

Reliability Standard Audit Worksheet¹

IRO-002-5 – Reliability Coordination – Monitoring and Analysis

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)²: 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						
R5									X						
R6									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

¹ 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.

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

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Findings

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

Req.	Finding	Summary and Documentation	Functions Monitored
R1			
R2			
R3			
R4			
R5			
R6			

Req.	Areas of Concern

Req.	Recommendations

Req.	Positive Observations

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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)

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R1 Supporting Evidence and Documentation

- R1.** Each Reliability Coordinator shall have data exchange capabilities with its Balancing Authorities and Transmission Operators, and with other entities it deems necessary, for it to perform its Operational Planning Analyses.
- M1.** Each Reliability Coordinator shall have, and provide upon request, evidence that could include, but is not limited to, a document that lists its data exchange capabilities with Balancing Authorities and Transmission Operators, and with other entities it deems necessary, for it to perform its Operational Planning Analyses.

Compliance Narrative (Required):

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 Requested³:

Provide the following evidence, or other evidence to demonstrate compliance.
Provide a list(s) of data exchange capabilities with Transmission Operators, Balancing Authorities, and other entities the Reliability Coordinator deemed necessary.
Documentation may include appropriate data exchange system diagrams and or facilities with notations showing specific data exchange facilities with Transmission Operators, Balancing Authorities and any other entities the Reliability Coordinator deemed necessary.

Registered Entity Evidence (Required):

The following information is requested for each document submitted as evidence. 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

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

³ 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.

Compliance Assessment Approach Specific to IRO-002-5, R1

This section to be completed by the Compliance Enforcement Authority

(R1) Review a list of Transmission Operators and Balancing Authorities within the Reliability Coordinator Area, and other entities deemed necessary by the Reliability Coordinator, and ensure data exchange capabilities exist for performing Operational Planning Analyses as required in Requirement R1.

Note to auditor: IRO-010-2 requires the RC to have a data specification for all the data it needs for operational planning analysis, real-time assessment, and real-time monitoring.

Auditor Notes:

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R2 Supporting Evidence and Documentation

- 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.

- M2.** Each Reliability Coordinator shall have, and provide upon request, evidence that could include, but is not limited to, system specifications, system diagrams, or other documentation that lists its data exchange capabilities, including 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, as specified in the requirement.

Compliance Narrative (Required):

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 Requested⁴:

Provide the following evidence, or other evidence to demonstrate compliance.
Provide a list(s) of data exchange capabilities with Transmission Operators, Balancing Authorities, and other entities the Reliability Coordinator deemed necessary.
Evidence that data exchange capabilities have redundant and diversely routed data exchange infrastructure within the Reliability Coordinator's primary Control Center.

Registered Entity Evidence (Required):

The following information is requested for each document submitted as evidence. 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

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

⁴ 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.

Compliance Assessment Approach Specific to IRO-002-5, R2

This section to be completed by the Compliance Enforcement Authority

	(R2) Review a list of Transmission Operators and Balancing Authorities within the Reliability Coordinator Area, and other entities deemed necessary by the Reliability Coordinator, and ensure data exchange capabilities exist for performing Real-time monitoring and Real-time Assessments as required in Requirement R2.
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	(R2) Verify that data exchange capabilities have redundant and diversely routed data exchange infrastructure within the Reliability Coordinator's primary Control Center.
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Note to auditor:

Redundant and diversely routed data exchange capabilities consist of data exchange infrastructure components (e.g. switches, routers, file 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 Reliability Coordinator's (RC) 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 R2 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 RC'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. Additional redundant data exchange infrastructure components solely to provide for redundancy during planned or unplanned outages of individual components is not required.

Infrastructure that is not within the RC's primary Control Center is not addressed by the proposed requirement.

IRO-010-2 requires the RC to have a data specification for all the data it needs for operational planning analysis, real-time assessment, and real-time monitoring.

Auditor Notes:

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R3 Supporting Evidence and Documentation

- 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.

- M3.** Each Reliability Coordinator shall have, and provide upon request, evidence that it tested its primary Control Center data exchange capabilities specified in Requirement R2 for redundant functionality, or experienced an event that demonstrated the redundant functionality; and if the test was unsuccessful, initiated action within two hours to restore redundant functionality as specified in Requirement R3. Evidence could include, but is not limited to: dated and time-stamped test records, operator logs, voice recordings, or electronic communications.

Registered Entity Response (Required):

Question: Were any of the data exchange capability tests unsuccessful?

Yes No

If No, explain how this was ascertained. If Yes, provide a list of such instances and evidence of compliance.

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

Compliance Narrative (Required):

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 Requested⁵:

Provide the following evidence, or other evidence to demonstrate compliance.
Provide a list(s) of data exchange capabilities specified in Requirement R2.
Evidence that the entity tested its data exchange capabilities specified in Requirement R2 for redundant functionality, or experienced an event that demonstrated the redundant functionality. ^{[A1][A2]}
Evidence that for each unsuccessful test, the entity initiated action within two hours to restore redundant functionality.

Registered Entity Evidence (Required):

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

⁵ 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.

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

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

Compliance Assessment Approach Specific to IRO-002-5, R3

This section to be completed by the Compliance Enforcement Authority

	(R3) Verify the entity tests its data exchange capabilities specified in Requirement R2 for redundant functionality at least once every 90 calendar days.
	Verify that for each unsuccessful test, the entity initiated action, which could include but is not limited to contacting support staff, implementing a procedure used to assist in the restoration of redundant functionality, etc., within two hours to restore redundant functionality.

Note to auditor:

A test for redundant functionality demonstrates that data exchange capabilities will continue to operate despite the malfunction or failure of an individual component. An entity's testing practices should^[A3], 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.^[A4]^[A5]
^[A6]

Auditor Notes:

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R4 Supporting Evidence and Documentation

- R4.** Each Reliability Coordinator shall provide its System Operators with the authority to approve planned outages and maintenance of its telecommunication, monitoring and analysis capabilities.

- M4.** Each Reliability Coordinator shall have and provide upon request evidence that could include, but is not limited to, a documented procedure or equivalent evidence that will be used to confirm that the Reliability Coordinator has provided its System Operators with the authority to approve planned outages and maintenance of its telecommunication, monitoring and analysis capabilities.

Compliance Narrative (Required):

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 Requested⁶:

Provide the following evidence, or other evidence to demonstrate compliance.
Provide documented procedure(s) or equivalent evidence that confirms that the entity has provided its System Operators with the authority to approve planned outages and maintenance of its telecommunications, monitoring, and analysis capabilities.

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):

⁶ 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.

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Compliance Assessment Approach Specific to IRO-002-5, R4

This section to be completed by the Compliance Enforcement Authority

(R4) Review documented procedures or equivalent evidence and confirm that the entity has provided its System Operators with the authority to approve planned outages and maintenance of its telecommunications, monitoring, and analysis capabilities ^[A7] ^[A8] .
Note to Auditor: This can be verified through System Operator interview questions.

Auditor Notes:

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R5 Supporting Evidence and Documentation

- R5.** Each Reliability Coordinator shall monitor Facilities, the status of Remedial Action Schemes, and non-BES facilities identified as necessary by the Reliability Coordinator, within its Reliability Coordinator Area and neighboring Reliability Coordinator Areas to identify any System Operating Limit exceedances and to determine any Interconnection Reliability Operating Limit exceedances within its Reliability Coordinator Area.
- M5.** Each Reliability Coordinator shall have, and provide upon request, evidence that could include, but is not limited to, Energy Management System description documents, computer printouts, SCADA data collection, or other equivalent evidence that will be used to confirm that it has monitored Facilities, the status of Remedial Action Schemes, and non-BES facilities identified as necessary by the Reliability Coordinator, within its Reliability Coordinator Area and neighboring Reliability Coordinator Areas to identify any System Operating Limit exceedances and to determine any Interconnection Reliability Operating Limit exceedances within its Reliability Coordinator Area.

Compliance Narrative (Required):

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.

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Evidence Requested⁷:

Provide the following evidence, or other evidence to demonstrate compliance.
Energy Management System (EMS) description documents, computer printouts, summary of SCADA collections of Real-time monitoring telemetry, or other equivalent evidence that will be used to confirm that the entity has monitored Facilities within its Reliability Coordinator Area and neighboring Reliability Coordinator Areas.
List(s) of monitored Remedial Action Schemes within the Reliability Coordinator’s area.
List(s) of identified or monitored non-BES facilities which are needed to identify System Operating Limit exceedances or to determine Interconnection Reliability Operating Limit exceedances within its Reliability Coordinator Area.

Registered Entity Evidence (Required):

The following information is requested for each document submitted as evidence. 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

⁷ 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.

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

Compliance Assessment Approach Specific to IRO-002-5, R5

This section to be completed by the Compliance Enforcement Authority

(R5) For all, or a sample of, Facilities, Remedial Action Schemes, and non-BES facilities identified as necessary by the entity, within its Reliability Coordinator Area and neighboring Reliability Coordinator Areas, review evidence and determine if the entity monitored them to identify any System Operating Limit exceedances and to determine any Interconnection Reliability Operating Limit exceedances within its area.

Note to Auditor: This can also be confirmed through observation during the Control Center observation and/or System Operator interview.

Auditor Notes:

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R6 Supporting Evidence and Documentation

R6. Each Reliability Coordinator shall have monitoring systems that provide information utilized by the Reliability Coordinator’s operating personnel, giving particular emphasis to alarm management and awareness systems, automated data transfers, and synchronized information systems, over a redundant infrastructure.

M6. The Reliability Coordinator shall have, and provide upon request, evidence that could include, but is not limited to, Energy Management System description documents, computer printouts, SCADA data collection, or other equivalent evidence that will be used to confirm that it has monitoring systems consistent with the requirement.

Compliance Narrative (Required):

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 Requested⁸:

Provide the following evidence, or other evidence to demonstrate compliance.
Reliability Coordinator Energy Management System (EMS) description documents, computer printouts, summary of SCADA data collection of Real-time telemetry, or other equivalent evidence that will be used to confirm that it has monitoring systems consistent with Requirement R6. Evidence must be specific to alarm management and awareness systems, automated data transfers, and synchronized information systems. Documentation should be specific and detailed showing how infrastructure is provisioned to operate in a redundant manner.

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):

⁸ 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.

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Compliance Assessment Approach Specific to IRO-002-5, R6

This section to be completed by the Compliance Enforcement Authority

	Review evidence and determine if the entity had redundant monitoring systems that:
	<ul style="list-style-type: none">• Provide information utilized by the Reliability Coordinator’s operating personnel.
	<ul style="list-style-type: none">• Emphasize alarm management and awareness systems.
	<ul style="list-style-type: none">• Emphasize automated data transfers.
	<ul style="list-style-type: none">• Emphasize synchronized information systems.
Note to Auditor: This can also be confirmed through observation during the Control Center observation and/or System Operator interview.	

Auditor Notes:

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Additional Information:

Reliability Standard

To be inserted by RSAW developer prior to posting of this RSAW associated with the enforceable date of this Reliability Standard.

Sampling Methodology

To be inserted by RSAW developer prior to posting of this RSAW associated with the enforceable date of this Reliability Standard, if applicable.

Regulatory Language

To be inserted by NERC Legal prior to posting of this RSAW associated with the enforceable date of this Reliability Standard.

Selected Glossary Terms

To be inserted by RSAW developer prior to posting of this RSAW associated with the enforceable date of this Reliability Standard, if applicable.

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Revision History for RSAW

Version	Date	Reviewers	Revision Description
1	06/30/2016	NERC Compliance Assurance, RSAW Task Force	New Document
2	09/09/2016	NERC Compliance Assurance, RSAW Task Force	Updated to reflect changes in draft Standard

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