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~~d by~~s 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

(iii) regardless of *maximum authorized real power* rating, material to this *reliability standard* and to the *reliability* of the *bulk electric system* as the *ISO* determines and publishesdetermined by the **ISO,** as published by the **ISO** on the AESO website and may amend as amended from time to time by the **ISO** on notice to *market participants*;in accordance with the process set out in Appendix 1;

(d) the *operator* of a *transmission facility* that is;

(i) part of the *bulk electric system*; or

(ii) below one hundred (100) kVnot part of the *bulk electric system* and which the *ISO*;

(A) -determines is necessary for the reliable operation of either the *interconnected electric system* or the City of Medicine Hat electric system; and

(B) -as publishepublishes on the d by the **ISO** on the AESO website and as amendedmay amend from time to time on notice to *market participants*in accordance with the process set out in Appendix 1;

(e) the *operator* 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 the *ISO* determines and publishes determined by the **ISO**, 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;

(f) the *operator* 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

(iii) regardless of *maximum authorized real power* rating, material to this *reliability standard* and to the *reliability* of the *bulk electric system* as the *ISO* determines and publishesdetermined by the **ISO**, as published by the **ISO** on the AESO website and as amendedmay amend from time to time by the **ISO** on notice to *market participan*in accordance with the process set out in Appendix 1*ts*; and

(g) the *ISO*.

- *ISO*
- *TFOs*

- ~~*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 operator*~~*s*~~ 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~~and *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 operator*~~*s*~~ 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 operator*~~*s*~~ 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*~~*, operator*~~*s*~~ of a *generating unit*~~*s*~~*, 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.