

Standard Development Timeline

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

Description of Current Draft

This draft is the first posting of the proposed standard.

Completed Actions	Date
Standards Committee approved Standard Authorization Request (SAR) for posting	July 15, 2015
SAR posted for comment	July 16 - August 17, 2015

Anticipated Actions	Date
45-day formal comment period with initial ballot	September 2015
45-day formal comment period with additional ballot	December 2015
10-day final ballot	January 2016
NERC Board (Board) adoption	February 2016

New or Modified Term(s) Used in NERC Reliability Standards

This section includes all new or modified terms used in the proposed standard that will be included in the *Glossary of Terms Used in NERC Reliability Standards* upon applicable regulatory approval. Terms used in the proposed standard that are already defined and are not being modified can be found in the *Glossary of Terms Used in NERC Reliability Standards*. The new or revised terms listed below will be presented for approval with the proposed standard. Upon Board adoption, this section will be removed.

Term(s): None

When this standard receives Board adoption, the rationale boxes will be moved to the Supplemental Material Section of the standard.

A. Introduction

1. **Title:** Real-time Reliability Monitoring and Analysis Capabilities
2. **Number:** TOP-010-1
3. **Purpose:** Establish requirements for Real-time monitoring and analysis capabilities used by System Operators in support of reliable System operations.
4. **Applicability:**
 - 4.1. **Functional Entities:**
 - 4.1.1. Transmission Operators
 - 4.1.2. Balancing Authorities
5. **Effective Date:** See Implementation Plan

B. Requirements and Measures

Rationale for Requirement R1: The Transmission Operator (TOP) uses a set of Real-time data identified in proposed standard TOP-003-3 Requirement R1 to perform its Real-time monitoring and Real-time Assessments. Functional requirements to perform monitoring and Real-time Assessments appear in other standards.

Requirement R1 Part 1.2 of this standard specifies the TOP shall include actions to coordinate resolution of Real-time data quality discrepancies in its Operating Process or Operating Procedure. These actions could be the same as the process to resolve data conflicts required by proposed TOP-003-3 Requirement R5 Part 5.2 provided that this process could resolve Real-time data quality issues.

- R1. Each Transmission Operator shall implement an Operating Process or Operating Procedure to address the quality of the Real-time data necessary to perform its Real-time monitoring and Real-time Assessments. The Operating Process or Operating Procedure shall include: *[Violation Risk Factor: Medium] [Time Horizon: Same Day Operations, Real-time Operations]*
 - 1.1. Criteria for evaluating potential Real-time data quality discrepancies including, but not limited to:
 - 1.1.1. Data outside of a prescribed data range;
 - 1.1.2. Analog data not updated within a predetermined time period;
 - 1.1.3. Data entered manually to override telemetered information; and
 - 1.1.4. Data otherwise identified as invalid or suspect.

- 1.2. Actions to coordinate resolution of Real-time data quality discrepancies with the entity(ies) responsible for providing the data.
- M1.** Each Transmission Operator shall have evidence that it implemented its Operating Process or Operating Procedure to address the quality of the Real-time data necessary to perform its Real-time Monitoring and Real-time Assessments. This evidence could include, but is not limited to: 1) an Operating Procedure or Operating Process in electronic or hard copy format meeting all provisions of Requirement R1, and 2) evidence the Transmission Operator implemented the Operating Procedure or Operating Process as called for in the Operating Procedure or Operating Process, such as dated operator logs, dated checklists, voice recordings, voice transcripts, or other evidence.

Rationale for Requirement R2: The Balancing Authority (BA) uses a set of Real-time data identified in proposed standard TOP-003-3 Requirement R2 to perform its analysis functions and Real-time monitoring. Requirements to perform monitoring appear in other standards.

Requirement R2 Part 2.2 of this standard specifies the BA shall include actions to coordinate resolution of Real-time data quality discrepancies in its Operating Process or Operating Procedure. These actions could be the same as the process to resolve data conflicts required by proposed TOP-003-3 Requirement R5 Part 5.2 provided that this process could resolve Real-time data quality issues.

- R2.** Each Balancing Authority shall implement an Operating Process or Operating Procedure to address the quality of the Real-time data necessary to perform its analysis functions and Real-time monitoring. The Operating Process or Operating Procedure shall include: *[Violation Risk Factor: Medium] [Time Horizon: Same Day Operations, Real-time Operations]*
- 2.1. Criteria for evaluating potential Real-time data quality discrepancies including, but not limited to:
 - 2.1.1. Data outside of a prescribed data range;
 - 2.1.2. Analog data not updated within a predetermined time period;
 - 2.1.3. Data entered manually to override telemetered information; and
 - 2.1.4. Data otherwise identified as invalid or suspect.
 - 2.2. Actions to coordinate resolution of Real-time data quality discrepancies with the entity(ies) responsible for providing the data.
- M2.** Each Balancing Authority shall have evidence that it implemented its Operating Process or Operating Procedure to address the quality of the Real-time data necessary to perform its analysis functions and Real-time monitoring. This evidence could include, but is not limited to: 1) an Operating Procedure or Operating Process in electronic or hard copy format meeting all provisions of Requirement R2, and 2)

evidence the Balancing Authority implemented the Operating Procedure or Operating Process as called for in the Operating Procedure or Operating Process, such as dated operator logs, dated checklists, voice recordings, voice transcripts, or other evidence.

- R3.** Each Transmission Operator shall provide its System Operators with indication(s) of the quality of Real-time data necessary to perform its Real-time monitoring and Real-time Assessments. *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*
- M3.** Each Transmission Operator shall have evidence it provided its System Operators with indications of the quality of Real-time data necessary to perform its Real-time monitoring and Real-time Assessments. This evidence could include, but is not limited to, computer printouts, system specifications, or other evidence.
- R4.** Each Balancing Authority shall provide its System Operators with indication(s) of the quality of Real-time data necessary to perform its analysis functions and Real-time monitoring. *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*
- M4.** Each Balancing Authority shall have evidence it provided its System Operators with indications of the quality of Real-time data necessary to perform its analysis functions and Real-time monitoring. This evidence could include, but is not limited to, computer printouts, system specifications, or other evidence.

Rationale for Requirements R5 and R6: Requirements R5 and R6 ensure the TOP's System Operators have procedures and receive indication(s) to address issues related to the quality of the analysis inputs used for Real-time Assessments. Requirements to perform Real-time Assessments appear in other standards.

- R5.** Each Transmission Operator shall implement an Operating Process or Operating Procedure to maintain the quality of any analysis used in its Real-time Assessments. The Operating Process or Operating Procedure shall include: *[Violation Risk Factor: Medium] [Time Horizon: Same Day Operations, Real-time Operations]*
 - 5.1.** Criteria for evaluating the quality of any analysis used in its Real-time Assessments; and
 - 5.2.** Actions to resolve quality deficiencies in any analysis used in its Real-time Assessments.
- M5.** Each Transmission Operator shall have evidence it implemented its Operating Process or Operating Procedure to maintain the quality of any analysis used in its Real-time Assessments. This evidence could include, but is not limited to: 1) an Operating Procedure or Operating Process in electronic or hard copy format meeting all provisions of Requirement R5, and 2) evidence the Transmission Operator implemented the Operating Procedure or Operating Process as called for in the

Operating Procedure or Operating Process, such as dated operator logs, dated checklists, voice recordings, voice transcripts, or other evidence.

- R6.** Each Transmission Operator shall provide its System Operators with indication(s) of the quality of any analysis used in its Real-time Assessments. *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*
- M6.** Each Transmission Operator shall have evidence it provided its System Operators with indication(s) of the quality of any analysis used in its Real-time Assessment capabilities. This evidence could include, but is not limited to, operator logs, computer printouts, system specifications, or other evidence.

Rationale for Requirement R7: The requirement addresses recommendation S7 of the Real-time Best Practices Task Force report concerning operator awareness of alarm availability.

An independent alarm process monitor is one that would not fail with a simultaneous failure of the alarm processor. A 'heartbeat' or 'watchdog' monitoring system may accomplish this objective.

- R7.** Each Transmission Operator and Balancing Authority shall utilize an independent alarm process monitor that provides notification(s) to its System Operators when a failure of its Real-time monitoring alarm processor has occurred. *[Violation Risk Factor: Medium] [Time Horizon: Same Day Operations, Real-time Operations]*
- M7.** Each Transmission Operator and Balancing Authority shall have evidence it utilized an independent alarm process monitor that provided notification(s) to its System Operators when a failure of its Real-time monitoring alarm processor occurred. This evidence could include, but is not limited to, operator logs, computer printouts, system specifications, or other evidence.

C. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority:

“Compliance Enforcement Authority” means NERC or the Regional Entity, or any entity as otherwise designated by an Applicable Governmental Authority, in their respective roles of monitoring and/or enforcing compliance with mandatory and enforceable Reliability Standards in their respective jurisdictions.

1.2. Evidence Retention:

The following evidence retention period(s) identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to

provide other evidence to show it was compliant for the full-time period since the last audit.

The applicable entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

The applicable entity shall retain evidence of compliance for Requirements R1 through R4, and Requirement R7, and Measures M1 through M4, and Measure M7, for the current calendar year and one previous calendar year, with the exception of operator logs and voice recordings which shall be retained for a minimum of ninety calendar days, unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

The Transmission Operator shall retain evidence of compliance for Requirements R5 and R6 and Measures M5 and M6 for a rolling 30-day period, unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

If an applicable entity is found non-compliant it shall keep information related to the non-compliance until mitigation is complete and approved or for the time specified above, whichever is longer.

1.3. Compliance Monitoring and Enforcement Program

As defined in the NERC Rules of Procedure, “Compliance Monitoring and Enforcement Program” refers to the identification of the processes used to evaluate data or information for the purpose of assessing performance or outcomes with the associated Reliability Standard.

Violation Severity Levels

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	N/A	N/A	The Transmission Operator's Operating Process or Operating Procedure to address the quality of the Real-time data necessary to perform its Real-time monitoring and Real-time Assessments did not include one of the elements listed in Part 1.1 and Part 1.2.	The Transmission Operator's Operating Process or Operating Procedure to address the quality of the Real-time data necessary to perform its Real-time monitoring and Real-time Assessments did not include any of the elements listed in Part 1.1 and Part 1.2; OR The Transmission Operator did not implement an Operating Process or Operating Procedure to address the quality of the Real-time data necessary to perform its Real-time monitoring and Real-time Assessments.
R2.	N/A	N/A	The Balancing Authority's Operating Process or Operating Procedure to address the quality of the	The Balancing Authority's Operating Process or Operating Procedure to address the quality of the

			Real-time data necessary to perform its analysis functions and Real-time monitoring did not include one of the elements listed in Part 2.1 and Part 2.2.	Real-time data necessary to perform its analysis functions and Real-time monitoring did not include any of the elements listed in Part 2.1 and Part 2.2; OR The Balancing Authority did not implement an Operating Process or Operating Procedure to address the quality of the Real-time data necessary to perform its analysis functions and Real-time monitoring.
R3.	N/A	N/A	N/A	The Transmission Operator did not provide its System Operators with indication(s) of the quality of Real-time data used to perform its Real-time monitoring and Real-time Assessments.
R4.	N/A	N/A	N/A	The Balancing Authority did not provide its System Operators with indication(s) of the quality of Real-time data used to perform its

				analysis functions and Real-time monitoring.
R5.	N/A	N/A	The Transmission Operator's Operating Process or Operating Procedure to maintain the quality of any analysis used in its Real-time Assessments did not include one of the elements listed in Part 5.1 and Part 5.2.	The Transmission Operator's Operating Process or Operating Procedure to maintain the quality of any analysis used in its Real-time Assessments did not include any of the elements listed in Part 5.1 and Part 5.2; OR The Transmission Operator did not implement an Operating Process or Operating Procedure to maintain the quality of any analysis used in its Real-time Assessments.
R6.	N/A	N/A	N/A	The Transmission Operator did not provide its System Operators with indication(s) of the quality of any analysis used in its Real-time Assessments.
R7.	N/A	N/A	N/A	The responsible entity did not utilize an independent alarm process monitor that provides notification(s) to its

				System Operators when a failure of its Real-time monitoring alarm processor has occurred.
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D. Regional Variances

None.

E. Associated Documents

None

Version History

Version	Date	Action	Change Tracking
1	TBD	Respond to recommendations in Real-time Best Practices Task Force Report and FERC directives	N/A

Standard Attachments

None

Guidelines and Technical Basis

Real-time monitoring, or monitoring the Bulk Electric System (BES) in Real-time, is a primary function of Reliability Coordinators (RCs), Transmission Operators (TOPs), and Balancing Authorities (BAs) as required by existing and proposed TOP and IRO standards. As used in TOP and IRO standards, monitoring involves observing operating status and operating value(s) in Real-time for awareness of system conditions. Real-time monitoring includes the following activities performed in Real-time:

- Acquisition of operating data;
- Display of operating data as needed for visualization of system conditions;
- Audible or visual alerting when warranted by system conditions; and
- Audible or visual alerting when monitoring and analysis capabilities degrade or become unavailable.

Rationale

During development of this standard, text boxes were embedded within the standard to explain the rationale for various parts of the standard. Upon BOT adoption, the text from the rationale text boxes was moved to this section.