

# Reliability Standard Audit Worksheet<sup>1</sup>

## TOP-010-1 –Real-time Reliability Monitoring and Analysis Capabilities

*This section to be completed by the Compliance Enforcement Authority.*

**Audit ID:** Audit ID if available; or REG-NCRnnnnn-YYYYMMDD  
**Registered Entity:** Registered name of entity being audited  
**NCR Number:** NCRnnnnn  
**Compliance Enforcement Authority:** Region or NERC performing audit  
**Compliance Assessment Date(s)<sup>2</sup>:** Month DD, YYYY, to Month DD, YYYY  
**Compliance Monitoring Method:** [On-site Audit | Off-site Audit | Spot Check]  
**Names of Auditors:** Supplied by CEA

### Applicability of Requirements

	BA	DP	GO	GOP	IA	LSE	PA	PSE	RC	RP	RSG	TO	TOP	TP	TSP
R1													X		
R2	X														
R3													X		
R4	X												X		

### Legend:

Text with blue background:	Fixed text – do not edit
Text entry area with Green background:	Entity-supplied information
Text entry area with white background:	Auditor-supplied information

<sup>1</sup> NERC developed this Reliability Standard Audit Worksheet (RSAW) language in order to facilitate NERC’s and the Regional Entities’ assessment of a registered entity’s compliance with this Reliability Standard. The NERC RSAW language is written to specific versions of each NERC Reliability Standard. Entities using this RSAW should choose the version of the RSAW applicable to the Reliability Standard being assessed. While the information included in this RSAW provides some of the methodology that NERC has elected to use to assess compliance with the requirements of the Reliability Standard, this document should not be treated as a substitute for the Reliability Standard or viewed as additional Reliability Standard requirements. In all cases, the Regional Entity should rely on the language contained in the Reliability Standard itself, and not on the language contained in this RSAW, to determine compliance with the Reliability Standard. NERC’s Reliability Standards can be found on NERC’s website. Additionally, NERC Reliability Standards are updated frequently, and this RSAW may not necessarily be updated with the same frequency. Therefore, it is imperative that entities treat this RSAW as a reference document only, and not as a substitute or replacement for the Reliability Standard. It is the responsibility of the registered entity to verify its compliance with the latest approved version of the Reliability Standards, by the applicable governmental authority, relevant to its registration status.

The NERC RSAW language contained within this document provides a non-exclusive list, for informational purposes only, of examples of the types of evidence a registered entity may produce or may be asked to produce to demonstrate compliance with the Reliability Standard. A registered entity’s adherence to the examples contained within this RSAW does not necessarily constitute compliance with the applicable Reliability Standard, and NERC and the Regional Entity using this RSAW reserves the right to request additional evidence from the registered entity that is not included in this RSAW. Additionally, this RSAW includes excerpts from FERC Orders and other regulatory references. The FERC Order cites are provided for ease of reference only, and this document does not necessarily include all applicable Order provisions. In the event of a discrepancy between FERC Orders, and the language included in this document, FERC Orders shall prevail.

<sup>2</sup> Compliance Assessment Date(s): The date(s) the actual compliance assessment (on-site audit, off-site spot check, etc.) occurs.

**DRAFT NERC Reliability Standard Audit Worksheet**

**Findings**

**(This section to be completed by the Compliance Enforcement Authority)**

Req.	Finding	Summary and Documentation	Functions Monitored
R1			
R2			
R3			
R4			

Req.	Areas of Concern

Req.	Recommendations

Req.	Positive Observations

**DRAFT** NERC Reliability Standard Audit Worksheet

**Subject Matter Experts**

Identify the Subject Matter Expert(s) responsible for this Reliability Standard.

**Registered Entity Response (Required; Insert additional rows if needed):**

SME Name	Title	Organization	Requirement(s)

DRAFT

**R1 Supporting Evidence and Documentation**

- 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:
  - 1.1.** Criteria for evaluating the quality of Real-time data;
  - 1.2.** Provisions to indicate the quality of Real-time data to the System Operator; and
  - 1.3.** Actions to resolve Real-time data quality issues with the entity(ies) responsible for providing the data when data quality affects Real-time Assessments.
  
- 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 Process or Operating Procedure in electronic or hard copy format meeting all provisions of Requirement R1; and 2) evidence the Transmission Operator implemented the Operating Process or Operating Procedure as called for in the Operating Process or Operating Procedure, such as dated operator logs, dated checklists, voice recordings, voice transcripts, or other evidence.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested:**

<b>Provide the following evidence, or other evidence to demonstrate compliance.</b>
Operating Process or Operating Procedure to address the quality of the Real-time data necessary to perform Real-time monitoring and Real-time Assessments
Evidence of implementation of the Operating Process or Operating Procedure which addresses the quality of the Real-time data necessary to perform Real-time monitoring and Real-time Assessments

**Registered Entity Evidence (Required):**

**The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.**

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**DRAFT NERC Reliability Standard Audit Worksheet**

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to TOP-010-1, R1**

***This section to be completed by the Compliance Enforcement Authority***

	Review and verify the entity’s Operating Process or Operating Procedure to address the quality of Real-time data necessary to perform Real-time monitoring and Real-time Assessments includes:
	(Part 1.1) Criteria for evaluating the quality of Real-time data
	(Part 1.2) Provisions to indicate the quality of Real-time data to the System Operator
	(Part 1.3) Actions to resolve Real-time data quality issues with the entity(ies) responsible for providing the data when data quality affects Real-time Assessments
	Verify implementation of the Operating Process or Operating Procedure which addresses the quality of the Real-time data necessary to perform Real-time monitoring and Real-time Assessments

**Note to Auditor:**

The TOP uses a set of Real-time data identified in TOP-003-3 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. 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.

As specified in Requirement R1 Part 1.1, the Operating Process or Operating Procedure must contain criteria for evaluating the quality of Real-time data. 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.

As specified in Requirement R1 Part 1.2, 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.

As specified in Requirement R1 Part 1.3, the TOP shall include actions to resolve Real-time data quality 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 proposed TOP-003-3 Requirement R5 Part 5.2 provided that the process resolves Real-time data quality issues.

**DRAFT** NERC Reliability Standard Audit Worksheet

Additionally, some data and data quality issues do not affect Real-time Assessments and will not need to be addressed by the actions contained in the Operating Process or Operating Procedures specified in this Requirement. 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.

**Auditor Notes:**

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**R2 Supporting Evidence and Documentation**

- 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:
  - 2.1.** Criteria for evaluating the quality of Real-time data;
  - 2.2.** Provisions to indicate the quality of Real-time data to the System Operator; and
  - 2.3.** Actions to resolve Real-time data quality issues with the entity(ies) responsible for providing the data when data quality affects its analysis functions.
  
- M2.** Each Balancing Authority shall have evidence 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 Process or Operating Procedure in electronic or hard copy format meeting all provisions of Requirement R2; and 2) evidence the Balancing Authority implemented the Operating Process or Operating Procedure as called for in the Operating Process or Operating Procedure , such as dated operator logs, dated checklists, voice recordings, voice transcripts, or other evidence.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested:**

<b>Provide the following evidence, or other evidence to demonstrate compliance.</b>
Operating Process or Operating Procedure to address the quality of the Real-time data necessary to perform its analysis functions and Real-time monitoring
Evidence of implementation of the Operating Process or Operating Procedure which addresses the quality of the Real-time data necessary to perform its analysis functions and Real-time monitoring

**Registered Entity Evidence (Required):**

**The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.**

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**DRAFT NERC Reliability Standard Audit Worksheet**

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**


**Compliance Assessment Approach Specific to TOP-010-1, R2**

***This section to be completed by the Compliance Enforcement Authority***

	Review and verify the entity’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 includes:
	(Part 2.1) Criteria for evaluating the quality of Real-time data
	(Part 2.2) Provisions to indicate the quality of Real-time data to the System Operator
	(Part 2.3) Actions to resolve Real-time data quality issues with the entity(ies) responsible for providing the data when data quality affects its analysis functions
	Verify implementation of the Operating Process or Operating Procedure which addresses the quality of the Real-time data necessary to perform its analysis functions and Real-time monitoring

**Note to Auditor:**

The BA uses a set of Real-time data identified in TOP-003-3 Requirement R2 to perform its analysis functions and Real-time monitoring. Requirements to perform its analysis functions and Real-time monitoring appear in other standards. 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.

As specified in Requirement R2 Part 2.1, the Operating Process or Operating Procedure must contain criteria for evaluating the quality of Real-time data. 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.

As specified in Requirement R2 Part 2.2, 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.

As specified in Requirement R2 Part 2.3, the BA shall include actions to resolve Real-time data quality issues affecting its analysis functions in its Operating Process or Operating Procedure. These actions could be the same as the process used to resolve data conflicts required by TOP-003-3 Requirement R5 Part 5.2 provided that the process resolves Real-time data quality issues.



**DRAFT NERC Reliability Standard Audit Worksheet**

Additionally, some data and data quality issues do not affect analysis and will not need to be addressed by the actions contained in the Operating Process or Operating Procedures specified in this Requirement. The Operating Process or Operating Procedure must clearly identify to operating personnel how to determine the data that affects the analysis quality so that effective actions can be taken to resolve data quality issues in an appropriate timeframe.

**Auditor Notes:**

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**R3 Supporting Evidence and Documentation**

- R3.** Each Transmission Operator shall implement an Operating Process or Operating Procedure to address the quality of analysis used in its Real-time Assessments. The Operating Process or Operating Procedure shall include:
  - 3.1.** Criteria for evaluating the quality of analysis used in its Real-time Assessments;
  - 3.2.** Provisions to indicate the quality of analysis used in its Real-time Assessments; and
  - 3.3.** Actions to resolve analysis quality issues affecting its Real-time Assessments.
  
- M3.** Each Transmission Operator shall have evidence it implemented its Operating Process or Operating Procedure to address the quality of analysis used in its Real-time Assessments as specified in Requirement R3. This evidence could include, but is not limited to: 1) an Operating Process or Operating Procedure in electronic or hard copy format meeting all provisions of Requirement R3; and 2) evidence that the Transmission Operator implemented the Operating Process or Operating Procedure as called for in the Operating Process or Operating Procedure , such as dated operator logs, dated checklists, voice recordings, voice transcripts, or other evidence.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested:**

<b>Provide the following evidence, or other evidence to demonstrate compliance.</b>
Operating Process or Operating Procedure to address the quality of analysis used in its Real-time Assessments
Evidence of implementation of the Operating Process or Operating Procedure which addresses the quality of analysis used in its Real-time Assessments

**Registered Entity Evidence (Required):**

**The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.**

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**

**DRAFT NERC Reliability Standard Audit Worksheet**


**Compliance Assessment Approach Specific to TOP-010-1, R3**

*This section to be completed by the Compliance Enforcement Authority*

	Verify that the Operating Process or Operating Procedure to address the quality of analysis used in its Real-time Assessments includes:
	(Part 3.1) Criteria for evaluating the quality of analysis used in its Real-time Assessments
	(Part 3.2) Provisions to indicate the quality of analysis used in its Real-time Assessments
	(Part 3.3) Actions to resolve analysis quality issues affecting its Real-time Assessments
	Verify implementation of the Operating Process or Operating Procedure which addresses the quality of analysis used in its Real-time Assessments

**Note to Auditor:**

Requirement R3 ensures TOPs 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.

As specified in Requirement R3 Part 3.1, the entity must specify criteria for evaluating the quality of analysis used in its Real-time Assessments. The criteria support identification of applicable analysis quality issues, such as:

- Solution tolerances;
- Mismatches with Real-time data; or
- Convergences.

As specified in Requirement R3 Part 3.2, the entity must include provisions for how the quality of analysis results used in Real-time Assessment will be indicated. These indications should be shown to operating personnel.

**Auditor Notes:**

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**R4 Supporting Evidence and Documentation**

**R4.** Each Transmission Operator and Balancing Authority shall have an alarm process monitor that provides notification(s) to its System Operators when a failure of its Real-time monitoring alarm processor has occurred.

**M4.** Each Transmission Operator and Balancing Authority shall have evidence of an alarm process monitor that provides 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.

**Registered Entity Response (Required):**

**Question:** During the monitoring period, were there any failures of alarming?       Yes    No

[If Yes, provide a list of times during the monitoring period when there were failures of alarming, and proceed to the Compliance Narrative below. If No, proceed to the Compliance Narrative below.]

[Note: A separate spreadsheet or other document may be used. If so, provide the document reference below.]

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

**Evidence Requested:**

<b>Provide the following evidence, or other evidence to demonstrate compliance.</b>
The alarm process monitor used by the entity
The notification(s) when a failure of its Real-time monitoring alarm processor has occurred
The method that these notification(s) are provided to the entity's System Operators

**Registered Entity Evidence (Required):**

**The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.**

File Name	Document Title	Revision or Version	Document Date	Relevant Page(s) or Section(s)	Description of Applicability of Document

**Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):**

**DRAFT NERC Reliability Standard Audit Worksheet**


**Compliance Assessment Approach Specific to TOP-010-1, R4**

*This section to be completed by the Compliance Enforcement Authority*

	Verify the entity has an alarm process monitor
	Verify the notification(s) when a failure of its Real-time monitoring alarm processor has occurred exist.
	Verify that these notification(s) are provided to the entity's System Operators.

**Note to Auditor:**

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

The alarm process monitor 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. Also, a stalled Real-time monitoring alarm processor must not cause a failure of the alarm process monitor.

'Heartbeat' or 'watchdog' monitors are examples of an alarm process monitor.

**Auditor Notes:**

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**Additional Information:**

**Reliability Standard**

Insert embedded Standard file here and Implementation Plan (if required)

*The RSAW developer should provide the following information without hyperlinks. Update the information below as appropriate.*

In addition to the Reliability Standard, there is an applicable Implementation Plan available on the NERC Web Site. (Remove this statement if embedded file included)

In addition to the Reliability Standard, there is background information available on the NERC Web Site.

Capitalized terms in the Reliability Standard refer to terms in the NERC Glossary, which may be found on the NERC Web Site.

**Sampling Methodology [If developer deems reference applicable]**

Sampling is essential for auditing compliance with NERC Reliability Standards since it is not always possible or practical to test 100% of either the equipment, documentation, or both, associated with the full suite of enforceable standards. The Sampling Methodology Guidelines and Criteria (see NERC website), or sample guidelines, provided by the Electric Reliability Organization help to establish a minimum sample set for monitoring and enforcement uses in audits of NERC Reliability Standards.

**Regulatory Language [Developer to ensure RSAW has been provided to NERC Legal for links to appropriate Regulatory Language – See example below]**

E.g. FERC Order No. 742 paragraph 34: “Based on NERC’s.....

E.g. FERC Order No. 742 Paragraph 55, Commission Determination: “We affirm NERC’s.....

**Selected Glossary Terms [If developer deems applicable]**

The following Glossary terms are provided for convenience only. Please refer to the NERC web site for the current enforceable terms.

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**DRAFT** NERC Reliability Standard Audit Worksheet

**Revision History for RSAW**

Version	Date	Reviewers	Revision Description
1	09/14/2015	RSAW Task Force, Standards Drafting Team, NERC Compliance Assurance	New Document
2	12/22/2015		Revised to address changes made to the proposed Reliability Standard

<sup>i</sup> Items in the Evidence Requested section are suggested evidence that may, but will not necessarily, demonstrate compliance. These items are not mandatory and other forms and types of evidence may be submitted at the entity's discretion.