PJM Compliance Bulletin

CB027, NERC Standard TOP-001-4: Transmission Operations

TOP-001-4 Purpose: To prevent instability, uncontrolled separation, or cascading outages that adversely impact the reliability of the Interconnection by ensuring prompt action to prevent or mitigate such occurrences.

General

NERC Reliability Standard TOP-001-4 becomes enforceable July 1, 2018 and is applicable to the following entities:

1. Balancing Authority
2. Transmission Operator
3. Generator Operator
4. Distribution Provider

Purpose

PJM is issuing this Compliance Bulletin to clarify that PJM Member Transmission Owners (TOs) have to comply with the assigned/shared tasks for TOP-001-4 Requirements R20 and R21 (data exchange infrastructure and testing requirements) listed in this Compliance Bulletin for PJM to be able to meet its functional obligations as the registered Transmission Operator (TOP). PJM Member TOs have to comply with the shared tasks (listed below) starting July 1, 2018, even though these shared tasks are not included in Version 12 of the TO/TOP Matrix.

This Compliance Bulletin will be retired after the shared tasks for TOP-001-4 R20 and R21 are incorporated into the next version of the TO/TOP Matrix. In the interim, PJM and/or ReliabilityFirst (RF) will use this Compliance Bulletin to audit PJM Member TOs scheduled for a TO/TOP Matrix Audit after July 1, 2018 for TOP-001-4 Requirements R20 and R21 shared tasks.

Background

In accordance with PJM Manual 1: Control Center and Data Exchange Requirements, Subsection 2.3.1: Transmission Monitoring Capabilities, PJM relies on Member TOs to serve as a back-up to PJM, monitoring BES facilities, when the PJM EMS is inoperable.

Since PJM relies on its Member TOs as a backup for PJM's Real-time monitoring and Real-time Assessment functionality in the event that PJM's monitoring and assessment capability is inoperable, PJM Member TOs are also required to have diverse and redundantly routed data exchange capabilities and redundant functionality testing procedures as required in TOP-001-4 Requirements R20 and R21 respectively.

~~The~~ Member TO compliance with the following shared tasks ~~applicable to PJM Member TOs~~ will ensure that PJM can rely on its Member TOs as a backup for monitoring functionality in the event that PJM's

Real-time monitoring and Real-time Assessment (RTA) capabilities become unavailable for 15 continuous minutes or more.

TOP-001-4 R20 and R21 shared tasks:

Standard Number	Req#	Approved BOT/FERC Standards	A / S	Assigned or Shared Member TO Tasks	PJM Tasks
TOP-001-4	R20	Each Transmission Operator shall have data exchange capabilities, with redundant and diversely routed exchange infrastructure within the Transmission Operator's primary Control Center, for the exchange of Real-time data with its Reliability Coordinator, Balancing Authority, and the entities it has identified it needs data from in order to perform its Real-time monitoring and Real-time Assessments.	S	Each Member TO shall have data exchange capabilities, with redundant and diversely routed exchange infrastructure within the Member TO's primary Control Center, for the exchange of Real-time data with PJM and, where applicable, other entities to allow the Member TO and PJM to perform Real-time monitoring and Real-time Assessments.	PJM shall have data exchange capabilities, with redundant and diversely routed exchange infrastructure within PJM's primary Control Centers, for the exchange of Real-time data with PJM Member TOs and entities that PJM has identified PJM needs data from in order to perform Real-time monitoring and Real-time Assessments.
TOP-001-4	R21	Each Transmission Operator shall test its primary Control Center data exchange capabilities specified in Requirement R20 for redundant functionality at least once every 90 calendar days. If the test is unsuccessful, the Transmission Operator shall initiate action within two hours to restore redundant functionality.	S	Each Member TO shall test its primary Control Center data exchange capabilities specified in Requirement R20 for redundant functionality at least once every 90 calendar days. If the test is unsuccessful, each Member TO shall initiate action within two hours to restore redundant functionality.	PJM shall test its primary Control Center data exchange capabilities specified in Requirement R20 for redundant functionality at least once every 90 calendar days. If the test is unsuccessful, PJM shall initiate action within two hours to restore redundant functionality.

TOP-001-4 R20 and R21 Audit Questions and Evidence of Compliance

Standard Number	Req#	Audit Questions	Evidence of Compliance (What auditors will be looking for)	Reference Documents
TOP-001-4	R20	Do you have data exchange capabilities, with redundant and diversely routed exchange infrastructure within your primary Control Center, for the exchange of Real-time data with PJM and, where applicable, other entities to allow you and PJM to perform Real-time monitoring and Real-time Assessments?	Exhibit evidence, such as, lists and/or diagrams of data communication facilities or other data exchange infrastructure, demonstrating that you have data exchange capabilities, with redundant and diversely routed exchange infrastructure within your primary Control Center, for the exchange of Real-time data with PJM and, where applicable, other entities, to allow you and PJM to perform Real-time monitoring and Real-time Assessments.	M-1 Control Center and Data Exchange Requirements; Section 3.2- Energy Management System (EMS) Data Exchange
TOP-001-4	R21	Do you test your primary Control Center data exchange capabilities specified in Requirement R20 for redundant functionality at least once every 90 calendar days? If the test is unsuccessful, do you initiate action within two hours to restore redundant functionality?	Exhibit evidence such as, testing logs, records, or documentation, that you tested your primary Control Center data exchange capabilities specified in Requirement R20 for redundant functionality at least once every 90 calendar days. Exhibit evidence that demonstrates that you initiated action within two hours to restore redundant functionality when the test was unsuccessful.	M-1 Control Center and Data Exchange Requirements; Section 3.2- Energy Management System (EMS) Data Exchange

More Background

Rationale for Requirement R21 from TOP-001-4: The proposed changes address directives for redundancy and diverse routing of data exchange capabilities (FERC Order No. 817 Para 47). Redundant and diversely routed data exchange capabilities consist of data exchange infrastructure components (e.g., switches, routers, servers, power supplies, and network cabling and communication paths between these components in the primary Control Center for the exchange of system operating data) that will provide continued functionality despite failure or malfunction of an individual component within the Transmission Operator's (TOP) primary Control Center. Redundant and diversely routed data exchange capabilities preclude single points of failure in primary Control Center data exchange infrastructure from halting the flow of Real-time data. Requirement R20 does not require automatic or instantaneous fail-over of data exchange capabilities. Redundancy and diverse routing may be achieved in various ways depending on the arrangement of the infrastructure or hardware within the TOP's primary Control Center. The reliability objective of redundancy is to provide for continued data exchange functionality during outages, maintenance, or testing of data exchange infrastructure. For periods of planned or unplanned

outages of individual data exchange components, the proposed requirements do not require additional redundant data exchange infrastructure components solely to provide for redundancy. Infrastructure that is not within the TOP's primary Control Center is not addressed by the proposed requirement.

Rationale for Requirement R21 from TOP-001-4: The proposed requirement addresses directives for testing of data exchange capabilities used in primary Control Centers (FERC Order No. 817 Para 51). A test for redundant functionality demonstrates that data exchange capabilities will continue to operate despite the malfunction or failure of an individual component (e.g., switches, routers, servers, power supplies, and network cabling and communication paths between these components in the primary Control Center for the exchange of system operating data). An entity's testing practices should, over time, examine the various failure modes of its data exchange capabilities. When an actual event successfully exercises the redundant functionality, it can be considered a test for the purposes of the proposed requirement

From the TOP-001-4 Implementation Plan: The initial test of primary Control Center data exchange capabilities specified in Requirements R21 and R24 must be completed within 90 calendar days of the effective date of TOP-001-4.

Conclusion

PJM Member TOs have to comply with the ~~assigned/~~shared tasks for TOP-001-4 Requirements R20 and R21 (data exchange infrastructure requirements) listed in this Compliance Bulletin for PJM to be able to meet its functional obligations as the registered TOP. PJM Member TOs have to comply with the shared tasks starting July 1, 2018. ~~through the time when the~~The shared tasks ~~are~~ will be incorporated into the next version of the PJM TO/TOP Matrix.

Development History

Revision: 0	Date: 06/22/2018
Author:	Srinivas Kappagantula Sr. Analyst, Reliability Compliance Mark Kuras Sr. Lead Engineer, Reliability Compliance
Reviewers:	Mark Holman Manager, Reliability Compliance Tom Moleski Sr. Compliance Specialist, Reliability Compliance
Approver:	Robert Eckenrod, Chief Compliance Officer Law, Compliance, and External Relations
Reason	New Compliance Bulletin