



ORDER NUMBER
R-14-16

IN THE MATTER OF
the *Utilities Commission Act*, RSBC 1996, Chapter 473

and

British Columbia Hydro and Power Authority
Mandatory Reliability Standards
BAL-001-2 Assessment Report

BEFORE:

D. M. Morton, Commissioner
D. J. Enns, Commissioner
H. G. Harowitz, Commissioner
R. I. Mason, Commissioner
R. D. Revel, Commissioner

on April 21, 2016

ORDER

WHEREAS:

- A. Pursuant to section 125.2(2) of the *Utilities Commission Act* (UCA) the British Columbia Utilities Commission (Commission) has exclusive jurisdiction to determine whether a “reliability standard” as defined in the UCA, is in the public interest and should be adopted in British Columbia (BC);
- B. The Rules of Procedure for Reliability Standards in BC, adopted by Commission Order G-123-09, dated October 15, 2009, and amended by Commission Order R-34-15, states that a reliability standard does not include Compliance Provisions and defines Compliance Provisions as “the compliance-related provisions that accompany, but do not constitute part of, a Commission adopted Reliability Standard”;
- C. In order to facilitate the Commission’s consideration of reliability standards, British Columbia Hydro and Power Authority (BC Hydro) is required under section 125.2(3) of the UCA to review each reliability standard established by a standard-making body, such as the North American Electric Reliability Corporation (NERC) and the Western Electricity Coordinating Council, 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 BC;
 - (c) the potential cost of the reliability standard if it were adopted;
 - (c.1) the application of the reliability standard to persons or persons in respect of specified equipment if the reliability standard were adopted; and
 - (d) any other matter prescribed by regulation or identified by order of the Commission;

- D. On March 23, 2016, BC Hydro filed the BAL-001-2 Assessment Report (Assessment Report), pursuant to section 125.2(3) of the UCA, assessing the revised standard BAL-001-2 (Revised Standard) excluding the accompanying Compliance Provisions. If adopted, the Revised Standard would supersede the existing Reliability Standard BAL-001-1 adopted in BC by Commission Order R-32-14;
- E. The Revised Standard assessed by BC Hydro in the Assessment Report uses defined terms contained in the NERC Glossary of Terms Used in Reliability Standards dated December 7, 2015 (NERC Glossary). The Assessment Report included an assessment of three new and one revised defined glossary terms (Glossary Terms) contained in the NERC Glossary;
- F. In the Assessment Report, BC Hydro concludes that the Revised Standard and four Glossary Terms are suitable for adoption in BC at this time;
- G. Pursuant to subsection 125.2(5) of the UCA, the Commission posted the Assessment Report on its website and, by Order R-10-16 dated April 1, 2016, directed BC Hydro to publish a Notice of Mandatory Reliability Standards BAL-001-2 Assessment Report and Process for Public Comments, and established the Regulatory Timetable for comments;
- H. On April 11, 2016, FortisBC Inc. submitted to the Commission that it had no comments regarding the Assessment Report and on April 18, 2016, BC Hydro replied that it had no response to that submission;
- I. Pursuant to section 125.2(6) of the UCA, the Commission must adopt the Reliability Standard(s) addressed in the Assessment Report if the Commission considers that the Reliability Standard(s) are required to maintain or achieve consistency in BC with other jurisdictions that have adopted the Reliability Standard(s);
- J. The Commission has reviewed and considered the Assessment Report, the Revised Standard and Glossary Terms assessed therein, as well as the comments received and considers that the adoption of the recommendations in the Assessment Report is warranted; and
- K. Although not assessed by BC Hydro, the Commission considers that the Compliance Provisions of the Reliability Standards should be adopted to maintain compliance monitoring consistency with other jurisdictions that have adopted the Reliability Standards with the Compliance Provisions and finds it appropriate to provide effective dates for entities to come into compliance with the Revised Standard and Glossary Terms adopted in this order.

NOW THEREFORE pursuant to subsections 125.2(3), 125.2(6) and 125.2(10) of the *Utilities Commission Act*:

1. The British Columbia Utilities Commission adopts Reliability Standard BAL-001-2 recommended for adoption in the Assessment Report with an effective date of July 1, 2016 as found in Table 1 of Attachment A to this order, and the Reliability Standard BAL-001-1, to be superseded by Reliability Standard BAL-001-2, shall remain in effect until June 30, 2016.
2. As a result of this order and Commission Orders G-67-09, G-167-10, G-162-11, G-175-11, R-1-13, R-11-13, R-41-13, R-32-14, and R-38-15 the Reliability Standards listed in the table found in Attachment B to this order are in effect in BC as of the dates shown. 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. Attachment B to this order also includes those Reliability Standards with effective dates held in abeyance to be assessed at a later date.

3. 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 in BC.
4. Individual requirements or sub-requirements within Reliability Standards, which the Commission has adopted but for which the Commission has not determined an effective date, are of no force and effect in BC.
5. The Commission adopts the BAL-001-2 Glossary Terms employed in Reliability Standard BAL-001-2 found in Attachment C to this order. The effective date of each of the new or revised BAL-001-2 Glossary Terms adopted in this order is the date appearing in Table 2 of Attachment A to this order. Each glossary term to be superseded by a revised BAL-001-2 Glossary Term adopted in this order shall remain in effect until the effective date of the BAL-001-2 Glossary Term superseding it.
6. As a result of this order and Commission Orders G-67-09, G-167-10, G-162-11, G-175-11, R-1-13, R-11-13, R-41-13, R-32-14, and R-38-15 the Glossary Terms listed in the tables found in Attachment D to this order are Glossary Terms in effect in BC as of the effective dates indicated. The effective dates for the Glossary Terms that are listed in the tables found in Attachment D supersede the effective dates that were included in any similar list appended to any previous order.
7. 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 reliability standards, in the form directed by the Commission and as amended from time to time.
8. The Reliability Standards adopted in British Columbia by the Commission will be posted on the Western Electricity Coordinating Council website with a link from the Commission website.
9. The Commission confirms that entities subject to Mandatory Reliability Standards are required to report to the Commission and may, on a voluntary basis, report to the North American Electric Reliability Corporation as an Electric Reliability Organization or to the Federal Energy Regulatory Commission.
10. Attachment E to this order contains the text of Reliability Standard BAL-001-2 adopted by this order.

DATED at the City of Vancouver, in the Province of British Columbia, this 28th day of April 2016.

BY ORDER

Original signed by:

D. M. Morton
Commissioner

Attachments

British Columbia Utilities Commission

Reliability Standards and Glossary Terms Adopted by this Order

Table 1: Reliability Standards with Effective Dates as Adopted by this Order

Standard	Standard Name	Effective Date	Type	Commission Approved Standard(s) Being Superseded¹
BAL-001-2	Real Power Balancing Control Performance	July 1, 2016 to coincide with the US effective date.	Revised	BAL-001-1

¹ Commission approved reliability standard(s) to be superseded by the revised reliability standard assessed.

British Columbia Utilities Commission

Reliability Standards and Glossary Terms Adopted by this Order

Table 2 NERC Glossary Terms with Effective Dates as Adopted by this Order

NERC Glossary Term¹	Effective Date	Commission Approved Term to be Replaced or Retired²
Interconnection	Align with the effective date of BAL-001-2	Interconnection
Regulation Reserve Sharing Group	Align with the effective date of BAL-001-2	New Term
Reporting ACE	Align with the effective date of BAL-001-2	New Term
Reserve Sharing Group Reporting ACE	Align with the effective date of BAL-001-2	New Term

¹ FERC approved terms in the NERC Glossary of Terms as of December 7, 2015.

² Commission approved terms in the NERC Glossary of Terms as of October 1, 2014 as adopted by the Commission Order R-38-15.

British Columbia Utilities Commission
Reliability Standards with Effective Dates adopted in British Columbia

Standard	Name	Commission Order Adopting	Effective Date
BAL-001-1 ¹	Real Power Balancing Control Performance	R-32-14	October 1, 2014
BAL-001-2	Real Power Balancing Control Performance	R-14-16	July 1, 2016
BAL-002-1	Disturbance Control Performance	R-41-13	December 12, 2013
BAL-002-WECC-2	Contingency Reserve	R-32-14	October 1, 2014
BAL-003-1	Frequency Response and Frequency Bias Setting	R-38-15	R1: April 1, 2016 R2-R4: October 1, 2015
BAL-004-0	Time Error Correction	G-67-09	November 1, 2010
BAL-004-WECC-2	Automatic Time Error Correction	R-32-14	October 1, 2014
BAL-005-0.2b	Automatic Generation Control	R-41-13	December 12, 2013 R2: Retired January 21, 2014 ²
BAL-006-2	Inadvertent Interchange	R-1-13	April 15, 2013
CIP-002-3 ¹	Cyber Security – Critical Cyber Asset Identification	G-162-11	July 1, 2012
CIP-002-5.1	Cyber Security – BES Cyber System Categorization	R-38-15	October 1, 2018
CIP-003-3 ^{1, 3, 4}	Cyber Security – Security Management Controls	G-162-11	July 1, 2012 R1.2, R3, R3.1, R3.2, R3.3, and R4.2: Retired January 21, 2014 ²
CIP-003-5	Cyber Security – Security Management Controls	R-38-15	October 1, 2018
CIP-004-3a ¹	Cyber Security - Personnel & Training	R-32-14	August 1, 2014
CIP-004-5.1	Cyber Security – Personnel & Training	R-38-15	October 1, 2018

¹ Reliability standard is superseded by the revised/replacement reliability standard listed immediately below it as of the effective date(s) of the revised/replacement reliability standard.

² On November 21, 2013, FERC Order 788 (referred to as Paragraph 81) approved the retiring of the reliability standard requirements.

³ Reliability standard is superseded by CIP-010-1 as of the CIP-010-1 effective date.

⁴ Reliability standard is superseded by CIP-011-1 as of the CIP-011-1 effective date.

Standard	Name	Commission Order Adopting	Effective Date
CIP-005-3a ^{1, 3}	Cyber Security – Electronic Security Perimeter(s)	R-1-13	July 15, 2013 R2.6: Retired January 21, 2014 ²
CIP-005-5	Cyber Security – Electronic Security Perimeter(s)	R-38-15	October 1, 2018
CIP-006-3c ¹	Cyber Security – Physical Security of Critical Cyber Assets	G-162-11	July 1, 2012
CIP-006-5	Cyber Security – Physical Security of BES Cyber Systems	R-38-15	October 1, 2018
CIP-007-3a ^{1, 3, 4}	Cyber Security - Systems Security Management	R-32-14	August 1, 2014 R7.3: Retired January 21, 2014 ²
CIP-007-5	Cyber Security – System Security Management	R-38-15	October 1, 2018
CIP-008-3 ¹	Cyber Security – Incident Reporting and Response Planning	G-162-11	July 1, 2012
CIP-008-5	Cyber Security – Incident Reporting and Response Planning	R-38-15	October 1, 2018
CIP-009-3 ¹	Cyber Security – Recovery Plans for Critical Cyber Assets	G-162-11	July 1, 2012
CIP-009-5	Cyber Security – Recovery Plans for BES Cyber Systems	R-38-15	October 1, 2018
CIP-010-1	Cyber Security – Configuration Change Management and Vulnerability Assessments	R-38-15	October 1, 2018
CIP-011-1	Cyber Security – Information Protection	R-38-15	October 1, 2018
COM-001-1.1	Telecommunications	G-167-10	January 1, 2011
COM-002-2	Communication and Coordination	G-67-09	November 1, 2010
EOP-001-2.1b	Emergency Operations Planning	R-32-14	August 1, 2014
EOP-002-3.1	Capacity and Energy Emergencies	R-32-14	August 1, 2014
EOP-003-1 ⁵	Load Shedding Plans	G-67-09	November 1, 2010

⁵ Reliability standard would be superseded by EOP-003-2 if adopted in BC. Adoption of EOP-003-2 pending reassessment.

Standard	Name	Commission Order Adopting	Effective Date
EOP-003-2	Load Shedding Plans		Adoption ⁶ held in abeyance at this time
EOP-004-2	Event Reporting	R-32-14	August 1, 2015
EOP-005-2	System Restoration and Blackstart Resources	R-32-14	August 1, 2015 R3.1: Retired ² January 21, 2014 ²
EOP-006-2	System Restoration Coordination	R-32-14	August 1, 2014
EOP-008-1	Loss of Control Center Functionality	R-32-14	August 1, 2015
EOP-010-1	Geomagnetic Disturbance Operations	R-38-15	R1, R3: October 1, 2016 R2: Upon retirement of IRO-005-3.1a
FAC-001-1 ¹	Facility Connection Requirements	R-32-14	November 1, 2014
FAC-001-2	Facility Interconnection Requirements	R-38-15	October 1, 2016
FAC-002-2	Facility Interconnection Studies	R-38-15	October 1, 2015
FAC-003-3	Transmission Vegetation Management	R-32-14	August 1, 2015
FAC-501-WECC-1	Transmission Maintenance	R-1-13	April 15, 2013
FAC-008-3	Facility Ratings	R-32-14	August 1, 2015 R4 and R5: Retired ² January 21, 2014 ²
FAC-010-2.1	System Operating Limits Methodology for the Planning Horizon	G-162-11	October 30, 2011 R5: Retired January 21, 2014 ²
FAC-011-2	System Operating Limits Methodology for the Operations Horizon	G-167-10	January 1, 2011 R5: Retired January 21, 2014 ²
FAC-013-1 ⁷	Establish and Communicate Transfer Capability	G-67-09	November 1, 2010

⁶ Unable to assess based on undefined Planning Coordinator/Planning Authority footprints and entities responsible. The Commission Reasons for Decision for Order R-41-13 (page 20), indicated that a separate process would be established to consider this matter as it pertains to B.C.

⁷ Reliability standard would be superseded by the FAC-013-2 if adopted in B.C. Adoption of FAC-013-2 pending reassessment.

Standard	Name	Commission Order Adopting	Effective Date
FAC-013-2	Assessment of Transfer Capability for the Near-Term Transmission Planning Horizon		Adoption ⁷ held in abeyance at this time
FAC-014-2	Establish and Communicate System Operating Limits	G-167-10	January 1, 2011
INT-004-3.1	Dynamic Transfers	R-38-15	R1, R2: October 1, 2015 R3: January 1, 2016
INT-006-4	Evaluation of Interchange Transactions	R-38-15	October 1, 2015
INT-009-2.1	Implementation of Interchange	R-38-15	October 1, 2015
INT-010-2.1	Interchange Initiation and Modification for Reliability	R-38-15	October 1, 2015
INT-011-1.1	Intra-Balancing Authority Transaction Identification	R-38-15	October 1, 2015
IRO-001-1.1	Reliability Coordination Responsibilities and Authorities	G-167-10	January 1, 2011
IRO-002-2	Reliability Coordination – Facilities	R-1-13	April 15, 2013
IRO-003-2	Reliability Coordination – Wide Area View	G-67-09	November 1, 2010
IRO-004-2	Reliability Coordination – Operations planning	R-1-13	April 15, 2013
IRO-005-3.1a ⁸	Reliability Coordination - Current Day Operations	R-32-14	August 1, 2014
IRO-006-5	Reliability Coordination – Transmission Loading Relief	R-1-13	April 15, 2013
IRO-006-WECC-2	Qualified Transfer Path Unscheduled Flow (USF) Relief	R-38-15	October 1, 2015
IRO-008-1	Reliability Coordinator Operational Analyses and Real-time Assessments	R-1-13	April 15, 2013
IRO-009-1	Reliability Coordinator Actions to Operate Within IROs	R-1-13	April 15, 2013
IRO-010-1a	Reliability Coordinator Data Specification and Collection	R-1-13	April 15, 2013

⁸ Requirement 3 of the reliability standard is superseded by EOP-010-1 Requirement 2 as of the EOP-010-1 Requirement 2 effective date.

Standard	Name	Commission Order Adopting	Effective Date
IRO-014-1	Procedures, Processes, or Plans to Support Coordination Between Reliability coordinators	G-67-09	November 1, 2010
IRO-015-1	Notification and Information Exchange	G-67-09	November 1, 2010
IRO-016-1	Coordination of Real-Time Activities	G-67-09	November 1, 2010 R2: Retired January 21, 2014 ²
MOD-001-1a	Available Transmission System Capability	G-175-11	November 30, 2011
MOD-004-1	Capacity Benefit Margin	G-175-11	November 30, 2011
MOD-008-1	Transmission Reliability Margin Calculation Methodology	G-175-11	November 30, 2011
MOD-010-0 ⁹	Steady-State Data for Modeling and Simulation for the Interconnected Transmission System	G-67-09	November 1, 2010
MOD-012-0 ⁹	Dynamics Data for Modeling and Simulation of the Interconnected Transmission System	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	G-167-10	January 1, 2011
MOD-017-0.1	Aggregated Actual and Forecast Demands and Net Energy for Load	G-167-10	January 1, 2011
MOD-018-0	Treatment of Non-member Demand Data and How Uncertainties are Addressed in the Forecasts of Demand and Net Energy for Load	G-67-09	November 1, 2010
MOD-019-0.1	Reporting of Interruptible Demands and Direct Control Load Management	G-167-10	January 1, 2011

⁹ Reliability standard will be superseded by MOD-032-1 and MOD-033-1 if adopted in BC. Adoption of MOD-032-1 and MOD-033-1 pending reassessment.

Standard	Name	Commission Order Adopting	Effective Date
MOD-020-0	Providing Interruptible Demands and Direct Control Load management Data to System Operators and Reliability Coordinators	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	R-1-13	April 15, 2013
MOD-025-2	Verification and Data Reporting of Generator Real and Reactive Power Capability and Synchronous Condenser Reactive Power Capability	R-38-15	40% by October 1, 2017 60% by October 1, 2018 80% by October 1, 2019 100% by October 1, 2020
MOD-026-1	Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions	R-38-15	R1: October 1, 2016 R2: 30% by October 1, 2019 50% by October 1, 2021 100% by October. 1, 2025 R3-R6: October 1, 2015
MOD-027-1	Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions	R-38-15	R1: October 1, 2016 R2: 30% by October 1, 2019 50% by October 1, 2021 100% by October 1, 2025 R3-R5: October 1, 2015
MOD-028-2	Area Interchange Methodology	R-32-14	August 1, 2014
MOD-029-1a	Rated System Path Methodology	G-175-11	November 30, 2011
MOD-030-2	Flowgate Methodology	G-175-11	November 30, 2011
MOD-032-1	Data for Power System Modeling and Analysis	R-38-15	Effective date held in abeyance ⁶
MOD-033-1	Steady-State and Dynamic System Model Validation	R-38-15	Effective date held in abeyance ⁶
NUC-001-3	Nuclear Plant Interface Coordination	R-38-15	January 1, 2016
PER-001-0.2	Operating Personnel Responsibility and Authority	R-41-13	December 12, 2013
PER-002-0	Operating Personnel Training	G-67-09	November 1, 2010
PER-003-1	Operating Personnel Credentials	R-41-13	January 1, 2015

Standard	Name	Commission Order Adopting	Effective Date
PER-004-2	Reliability Coordination – Staffing	R-1-13	January 15, 2013
PER-005-1 ¹	System Personnel Training	R-1-13	R1, R2: January 15, 2015 R3: July 15, 2014 R3.1: January 15, 2016
PER-005-2	Operations Personnel Training	R-38-15	R1-R4, R6: October 1, 2016 R5: October 1, 2017
PRC-001-1.1	System Protection Coordination	R-38-15	October 1, 2015
PRC-004-2.1a	Analysis and Mitigation of Transmission and Generation Protection System Misoperations	R-32-14	August 1, 2014
PRC-004-WECC-1	Protection System and Remedial Action Scheme Misoperation	R-1-13	July 15, 2013
PRC-005-1.1b ¹	Transmission and Generation Protection System Maintenance and Testing	R-32-14	January 1, 2015
PRC-005-2	Protection System Maintenance	R-38-15	R1, R2, R5: October 1, 2017 R3 R4: staged as per BC Implementation Plan
PRC-006-1	Automatic Underfrequency Load Shedding		Adoption held in abeyance at this time ⁶
PRC-007-0 ¹⁰	Assuring consistency of entity Underfrequency Load Shedding Program Requirements	G-67-09	November 1, 2010
PRC-008-0 ¹¹	Implementation and Documentation of Underfrequency Load Shedding Equipment Maintenance Program	G-67-09	November 1, 2010
PRC-009-0 ¹⁰	Analysis and Documentation of Underfrequency Load Shedding Performance Following an Underfrequency Event	G-67-09	November 1, 2010
PRC-010-0	Technical Assessment of the Design and Effectiveness of Undervoltage Load Shedding Program	G-67-09	November 1, 2010 R2: Retired January 21, 2014 ²

¹⁰ Reliability standard will be superseded by PRC-006-1 if adopted in BC. Adoption of PRC-006-1 pending reassessment.

¹¹ Reliability standard is superseded by PRC-005-2 as of the PRC-005-2 effective date.

Standard	Name	Commission Order Adopting	Effective Date
PRC-011-0 ¹¹	Undervoltage Load Shedding System Maintenance and Testing	G-67-09	November 1, 2010
PRC-015-0	Special Protection System Data and Documentation	G-67-09	November 1, 2010
PRC-016-0.1	Special Protection System Misoperations	G-167-10	January 1, 2011
PRC-017-0 ¹¹	Special Protection System Maintenance and Testing	G-67-09	November 1, 2010
PRC-018-1	Disturbance Monitoring Equipment Installation and Data Reporting	G-67-09	November 1, 2010
PRC-019-1	Coordination of Generating Unit or Plant Capabilities, Voltage Regulating Controls, and Protection	R-38-15	40% by October 1, 2017 60% by October 1, 2018 80% by October 1, 2019 100% by October 1, 2020
PRC-021-1	Under Voltage Load Shedding Program Data	G-67-09	November 1, 2010
PRC-022-1	Under Voltage Load Shedding Program Performance	G-67-09	November 1, 2010 R2: Retired January 21, 2014 ²
PRC-023-2 ^{1,12}	Transmission Relay Loadability	R-41-13	R1-R5: For circuits identified by sections 4.2.1.1 and 4.2.1.4: January 1, 2016 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 ⁶ R6: To be determined ⁶
PRC-023-3	Transmission Relay Loadability	R-38-15	R1-R5: regarding circuits 4.2.1.1 and 4.2.1.4: January 1, 2016 R1-R5: Circuits 4.2.1.2, 4.2.1.3, 4.2.1.5 and 4.2.1.6: TBD R6: TBD ⁶
PRC-024-1	Generator Frequency and Voltage Protective Relay Settings	R-38-15	40% by October 1, 2017 60% by October 1, 2018 80% by October 1, 2019 100% by October 1, 2020

¹² PRC-023-2 Requirement 1, Criterion 6 only is superseded by PRC-025-1 as of PRC-025-1's 100 per cent Effective Date.

Standard	Name	Commission Order Adopting	Effective Date
PRC-025-1	Generator Relay Loadability	R-38-15	40% by October 1, 2017 60% by October 1, 2018 80% by October 1, 2019 100% by October 1, 2020
TOP-001-1a	Reliability Responsibilities and Authorities	R-1-13	January 15, 2013
TOP-002-2.1b	Normal Operations Planning	R-41-13	December 12, 2013
TOP-003-1	Planned Outage Coordination	R-1-13	April 15, 2013
TOP-004-2	Transmission Operations	G-167-10	January 1, 2011
TOP-005-2a	Operational Reliability Information	R-1-13	April 15, 2013
TOP-006-2	Monitoring System Conditions	R-1-13	April 15, 2013
TOP-007-0	Reporting System Operating Unit (SOL) and Interconnection Reliability Operating Limit (IROL) Violations	G-67-09	November 1, 2010
TOP-007-WECC-1a	System Operating Limits	R-38-15	October 1, 2015
TOP-008-1	Response to Transmission Limit Violations	G-67-09	November 1, 2010
TPL-001-0.1 ¹³	System Performance Under Normal (No Contingency) Conditions (Category A)	G-167-10	January 1, 2011
TPL-001-4	Transmission System Planning Performance Requirements	Adoption pending reassessment	TBD
TPL-002-0b ¹³	System Performance Following Loss of a Single Bulk Electric System Element (Category B)	R-1-13	January 15, 2013
TPL-003-0b ¹³	System Performance Following Loss of Two or More Bulk Electric System Elements (Category C)	R-32-14	August 1, 2014
TPL-004-0a ¹³	System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements (Category D)	R-32-14	August 1, 2014

¹³ Reliability standard will be superseded by TPL-001-4 if adopted in BC. Adoption of TPL-001-4 pending reassessment.

Standard	Name	Commission Order Adopting	Effective Date
VAR-001-3 ¹	Voltage and Reactive Control	R-32-14	R1, R2, R6-R12 Effective: August 1, 2014 E.A. 13-E.A.18 : Effective: August 1, 2015 R5: Retired January 21, 2014 ²
VAR-001-4	Voltage and Reactive Control	R-38-15	October 1, 2016
VAR-002-2b ¹	Generator Operation for Maintaining Network Voltage Schedules	R-32-14	August 1, 2014
VAR-002-3	Generator Operation for Maintaining Network Voltage Schedules	R-38-15	October 1, 2016
VAR-002-WECC-1	Automatic Voltage Regulators (AVR)	R-1-13	January 15, 2014
VAR-501-WECC-1	Power System Stabilizer (PSS)	R-11-13	January 15, 2014

Table 1 NERC Glossary Terms Used in BAL-001-2 Reliability Standard

Term	BOT Approved Date	FERC Approved Date	Definition
Interconnection	8/15/2013	4/16/2015 (Effective 7/1/2016)	When capitalized, any one of the four major electric system networks in North America: Eastern, Western, ERCOT and Quebec.
Regulation Reserve Sharing Group	8/15/2013	4/16/2015 (Becomes effective 7/1/2016)	A group whose members consist of two or more Balancing Authorities that collectively maintain, allocate, and supply the Regulating Reserve required for all member Balancing Authorities to use in meeting applicable regulating standards.
Reporting ACE	8/15/2013	4/16/2015 (Becomes effective 7/1/2016)	<p>The scan rate values of a Balancing Authority's Area Control Error (ACE) measured in MW, which includes the difference between the Balancing Authority's Net Actual Interchange and its Net Scheduled Interchange, plus its Frequency Bias obligation, plus any known meter error. In the Western Interconnection, Reporting ACE includes Automatic Time Error Correction (ATEC).</p> <p>Reporting ACE is calculated as follows:</p> <ul style="list-style-type: none"> Reporting ACE = $(NI_A - NI_S) - 10B (F_A - F_S) - I_{ME}$ <p>Reporting ACE is calculated in the Western Interconnection as follows:</p> <ul style="list-style-type: none"> Reporting ACE = $(NI_A - NI_S) - 10B (F_A - F_S) - I_{ME} + I_{ATEC}$ <p>Where:</p> <p>NI_A (Actual Net Interchange) is the algebraic sum of actual megawatt transfers across all Tie Lines and includes Pseudo-Ties. Balancing Authorities directly connected via asynchronous ties to another Interconnection may include or exclude megawatt transfers on those Tie lines in their actual interchange, provided they are implemented in the same manner for Net Interchange Schedule.</p>

Term	BOT Approved Date	FERC Approved Date	Definition
			<p>NI_s (Scheduled Net Interchange) is the algebraic sum of all scheduled megawatt transfers, including Dynamic Schedules, with adjacent Balancing Authorities, and taking into account the effects of schedule ramps. Balancing Authorities directly connected via asynchronous ties to another Interconnection may include or exclude megawatt transfers on those Tie Lines in their scheduled Interchange, provided they are implemented in the same manner for Net Interchange Actual.</p> <p>B (Frequency Bias Setting) is the Frequency Bias Setting (in negative MW/0.1 Hz) for the Balancing Authority.</p> <p>10 is the constant factor that converts the frequency bias setting units to MW/Hz.</p> <p>F_A (Actual Frequency) is the measured frequency in Hz.</p> <p>F_s (Scheduled Frequency) is 60.0 Hz, except during a time correction.</p> <p>I_{ME} (Interchange Meter Error) is the meter error correction factor and represents the difference between the integrated hourly average of the net interchange actual (NIA) and the cumulative hourly net Interchange energy measurement (in megawatt-hours).</p> <p>I_{ATEC} (Automatic Time Error Correction) is the addition of a component to the ACE equation for the Western Interconnection that modifies the control point for the purpose of continuously paying back Primary Inadvertent Interchange to correct accumulated time error. Automatic Time Error Correction is only applicable in the Western Interconnection.</p> <div style="background-color: #e6f2ff; padding: 10px; margin: 10px 0;"> $I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(1 - Y) * H} \text{ when operating in Automatic Time Error Correction control mode.}$ </div> <p>I_{ATEC} shall be zero when operating in any other AGC mode.</p> <ul style="list-style-type: none"> • Y = B / BS. • H = Number of hours used to payback Primary Inadvertent Interchange energy. The value of H is set to 3.

Term	BOT Approved Date	FERC Approved Date	Definition
			<ul style="list-style-type: none"> • BS = Frequency Bias for the Interconnection (MW / 0.1 Hz). • Primary Inadvertent Interchange (PII_{hourly}) is $(1-Y) * (II_{actual} - B * \Delta TE/6)$ • II_{actual} is the hourly Inadvertent Interchange for the last hour. • ΔTE is the hourly change in system Time Error as distributed by the Interconnection Time Monitor. Where: $\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t) * (TE_{offset})$ • TD_{adj} is the Reliability Coordinator adjustment for differences with Interconnection Time Monitor control center clocks. • t is the number of minutes of Manual Time Error Correction that occurred during the hour. • TE_{offset} is 0.000 or +0.020 or -0.020. • PII_{accum} is the Balancing Authority's accumulated PII_{hourly} in MWh. An On-Peak and Off-Peak accumulation accounting is required. <p>Where:</p> <div style="background-color: #e6f2ff; padding: 10px; margin: 10px 0;"> $PII_{accum}^{on/off\ peak} = \text{last period's } PII_{accum}^{on/off\ peak} + PII_{hourly}$ </div> <p>All NERC Interconnections with multiple Balancing Authorities operate using the principles of Tie-line Bias (TLB) Control and require the use of an ACE equation similar to the Reporting ACE defined above. Any modification(s) to this specified Reporting ACE equation that is(are) implemented for all BAs on an Interconnection and is(are) consistent with the following four principles will provide a valid alternative Reporting ACE equation consistent with the measures included in this standard.</p> <ol style="list-style-type: none"> 1. All portions of the Interconnection are included in one area or another so that the sum of all area generation, loads and losses is the same as total system generation, load and losses.

Term	BOT Approved Date	FERC Approved Date	Definition
			<p>2. The algebraic sum of all area Net Interchange Schedules and all Net Interchange actual values is equal to zero at all times.</p> <p>3. The use of a common Scheduled Frequency FS for all areas at all times.</p> <p>4. The absence of metering or computational errors. (The inclusion and use of the IME term to account for known metering or computational errors.)</p>
Reserve Sharing Group Reporting ACE	8/15/2013	4/16/2015 (Becomes effective 7/1/2016)	At any given time of measurement for the applicable Reserve Sharing Group, the algebraic sum of the Reporting ACEs (or equivalent as calculated at such time of measurement) of the Balancing Authorities participating in the Reserve Sharing Group at the time of measurement.

British Columbia (BC) Exceptions to the Glossary of Terms Used in North American Electric Reliability Corporation (NERC) Reliability Standards (NERC Glossary)

Updated: April 21, 2016

Introduction:

This document is to be used in conjunction with the NERC Glossary dated October 1, 2014.

- The NERC Glossary terms listed in [Table 1](#) below are effective in BC on the date specified in the “Effective Date” column.
- [Table 2](#) below outlines the adoption history by the Commission of the NERC Glossaries in BC.
- Any NERC Glossary terms and definitions in the NERC Glossary that are not approved by FERC on or before November 30, 2014 are of no force or effect in B.C. with the exception of the BAL-001-2 Glossary Terms approved by order in BC.
- Any NERC Glossary terms that have been remanded or retired by NERC are of no force or effect in BC, with the exception of those remanded or retired NERC Glossary terms which have not yet been retired in BC.
- The Electric Reliability Council of Texas, Northeast Power Coordinating Council and Reliability First regional definitions listed at the end of the NERC Glossary have been adopted by the NERC Board of Trustees for use in regional standards and are of no force or effect in BC.

Table 1 BC Effective Date Exceptions to Definitions in October 1, 2014 Version of the NERC Glossary

NERC Glossary Term	Acronym	Assessment Report Number	Commission Order Number	Commission Adoption or Retirement	Effective Date
Adjacent Balancing Authority	-	Report No. 8	R-38-15	Adoption	October 1, 2015
Area Control Error (from NERC section of the Glossary)	ACE	Report No. 7	R-32-14	Adoption	October 1, 2014
Area Control Error (from the WECC Regional Definitions section of the Glossary)	ACE	Report No. 7	R-32-14	Retirement	October 1, 2014
Arranged Interchange	-	Report No. 8	R-38-15	Adoption	October 1, 2015
Attaining Balancing Authority	-	Report No. 8	R-38-15	Adoption	October 1, 2015
Automatic Time Error Correction	-	Report No. 7	R-32-14	Adoption	October 1, 2014
BES Cyber Asset	-	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
BES Cyber System	-	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
BES Cyber System Information	-	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
Blackstart Capability Plan	-	Report No. 7	R-32-14	Retirement	August 1, 2015
Blackstart Resource	-	Report No. 6	R-41-13	Adoption	December 12, 2013
Bulk Electric System	BES	Report No. 8	R-38-15	-	October 1, 2015

NERC Glossary Term	Acronym	Assessment Report Number	Commission Order Number	Commission Adoption or Retirement	Effective Date
Bulk-Power System	-	Report No. 8	R-38-15	-	October 1, 2015
Bus-tie Breaker	-	Report No. 8	R-38-15	Adoption	To be determined ¹
CIP Exceptional Circumstance	-	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
CIP Senior Manager	-	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
Composite Confirmed Interchange	-	Report No. 8	R-38-15	Adoption	October 1, 2015
Confirmed Interchange	-	Report No. 8	R-38-15	Adoption	October 1, 2015
Consequential Load Loss	-	Report No. 8	R-38-15	Adoption	To be determined ¹
Control Center	-	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
Cyber Assets	-	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
Cyber Security Incident	-	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.

¹ NERC Glossary term is specific to the TPL-001-04 reliability standard. NERC Glossary term will be assessed in a TPL-001-4 specific assessment report

NERC Glossary Term	Acronym	Assessment Report Number	Commission Order Number	Commission Adoption or Retirement	Effective Date
Dial-up Connectivity	-	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
Dynamic Interchange Schedule or Dynamic Schedule	-	Report No. 8	R-38-15	Adoption	October 1, 2015
Electronic Access Control or Monitoring Systems	EACMS	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
Electronic Access Point	EAP	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
Electronic Security Perimeter	ESP	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
External Routable Connectivity	-	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
Frequency Bias Setting	-	Report No. 8	R-38-15	Adoption	Align with earliest effective date of BAL-003-1 standard where this term is referenced.
Frequency Response Measure	FRM	Report No. 8	R-38-15	Adoption	Align with earliest effective date of BAL-003-1 standard where this term is referenced.
Frequency Response Obligation	FRO	Report No. 8	R-38-15	Adoption	Align with earliest effective date of BAL-003-1 standard where this term is referenced.
Frequency Response Sharing Group	FRSG	Report No. 8	R-38-15	Adoption	Align with earliest effective date of BAL-003-1 standard where this term is referenced.

NERC Glossary Term	Acronym	Assessment Report Number	Commission Order Number	Commission Adoption or Retirement	Effective Date
Interactive Remote Access	-	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
Intermediate Balancing Authority	-	Report No. 8	R-38-15	Adoption	October 1, 2015
Interconnection		BAL-001-2	R-14-16	Adoption	July 1, 2016
Interconnection Reliability Operating Limit	IROL	Report No. 6	R-41-13	Adoption	December 12, 2013
Intermediate System	-	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
Long-Term Transmission Planning Horizon	-	Report No. 8	R-38-15	Adoption	To be determined ¹
Minimum Vegetation Clearance Distance	MVCD	Report No. 7	R-32-14	Adoption	August 1, 2015
Native Balancing Authority	-	Report No. 8	R-38-15	Adoption	October 1, 2015
Non-Consequential Load Loss	-	Report No. 8	R-38-15	Adoption	To be determined ¹
Operational Planning Analysis ²	-	Report No. 6	R-41-13	Adoption	December 12, 2013
Operational Planning Analysis	-	Report No. 8	R-38-15	Adoption	October 1, 2015
Operations Support Personnel	-	Report No. 8	R-38-15	Adoption	Align with effective date of Requirement 5 of the PER-005-2 standard where this term is referenced.

² NERC Glossary term definition is superseded by the revised NERC Glossary term definition listed immediately below it as of the effective date(s) of the revised NERC Glossary term definition.

NERC Glossary Term	Acronym	Assessment Report Number	Commission Order Number	Commission Adoption or Retirement	Effective Date
Physical Access Control Systems	PACS	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
Physical Security Perimeter	PSP	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
Planning Assessment	-	Report No. 8	R-38-15	Adoption	To be determined ¹
Protected Cyber Assets	PCA	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
Protection System	-	Report No. 6	R-41-13	Adoption	January 1, 2015 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 Maintenance Program	PSMP	Report No. 8	R-38-15	Adoption	Align with effective date of Requirement 1 of the PRC-005-2 standard where this term is referenced.
Pseudo-Tie	-	Report No. 8	R-38-15	Adoption	October 1, 2015
Real-time Assessment	-	Report No. 6	R-41-13	Adoption	January 1, 2014
Regulation Reserve Sharing Group		BAL-001-2	R-14-16	Adoption	July 1, 2016
Reliability Adjustment Arranged Interchange	-	Report No. 8	R-38-15	Adoption	October 1, 2015
Reliability Standard	-	Report No. 8	R-32-14	Adoption	October 1, 2015

NERC Glossary Term	Acronym	Assessment Report Number	Commission Order Number	Commission Adoption or Retirement	Effective Date
Reliable Operation	-	Report No. 8	R-32-14	Adoption	October 1, 2015
Relief Requirement (WECC Regional Term)	-	Report No. 8	R-38-15	Adoption	Align with effective date of IRO-006-WECC-2 standard where this term is referenced.
Reportable Cyber Security Incident	-	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) where this term is referenced.
Reporting Ace		BAL-001-2	R-14-16	Adoption	July 1, 2016
Request for Interchange	RFI	Report No. 8	R-38-15	Adoption	October 1, 2015
Reserve Sharing Group Reporting Ace		BAL-001-2	R-14-16	Adoption	July 1, 2016
Sink Balancing Authority	-	Report No. 8	R-38-15	Adoption	October 1, 2015
Source Balancing Authority	-	Report No. 8	R-38-15	Adoption	October 1, 2015
System Operator	-	Report No. 8	R-38-15	Adoption	Align with effective date of CIP Version 5 standards (CIP-002-5.1, CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1) as reference is made to the term Control Center as part of the definition of System Operator. The term Control Center is in turn referenced from the CIP Version 5 standards.
Right-of-Way	ROW	Report No. 7	R-32-14	Adoption	August 1, 2015
TLR (Transmission Loading Relief) Log	-	Report No. 7	R-32-14	Adoption	August 1, 2014
Vegetation Inspection	-	Report No. 7	R-32-14	Adoption	August 1, 2015

Table 2 NERC Glossary Adoption History in BC

NERC Glossary of Terms Version Date	Assessment Report Number	Commission Order Adoption Date	Commission Order Adopting	Effective Date
February 12, 2008	Report No. 1	June 4, 2009	G-67-09	The NERC Glossary is effective as of the date of the Order (June 4, 2009)
April 20, 2010	Report No. 2	November 10, 2010	G-167-10	The NERC Glossary is effective as of the date of the Order (November 10, 2010)
August 4, 2011	Report No. 3	September 1, 2011	G-162-11 Replacing G-151-11	The NERC Glossary is effective as of the date of the Order (September 1, 2011)
December 13, 2011	Report No. 5	January 15, 2013	R-1-13	The NERC Glossary is effective as of the date of the Order (January 15, 2013). NERC Glossary terms which have not been approved by FERC are of no force or effect.
December 5, 2012	Report No. 6	December 12, 2013	R-41-13	The NERC Glossary is effective as of the date of the Order (December 12, 2013) The effective date of the new and revised NERC Glossary terms adopted in the Order is the date appearing in the table found in Attachment A to the Order. NERC Glossary terms which have not been approved by FERC are of no force or effect.

NERC Glossary of Terms Version Date	Assessment Report Number	Commission Order Adoption Date	Commission Order Adopting	Effective Date
January 2, 2014	Report No. 7	July 17, 2014	R-32-14	<p>The NERC Glossary is effective as of the date of the Order (July 17, 2014).</p> <p>The effective date of the new and revised NERC Glossary terms adopted in the Order is the date appearing in the table found in Attachment A to the Order. Each Glossary term to be superseded by a revised Glossary term adopted in the Order shall remain in effect until the effective date of the Glossary term superseding it.</p> <p>The NERC Glossary terms listed in the tables found in Attachment C to the Order are all of the NERC Glossary terms in effect in B.C. as of the effective dates listed in the tables of Attachment C to the Order. The effective dates for the NERC Glossary terms that are listed in the tables found in Attachment C supersede the effective dates that were included in any similar list appended to any previous order.</p> <p>NERC Glossary terms which have not been approved by FERC are of no force or effect.</p> <p>The Electric Reliability Council of Texas, Northeast Power Coordinating Council and Reliability First regional definitions listed at the end of the NERC Glossary of Terms are of no force or effect in BC.</p>
October 1, 2014	Report No. 8	July 24, 2015	R-38-15	The NERC Glossary is effective as of the date of Commission Order R-38-15.
December 7, 2015	BAL-001-2	April 21, 2016	R-14-16	The BAL-001-2 Glossary Terms (Interconnection, Regulation Reserve Sharing Group, Reporting Ace and Reserve Sharing Group Reporting Ace) are effective as of July 1, 2016

REAL POWER BALANCING CONTROL PERFORMANCE

A. INTRODUCTION

1. **Title:** Real Power Balancing Control Performance
2. **Number:** BAL-001-2
3. **Purpose:** To control Interconnection frequency within defined limits.
4. **Applicability:**
 - 4.1. **Balancing Authority**
 - 4.1.1 A Balancing Authority receiving Overlap Regulation Service is not subject to Control Performance Standard 1 (CPS1) or Balancing Authority ACE Limit (BAAL) compliance evaluation.
 - 4.1.2 A Balancing Authority that is a member of a Regulation Reserve Sharing Group is the Responsible Entity only in periods during which the Balancing Authority is not in active status under the applicable agreement or the governing rules for the Regulation Reserve Sharing Group.
 - 4.2. **Regulation Reserve Sharing Group**
5. **(Proposed) Effective Date:*** see footnote below.

B. REQUIREMENTS

- R1. The Responsible Entity shall operate such that the Control Performance Standard 1 (CPS1), calculated in accordance with Attachment 1, is greater than or equal to 100 percent for the applicable Interconnection in which it operates for each preceding 12 consecutive calendar month period, evaluated monthly. *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*
- R2. Each Balancing Authority shall operate such that its clock-minute average of Reporting ACE does not exceed its clock-minute Balancing Authority ACE Limit (BAAL) for more than 30 consecutive clock-minutes, calculated in accordance with Attachment 2, for the applicable Interconnection in which the Balancing Authority operates. *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

C. MEASURES

- M1. The Responsible Entity shall provide evidence, upon request, such as dated calculation output from spreadsheets, system logs, software programs, or other evidence (either in hard copy or electronic format) to demonstrate compliance with Requirement R1.
- M2. Each Balancing Authority shall provide evidence, upon request, such as dated calculation output from spreadsheets, system logs, software programs, or other evidence (either in hard copy or electronic format) to demonstrate compliance with Requirement R2.

D. COMPLIANCE

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

The British Columbia Utilities Commission.

1.2. Data Retention

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full-time period since the last audit.

The Responsible Entity shall retain data or evidence to show compliance for the current year, plus three previous calendar years unless, directed by its Compliance Enforcement Authority, to retain specific evidence for a longer period of time as part of an investigation. Data required for the calculation of Regulation Reserve Sharing Group Reporting Ace, or Reporting ACE, CPS1, and BAAL shall be retained in digital format at the same scan rate at which the Reporting ACE is calculated for the current year, plus three previous calendar years.

If a Responsible Entity is found noncompliant, it shall keep information related to the noncompliance until found compliant, or for the time period specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all subsequent requested and submitted records.

1.3. Compliance Monitoring and Assessment Processes

Compliance Audits
Self-Certifications
Spot Checking
Compliance Investigation
Self-Reporting
Complaints

1.4. Additional Compliance Information

None.

2. Violation Severity Levels

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	The CPS 1 value of the Responsible Entity, for the preceding 12 consecutive calendar month period, is less than 100 percent but greater than or equal to 95 percent for the applicable Interconnection.	The CPS 1 value of the Responsible Entity, for the preceding 12 consecutive calendar month period, is less than 95 percent, but greater than or equal to 90 percent for the applicable Interconnection.	The CPS 1 value of the Responsible Entity, for the preceding 12 consecutive calendar month period, is less than 90 percent, but greater than or equal to 85 percent for the applicable Interconnection.	The CPS 1 value of the Responsible Entity, for the preceding 12 consecutive calendar month period, is less than 85 percent for the applicable Interconnection.
R2	The Balancing Authority exceeded its clock-minute BAAL for more than 30 consecutive clock minutes but for 45 consecutive clock-minutes or less for the applicable Interconnection.	The Balancing Authority exceeded its clock-minute BAAL for greater than 45 consecutive clock minutes but for 60 consecutive clock-minutes or less for the applicable Interconnection.	The Balancing Authority exceeded its clock-minute BAAL for greater than 60 consecutive clock minutes but for 75 consecutive clock-minutes or less for the applicable Interconnection.	The Balancing Authority exceeded its clock-minute BAAL for greater than 75 consecutive clock-minutes for the applicable Interconnection.

E. REGIONAL VARIANCES

None.

F. ASSOCIATED DOCUMENTS

BAL-001-2, Real Power Balancing Control Performance Standard Background Document

Version History

Version	Date	Action	Change Tracking
0	February 8, 2005	BOT Approval	New
0	April 1, 2005	Effective Implementation Date	New
0	August 8, 2005	Removed “Proposed” from Effective Date	Errata
0	July 24, 2007	Corrected R3 to reference M1 and M2 instead of R1 and R2	Errata
0a	December 19, 2007	Added Appendix 2 – Interpretation of R1 approved by BOT on October 23, 2007	Revised
0a	January 16, 2008	In Section A.2., Added “a” to end of standard number In Section F, corrected automatic numbering from “2” to “1” and removed “approved” and added parenthesis to “(October 23, 2007)”	Errata
0	January 23, 2008	Reversed errata change from July 24, 2007	Errata
0.1a	October 29, 2008	Board approved errata changes; updated version number to “0.1a”	Errata
0.1a	May 13, 2009	Approved by FERC	
1		Inclusion of BAAL and WECC Variance and exclusion of CPS2	Revision
1	December 19, 2012	Adopted by NERC Board of Trustees	
2	August 15, 2013	Adopted by the NERC Board of Trustees	
2	April 16, 2015	FERC Order issued approving BAL-001-2	

Attachment 1 Equations Supporting Requirement R1 and Measure M1

CPS1 is calculated as follows:

$$CPS1 = (2 - CF) * 100\%$$

The frequency-related compliance factor (CF), is a ratio of the accumulating clock-minute compliance parameters for the most recent preceding 12 consecutive calendar months, divided by the square of the target frequency bound:

$$CF = \frac{CF_{12\text{-month}}}{(\epsilon_{1_i})^2}$$

Where ϵ_{1_i} is the constant derived from a targeted frequency bound for each Interconnection as follows:

- Eastern Interconnection $\epsilon_{1_i} = 0.018$ Hz
- Western Interconnection $\epsilon_{1_i} = 0.0228$ Hz
- ERCOT Interconnection $\epsilon_{1_i} = 0.030$ Hz
- Quebec Interconnection $\epsilon_{1_i} = 0.021$ Hz

The rating index $CF_{12\text{-month}}$ is derived from the most recent preceding 12 consecutive calendar months of data. The accumulating clock-minute compliance parameters are derived from the one-minute averages of Reporting ACE, Frequency Error, and Frequency Bias Settings.

A clock-minute average is the average of the reporting Balancing Authority's valid measured variable (i.e., for Reporting ACE (RACE) and for Frequency Error) for each sampling cycle during a given clock-minute.

$$\left(\frac{RACE}{-10B} \right)_{\text{clock-minute}} = \frac{\left(\frac{\sum RACE_{\text{sampling cycles in clock-minute}}}{n_{\text{sampling cycles in clock-minute}}} \right)}{-10B}$$

And,

$$\Delta F_{\text{clock-minute}} = \frac{\sum \Delta F_{\text{sampling cycles in clock-minute}}}{n_{\text{sampling cycles in clock-minute}}}$$

The Balancing Authority's clock-minute compliance factor ($CF_{\text{clock-minute}}$) calculation is:

$$CF_{\text{clock-minute}} = \left[\left(\frac{RACE}{-10B} \right)_{\text{clock-minute}} * \Delta F_{\text{clock-minute}} \right]$$

Normally, 60 clock-minute averages of the reporting Balancing Authority's Reporting ACE and Frequency Error will be used to compute the hourly average compliance factor ($CF_{\text{clock-hour}}$).

$$CF_{\text{clock-hour}} = \frac{\sum CF_{\text{clock-minute}}}{n_{\text{clock-minutesamplesin hour}}}$$

The reporting Balancing Authority shall be able to recalculate and store each of the respective clock-hour averages ($CF_{\text{clock-hour average-month}}$) and the data samples for each 24-hour period (one for each clock-hour; i.e., hour ending (HE) 0100, HE 0200, ..., HE 2400). To calculate the monthly compliance factor (CF_{month}):

$$CF_{\text{clock-hour average month}} = \frac{\sum_{\text{day sin month}} [(CF_{\text{clock-hour}})(n_{\text{one-minute samples in clock-hour}})]}{\sum_{\text{day sin month}} [n_{\text{one-minute samples in clock-hour}}]}$$

$$CF_{\text{month}} = \frac{\sum_{\text{hours-in-day}} [(CF_{\text{clock-hour average month}})(n_{\text{one-minute samples in clock-hour averages}})]}{\sum_{\text{hours-in day}} [n_{\text{one-minute samples in clock-hour averages}}]}$$

To calculate the 12-month compliance factor ($CF_{12\text{ month}}$):

$$CF_{12\text{-month}} = \frac{\sum_{i=1}^{12} (CF_{\text{month-}i})(n_{(\text{one-minute samples in month-}i)})}{\sum_{i=1}^{12} [n_{(\text{one-minute samples in month-}i)}]}$$

To ensure that the average Reporting ACE and Frequency Error calculated for any one-minute interval is representative of that time interval, it is necessary that at least 50 percent of both the Reporting ACE and Frequency Error sample data during the one-minute interval is valid. If the recording of Reporting ACE or Frequency Error is interrupted such that less than 50 percent of the one-minute sample period data is available or valid, then that one-minute interval is excluded from the CPS1 calculation.

A Balancing Authority providing Overlap Regulation Service to another Balancing Authority calculates its CPS1 performance after combining its Reporting ACE and Frequency Bias Settings with the Reporting ACE and Frequency Bias Settings of the Balancing Authority receiving the Regulation Service.

Attachment 2 Equations Supporting Requirement R2 and Measure M2

When actual frequency is equal to Scheduled Frequency, $BAAL_{High}$ and $BAAL_{Low}$ do not apply.

When actual frequency is less than Scheduled Frequency, $BAAL_{High}$ does not apply, and $BAAL_{Low}$ is calculated as:

$$BAAL_{Low} = (-10B_i \times (FTL_{Low} - F_S)) \times \frac{(FTL_{Low} - F_S)}{(F_A - F_S)}$$

When actual frequency is greater than Scheduled Frequency, $BAAL_{Low}$ does not apply and the $BAAL_{High}$ is calculated as:

$$BAAL_{High} = (-10B_i \times (FTL_{High} - F_S)) \times \frac{(FTL_{High} - F_S)}{(F_A - F_S)}$$

Where:

$BAAL_{Low}$ is the Low Balancing Authority ACE Limit (MW)

$BAAL_{High}$ is the High Balancing Authority ACE Limit (MW)

10 is a constant to convert the Frequency Bias Setting from MW/0.1 Hz to MW/Hz

B_i is the Frequency Bias Setting for a Balancing Authority (expressed as MW/0.1 Hz)

F_A is the measured frequency in Hz.

F_S is the scheduled frequency in Hz.

FTL_{Low} is the Low Frequency Trigger Limit (calculated as $F_S - 3\epsilon_{1i}$ Hz)

FTL_{High} is the High Frequency Trigger Limit (calculated as $F_S + 3\epsilon_{1i}$ Hz)

Where ϵ_{1i} is the constant derived from a targeted frequency bound for each Interconnection as follows:

- Eastern Interconnection $\epsilon_{1i} = 0.018$ Hz
- Western Interconnection $\epsilon_{1i} = 0.0228$ Hz
- ERCOT Interconnection $\epsilon_{1i} = 0.030$ Hz
- Quebec Interconnection $\epsilon_{1i} = 0.021$ Hz

To ensure that the average actual frequency calculated for any one-minute interval is representative of that time interval, it is necessary that at least 50% of the actual frequency sample data during that one-minute interval is valid. If the recording of actual frequency is interrupted such that less than 50 percent of the one-minute sample period data is available or valid, then that one-minute interval is excluded from the BAAL calculation and the 30-minute clock would be reset to zero.

A Balancing Authority providing Overlap Regulation Service to another Balancing Authority calculates its BAAL performance after combining its Frequency Bias Setting with the Frequency Bias Setting of the Balancing Authority receiving Overlap Regulation Service.

*** FOR INFORMATIONAL PURPOSES ONLY ***

Enforcement Dates: Standard BAL-001-2 — Real Power Balancing Control Performance

United States

Standard	Requirement	Enforcement Date	Inactive Date
BAL-001-2	All	07/01/2016	

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