NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Implementation of Modified TOP and IRO Standards

Standards and Compliance Workshop
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RELIABILITY | ACCOUNTABILITY




Modified TOP and IRO Standards

- FERC approved two Reliability Standards on April 17, 2017 addressing TOP and IRO directives from Order No. 817
  - IRO-002-5 – Reliability Coordination – Monitoring and Analysis
  - TOP-001-4 – Transmission Operations

- IRO-002-5 effective October 1, 2017
- TOP-001-4 effective July 1, 2018

Project 2016-01 Background

- Modifications address three objectives from Order No. 817 :
  - Transmission Operator monitoring of some non-BES facilities
  - Redundancy and diverse routing of data exchange capabilities
  - Testing for data exchange capabilities used in primary control centers

- Applicable to Reliability Coordinators (RC), Transmission Operators (TOP), and Balancing Authorities (BA)

Monitoring Non-BES Facilities

- **Directive:** Modify requirements to address monitoring non-BES facilities within or outside the TOP area as necessary for determining System Operating Limit (SOL) exceedances
  - Addresses potential gap during BES exception processing, or situations where some non-BES facilities should be monitored for reliability purposes
  - Brings TOP requirements in line with monitoring requirements for RC's

- TOP-001-4 Requirement R10 addresses the directive

TOP-001 Requirement R10

R10. Each Transmission Operator shall perform the following for determining System Operating Limit (SOL) exceedances within its Transmission Operator Area:

10.1 Monitor Facilities within its Transmission Operator Area;

10.2 Monitor the status of Remedial Action Schemes within its Transmission Operator Area;

10.3 **Monitor non-BES facilities within its Transmission Operator Area identified as necessary by the Transmission Operator**;

10.4 Obtain and utilize status, voltages, and flow data for Facilities outside its Transmission Operator Area identified as necessary by the Transmission Operator;

10.5 Obtain and utilize the status of Remedial Action Schemes outside its Transmission Operator Area identified as necessary by the Transmission Operator; and

10.6 **Obtain and utilize status, voltages, and flow data for non-BES facilities outside its Transmission Operator Area identified as necessary by the Transmission Operator**.

Determining Non-BES Facilities to Monitor

- The objective is to monitor all facilities necessary for **determining SOL exceedances**

- Examples of analyses performed by TOPs to identify non-BES facilities that should be monitored:
  - Operational Planning Analysis (OPA);
  - Real-time Assessments (RTA);
  - Analysis performed by the TOP as part of BES Exception processing for including a facility in the BES; and
  - Analysis which may be specified in the RC's outage coordination process that leads to the identification of a non-BES facility that should be temporarily monitored for determining SOL exceedances.

Data Exchange Redundancy

- **Directive:** Modify standards to include requirements for redundancy and diverse routing of data exchange capabilities used by RC, TOP, and BA

- IRO-002-5 Requirement R2 and TOP-001-4 Requirements R20 and R23 address the directive

IRO-002-5 Requirement

R2. Each Reliability Coordinator shall have data exchange capabilities, **with redundant and diversely routed data exchange infrastructure within the Reliability Coordinator's primary Control Center**, for the exchange of Real-time data with its Balancing Authorities and Transmission Operators, and with other entities it deems necessary, for performing its Real-time monitoring and Real-time Assessments.

Data Exchange Redundancy Rationale

- 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.
  - Instantaneous fail-over of data exchange capabilities is not required
  - Provides 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.

- Requirements apply to infrastructure **within the primary Control Center only**

Data Exchange Redundancy Testing

- **Directive:** Modify standards to require testing of alternate data exchange capabilities used by RC, TOP, and BA in primary control centers

- IRO-002-5 Requirement R3 and TOP-001-4 Requirements R21 and R24 address the directive

IRO-002 Requirement

R3. Each Reliability Coordinator shall test its primary Control Center data exchange capabilities specified in Requirement R2 for redundant functionality at least once every 90 calendar days. If the test is unsuccessful, the Reliability Coordinator shall initiate action within two hours to restore redundant functionality.

Redundancy Testing Rationale

- A test 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).
- Tests do not need to address all failure modes each quarter
  - “An entity's testing practices should, over time, examine the various failure modes of its data exchange capabilities.”

Implementation

- IRO-002-5 effective October 1, 2017 (3 months following regulatory approval)

- TOP-001-4 effective July 1, 2018 (12 months following regulatory approval)
  - Longer implementation period is needed due to new requirement for TOPs to monitor some non-BES facilities (R10)

Questions and Answers