

**ARC Technical Work Group and Operations Work Group Assessment and Conversion of NERC PRC-001-1 System Protection Coordination to Alberta PRC-001-AB-1 Protection System Coordination**

Section	NERC PRC-001-1	Alberta PRC-001-AB-1	Reason for Difference <sup>1</sup>
<b>Purpose</b>	To ensure system protection is coordinated among operating entities.	<u>The purpose of this reliability standard is to ensure protection systems are coordinated among operating entities.</u>	
<b>Applicability</b>	4.1. Balancing Authorities 4.2. Transmission Operators 4.3. Generator Operators	<u>This reliability standard applies to:</u> <ul style="list-style-type: none"> <li>ISO</li> <li>TFOs</li> <li>GFOs</li> <li>GOPs</li> </ul>	
<b>Effective Date</b>	January 1, 2007	<u>R1 is effective 365 calendar days after the date of approval by the Commission.</u> <u>R2-9, inclusive, are effective 10 calendar days after the date of approval by the Commission.</u>	ISO, TFOs and GFOs need time to develop a program to train operational staff and prepare documentation as required.
<b>Definitions</b>		Italicized terms used in this reliability standard have the same meanings as set out in the Alberta Reliability Standards Glossary of Terms and Part 1 of the ISO Rules. <sup>2</sup>	Added definitions section to the Alberta reliability standard.
<b>Requirement</b>	R1. Each Transmission Operator,	R1 <u>The ISO's, GOP's and TFO's operating</u>	Added clarification in the measure for requirement R1

- Deleted: System
- Deleted: ¶
- Deleted: To
- Deleted: system
- Deleted: is
- Deleted: B
- Deleted: balancing a
- Deleted: A
- Deleted: uthorities (ISO)
- Deleted: Transmission Operators
- Deleted: Generator
- Deleted: Operators
- Deleted: January 1, 2007

<sup>1</sup> The following revisions have been made throughout this proposed reliability standard:  
 - Identified the responsible entities in Alberta.  
 - Applied a consistent writing style and added clarity.  
 - Changed passive terms such as “shall” to “must”.  
 - Developed measures specific to the requirements.

<sup>2</sup> Defined terms are not italicized in this document, but will appear in the Alberta Reliability Standards document.

ARC Technical Work Group and Operations Work Group Assessment and Conversion of NERC PRC-001-1 System Protection Coordination to Alberta PRC-001-AB-1 Protection System Coordination			
Section	NERC PRC-001-1	Alberta PRC-001-AB-1	Reason for Difference <sup>1</sup>
	Balancing Authority, and Generator Operator shall be familiar with the purpose and limitations of protection system schemes applied in its area.	<del>personnel must each</del> be familiar with the purpose and limitations of protection system schemes applied in its area.	that protection system schemes includes RAS.
Measure		<del>MR1 Training records are available that indicate training of staff who operate the system in basic relaying, including any RASs within their system.</del>	
Requirement	R2. Each Generator Operator and Transmission Operator shall notify reliability entities of relay or equipment failures as follows:	R2 Each <del>GOP and TFO must</del> notify <del>the ISO</del> of <del>protective</del> relay or equipment failures as follows:	
Measure			Measures provided for R2.1 and R2.2.
Requirement	R2.1. If a protective relay or equipment failure reduces system reliability, the Generator Operator shall notify its Transmission Operator and Host Balancing Authority. The Generator Operator shall take corrective action as soon as possible.	R2.1 If a protective relay or <del>any</del> equipment of <del>a protection system of a generating unit described below fails, and such</del> failure reduces <del>transmission</del> system reliability, <del>the GOP must do the following:</del> <ul style="list-style-type: none"> <li><del>notify the TFO in its area and the ISO as soon as possible but no longer than 24 hours after such failure; and</del></li> <li><del>take action as soon as possible to correct such failure.</del></li> </ul>	

- Deleted: System
- Deleted: ¶
- Deleted:
- Deleted: GFO
- Deleted:
- Deleted:
- Deleted: shall
- Deleted: Each Generator Operator and Transmission Operator shall have and provide upon request evidence that could include but is not limited to, revised fault analysis study, letters of agreement on settings, notifications of changes, or other equivalent evidence that will be used to confirm that there was coordination of new protective systems or ch... [1]
- Deleted: t
- Deleted: ing
- Deleted: Generator Operator { ... [2]
- Deleted: GFO
- Deleted: reliability entities
- Deleted: AE
- Deleted: and the ISO must no... [3]
- Deleted: MR2 Requirement Rf... [4]
- Deleted: ¶
- Deleted: the Generator Opera... [5]
- Deleted: its Transmission Operator
- Deleted: Host Balancing Authority
- Deleted: The Generator Oper... [6]
- Deleted: corrective

**ARC Technical Work Group and Operations Work Group Assessment and Conversion of NERC PRC-001-1 System Protection Coordination to Alberta PRC-001-AB-1 Protection System Coordination**

Section	NERC PRC-001-1	Alberta PRC-001-AB-1	Reason for Difference <sup>1</sup>
		<p><u>This requirement R2.1 applies to a generating unit protection system that measures voltage, current or frequency from the generating unit to the AIES, but excludes the prime mover and associated control systems.</u></p>	
<b>Measure</b>		<p><u>MR2.1 Notifications exist for each failure, as specified in R2.1. Evidence exists that corrective actions have been taken as specified in requirement R2.1</u></p>	
<b>Requirement</b>	<p><b>R2.2.</b> If a protective relay or equipment failure reduces system reliability, the Transmission Operator shall notify its Reliability Coordinator and affected Transmission Operators and Balancing Authorities. The Transmission Operator shall take corrective action as soon as possible.</p>	<p><b>R2.2</b> If a protective relay or equipment failure <u>on the BES</u> reduces <u>transmission</u> system reliability, the <u>TFO must</u> notify <u>the ISO</u>, <u>directly</u> affected <u>TFOs and interconnected transmission operators as soon as possible, but no longer than 24 hours after detecting such failure.</u> The <u>TFO must</u> take corrective action as soon as possible <u>or as directed by the ISO.</u></p>	

Deleted: System

Deleted: ¶

Deleted: Transmission Operator shall

Deleted: its Reliability Coordinator

Deleted: Transmission Operators and Balancing Authorities

Deleted: .

Deleted: Transmission Operator shall

**ARC Technical Work Group and Operations Work Group Assessment and Conversion of NERC PRC-001-1 System Protection Coordination to Alberta PRC-001-AB-1 Protection System Coordination**

Section	NERC PRC-001-1	Alberta PRC-001-AB-1	Reason for Difference <sup>1</sup>
Measure	M2. Each Transmission Operator and Balancing Authority shall have and provide upon request evidence that could include but is not limited to, documentation, electronic logs, computer printouts, or computer demonstration or other equivalent evidence that will be used to confirm that it monitors the Special Protection Systems in its area. (Requirement 6 Part 1)	<u>MR2.2 Notifications exist for each failure, as specified in R2.2. Evidence exists that corrective actions have been taken as specified in requirement R2.2</u>	
Requirement		<u>R3 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.</u>	It is the responsibility of the ISO to notify the VRC.
Measure		<u>MR3 Confirmation exists that a notification was sent to VRC, as per R3.</u>	
Requirement	R3. A Generator Operator or Transmission Operator shall coordinate new protective systems and changes as follows.		Not a requirement.

Deleted: System

Deleted: ¶

Deleted: M2.2.

Deleted: Each Transmission Operator and Balancing Authority shall have and provide upon request evidence that could include but is not limited to, documentation, electronic logs, computer printouts, or computer demonstration or other equivalent evidence that will be used to confirm that it monitors the Special Protection Systems in its area. (Requirement 6 Part 1)

Deleted: k

Deleted: R3. A Generator Operator or Transmission Operator shall coordinate new protective systems and changes as follows.

**ARC Technical Work Group and Operations Work Group Assessment and Conversion of NERC PRC-001-1 System Protection Coordination to Alberta PRC-001-AB-1 Protection System Coordination**

Section	NERC PRC-001-1	Alberta PRC-001-AB-1	Reason for Difference <sup>1</sup>
Measure	M1. Each Generator Operator and Transmission Operator shall have and provide upon request evidence that could include but is not limited to, revised fault analysis study, letters of agreement on settings, notifications of changes, or other equivalent evidence that will be used to confirm that there was coordination of new protective systems or changes as noted in Requirements 3, 3.1, and 3.2.		
Requirement	R3.1. Each Generator Operator shall coordinate all new protective systems and all protective system changes with its Transmission Operator and Host Balancing Authority.	R4 Each GFO must coordinate all new protection systems and all protection system changes with its interconnecting TFO and the ISO.	
Measure	M1. Each Generator Operator and Transmission Operator shall have and provide upon request evidence that could include but is not limited to, revised fault analysis study, letters of agreement on settings, notifications of changes, or other equivalent evidence that will be used to confirm that there was coordination of new protective systems or changes as noted in Requirements 3, 3.1, and 3.2.	MR4 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 specified in R4.	
Requirement	R3.2. Each Transmission Operator shall coordinate all new protective	R5 Each TFO must coordinate all protection systems including existing, new and modified	

- Deleted: System ... [7]
- Deleted: M1. Each Generator Operator and Transmission Operator shall have and provide upon request evidence that could include but is not limited to, revised fault analysis study, letters of agreement on settings, notifications of changes, or other equivalent evidence that will be used to confirm that there was coordination of new protective systems or changes as noted in Requirements 3, 3.1, and 3.2. [8]
- Deleted: 3.1
- Deleted: Generator Operator. [9]
- Deleted: ve ...ve [10]
- Deleted: its...Transmission [11]
- Deleted:
- Deleted: in accordance with [12]
- Deleted: 1
- Deleted: Each
- Deleted: Generator Operator [13]
- Deleted: GFO must have an [14]
- Deleted: that could ...e... is. [15]
- Deleted: or other equivalent [16]
- Deleted: ve
- Deleted: on systems or changes
- Deleted:
- Deleted: as noted in Require [17]
- Deleted: 3.2
- Deleted: Transmission [18]
- Deleted: ve

**ARC Technical Work Group and Operations Work Group Assessment and Conversion of NERC PRC-001-1 System Protection Coordination to Alberta PRC-001-AB-1 Protection System Coordination**

Section	NERC PRC-001-1	Alberta PRC-001-AB-1	Reason for Difference <sup>1</sup>
	systems and all protective system changes with neighboring Transmission Operators and Balancing Authorities.	<del>protection systems with adjacent TFOs, affected GFOs, affected interconnected transmission operators and the ISO.</del>	
Measure	M1. Each Generator Operator and Transmission Operator shall have and provide upon request evidence that could include but is not limited to, revised fault analysis study, letters of agreement on settings, notifications of changes, or other equivalent evidence that will be used to confirm that there was coordination of new protective systems or changes as noted in Requirements 3, 3.1, and 3.2.	<del>MR5 Evidence exists including but not limited to, revised fault analysis study, letters of agreement on settings, notifications of changes, that meets the requirements specified in R5.</del>	
Requirement	R4. Each Transmission Operator shall coordinate protection systems on major transmission lines and interconnections with neighboring Generator Operators, Transmission Operators, and Balancing Authorities.	<del>R6 Each TFO must coordinate protection systems on all transmission lines and interconnections with affected GFOs, adjacent TFOs, interconnected transmission operators, and the ISO.</del>	Combined into R5.

- Deleted: System
- Deleted: ¶
- Deleted: and all
- Deleted: protective
- Deleted: changes
- Deleted:
- Deleted: neighboring
- Deleted: Transmission Operators
- Deleted: and
- Deleted: notify Balancing Authorities
- Deleted: in accordance OPP
- Deleted: M1. Each Generator Operator and Transmission Operator shall have and provide upon request evidence that could include but is not limited to, revised fault analysis study, letters of agreement on setting ... [19]
- Deleted: that could
- Deleted: e
- Deleted: is
- Deleted: 4
- Deleted: Transmission Operator
- Deleted: shall
- Deleted: major
- Deleted: neighboring
- Deleted: Generator Operators
- Deleted:
- Deleted: notify
- Deleted: in accordance

**ARC Technical Work Group and Operations Work Group Assessment and Conversion of NERC PRC-001-1 System Protection Coordination to Alberta PRC-001-AB-1 Protection System Coordination**

Section	NERC PRC-001-1	Alberta PRC-001-AB-1	Reason for Difference <sup>1</sup>
Measure		<del>MR6 Evidence exists, including but not limited to, revised fault analysis study, letters of agreement on settings, notifications of changes, that meets the requirements specified in R6.</del>	
Requirement	R5. A Generator Operator or Transmission Operator shall coordinate changes in generation, transmission, load or operating conditions that could require changes in the protection systems of others.	R6. <del>Each GFO or TFO must identify and coordinate changes in generation, transmission, load or operating conditions that require changes in the protection systems of others as follows:</del>	<p>Deleted: System ...¶ [20]</p> <p>Deleted: that could ...include [21]</p> <p>Deleted: 7</p> <p>Deleted: 5</p> <p>Deleted: A Generator Operator...Transmission Operator...shall ...could [22]</p> <p>Deleted: .</p> <p>Deleted: MR7 Evidence exists and shows that all changes requiring protection changes were identified and coordinated with other affected parties.</p> <p>Deleted: 7</p> <p>Deleted: 5</p> <p>Deleted: Generator Operator</p> <p>Deleted:</p> <p>Deleted: shall</p> <p>Deleted: , or</p> <p>Deleted: its</p> <p>Deleted: Transmission Operator</p> <p>Deleted: TFO</p> <p>Deleted: 7</p> <p>Deleted: ,... [23]</p> <p>Deleted: of changes in generation or operating conditions that could require changes in the</p> <p>Deleted: Transmission Operator's</p> <p>Deleted: TFO's protection systems.</p>
Measure			
Requirement	R5.1. Each Generator Operator shall notify its Transmission Operator in advance of changes in generation or operating conditions that could require changes in the Transmission Operator's protection systems.	<p>R6.1 Each <u>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.</u></p> <p>R6.2 <u>The ISO must notify affected 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.</u></p>	

**ARC Technical Work Group and Operations Work Group Assessment and Conversion of NERC PRC-001-1 System Protection Coordination to Alberta PRC-001-AB-1 Protection System Coordination**

Section	NERC PRC-001-1	Alberta PRC-001-AB-1	Reason for Difference <sup>1</sup>
Measure		<p><b>MR6.1</b> Evidence exists and shows that all changes requiring protection changes were made as specified in requirement R6.1.</p> <p><b>MR6.2</b> Evidence exists and shows that all changes requiring protection changes were made as specified in requirement R6.2.</p>	
Requirement	<p><b>R5.2.</b> Each Transmission Operator shall notify neighboring Transmission Operators in advance of changes in generation, transmission, load, or operating conditions that could require changes in the other Transmission Operators' protection systems.</p>	<p><b>R6.3</b> Each 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 affected TFOs and adjacent interconnected transmission operators of such proposed changes.</p>	
Measure		<p><b>MR6.3</b> Evidence exists and shows that all changes requiring protection changes were made as specified in requirement R6.3.</p>	
Requirement	<p><b>R6.</b> Each Transmission Operator and Balancing Authority shall monitor the status of each Special Protection System in their area, and shall notify affected Transmission Operators and</p>	<p><b>R7.</b> Each TFO must monitor the status of each RAS in its area, and must notify affected TFOs, GFOs and the ISO of each change in status.</p> <p><b>R8.</b> Each GOP must provide reasonable prior</p>	

- Deleted: System ...¶ [24]
- Deleted: 7...7 [25]
- Deleted: 7...7 [26]
- Deleted: 7 [27]
- Deleted: Transmission Oper( [27]
- Deleted: shall notify neighbo [28]
- Deleted: Transmission Oper( [29]
- Deleted: TFO must notify [30]
- Deleted: Transmission Operators [31]
- Deleted: TFOs in advance of [31]
- Deleted: Transmission Operators' [32]
- Deleted: TFOs protection systems. [32]
- Deleted: 7...7 [32]
- Deleted: 8 [33]
- Deleted: 6...Each [33]
- Deleted: Transmission Operator [34]
- Deleted: TFO [34]
- Deleted: and [34]
- Deleted: Balancing Authority shall [34]
- Deleted: the ISO [34]
- Deleted: m [34]
- Deleted: Special Protection System [34]
- Deleted: their [34]
- Deleted: shall ...Transmissio( [34]
- Deleted: ¶ [34]
- Deleted: 9 [34]
- Deleted: The [34]
- Deleted: GFO [34]
- Deleted: notify [34]

**ARC Technical Work Group and Operations Work Group Assessment and Conversion of NERC PRC-001-1 System Protection Coordination to Alberta PRC-001-AB-1 Protection System Coordination**

Section	NERC PRC-001-1	Alberta PRC-001-AB-1	Reason for Difference <sup>1</sup>
	Balancing Authorities of each change in status.	<del>notice to the TFO and ISO of proposed changes to the arming status (on, off and which generator) of any RAS in their facility.</del>	
<b>Measure</b>	<b>M3.</b> Each Transmission Operator and Balancing Authority shall have and provide upon request evidence that could include but is not limited to, operator logs, phone records, electronic-notifications or other equivalent evidence that will be used to confirm that it notified affected Transmission Operator and Balancing Authorities of changes in status of one of its Special Protection Systems. (Requirement 6 Part 2)	<del>MR7. Operator logs, voice recordings or other evidence exists that affected parties were notified as specified in requirement R7.</del> <del>MR8. Operator logs, voice recordings or other evidence exists that affected parties were notified as specified in requirement R8.</del>	
<b>Procedures</b>	None identified	None identified	
<b>Compliance</b>	To view the compliance section D of the NERC reliability standard follow this link: <a href="http://www.nerc.com/files/PRC-001-1.pdf">http://www.nerc.com/files/PRC-001-1.pdf</a>		<p>There is no compliance section currently proposed in the Alberta Reliability Standards.</p> <p>A compliance program will be developed at a later date for Alberta Reliability Standards that recognizes the compliance monitoring and enforcement structure in Alberta.</p> <p>This approach is deemed consistent with the existing ISO Rules.</p>

Deleted: System  
Deleted: ¶

Deleted: the  
Deleted: SPS  
Deleted: plant  
Deleted: ¶  
Deleted: The ISO must monitor the status of each RAS Special Protection System in accordance with ISO rules.  
Deleted: 8  
Deleted: 8  
Deleted: 9  
Deleted: 9

Deleted: M3. Each Transmission Operator and Balancing Authority shall have and provide upon request evidence that could include but is not limited to, operator logs, phone records, electronic-notifications or other equivalent evidence that will be used to confirm that it notified affected Transmission Operator and Balancing Authorities of changes in status of one of its Special Protection Systems. (Requirement 6 Part 2)



**ARC Technical Work Group and Operations Work Group Assessment and Conversion of NERC PRC-001-1 System Protection Coordination to Alberta PRC-001-AB-1 Protection System Coordination**

Section	NERC PRC-001-1	Alberta PRC-001-AB-1	Reason for Difference <sup>1</sup>
<b>Regional Differences</b>	None identified	None identified	Not applicable in Alberta

Deleted: System  
Deleted: ¶

**Proposed Terms for the ARS Glossary:**

“transmission system” has the same meaning as that provided in the Act.

**Defined Terms Used in this Standard:**

(As included in the ISO Rules Definitions or Alberta Reliability Standards Glossary)

- *Alberta Interconnected Electric System (AIES)*
- *balancing authority*
- *bulk electric system (BES) \**
- *energization*
- *generation facility owner (GFO)*
- *facility*
- *Independent System Operator (ISO)*
- *load*
- *protection system\**
- *reliability standard*
- *remedial action scheme (RAS)*
- *system\**
- *transmission facility owner (TFO)*
- *Vancouver Reliability Council (VRC)*

\* Term appears in the Alberta Reliability Standards Glossary of Terms – April 2009 rules cycle

\* Term appears in the Alberta Reliability Standards Glossary of Terms – July 2009 rules cycle