Standard Development Timeline

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

Description of Current Draft
This draft is the ~~first~~second 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
45-day formal comment period with initial ballot	September 24 - November 9, 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~~February 2016
NERC Board (Board) adoption	~~February~~May 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:** **Reliability Coordinator Real-time Reliability Monitoring and Analysis Capabilities**

2. **Number:** **IRO-018-1**

3. **Purpose:** Establish requirements for Real-time monitoring and analysis capabilities ~~used by Reliability Coordinator System Operators in support of~~to support reliable System operations.

4. **Applicability:**

   4.1. Functional Entities:

   4.1.1. Reliability Coordinators

5. **Effective Date:** See Implementation Plan

B. Requirements and Measures

> **Rationale for Requirement R1:** The Reliability Coordinator (RC) uses a set of Real-time data identified in ~~approved standard~~ IRO-010-1a Requirement R1 and ~~proposed standard~~ IRO-010-2 Requirement R1 to perform its Real-time monitoring and Real-time Assessments. Requirements to perform Real-time monitoring and Real-time Assessments appear in other standards.
>
> The Operating Process or Operating Procedure must include provisions for indicating the quality of Real-time data to operating personnel. Descriptions of quality indicators such as display color codes, data quality flags, or other such indicators as found in Real-time monitoring specifications could be used.
>
> Requirement R1 Part 1.~~2~~3 of this standard specifies the RC shall include actions to ~~coordinate resolution of~~resolve Real-time data quality ~~discrepancies~~issues affecting its Real-time Assessments in its Operating Process or Operating Procedure. These actions could be the same as the process used to resolve data conflicts required by IRO-010-2 Requirement R3 Part 3.2, provided that this process ~~could~~resolves Real-time data quality issues.
>
> The revision in Part 1.3 to resolve Real-time data quality issues. *when data quality affects Real-time Assessments* clarifies the scope of data points that must be covered by the Operating Process or Operating Procedure.

R1. Each Reliability Coordinator 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~~the quality of Real-time data ~~quality discrepancies including, but not limited~~;

~~**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~~

~~**1.1.1.** Data otherwise identified as invalid or suspect~~.

1.2. Provisions to indicate the quality of Real-time data to the System Operator; and

~~**1.2.**~~**1.3.** Actions to resolve ~~coordinate resolution of~~Real-time data quality ~~discrepancies~~issues with the entity(ies) responsible for providing the data when data quality affects Real-time Assessments.

M1. Each Reliability Coordinator shall have evidence 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 Proce~~dure~~ss or Operating Proce~~ss~~dure in electronic or hard copy format meeting all provisions of Requirement R1~~,~~; and 2) evidence the Reliability Coordinator implemented the Operating Proce~~dure~~ss or Operating Proce~~ss~~dure as called for in the Operating Proce~~dure~~ss or Operating Proce~~ss~~dure, such as dated operator or supporting logs, dated checklists, voice recordings, voice transcripts, or other evidence.

~~**R2.** Each Reliability Coordinator shall provide its System Operators with indication(s) of the quality of the Real-time data necessary to perform its Real-time monitoring and Real-time Assessments. *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*~~

~~**M2.** Each Reliability Coordinator shall have evidence it provided its System Operators with indications of 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, computer printouts, system specifications, or other evidence.~~

Rationale for ~~Requirements R3 and R4: Requirements R3 and R4 ensure the RC's System Operators~~**Requirement R2:** Requirement R2 ensures RCs have procedures ~~and receive indication(s)~~ to address issues related to the quality of the analysis ~~inputs~~results used for Real-time Assessments. Requirements to perform Real-time Assessments appear in other standards. Examples of the types of analysis used in Real-time Assessments include, as applicable, state estimation, Real-time Contingency analysis, Stability analysis or other studies used for Real-time Assessments.

> The Operating Process or Operating Procedure must include provisions for how the quality of analysis results used in Real-time Assessment will be shown to operating personnel.

R3.R2.   Each Reliability Coordinator shall implement an Operating Process or Operating Procedure to ~~maintain~~address 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]*

   2.1. Criteria for evaluating the quality of ~~any~~analysis used in its Real-time Assessments;

   3.1.2.2.   Provisions to indicate the quality of analysis used in its Real-time Assessments; and

   3.2.2.3.   Actions to resolve ~~quality deficiencies in any~~ analysis ~~used in~~quality issues affecting its Real-time Assessments.

M3.M2.   Each Reliability Coordinator shall have evidence it implemented its Operating Process or Operating Procedure to ~~maintain~~address the quality of ~~any~~ analysis used in its Real-time Assessments~~.~~ as specified in Requirement R2. This evidence could include, but is not limited to: 1) an Operating Proce~~dure~~ss or Operating Proce~~ss~~dure in electronic or hard copy format meeting all provisions of Requirement ~~R3,~~R2; and 2) evidence the Reliability Coordinator implemented the Operating Proce~~dure~~ss or Operating Proce~~ss~~dure as called for in the Operating Proce~~dure~~ss or Operating Proce~~ss~~dure , such as dated operator logs, dated checklists, voice recordings, voice transcripts, or other evidence.

~~R4.   Each Reliability Coordinator 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]~~

~~Each Reliability Coordinator shall have evidence it provided its System Operators with indication(s) of the quality of any analysis used in its Real-time Assessments. This evidence could include, but is not limited to, operator logs, computer printouts, system specifications, or other evidence.~~

> **Rationale for Requirement ~~R5~~R3:** The requirement addresses recommendation S7 of the Real-time Best Practices Task Force report concerning operator awareness of alarm availability.
>
> ~~An~~The requirement in Draft Two of the proposed standard has been revised for clarity by removing the term *independent*. The alarm process monitor ~~is one that would~~must be able to provide notification of failure of the Real-time monitoring alarm processor. This capability could be provided by an application within a Real-time monitoring system or by a separate component used by the System Operator. The alarm process monitor must not

fail with a simultaneous failure of the ~~Real-time monitoring~~ alarm processor. ~~A 'heartbeat' or 'watchdog' monitoring system may accomplish this objective.~~

~~R5.~~R3.   Each Reliability Coordinator shall ~~utilize~~have 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]*

~~M4.~~M3.   Each Reliability Coordinator shall have evidence ~~it utilized~~of an ~~independent~~ alarm process monitor that provide~~d~~s notification(s) to its System Operators when a failure of its Real-time monitoring alarm processor has 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 Reliability Coordinator 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 Reliability Coordinator shall retain evidence of compliance for Requirements R1~~, R2,~~ and ~~R5~~R3 and Measures ~~M1, M2, and M5~~M1and M3 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~~90 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 Reliability Coordinator shall retain evidence of compliance for ~~Requirements R3~~Requirement R2 and ~~R4 and Measures M3 and M4~~Measure

M2 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 a Reliability Coordinator 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.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

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 Reliability Coordinator'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 through Part 1.3.	The Reliability Coordinator'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~~two of the elements listed in Part 1.1 ~~and~~through Part 1.~~2.~~3.	The Reliability Coordinator'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~~through Part 1.~~2~~3; OR The Reliability Coordinator 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~~	~~N/A~~	~~The Reliability Coordinator 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.~~
~~R3~~R2.	N/A	~~N/A~~The Reliability Coordinator's Operating Process or Operating Procedure to address the quality of analysis used in its Real-time Assessments did not include one of the elements listed in Part 2.1 through Part 2.3.	The Reliability Coordinator's Operating Process or Operating Procedure to ~~maintain~~address the quality of ~~any~~ analysis used in its Real-time Assessments did not include ~~one~~two of the elements listed in Part ~~3~~2.1 ~~and~~through Part 2.3.~~2.~~	The Reliability Coordinator's Operating Process or Operating Procedure to ~~maintain~~address the quality of ~~any~~ analysis used in its Real-time Assessments did not include any of the elements listed in Part ~~3~~2.1 ~~and~~through Part 2.3.~~2~~; OR The Reliability Coordinator did not implement an Operating Process or Operating Procedure to ~~maintain~~address the quality of ~~any~~ analysis used in its Real-time Assessments.
~~R4.~~	~~N/A~~	~~N/A~~	~~N/A~~	~~The Reliability Coordinator did not provide its System Operators with indication(s) of the quality of any analysis used in its Real-time Assessments.~~

| R5R3. | N/A | N/A | N/AThe Reliability Coordinator has an alarm process monitor but the alarm process monitor did not provide a notification(s) to its System Operators when a failure of its Real-time monitoring alarm processor occurred. | The Reliability Coordinator diddoes not utilizehave 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. |

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)values 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.

Requirement R1

The RC uses a set of Real-time data identified in IRO-010-1a Requirement R1 and IRO-010-2 Requirement R1 to perform its Real-time monitoring and Real-time Assessments. Requirements to perform monitoring and Real-time Assessments appear in other standards.

The RC's Operating Process or Operating Procedure must contain criteria for evaluating the quality of Real-time data as specified in proposed IRO-018-1 Requirement R1 Part 1.1. The criteria support identification of applicable data quality issues, such as:

- Data outside of a prescribed data range;

- Analog data not updated within a predetermined time period;

- Data entered manually to override telemetered information; or

- Data otherwise identified as invalid or suspect.

The Operating Process or Operating Procedure must include provisions for indicating the quality of Real-time data to operating personnel. Descriptions of quality indicators such as display color codes, data quality flags, or other such indicators as found in Real-time monitoring specifications could be used.

Requirement R1 Part 1.3 specifies the RC shall include actions to resolve Real-time data quality issues with the entity(ies) responsible for providing the data when data quality affects Real-time Assessments. The Operating Process or Operating Procedure must clearly identify to operating personnel how to determine the data that affects the quality of the Real-time Assessment so that effective actions can be taken to resolve data quality issues in an appropriate timeframe.

Requirement R2

Requirement R2 ensures RCs have procedures to address issues related to the quality of the analysis results used for Real-time Assessments. Requirements to perform Real-time Assessments appear in other standards. Examples of the types of analysis used in Real-time

Assessments include, as applicable, state estimation, Real-time Contingency analysis, Stability analysis or other studies used for Real-time Assessments.

The entity must use appropriate quality criteria based on the analysis capabilities used to perform Real-time Assessments, such as solution tolerances, mismatches with Real-time data, convergences, etc.

The Operating Process or Operating Procedure must include provisions for how the quality of analysis results used in Real-time Assessment will be shown to operating personnel.

Requirement R3

Requirement R3 addresses recommendation S7 of the Real-time Best Practices Task Force report concerning operator awareness of alarm availability.

An alarm process monitor could be an application within a Real-time monitoring system or it could be a separate system. 'Heartbeat' or 'watchdog' monitors are examples of an alarm process monitor. A stalled Real-time monitoring alarm processor must not cause a failure of the alarm process monitor.

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~~NERC Board of Trustees adoption, the text from the rationale text boxes ~~was~~will be moved to this section.