Alberta Reliability Standard
Protection System Coordination
PRC-001-AB3-1.1(ii)

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** 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) publishes on the AESO website and may amend from time to time in accordance with the process set out in Appendix 1;

(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 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 67.5 MW;

(iii) a **blackstart resource**; or

(iv) material to this **reliability standard** and to the reliability of the **bulk electric system**, regardless of its **maximum authorized real power** rating, as the **ISO** determines and publishes on the AESO website and may amend from time to time 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 67.5 MW;

(ii) within a power plant or industrial complex which:

(A) is directly connected to the **bulk electric system**; and

(B) has a combined **maximum authorized real power** rating greater than 67.5 MW;

(iii) a **blackstart resource**; or

(iv) material to this **reliability standard** and to the reliability of the **bulk electric system**, regardless of its **maximum authorized real power** rating, as the **ISO** determines and publishes on the AESO website and may amend from time to time 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) not 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) publishes on the AESO website and may amend from time to time 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 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 67.5 MW;

(iii) a **blackstart resource**; or

(iv) material to this **reliability standard** and to the reliability of the **bulk electric system**, regardless of its **maximum authorized real power** rating, as the **ISO** determines and publishes on the AESO website and may amend from time to time in accordance with the process set out in Appendix 1; and

(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 67.5 MW;

(ii) within a power plant or industrial complex which:

(A) is directly connected to the bulk electric system; and

(B) has a combined maximum authorized real power rating greater than 67.5 MW;

(iii) a **blackstart resource**; or

(iv) material to this **reliability standard** and to the reliability of the **bulk electric system**, regardless of its **maximum authorized real power** rating, as the **ISO** determines and publishes on the AESO website and may amend from time to time in accordance with the process set out in Appendix 1.

3. Requirements

R1 Each **operator** of a **generating unit** and **operator** of an **aggregated generating facility** must, upon failure of any component of a **protection system** of a **generating unit** or an **aggregated generating facility** which it operates, take the actions listed in requirement R1.1 and R1.2.

R1.1 Notify the **operator** of a **transmission facility** to which the **generating unit** or **aggregated generating facility** is connected as soon as possible, but no longer than twenty-four (24) hours after becoming aware of such a failure, and provide the following information, regardless of whether or not the **generating unit** or **aggregated generating facility** remains on-line:

(a) identify the **protection system** that failed; and

(b) identify whether or not a **functionally equivalent protection system** remains in service.

R1.2 Correct the failure as soon as possible.

R2 Each **operator** of a **transmission facility**, **operator** of a **generating unit** and **operator** of an **aggregated generating facility** must take the actions listed in requirements R2.1 through R2.3 after becoming aware of the failure of any of the following **protection systems** or teleprotection communication channels under its authority:

(a) a **protection system**, other than a related teleprotection communication channel referred to in requirement R2(c) or R2(d), that protects a **transmission facility** operated at a nominal voltage greater than 200 kV, whether or not a **functionally equivalent protection system** remains in service;

(b) a **protection system**, other than a related teleprotection communication channel referred to in requirement R2(c) or R2(d), that protects a **transmission facility** that is part of the **bulk electric system** where a **functionally equivalent protection system** is not available;

(c) a teleprotection communication channel, that is part of a **protection system** for a **transmission facility** operated at a nominal voltage greater than 200 kV, where there is an equivalent backup teleprotection communication channel, and where the failure lasts for more than twenty-four (24) continuous hours; or

(d) a teleprotection communication channel, where there is no equivalent backup teleprotection communication channel, and where the failure lasts for more than ten (10) consecutive minutes.

R2.1 Provide notification to the **ISO**, and to each directly affected **operator** of a **transmission facility**, directly affected **operator** of a **generating unit**, directly affected **operator** of an **aggregated generating facility** and directly affected **interconnected transmission operator** as soon as possible, but no longer than twenty-four (24) hours after becoming aware of a failure identified in requirements R2(a), R2(b) and R2(d), and no longer than forty-eight (48) hours after becoming aware of a failure identified in requirement R2(c), regardless of whether or not the **transmission facility** is removed from service following the awareness of such failure, that includes the following information:

(a) the identification of the **protection system** or teleprotection communication channel(s) that failed;

(b) when the **protection system** or teleprotection communication channel(s) failed or when such failure was first discovered; and

(c) an estimate of the date when the **protection system** or teleprotection communication channel(s) will be returned to service.

R2.2 Where the protection system or teleprotection communication channel(s) are not returned to service by the estimated return to service date identified in requirement R2.1, provide a new estimate of the return to service date up to five (5) **days** after the previous estimated return to service date to the entities that received the notification in accordance with requirement R2.1.

R2.3 Correct the failure as soon as possible.

R3 Each **legal owner** of a **generating unit** and **legal owner** of an **aggregated generating facility** must coordinate all new **protection systems** and all **protection system** changes with each affected interconnecting **legal owner** of a **transmission facility** and notify the **ISO** that such coordination has occurred.

R4 Each **legal owner** of a **transmission facility** must coordinate all new **protection systems** and all **protection system** changes with:

(a) each affected adjacent **legal owner** of a **transmission facility**;

(b) each affected **legal owner** of a **generating unit**;

(c) each affected **legal owner** of an **aggregated generating facility**;

(d) each affected **interconnected transmission operator**; and

(e) the **ISO**, as affected,

and must notify the **ISO** that such coordination has occurred.

R5 Each **operator** of a **generating unit**, **operator** of an **aggregated generating facility** and **operator** of a **transmission facility** must identify, notify and coordinate planned changes that may require changes in the **protection systems** of others as described in requirements R5.1 and R5.2.

R5.1 Each **operator** of a **generating unit** and **operator** of an **aggregated generating facility** must identify planned changes to its generation, load, or operating conditions that may require changes to the **protection systems** of others, and must notify the **ISO** and coordinate with each affected **operator** of a **transmission facility** in advance of making such changes.

R5.2 Each **operator** of a **transmission facility** must identify planned changes to its transmission, load or operating conditions that may require changes to the **protection systems** of others, and must notify the **ISO** and coordinate with each affected:

(a) **operator** of a **transmission facility**;

(b) adjacent **interconnected transmission operator**;

(c) **operator** of a **generating unit**; and

(d) **operator** of an **aggregated generating facility**,

in advance of making such changes.

R6 Each **operator** of a **transmission facility** must monitor the status (on/off) of each **remedial action scheme** in its area, and must notify the **ISO** and each affected:

(a) **operator** of a **transmission facility**;

(b) adjacent **interconnected transmission operator**;

(c) **operator** of a **generating unit**; and

(d) **operator** of an **aggregated generating facility**,

of each change in status.

4. Measures

The following measures correspond to the requirements identified in section 3 of this reliability standard. For example, MR1 is the measure for requirement R1.

MR1 Evidence of notifying, providing information and correcting failures of any component of a **protection system** as required in requirement R1 exists. Evidence may include, but is not limited to:

MR1.1 voice recordings, operator logs, electronic notifications (emails) or other equivalent evidence; and

MR1.2 work orders, setting change files, electronic records or other equivalent evidence.

MR2 Evidence of providing notification, providing an estimate and correcting failures of any of the **protection systems** or teleprotection communication channel(s) as required in requirement R2 exists. Evidence may include, but is not limited to:

MR2.1 voice recordings, operator logs, electronic notifications (emails) or other equivalent evidence;

MR2.2 voice recordings, operator logs, electronic notifications (emails) or other equivalent evidence; and

MR2.3 work orders, setting change files, electronic records or other equivalent evidence.

MR3 Evidence of coordinating **protection systems** and notifying the **ISO** as required in requirement R3 exists.

Evidence of coordinating **protection systems** may include, but is not limited to, a fault analysis study, letters of agreement on settings, notifications of changes or other equivalent evidence.

Evidence of notifying the **ISO** may include, but is not limited to, electronic notifications (emails), hard copy notifications, or other equivalent evidence.

MR4 Evidence of coordinating **protection systems** and notifying the **ISO** as required in requirement R4 exists.

Evidence of coordinating **protection systems** may include, but is not limited to, a fault analysis study, letters of agreement on settings, notifications of changes or other equivalent evidence.

Evidence of notifying the **ISO** may include, but is not limited to, electronic notifications (emails), hard copy notifications or other equivalent evidence.

MR5 Measures for this requirement are identified in the subsections below:

MR5.1 Evidence of identifying, notifying and coordinating planned changes that may require changes to the **protection systems** of others as required in requirement R5.1 exists.

Evidence may include, but is not limited to, voice recordings, operator logs, electronic notifications (emails) or other equivalent evidence.

MR5.2 Evidence of identifying, notifying and coordinating planned changes that may require changes to the **protection systems** of others as required in requirement R5.2 exists.

Evidence may include, but is not limited to, voice recordings, operator logs, electronic notifications (emails) or other equivalent evidence.

MR6 Evidence of monitoring the status of each **remedial action scheme** in its area and notifying entities of each change in status as required in requirement R6 exists.

Evidence of monitoring the status of each **remedial action scheme** may include, but is not limited to, SCADA data, wiring diagrams or other equivalent evidence.

Evidence of notifying entities may include, but is not limited to, SCADA data, voice recordings, operator logs, electronic notifications (emails) or other equivalent evidence.

Revision History

Date	Description
2017-10-01	Alberta specific revisions made to improve clarity.
2015-05-01	Revised for ISO assumption of RC functionality for the Alberta footprint
2013-01-02	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)(iv), (d)(ii)(B), (e)(iv) and (f)(iv) 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, by which the **transmission facility**, **generating unit** or **aggregated generating facility** is 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 on which the **transmission facility**, **generating unit** or **aggregated generating facility** will no longer be required to meet the applicable requirements; and

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