



## G.10 NERC Standard PRC-023 – Transmission Relay Loadability

### Background

The purpose of the standard is to ensure that protective relay settings shall not limit transmission loadability; not interfere with system operators' ability to take remedial action to protect system reliability and; be set to reliably detect all fault conditions and protect the electrical network from these faults. There are a number of requirements that specify how protective relays should be set so that they will not limit loadability of a circuit. One of the requirements of the Standard (R3) is for the Planning Coordinator to identify the 100 kV to 200 kV facilities that must meet Requirement 1 of the standard to prevent potential cascade tripping that may occur when protective relay settings limit transmission loadability. The Planning Coordinator shall have a process to determine the facilities that are critical to the reliability of the Bulk Electric System, maintain a current list of facilities determined according to the process, and provide the list of facilities to its Reliability Coordinators, Transmission Owners, Generator Owners, and Distribution Providers within 30 days of establishment of the initial list and within 30 days of any changes to the list. [The process shall consider input from adjoining Planning Coordinators and affected Reliability Coordinators.](#)

### [Process to determine PRC-023 Critical Facilities](#)

As part of the development of the RTEP each year PJM staff will perform analysis to determine what facilities may be susceptible to cascading. The test will determine if the simultaneous loss of two independent<sup>5</sup> BES elements (without intermediate system adjustments) results in a 100 kV – 200 kV facility being loaded in excess of 115% of its emergency rating and the loss of that overloaded facility results in additional overloaded BES facilities. If there are additional overloaded BES facilities loaded in excess of their emergency rating, the 100 kV – 200 kV element that was overloaded after the initial N-1-1 will be identified as needing to meet the requirements of the standard.

<sup>5</sup> Note that this test methodology is beyond the current requirements of NERC Standard TPL-003 given the standard evaluates common mode failures (i.e. loss of a double circuit tower line, bus, or circuit breaker failure) that result in the loss of two or more facilities. Category C3 in Table 1 of the standard evaluates the loss of independent BES elements however system adjustments can be made following the loss of the first facility.