| Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1<br>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. | The purpose of this reliability standard is to~~To~~ ensure ~~system~~ protection systems are~~is~~ coordinated among operating entities. | |
| **Applicability** | **4.1.** Balancing Authorities<br>**4.2.** Transmission Operators<br>**4.3.** Generator Operators | This reliability standard applies to:<br>• ISO<br>• TFOs<br>• GFOs<br>• ~~GOPsGenerator operators~~operators of generating units | |
| **Effective Date** | January 1, 2007 | ~~January 1, 2007~~**R1** is effective 365 calendar days after the date of approval by the Commission.<br>**R2-R9** inclusive, are effective 10 calendar days after the date of approval by the Commission. | 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 | 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.

| Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1<br>Protection System Coordination | | | |
|---|---|---|---|
| **Section** | **NERC PRC-001-1** | **Alberta PRC-001-AB-1** | **Reason for Difference[1]** |
| | | out in the Alberta Reliability Standards 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** The operating personnel of the ISO, ~~generator operator's~~ TFO's and operators of generating units must each ~~shall~~ 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.

| Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1<br>Protection System Coordination | | | |
|---|---|---|---|
| **Section** | **NERC PRC-001-1** | **Alberta PRC-001-AB-1** | **Reason for Difference[1]** |
| **Measure** | | **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.~~<br><br>T~~t~~raining records are available that indicate~~ing~~ training of staff who operate the system in~~basic relaying~~ protection system schemes and~~, including~~ any RASs applicable within their system. | |
| **Requirement** | **R2.** Each Generator Operator and Transmission Operator shall notify reliability entities of relay or equipment failures as follows: | ~~**R2.** Each Generator Operator and Transmission Operator shall notify reliability entities of relay or equipment failures as follows:~~ | This requirement is redundant with Alberta requirements R2 and R3. |
| **Measure** | | | |

| Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1<br>Protection System Coordination | | | |
|---|---|---|---|
| **Section** | **NERC PRC-001-1** | **Alberta PRC-001-AB-1** | **Reason for Difference[1]** |
| **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~~** Each operator of a generating unit~~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 failsed,~~ and such failure reduces transmission system reliability:<br><br>**R2.1** ~~the Generator Operator shall N~~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~~<br><br>**R2.2** Commence as soon as possible, and proceed diligently thereafter, to correct~~The Generator Operator shall take corrective action as soon as possible to correct~~ such failure. | |
| **Measure** | | **MR2** Measures for this requirement are | |

| Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1<br>Protection System Coordination | | | |
|---|---|---|---|
| **Section** | **NERC PRC-001-1** | **Alberta PRC-001-AB-1** | **Reason for Difference[1]** |
| | | identified in the subsections below.<br>**MR2.1** Notifications exist for each failure, as specified in requirement R2.1.<br>**MR2.2** Evidence exists that corrective actions have been taken as specified in requirement R2.2. | |
| **Requirement** | **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. | **R3~~2.2~~** 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:<br>**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.<br>**R3.2** Commence as soon as possible, and proceed diligently thereafter, to correct such failure unless otherwise ~~detecting such failure. Transmission Operators and Balancing AuthoritiesThe Transmission Operator shall~~TFO must ~~take corrective action as soon as~~ | |

| Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1<br>Protection System Coordination | | | |
|---|---|---|---|
| **Section** | **NERC PRC-001-1** | **Alberta PRC-001-AB-1** | **Reason for Difference[1]** |
| | | ~~possible or as~~ directed by the ISO. | |
| **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) | **MR3** Measures for this requirement are identified in the subsections below.<br>**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)~~**MR3.1** Notifications exist for each failure as specified in requirement R3.1.<br>**MR3.2** Evidence exists that corrective actions have been taken as specified in requirement R3.2 | |
| **Requirement** | | **R4** The ISO must notify the VRC of a protective relay or equipment failure that reduces system reliability for facilities that operate at 200 ~~k~~kV and above as soon as possible, but no longer than 24 hours after such failure was reported to the ISO. | It is the responsibility of the ISO to notify the VRC. |

| Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1<br>Protection System Coordination | | | |
|---|---|---|---|
| **Section** | **NERC PRC-001-1** | **Alberta PRC-001-AB-1** | **Reason for Difference[1]** |
| **Measure** | | **MR4** Confirmation exists that a 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. | **R5~~3.1~~** Each ~~Generator Operator~~GFO ~~shall~~ must coordinate all new protection ~~ve~~ systems and all protecti~~ve~~on system changes with its interconnecting~~its Transmission Operator~~TFO and the ISO~~notify Host Balancing Authority in accordance with OPP ..~~. | |

| Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1<br>Protection System Coordination | | | |
|---|---|---|---|
| **Section** | **NERC PRC-001-1** | **Alberta PRC-001-AB-1** | **Reason for Difference[1]** |
| **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. | **MR5~~1~~** ~~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~~ meets the requirements as specified in requirement R5~~5or other equivalent evidence that will be used to confirm that there was coordination of new protectiveon systems or changesas noted in Requirements 3, 3.1, and 3.2~~. | |
| **Requirement** | **R3.2.** Each Transmission Operator shall coordinate all new protective systems and all protective system changes with neighboring Transmission Operators and Balancing Authorities. | **R6~~3.2~~** Each ~~Transmission Operator~~TFO ~~shall~~ must coordinate all protecti~~ve~~on systems including existing, new and modified ~~and all protective~~ protection system~~s~~ ~~changes~~ with ~~neighboring~~adjacent ~~Transmission Operators~~TFOs, affected ~~and~~ GFOs, affected interconnected transmission operators and ~~notify Balancing Authorities~~the ISO. ~~in accordance OPP~~ | |

| Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1<br>Protection System Coordination | | | |
|---|---|---|---|
| **Section** | **NERC PRC-001-1** | **Alberta PRC-001-AB-1** | **Reason for Difference[1]** |
| **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.~~**MR6** Evidence exists that could include~~,ing~~ 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. | |
| **Requirement** | **R4.** Each Transmission Operator shall coordinate protection systems on major transmission lines and interconnections with neighboring Generator Operators, Transmission Operators, and Balancing Authorities. | ~~**R6**~~**4.** ~~Each Transmission Operator~~TFO ~~shall~~ must ~~coordinate protection systems on major~~ all ~~transmission lines and interconnections with neighboring~~affected ~~Generator Operators~~GFO's, ~~adjacent TFO's, interconnected transmission operators, and notify the ISO in accordance .~~ | Combined into R5. |

| Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1<br>Protection System Coordination | | | |
|---|---|---|---|
| **Section** | **NERC PRC-001-1** | **Alberta PRC-001-AB-1** | **Reason for Difference[1]** |
| **Measure** | | ~~**MR6** Evidence exists that could includinginclude 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. | **R7~~5~~** 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 | **R7~~5~~.1** Each ~~Generator Operator~~GFO must ~~shall~~ identify changes in each of its generation, load, or ~~, or~~ operating conditions that may require changes in | |

| Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1<br>Protection System Coordination | | | |
|---|---|---|---|
| **Section** | **NERC PRC-001-1** | **Alberta PRC-001-AB-1** | **Reason for Difference[1]** |
| | that could require changes in the Transmission Operator's protection systems. | protection systems of others, and notify the ISO~~its Transmission Operator~~~~TFO~~ in advance of their changes.<br><br>**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.<br><br>~~of changes in generation or operating conditions that could require changes in the Transmission Operator's~~~~TFO's~~ ~~protection systems.~~ | |
| **Measure** | | **MR7.1** Evidence exists and shows that all changes requiring protection changes were made as specified in requirement R7.1.<br><br>**MR7.2** Evidence exists and shows that all changes requiring protection changes were made as specified in requirement R7.2. | |
| **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 | |

| Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1<br>Protection System Coordination | | | |
|---|---|---|---|
| **Section** | **NERC PRC-001-1** | **Alberta PRC-001-AB-1** | **Reason for Difference[1]** |
| | 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~~TFO must notify neighboring Transmission Operators~~TFOs~~ ~~in advance of changes in generation, transmission, load, or operating conditions that could require changes in the other Transmission Operators'~~TFOs ~~protection systems.~~ | |
| **Measure** | | **MR7.3** Evidence exists and shows that all changes requiring protection changes were made as specified in requirement R7.3. | |
| **Requirement** | **R6.** Each Transmission Operator and Balancing Authority shall monitor the status of each Special Protection System in their area, and shall notify affected | **R8~~6~~** ~~Each Transmission Operator~~TFO ~~and Balancing Authority shall~~the ISO ~~m~~Each TFO must monitor the status of each RAS~~Special Protection System~~ in its~~their~~ area, and ~~shall~~ must notify | |

| Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1<br>Protection System Coordination | | | |
|---|---|---|---|
| **Section** | **NERC PRC-001-1** | **Alberta PRC-001-AB-1** | **Reason for Difference[1]** |
| | Transmission Operators and Balancing Authorities of each change in status. | affected ~~Transmission Operators~~TFOs, ~~GFOGOPgenerator~~ operators of generating units and ~~Balancing Authorities~~the ISO of each change in status.<br><br>**R9** Each~~The~~ ~~GFOGOPgenerator~~ operator of a generating unit 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 RAS~~SPS~~ in their facility~~plant.The ISO must monitor the status of each RASSpecial Protection System in accordance with ISO rules.~~ | |
| **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) | **MR8** Operator logs, voice recordings or other evidence exists that affected parties were notified as specified in requirement R8.<br><br>**MR9** Operator logs, voice recordings or other evidence exists that affected parties were notified as specified in requirement R9.<br><br>~~**M3.** Each Transmission Operator and Balancing Authority shall have and provide upon request evidence that could include but is not limited to, operator logs,~~ | |

| Comparison between NERC PRC-001-1 and Alberta PRC-001-AB-1<br>Protection System Coordination | | | |
|---|---|---|---|
| **Section** | **NERC PRC-001-1** | **Alberta PRC-001-AB-1** | **Reason for Difference[1]** |
| | | ~~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)~~ | |
| **Procedures** | None identified | None identified | |
| **Compliance** | To view the compliance section D of the NERC reliability standard follow this link:<br>http://www.nerc.com/files/PRC-001-1.pdf | | There is no compliance section currently proposed in the Alberta Reliability Standards.<br>A compliance program will be developed at a later date for Alberta Reliability Standards that recognizes the compliance monitoring and enforcement structure in Alberta.<br>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