Letter No. L-29-13 to BC Hydro advising that the April 21, 2011 effective date remains in effect for PRC-023-1 Requirement 3 applicable for the PC function. The Commission also informed BC Hydro that it is not embarking on the process proposed in BC Hydro's letter. The BCUC requested that BC Hydro and other responsible entities provide input to the Commission regarding "the extent of the Planning Authority/PC operations/footprint in BC" by July 31, 2013 (BCUC Process);

K. On May 24, 2013, BC Hydro filed MRS Assessment Report No. 6 pursuant to section 125.2(3) of the Act assessing nine revised reliability standards developed by the North American Electric Reliability Corporation (NERC). BC Hydro assessed the reliability standards excluding the accompanying compliance provisions. The existing Commission approved reliability standards to be superseded by replacement standards were adopted in B.C. under Order Nos. G-67-09; G-167-10, G-162-11 and R-1-13;

BRITISH COLUMBIA UTILITIES COMMISSION

ORDER NUMBER R-

L. MRS Assessment Report No. 6 included an assessment of five new or revised defined terms included in the NERC Glossary of Terms. Each of these terms are identified as being approved by the Federal Energy Regulatory Commission (FERC) in the December 5, 2012 version of the NERC Glossary of Terms but were identified as being not approved by FERC in the December 13, 2011 version of the NERC Glossary of Terms that was adopted under Order No. R-1-13;

M. In MRS Assessment Report No. 6, BC Hydro concluded that eight of the nine revised reliability standards and the five glossary terms were suitable for adoption in British Columbia; BC Hydro respectfully recommended that PRC-023-1, Requirement 3 that was adopted by the Commission pursuant to Order No. G-162-11 be rescinded pending the outcome of the BCUC Process and that only those portions of PRC-023-2 that could be enforced without reliance on a PC come into effect in B.C. pending the outcome of the BCUC Process;

N. Further to Recital M; in MRS Report No. 6, BC Hydro concluded the ninth standard, PRC-004-2a, should not be adopted at that time since it could not be properly assessed due to unclear requirements related to regional entity procedures. BC Hydro recommended that PRC-004-2a should be reassessed in a future MRS assessment report once the regional entity procedures were clarified by the BCUC;

O. On July 3, 2013, the BCUC issued a letter requesting BC Hydro complete its assessment of PRC-004-2a using the Western Electricity Coordinating Council's (WECC's) Criterion PRC-003-WECC-CRT-1.2 with errata dated June 26, 2013, and a corresponding reporting template, which together describe the procedures for reporting under PRC-004-2a;

P. BCUC Order No. R-30-13, issued on July 25, 2013, directed BC Hydro to provide an Addendum to Assessment Report No. 6 addressing PRC-004-2a by Monday, September 30, 2013 and provided a Regulatory Timetable for consideration of both MRS Assessment Report No. 6 and the Addendum to Assessment Report No. 6;

Q. On September 30, 2013, BC Hydro filed an Addendum to MRS Assessment Report No. 6 pursuant to section 125.2(3) of the Act assessing PRC-004-2a developed by NERC together with PRC-003-WECC-CRT-1.2. BC Hydro assessed PRC-004-2a excluding the accompanying compliance provisions;

R. In the Addendum, BC Hydro concluded that PRC-004-2a was suitable for adoption in British Columbia;

S. Pursuant to section 125.2(5)(a) of the Act, the Commission posted the MRS Assessment Report No. 6 and the Addendum to the MRS Assessment Report No. 6 on its website at www.bcuc.com and by Order No. R-xx-13 dated xxxx, directed BC Hydro to publish a Notice of MRS Assessment Report No. 6 and Process for Public Comments, and established the Regulatory Timetable for comments;

T. Comments were received from xxxxxxxx;

U. On xxxx, 2013 BC Hydro provided comments in response;

BRITISH COLUMBIA UTILITIES COMMISSION

ORDER NUMBER R-

V. The Commission has reviewed and considered the MRS Assessment Report No. 6 and Addendum as well as the comments received;

W. The Commission determines that the nine reliability standards assessed in BC Hydro's MRS Assessment Report No. 6 and Addendum, and recommended by BC Hydro as being suitable for adoption in B.C. are in the public interest and should be adopted in British Columbia to maintain or achieve consistency with other jurisdictions that have adopted the reliability standards, subject to the terms of this Order;

X. The Commission determines that the five new or revised glossary terms assessed in BC Hydro's MRS Assessment Report No. 6 are in the public interest and should be adopted in British Columbia to maintain or achieve consistency with other jurisdictions that have adopted the NERC Glossary of Terms, subject to the terms of this Order;

Y. The Commission considers that the NERC Glossary of Terms dated December 5, 2012 should be adopted, except for those terms that were not adopted by FERC before November 30, 2012;

Z. The Commission considers the compliance provisions of the reliability standards helpful for compliance monitoring in B.C.;

AA. The Commission considers that it is appropriate to provide effective dates for entities to come into compliance with the reliability standards and glossary terms to be adopted in this Order.

NOW THEREFORE the Commission orders as follows:

1. The Effective Date of each of the standards adopted in this Order is the date appearing in the table found in Attachment A to this Order.

2. The Effective Date of each of the new or revised glossary terms adopted in this Order is the date appearing in the table found in Attachment A to this Order.

3. The Commission adopts the nine revised standards that are listed in the table found in Attachment A to this Order. These standards' Effective Dates shall be as provided in Directive 1. Each standard to be superseded by a standard adopted in this Order shall remain in effect until the effective date of the standard superseding it.

4. As a result of this Order and Order Nos. G-67-09, G-167-10, G-162-11, G-175-11, R-1-13 and R-11-13, the standards listed in the table found in Attachment B to this Order are the reliability standards in effect in British Columbia as of the Effective Dates listed in Attachment B to this Order and the effective dates for the reliability standards that are listed in the table found in Attachment B supersede the effective dates that were included in any similar list appended to any previous order.

BRITISH COLUMBIA UTILITIES COMMISSION

ORDER NUMBER R-

5. The Commission directs that individual requirements within reliability standards that incorporate by reference reliability standards that have not been adopted by the Commission are of no force and effect.

6. The Commission directs that individual requirements or sub-requirements within reliability standards for which the Commission has not determined an effective date are of no force and effect.

7. The Commission directs entities to comply with PRC-003-WECC-CRT-1.2 for the purpose of demonstrating compliance with PRC-004-2a.

8. The Commission adopts the NERC Glossary of Terms Used in Reliability Standards, dated December 5, 2012, which defines terms employed in the reliability standards, and which is posted to the NERC website. These new or revised glossary terms' Effective Dates shall be as provided in Directive 2. Each glossary term to be superseded by a revised glossary term adopted in this Order shall remain in effect until the effective date of the glossary term superseding it.

9. The Commission directs that terms within the NERC Glossary of Terms used in Reliability Standards, dated December 5, 2012 that do not include a U.S. FERC approval date on or before November 30, 2012 are of no force or effect.

10. The Commission adopts the Compliance Provisions, as defined in the Rules of Procedure for Reliability Standards in British Columbia, that accompany each of the adopted British Columbia reliability standards, in the form directed by the Commission to be posted on the WECC website, as amended from time to time.

11. The Commission directs that reliability standards MOD-006-0.1 and MOD-007-0 are not effective, being superseded by MOD-004-1 effective November 30, 2011.

12. Attachment XX to this Order contains the text of the standards adopted by this Order.

DATED at the City of Vancouver, in the Province of British Columbia, this day of , 2013.

BY ORDER

British Columbia Utilities Commission
Reliability Standards with Effective Dates as Adopted

Standard	Standard Name	Effective Date	Type	BCUC Approved Standard Superseded [1]	By Order
BAL-002-1	Disturbance Control Performance	Immediately after BCUC adoption	Revised	BAL-002-0	
BAL-005-0.2b	Automatic Generation Control	Immediately after BCUC adoption	Revised	BAL-005-0.1b	
EOP-001-0.1b	Emergency Operations Planning	Immediately after BCUC adoption	Revised	EOP-001-0	
PER-001-0.2	Operating Personnel Credentials	Immediately after BCUC adoption	Revised	PER-001-0.1	
PER-003-1	Analysis and Mitigation of Transmission and Generation Protection System Misoperations	1st day of the first calendar quarter 12 months after BCUC adoption	Revised	PER-003-0	
PRC-004-2a	Transmission and Generation Protection System Maintenance and Testing	6 months after BCUC adoption	Revised	PRC-004-1a	
PRC-005-1b	Transmission Relay Loadability	1st calendar quarter, 12 months after BCUC adoption.	Revised	PRC-005-1a	
PRC-023-2	Normal Operations Planning	**R1-R5**: For circuits identified by sections 4.2.1.1 and 4.2.1.4: 1st day of the first calendar quarter 24 months after BCUC adoption. For circuits identified by sections 4.2.1.2, 4.2.1.3, 4.2.1.5, and 4.2.1.6: 1st day of the first calendar quarter 24 months after BCUC adoption of Requirement 6. **R6**: to be determined [2]	Revised	PRC-023-1	
TOP-002-2.1b	Operating Personnel Responsibility and Authority	Immediately after BCUC adoption	Revised	TOP-002-2b	

[1] BCUC Approved Standard to be Superseded by replacement or revised standard assessed in MRS Assessment Report No. 6.

[2] Effective Date for PRC-023-2 Requirement 6 to be determined under separate process to establish “planning coordinator” function.

British Columbia Utilities Commission
NERC Glossary Terms with Effective Dates as Adopted

Glossary Term [3]	Acronym	Effective Date	Commission Approved Term to be Replaced [4]	By Order
Blackstart Resource	-	Immediately after BCUC adoption	-	
Interconnection Reliability Operating Limit	IROL	Immediately after BCUC adoption	Interconnection Reliability Operating Limit	
Operational Planning Analysis	-	Immediately after BCUC adoption	-	
Protection System	-	1st calendar quarter, 12 months after BCUC adoption for each entity to modify its protection system maintenance and testing program to reflect the new definition (to coincide with recommended effective date of PRC-005-1b) and until the end of the first complete maintenance and testing cycle to implement any additional maintenance and testing for battery chargers as required by that entity's program.	Protection System	
Real-time Assessment	-	1st day of the first calendar quarter immediately after BCUC adoption	-	

[3] FERC approved Terms in the NERC Glossary of Terms as of December 5, 2012

[4] Commission Approved Terms in the NERC Glossary of Terms as of December 13, 2011

Standard	Name	BCUC Order Adoption Signed Date	BCUC Order Adopting	Effective Date
BAL-001-0.1a	Real Power Balancing Control Performance	November 10, 2010	G-167-10	January 1, 2011
BAL-002-0 [1]	Disturbance Control Performance	June 8, 2009	G-67-09	November 1, 2010
BAL-002-1	Disturbance Control Performance			
BAL-003-0.1b	Frequency Response and Bias	November 10, 2010	G-167-10	January 1, 2011
BAL-004-0	Time Error Correction	June 8, 2009	G-67-09	November 1, 2010
BAL-004-WECC-01	Automatic Time Error Correction	November 10, 2010	G-167-10	January 1, 2011
BAL-005-0.1b [1]	Automatic Generation Control	November 10, 2010	G-167-10	January 1, 2011
BAL-005-0.2b	Automatic Generation Control			
BAL-006-2	Inadvertent Interchange	January 15, 2013	R-1-13	April 15, 2013
BAL-STD-002-0	Operating Reserves	June 8, 2009	G-67-09	November 1, 2010
CIP-001-2a	Sabotage Reporting	January 15, 2013	R-1-13	January 15, 2013
CIP-002-3	Cyber Security – Critical Cyber Asset Identification	October 21, 2011	G-162-11	July 1, 2012
CIP-003-3	Cyber Security – Security Management Controls	October 21, 2011	G-162-11	July 1, 2012
CIP-004-3	Cyber Security – Personnel and Training	October 21, 2011	G-162-11	July 1, 2012
CIP-005-3 [1]	Cyber Security – Electronic Security Perimeter(s)	October 21, 2011	G-162-11	July 1, 2012
CIP-005-3a	Cyber Security – Electronic Security Perimeter(s)	January 15, 2013	R-1-13	July 15, 2013
CIP-006-3c	Cyber Security – Physical Security of Critical Cyber Assets	October 21, 2011	G-162-11	July 1, 2012
CIP-007-3	Cyber Security – Systems Security Management	October 21, 2011	G-162-11	July 1, 2012
CIP-008-3	Cyber Security – Incident Reporting and Response Planning	October 21, 2011	G-162-11	July 1, 2012
CIP-009-3	Cyber Security – Recovery Plans for Critical Cyber Assets	October 21, 2011	G-162-11	July 1, 2012
COM-001-1.1	Telecommunications	November 10, 2010	G-167-10	January 1, 2011
COM-002-2	Communication and Coordination	June 8, 2009	G-67-09	November 1, 2010
EOP-001-0 [1]	Emergency Operations Planning	June 8, 2009	G-67-09	November 1, 2010
EOP-001-0.1b	Emergency Operations Planning			
EOP-002-2.1 [1]	Capacity and Energy Emergencies	November 10, 2010	G-167-10	January 1, 2011
EOP-002-3	Capacity and Energy Emergencies	January 15, 2013	R-1-13	July 15, 2013
EOP-003-1	Load Shedding Plans	June 8, 2009	G-67-09	November 1, 2010
EOP-004-1	Disturbance Reporting	June 8, 2009	G-67-09	November 1, 2010
EOP-005-1	System Restoration Plans	June 8, 2009	G-67-09	November 1, 2010
EOP-006-1	Reliability Coordination – System Restoration	June 8, 2009	G-67-09	November 1, 2010
EOP-008-0	Plans for Loss of Control Center Functionality	June 8, 2009	G-67-09	November 1, 2010
EOP-009-0	Documentation of Blackstart Generating Unit Test Results	June 8, 2009	G-67-09	November 1, 2010
FAC-001-0	Facility Connector Requirements	June 8, 2009	G-67-09	November 1, 2010
FAC-002-0 [1]	Coordination of Plans for New Generation, Transmission, and End-User	June 8, 2009	G-67-09	November 1, 2010
FAC-002-1	Coordination of Plans for New Generation, Transmission, and End-User	January 15, 2013	R-1-13	July 15, 2013
FAC-003-1	Transmission Vegetation Management Program	June 8, 2009	G-67-09	November 1, 2010
FAC-501-WECC-1	Transmission Maintenance	January 15, 2013	R-1-13	April 15, 2013
FAC-008-1	Facility Ratings Methodology	June 8, 2009	G-67-09	November 1, 2010
FAC-009-1	Establish and Communicate Facility Ratings	June 8, 2009	G-67-09	November 1, 2010
FAC-010-2.1	System Operating Limits Methodology for the Planning Horizon	October 21, 2011	G-162-11	October 30, 2011
FAC-011-2	System Operating Limits Methodology for the Operations Horizon	November 10, 2010	G-167-10	January 1, 2011

Standard	Name	BCUC Order Adoption Signed Date	BCUC Order Adopting	Effective Date
FAC-013-1	Establish and Communicate Transfer Capability	June 8, 2009	G-67-09	November 1, 2010
FAC-014-2	Establish and Communicate System Operating Limits	November 10, 2010	G-167-10	January 1, 2011
INT-001-3	Interchange Information	June 8, 2009	G-67-09	November 1, 2010
INT-003-3	Interchange Transaction Implementation	January 15, 2013	R-1-13	April 15, 2013
INT-004-2	Dynamic Interchange Transaction Modifications	June 8, 2009	G-67-09	November 1, 2010
INT-005-3	Interchange Authority Distributes Arranged Interchange	October 21, 2011	G-162-11	October 30, 2011
INT-006-3	Response to Interchange Authority	October 21, 2011	G-162-11	October 30, 2011
INT-007-1	Interchange Confirmation	June 8, 2009	G-67-09	November 1, 2010
INT-008-3	Interchange Authority Distributes Status	October 21, 2011	G-162-11	October 30, 2011
INT-009-1	Implementation of Interchange	June 8, 2009	G-67-09	November 1, 2010
INT-010-1	Interchange Coordination Exemptions	June 8, 2009	G-67-09	November 1, 2010
IRO-001-1.1	Reliability Coordination Responsibilities and Authorities	November 10, 2010	G-167-10	January 1, 2011
IRO-002-2	Reliability Coordination – Facilities	January 15, 2013	R-1-13	April 15, 2013
IRO-003-2	Reliability Coordination – Wide Area View	June 8, 2009	G-67-09	November 1, 2010
IRO-004-2	Reliability Coordination – Operations planning	January 15, 2013	R-1-13	April 15, 2013
IRO-005-3a	Reliability Coordination – Current Day Operations	January 15, 2013	R-1-13	April 15, 2013
IRO-006-5	Reliability Coordination – Transmission Loading Relief	January 15, 2013	R-1-13	April 15, 2013
IRO-006-WECC-1	Qualified Transfer Path Unscheduled Flow (USF) Relief	January 15, 2013	R-1-13	April 15, 2013
IRO-008-1	Reliability Coordinator Operational Analyses and Real-time Assessments	January 15, 2013	R-1-13	April 15, 2013
IRO-009-1	Reliability Coordinator Actions to Operate Within IROLs	January 15, 2013	R-1-13	April 15, 2013
IRO-010-1a	Reliability Coordinator Data Specification and Collection	January 15, 2013	R-1-13	April 15, 2013
IRO-014-1	Procedures, Processes, or Plans to Support Coordination Between Reliability coordinators	June 8, 2009	G-67-09	November 1, 2010
IRO-015-1	Notification and Information Exchange	June 8, 2009	G-67-09	November 1, 2010
IRO-016-1	Coordination of Real-Time Activities	June 8, 2009	G-67-09	November 1, 2010
MOD-001-1a	Available Transmission System Capability	October 28, 2011	G-175-11	November 30, 2011
MOD-004-1	Capacity Benefit Margin	October 28, 2011	G-175-11	November 30, 2011
~~MOD-006-0.1~~ [2]	~~Procedures for the Use of Capacity Benefit Margin Values~~	~~November 10, 2010~~	~~G-167-10~~	~~January 1, 2011~~
~~MOD-007-0~~ [2]	~~Documentation of the Use of Capacity Benefit Margin~~	~~June 8, 2009~~	~~G-67-09~~	~~November 1, 2010~~
MOD-008-1	Transmission Reliability Margin Calculation Methodology	October 28, 2011	G-175-11	November 30, 2011
MOD-010-0	Steady-State Data for Modeling and Simulation for the Interconnected Transmission System	June 8, 2009	G-67-09	November 1, 2010
MOD-012-0	Dynamics Data for Modeling and Simulation of the Interconnected Transmission System	June 8, 2009	G-67-09	November 1, 2010
MOD-016-1.1	Documentation of Data Reporting Requirements for Actual and Forecast Demand, New Energy for Load, and Controllable Demand-Side Management	November 10, 2010	G-167-10	January 1, 2011
MOD-017-0.1	Aggregated Actual and Forecast Demands and Net Energy for Load	November 10, 2010	G-167-10	January 1, 2011

Standard	Name	BCUC Order Adoption Signed Date	BCUC Order Adopting	Effective Date
MOD-018-0	Treatment of Non member Demand Data and How Uncertainties are Addressed in the Forecasts of Demand and Net Energy for Load	June 8, 2009	G-67-09	November 1, 2010
MOD-019-0.1	Reporting of Interruptible Demands and Direct Control Load Management Data to System Operators and Reliability Coordinators	November 10, 2010	G-167-10	January 1, 2011
MOD-020-0	Providing Interruptible Demands and Direct Control Load management Data to System Operators and Reliability Coordinators	June 8, 2009	G-67-09	November 1, 2010
MOD-021-1	Documentation of the Accounting Methodology for the Effects of Demand-Side Management in Demand and Energy Forecasts.	January 15, 2013	R-1-13	April 15, 2013
MOD-028-1	Area Interchange Methodology	October 28, 2011	G-175-11	November 30, 2011
MOD-029-1a	Rated System Path Methodology	October 28, 2011	G-175-11	November 30, 2011
MOD-030-02	Flowgate Methodology	October 28, 2011	G-175-11	November 30, 2011
NUC-001-2	Nuclear Plant Interface Coordination	November 10, 2010	G-167-10	January 1, 2011
PER-001-0.1 [1]	Operating Personnel Responsibility and Authority	October 21, 2011	G-162-11	October 30, 2011
PER-001-0.2	Operating Personnel Responsibility and Authority			
PER-002-0	Operating Personnel Training	June 8, 2009	G-67-09	November 1, 2010
PER-003-0 [1]	Operating Personnel Credentials	June 8, 2009	G-67-09	November 1, 2010
PER-003-1	Operating Personnel Credentials			
PER-004-2	Reliability Coordination – Staffing	January 15, 2013	R-1-13	January 15, 2013
PER-005-1	System Personnel Training	January 15, 2013	R-1-13	**R1, R2:** Jan. 15, 2015 **R3:** July 15, 2014 **R3.1:** Jan. 15, 2016
PRC-001-1	System Protection Coordination	June 8, 2009	G-67-09	November 1, 2010
PRC-004-1a	Analysis and Mitigation of Transmission and Generation Protection System Misoperations	January 15, 2013	R-1-13	April 15, 2013
PRC-004-2a	Analysis and Mitigation of Transmission and Generation Protection System Misoperations			
PRC-STD-001-1 [3]	Certification of Protective Relay Applications and Settings	June 8, 2009	G-67-09	November 1, 2010
PRC-STD-003-1 [1]	Protective Relay and Remedial Action Scheme Misoperation	June 8, 2009	G-67-09	November 1, 2010
PRC-004-WECC-1	Protection System and Remedial Action Scheme Misoperation	January 15, 2013	R-1-13	July 15, 2013
PRC-005-1a [1]	Transmission and Generation Protection System Maintenance and Testing	January 15, 2013	R-1-13	April 15, 2013
PRC-005-1b	Transmission and Generation Protection System Maintenance and Testing			
PRC-007-0	Assuring consistency of entity Underfrequency Load Shedding Program Requirements	June 8, 2009	G-67-09	November 1, 2010
PRC-008-0	Implementation and Documentation of Underfrequency Load Shedding Equipment Maintenance Program	June 8, 2009	G-67-09	November 1, 2010
PRC-009-0	Analysis and Documentation of Underfrequency Load Shedding Performance Following an Underfrequency Event	June 8, 2009	G-67-09	November 1, 2010

Standard	Name	BCUC Order Adoption Signed Date	BCUC Order Adopting	Effective Date
PRC-010-0	Technical Assessment of the Design and Effectiveness of Undervoltage Load Shedding Program	June 8, 2009	G-67-09	November 1, 2010
PRC-011-0	Undervoltage Load Shedding system Maintenance and Testing	June 8, 2009	G-67-09	November 1, 2010
PRC-015-0	Special Protection System Data and Documentation	June 8, 2009	G-67-09	November 1, 2010
PRC-016-0.1	Special Protection System Misoperations	November 10, 2010	G-167-10	January 1, 2011
PRC-017-0	Special Protection System Maintenance and Testing	June 8, 2009	G-67-09	November 1, 2010
PRC-018-1	Disturbance Monitoring Equipment Installation and Data Reporting	June 8, 2009	G-67-09	November 1, 2010
PRC-021-1	Under Voltage Load Shedding Program Data	June 8, 2009	G-67-09	November 1, 2010
PRC-022-1	Under Voltage Load Shedding Program Performance	June 8, 2009	G-67-09	November 1, 2010
PRC-023-1 [1]	Transmission Relay Loadability	October 21, 2011	G-162-11	**R1, R2:** Applicability Criteria 5.1.1: Jan. 1, 2012 Applicability Criteria 5.1.2: Apr. 1, 2015 Applicability Criteria 5.1.3: Apr. 21, 2015 **R3:** To be determined [4]
PRC-023-2	Transmission Relay Loadability			**R1-R5:** For circuits identified by Sections 4.2.1.1 and 4.2.1.4: _____ For circuits identified by Sections 4.2.1.2, 4.2.1.3, 4.2.1.5, and 4.2.1.6: To be determined [4] **R6**: To be determined [4]
TOP-001-1a	Reliability Responsibilities and Authorities	January 15, 2013	R-1-13	January 15, 2013
TOP-002-2b [1]	Normal Operations Planning	January 15, 2013	R-1-13	January 15, 2013
TOP-002-2.1b	Normal Operations Planning			
TOP-003-1	Planned Outage Coordination	January 15, 2013	R-1-13	April 15, 2013
TOP-004-2	Transmission Operations	November 10, 2010	G-167-10	January 1, 2011
TOP-005-2a	Operational Reliability Information	January 15, 2013	R-1-13	April 15, 2013
TOP-006-2	Monitoring System Conditions	January 15, 2013	R-1-13	April 15, 2013
TOP-007-0	Reporting System Operating Unit (SOL) and Interconnection Reliability Operating Limit (IROL) Violations	June 8, 2009	G-67-09	November 1, 2010
TOP-007-WECC-1	System Operating Limits	January 15, 2013	R-1-13	April 15, 2013
TOP-008-1	Response to Transmission Unit Violations	June 8, 2009	G-67-09	November 1, 2010
TPL-001-0.1	System Performance Under Normal (No Contingency) Conditions (Category A)	November 10, 2010	G-167-10	January 1, 2011
TPL-002-0b	System Performance Following Loss of a Single Bulk Electric System Element (Category B)	January 15, 2013	R-1-13	January 15, 2013
TPL-003-0a	System Performance Following Loss of a Single Bulk Electric System Element (Category C)	October 21, 2011	G-162-11	October 30, 2011
TPL-004-0	System Performance Following Loss of a Single Bulk Electric System Element (Category D)	June 8, 2009	G-67-09	November 1, 2010

Standard	Name	BCUC Order Adoption Signed Date	BCUC Order Adopting	Effective Date
VAR-001-1 [1]	Voltage and Reactive Control	June 8, 2009	G-67-09	November 1, 2010
VAR-001-2	Voltage and Reactive Control	January 15, 2013	R-1-13	July 15, 2013
VAR-002-1.1b	Generator Operation for Maintaining Network Voltage Schedules	October 21, 2011	G-162-11	October 30, 2011
VAR-STD-002a-1 [1]	Automatic Voltage Regulators (AVR)	June 8, 2009	G-67-09	November 1, 2010
VAR-002-WECC-1	Automatic Voltage Regulators (AVR)	January 15, 2013	R-1-13	January 15, 2014
VAR-STD-002b-1 [1]	Power System Stabilizer (PSS)	June 8, 2009	G-67-09	November 1, 2010
VAR-501-WECC-1	Power System Stabilizer (PSS)	February 28, 2013	R-11-13	January 15, 2014

[1] Standard is superseded by the revised/replacement standard listed immediately below it as of the effective date(s) of the revised/replacement standard.
[2] Standard was superseded by the MOD-004-1 standard as of the MOD-004-1 effective date. Standard to be made not-effective and removed from list.
[3] Standard is superseded by the PRC-004-WECC-1 standard as of the PRC-004-WECC-1 effective date.
[4] Standard effective date is to be determined under a process to establish Planning Coordinator functional registration.