

PRC-001-AB1-1 Protection System Coordination

1. Purpose

The purpose of this *reliability standard* is to ensure *protection systems* are coordinated among operating entities.

2. Applicability

This *reliability standard* applies to:

- (a) the legal owner of a transmission facility that is:
 - (i) part of the bulk electric system; or
 - (ii) not part of the bulk electric system below one hundred (100) kV and which the ISO:
 - (A) which the ISO determines is necessary for the reliable operation of either the interconnected electric system or the City of Medicine Hat electric system, and
 - (B) as published by on the ISO on the AESO website and may amend as from time to time in accordance with the process set out in Appendix 1 on notice to market participants;
- (b) the legal owner of a generating unit that is:
 - (i) directly connected to the bulk electric system and has a maximum authorized real power rating greater than eighteen (18) MW;
 - (ii) within a power plant which:
 - (A) is not part of an aggregated generating facility;
 - (B) is directly connected to the bulk electric system; and
 - (C) has a combined maximum authorized real power rating greater than sixty-seven point five (67.5) MW;
 - (iii) a blackstart resource; or
 - (iv) regardless of maximum authorized real power rating, material to this reliability standard and to the reliability of the bulk electric system as determined by the ISO determines and publishes as published by the ISO on the AESO website and as amended may amend from time to time by the ISO on notice to market participants in accordance with the process set out in Appendix 1;
- (c) the legal owner of an aggregated generating facility that is:
 - (i) directly connected to the bulk electric system and has a maximum authorized real power rating greater than sixty-seven point five (67.5) MW;
 - (ii) a blackstart resource; or

- ~~GFOs~~
- ~~operators of generating units~~

3. Definitions

Italicized terms used in this *reliability standard* have the meanings as set out in the [*Alberta Reliability Standards Glossary of Terms and Part 1 of the ISO Rules Consolidated Authoritative Document Glossary*](#).

4. Requirements

- R1** The operating personnel of each of the ISO, the operator of a transmission facility, the operator of a generating unit and the operator of an aggregated generating facility ~~TFO's and operators of generating units~~ must ~~each~~ be familiar with the purpose and limitations of protection system schemes applied in its area.
- R2** Each *operator* of a *generating unit* and operator of an aggregated generating facility must do the following if a protective relay or any equipment of a *protection system* of a generating unit or an aggregated generating facility that measures voltage, current or frequency from the generating unit or the aggregated generating facility to the *AIES*, but excluding the prime mover and associated control systems, fails, and such failure reduces *transmission system reliability*:
- R2.1** Notify the operator of a transmission facility ~~TFO~~ in its area and the *ISO* as soon as possible, but no longer than 24 hours after receiving knowledge of such failure.
- R2.2** Commence as soon as possible, and proceed diligently thereafter, to correct such failure.
- R3** Each operator of a transmission facility ~~TFO~~ must do the following if a protective relay or equipment fails, and such failure reduces *transmission system reliability* on the *BES*:
- R3.1** Notify the *ISO*, each directly affected operator of a transmission facility ~~TFOs~~ and *interconnected transmission operators* as soon as possible, but no longer than 24 hours after the earlier of receiving knowledge of or detecting such failure.
- R3.2** Commence as soon as possible, and proceed diligently thereafter, to correct such failure unless otherwise directed by the *ISO*.
- R4** The *ISO* must notify the *VRC* of a protective relay or equipment failure that reduces *system reliability* for *facilities* that operate at 200 kV and above as soon as possible, but no longer than 24 hours after such failure was reported to the *ISO*.
- R5** Each legal owner of a generating unit, and legal owner of an aggregated generating facility ~~GFO~~ must coordinate all new *protection systems* and all *protection system* changes with each ~~its~~ interconnecting legal owner of a transmission facility ~~TFO~~ and the *ISO*.
- R6** Each legal owner of a transmission facility ~~TFO~~ must coordinate all *protection systems* including existing, new and modified *protection systems* with each adjacent legal owner of a transmission facility ~~TFOs~~, affected legal owner of a generating unit, affected legal owner of an aggregated generating facility ~~GFOs~~, affected *interconnected transmission operators* and the *ISO*.

- R7** Each operator of a generating unit, operator of an aggregated generating facility~~GFO~~ ~~or~~ operator of a transmission facility~~TFO~~ must identify and coordinate changes in generation, transmission, load and/or operating conditions that require changes in the protection systems of others as follows:
- R7.1** Each operator of a generating unit and operator of an aggregated generating facility~~GFO~~ must identify changes in each of its generation, load, or operating conditions that may require changes in protection systems of others, and notify the ISO in advance of their changes.
- R7.2** The ISO must notify each affected operator of a transmission facility~~TFOs~~ and adjacent interconnected transmission operators in advance of changes in each of its generation or operating conditions that may require changes in protection systems.
- R7.3** Each operator of a transmission facility~~TFO~~ must identify changes in any of its transmission, load or operating conditions that may require changes in protection systems of others, and provide reasonable prior notice to the ISO and ~~other~~ each affected operator of a transmission facility~~TFOs~~ and adjacent interconnected transmission operators of such proposed changes.
- R8** Each operator of a transmission facility~~TFO~~ must monitor the status of each RAS in its area, and must notify each affected operator of a transmission facility~~TFOs~~, operators of a generating units, operator of an aggregated generating facility and the ISO of each change in status.
- R9** Each operator of a generating unit and operator of an aggregated generating facility must provide reasonable prior notice to the operator of a transmission facility~~TFO~~ and the ISO of proposed changes to the arming status (on, off and which generator) of any RAS in their facility.

5. Processes and Procedures

No procedures have been defined for this *reliability standard*.

6. Measures

The following measures correspond to the requirements identified in Section 4 of this *reliability standard*. For example, MR1 is the measure for R1.

- MR1** Training records are available that indicate training of staff who operate the system in protection system schemes and any RASs applicable within their system.
- MR2** Measures for this requirement are identified in the subsections below.
- MR2.1** Notifications exist for each failure as specified in requirement R2.1.
- MR2.2** Evidence exists that corrective actions have been taken as specified in requirement R2.2.
- MR3** Measures for this requirement are identified in the subsections below.
- MR3.1** Notifications exist for each failure as specified in requirement R3.1.
- MR3.2** Evidence exists that corrective actions have been taken as specified in requirement R3.2.
- MR4** Confirmation exists that a notification was sent to the VRC as specified in requirement R4.

- MR5** Evidence exists including, but not limited to, revised fault analysis study, letters of agreement on settings, notifications of changes, all of which meets the requirements as specified in requirement R5.
- MR6** Evidence exists that could include, but is not limited to, revised fault analysis study, letters of agreement on settings, notifications of changes, that meets the requirements as specified in requirement R6.
- MR7** Measures for this requirement are identified in the subsections below.
 - MR7.1** Evidence exists and shows that all changes requiring protection changes were made as specified in requirement R7.1.
 - MR7.2** Evidence exists and shows that all changes requiring protection changes were made as specified in requirement R7.2.
 - MR7.3** Evidence exists and shows that all changes requiring protection changes were made as specified in requirement R7.3.
- MR8** Operator logs, voice recordings or other evidence exists that affected parties were notified as specified in requirement R8.
- MR9** Operator logs, voice recordings or other evidence exists that affected parties were notified as specified in requirement R9.

7. Appendices

~~No appendices have been defined for this reliability standard~~ [Appendix 1 – Amending Process for List of Material Facilities](#)

8. Guidelines

No guidelines have been defined for this *reliability standard*.

Revision History

Effective	Description
2012-xx-xx	Administrative update – “TFO” and “GFO” replaced with “legal owner of a transmission facility”, “operator of a transmission facility”, “legal owner of a generating unit”, “operator of a generating unit”, “legal owner of an aggregated generating facility”, and “operator of an aggregated generating facility”; applied standard at the bulk electric system level; added Appendix 1; and other minor cleanup items.
2011-01-13	R1
2010-01-22	New Issue

Appendix 1
Amending Process for List of Facilities

In order to amend any list referenced in subsections (a)(ii)(B), (b)(iv), (c)(iii), (d)(ii)(B), (e)(iv) and (f)(iii) of section 2, *Applicability*, the ISO must:

(a) upon determining that a *transmission facility, generating unit or aggregated generating facility* is to be added, notify the *legal owner and operator* in writing and determine an effective date, which must be no less than thirty (30) days after the date of notice, for the *legal owner and operator* to meet the applicable requirements;

(b) upon determining that a *transmission facility, generating unit or aggregated generating facility* is to be deleted, notify the *legal owner and operator* in writing and determine an effective date for the *legal owner and operator* to no longer be required to meet the applicable requirements; and

~~(a)~~(c) publish the amended list with effective dates on the AESO website.