

**Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1
Protection System Coordination**

Section	NERC PRC-001-1	Alberta PRC-001-AB-1	Reason for Difference ¹
Purpose	To ensure system protection is coordinated among operating entities.	<u>The purpose of this reliability standard is to ensure system protection systems are coordinated among operating entities.</u>	
Applicability	<p>4.1. Balancing Authorities</p> <p>4.2. Transmission Operators</p> <p>4.3. Generator Operators</p>	<p><u>This reliability standard applies to:</u></p> <ul style="list-style-type: none"> • <u>ISO</u> • <u>TFOs</u> • <u>GFOs</u> • <u>GOPs</u>Generator operators 	
Effective Date	January 1, 2007	<p><u>January 1, 2007 R1 is effective 365 calendar days after the date of approval by the Commission.</u></p> <p><u>R2-R9 inclusive, are effective 10 calendar days after the date of approval by the Commission.</u></p>	ISO, TFOs and GFOs need time to develop a program to train operational staff and prepare documentation as required.
Definitions		Italicized terms used in this reliability standard have the same meanings as set out in the Alberta Reliability Standards	Added definitions section to the Alberta reliability standard.

¹ 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.

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		Glossary of Terms and Part 1 of the ISO Rules. ²	
Requirement	R1. Each Transmission Operator, Balancing Authority, and Generator Operator shall be familiar with the purpose and limitations of protection system schemes applied in its area.	R1 <u>The ISO's, generator GOP'soperator's and TFO's operating personnel must each shall</u> be familiar with the purpose and limitations of protection system schemes applied in its area.	Added clarification in the measure for requirement R1 that protection system schemes includes RAS.

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

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Measure		<p>MR1 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.</p> <p><u>Training records are available that indicate training of staff who operate the system in basic relaying protection system schemes and, including any RASs applicable within their system.</u></p>	
Requirement	<p>R2. Each Generator Operator and Transmission Operator shall notify reliability entities of relay or equipment failures as follows:</p>	<p>R2. Each Generator Operator and Transmission Operator shall notify reliability entities of relay or equipment failures as follows:</p>	<p><u>This requirement is redundant with Alberta requirements R2 and R3.</u></p>
Measure			

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Requirement	<p>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.</p>	<p>R2.1 <u>Each generator operator must do the following if a protective relay or any equipment of a protection system of a generating unit that measures voltage, current or frequency from the generating unit to the AIES, but excluding the prime mover and associated control systems fails, described below is known to have failed, and such failure reduces transmission system reliability:</u></p> <p>R2.1 <u>the Generator Operator shall Notify its Transmission Operator the TFO in its area and Host Balancing Authority the ISO as soon as possible, but no longer than 24 hours after receiving knowledge of such failure. such failure is known</u></p> <p>R2.2 <u>Commence as soon as possible, and proceed diligently thereafter, to correct</u>The Generator Operator shall take corrective action as soon as possible to correct such failure.</p>	
Measure		<p>MR2 <u>Measures for this requirement are identified in the subsections below.</u></p>	

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		<p>MR2.1 Notifications exist for each failure, as specified in requirement R2.1.</p> <p>MR2.2 Evidence exists that corrective actions have been taken as specified in requirement R2.2.</p>	
Requirement	<p>R2.2. 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>R32.2 Each TFO must do the following if a protective relay or equipment fails, and such failure on the BES reduces transmission system reliability on the BES:</p> <p>R3.1 must Notify its Reliability Coordinator the ISO, directly affected 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.</p> <p>R3.2 Commence as soon as possible, and proceed diligently thereafter, to correct such failure unless otherwise detecting such failure. Transmission Operators and Balancing Authorities The Transmission Operator shall TFO must take corrective action as soon as possible or as directed by the ISO.</p>	

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Measure	<p>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)</p>	<p><u>MR3 Measures for this requirement are identified in the subsections below.</u></p> <p>M2.2. 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)</p> <p><u>MR3.1 Notifications exist for each failure, as specified in R3.1.</u></p> <p><u>MR3.2 Evidence exists that corrective actions have been taken as specified in requirement R3.2</u></p>	
Requirement		<p><u>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.</u></p>	It is the responsibility of the ISO to notify the VRC.
Measure		<p><u>MR4 Confirmation exists that a</u></p>	

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		notification was sent to the VRC as specified in requirement per R4.	
Requirement	R3. A Generator Operator or Transmission Operator shall coordinate new protective systems and changes as follows.	R3. A Generator Operator or Transmission Operator shall coordinate new protective systems and changes as follows.	Not a requirement.
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.	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.	R3.1 Each Generator OperatorGFO shall must coordinate all new protection on ve systems and all protective on system changes with its interconnecting its Transmission OperatorTFO and the ISO notify Host Balancing Authority in accordance with OPP ...	

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Measure	<p>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.</p>	<p>MR51 Each Generator Operator and Transmission Operator shall GFO must have and provide upon request evidence Evidence exists including, but not limited to, revised fault analysis study, letters of agreement on settings, notifications of changes, all of which that <u>meets the requirements as specified in requirement R55 or other equivalent evidence that will be used to confirm that there was coordination of new protective on systems or changes as noted in Requirements 3, 3.1, and 3.2.</u></p>	
Requirement	<p>R3.2. Each Transmission Operator shall coordinate all new protective systems and all protective system changes with neighboring Transmission Operators and Balancing Authorities.</p>	<p>R63.2 Each Transmission Operator TFO shall must <u>coordinate all protective on systems including existing, new and modified and all protective-protection systems changes with neighboring adjacent Transmission Operators TFOs, affected and GFOs, affected interconnected transmission operators and notify Balancing Authorities the ISO in accordance OPP</u></p>	

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Measure	<p>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.</p>	<p>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. MR6 Evidence exists that could include <u>ing</u> but is not limited to, revised fault analysis study, letters of agreement on settings, notifications of changes, <u>that meets the requirements as specified in requirement R6.</u></p>	
Requirement	<p>R4. Each Transmission Operator shall coordinate protection systems on major transmission lines and interconnections with neighboring Generator Operators, Transmission Operators, and Balancing Authorities.</p>	<p>R4. Each Transmission Operator shall <u>must</u> coordinate protection systems on <u>major all</u> transmission lines and interconnections with <u>neighboring affected</u> Generator Operators <u>GEO's, adjacent TFO's, interconnected transmission operators, and notify the ISO in accordance.</u></p>	<p><u>Combined into R5.</u></p>

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Measure		MR6 Evidence exists that could including include but is not limited to, revised fault analysis study, letters of agreement on settings, notifications of changes, that meets the requirements specified in R6.	
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.	R75 Each A Generator Operator GFO or Transmission Operator TFO shall must identify and coordinate changes in generation, transmission, load and/or operating conditions that could require changes in the protection systems of others as follows:	
Measure		MR7 Measures for this requirement are identified in the subsections below. MR7 Evidence exists and shows that all changes requiring protection changes were identified and coordinated with other affected parties.	
Requirement	R5.1. Each Generator Operator shall notify its Transmission Operator in advance of changes in generation or operating conditions	R75.1 Each Generator Operator GFO must shall identify changes in each of its generation, load, or -or operating conditions that may require changes in	

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	that could require changes in the Transmission Operator's protection systems.	<p>protection systems of others, and notify the ISO its Transmission Operator TFO in advance of their changes.</p> <p>R7.2 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.</p> <p>-of changes in generation or operating conditions that could require changes in the Transmission Operator's TFO's protection systems.</p>	
Measure		<p>MR7.1 Evidence exists and shows that all changes requiring protection changes were made as specified in requirement R7.1.</p> <p>MR7.2 Evidence exists and shows that all changes requiring protection changes were made as specified in requirement R7.2.</p>	
Requirement	R5.2. Each Transmission Operator shall notify neighboring Transmission Operators in advance of changes in generation,	R7.3 Each Transmission Operator TFO must identify changes in any of its transmission, load or operating conditions that may require changes in protection	

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	transmission, load, or operating conditions that could require changes in the other Transmission Operators' protection systems.	systems of others, and provide reasonable prior notice to the ISO and other affected TFOs and adjacent interconnected transmission operators of such proposed changes 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. R5.2. Each Transmission Operator shall <u>TFO must</u> notify neighboring Transmission Operators <u>TFOs</u> in advance of changes in generation, transmission, load, or operating conditions that could require changes in the other Transmission Operators' <u>TFOs</u> protection systems.	
Measure		MR7.3 Evidence exists and shows that all <u>changes requiring protection changes were made as specified in requirement R7.3.</u>	
Requirement	R6. Each Transmission Operator and Balancing Authority shall monitor the status of each Special Protection System in their area, and shall notify affected	R6 Each Transmission Operator <u>TFO</u> and Balancing Authority shall <u>the ISO</u> m Each TFO must monitor the status of each <u>RAS</u> Special Protection System in <u>its</u> their area, and shall <u>must</u> notify	

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	Transmission Operators and Balancing Authorities of each change in status.	<p>affected Transmission Operators TFOs, GFOGOP generator operators and Balancing Authorities the ISO of each change in status.</p> <p>R9 Each The GFOGOP generator operator must provide notify-reasonable prior notice to the TFO and ISO of proposed changes to the arming status (on, off and which generator) of the any RASSPS in their facility plant. The ISO must monitor the status of each RASS Special Protection System in accordance with ISO rules.</p>	
Measure	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)	<p>MR8 Operator logs, voice recordings or other evidence exists that affected parties were notified as specified in requirement R8.</p> <p>MR9 Operator logs, voice recordings or other evidence exists that affected parties were notified as specified in requirement R9.</p> <p>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</p>	

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		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)	
Procedures	None identified	None identified	
Compliance	To view the compliance section D of the NERC reliability standard follow this link: http://www.nerc.com/files/PRC-001-1.pdf		There is no compliance section currently proposed in the Alberta Reliability Standards. A compliance program will be developed at a later date for Alberta Reliability Standards that recognizes the compliance monitoring and enforcement structure in Alberta. This approach is deemed consistent with the existing ISO Rules.
Regional Differences	None identified	None identified	Not applicable in Alberta

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