

**Reliability Standard Audit Worksheet[[1]](#footnote-1)**

IRO-002-4 – Reliability Coordination – Monitoring and Analysis

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

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| **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]](#footnote-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**

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

**Legend:**

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| --- | --- |
| 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 |

Findings

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

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

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| Req. | Areas of Concern |
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| Req. | Recommendations |
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| 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):

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| 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, Real-time monitoring, and Real-time Assessments.

**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 its Balancing Authorities and Transmission Operators, and with other entities it deems necessary, for it to perform its operational Planning Analyses, Real-time monitoring, and Real-time Assessments.

**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 Requested[[3]](#endnote-1):

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| Provide the following evidence, or other evidence to demonstrate compliance.  |
| Provide a list(s) of data exchange capabilities with its 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.  |
| The entity’s documented specification for the data necessary for it to perform its Operational Planning Analyses, Real-time monitoring, and Real-time Assessments (from IRO-010-2 Requirement R1.) |

Registered Entity Evidence (Required):

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

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Compliance Assessment Approach Specific to IRO-002-4, R1

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

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|  | (R1) Verify the entity has 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, Real-time monitoring, and Real-time Assessments.  |
| **Note to auditor**: Data necessary to perform the entity’s Operational Planning Analyses, Real-time monitoring, and Real-time Assessments is maintained in a documented specification required in IRO-010-2 Requirement R1. |

Auditor Notes:

R2 Supporting Evidence and Documentation

**R2.** Each Reliability Coordinator shall provide its System Operators with the authority to approve planned outages and maintenance of its telecommunication, monitoring and analysis capabilities.

**M2.** 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.

Requestedi:

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| 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):

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

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Compliance Assessment Approach Specific to IRO-002-4, R2

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

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|  | (R2) 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 telecommunication, monitoring, and analysis capabilities. |
| **Note to Auditor**:  |

Auditor Notes:

R3 Supporting Evidence and Documentation

**R3.** Each Reliability Coordinator shall monitor Facilities, the status of Special Protection Systems, 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.

**M3.** 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, Supervisory Control and Data Acquisition (SCADA) data collection, or other equivalent evidence that will be used to confirm that it has monitored Facilities, the status of Special Protection Systems, 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.

Evidence Requestedi:

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| 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 Special Protection Systems.  |
| List(s) of 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. |
| The entity’s documented specification for the data necessary for it to perform its Real-time monitoring and Real-time Assessments (from IRO-010-2 Requirement R1.) |

Registered Entity Evidence (Required):

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

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Compliance Assessment Approach Specific to IRO-002-4, R3

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

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|  | (R3) For all, or a sample of, Facilities, Special Protection Systems, 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**: Data necessary to perform Real-time monitoring and Real-time Assessments is maintained in a documented specification required in IRO-010-2 Requirement R1. |

Auditor Notes:

R4 Supporting Evidence and Documentation

**R4.** 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.

**M4.** 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 Requestedi:

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| **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 R4. 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):

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

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Compliance Assessment Approach Specific to IRO-002-4, R4

This section to be completed by the Compliance Enforcement Authority

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|  | Review evidence and determine if the entity had redundant monitoring systems that:  |
|  | * provide information utilized by the Reliability Coordinator’s operating personnel.
 |
|  | * emphasize alarm management and awareness systems.
 |
|  | * emphasize automated data transfers.
 |
|  | * emphasize synchronized information systems.
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| **Note to Auditor**:  |

Auditor Notes:

Additional Information:

Reliability Standard



The full text of IRO-002-2 may be found on the NERC Web Site (www.nerc.com) under “Program Areas & Departments”, “Reliability Standards.”

In addition to the Reliability Standard, there is an applicable Implementation Plan available on the NERC Web Site.

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.

Regulatory Language

[*Transmission Operations Reliability Standards and Interconnection Reliability Operations and Coordination Reliability Standards,* Final Rule, Order No. 817, 153 FERC ¶ 61,178 (2015).](http://www.nerc.com/FilingsOrders/us/FERCOrdersRules/Order%20No.%20817%20Approving%20TOP%20IRO%20Reliability%20Standards.pdf)

5. The Commission approved the initial TOP and IRO Reliability Standards in Order No. 693. On April 16, 2013, in Docket No. RM13-14-000, NERC submitted for Commission approval three revised TOP Reliability Standards to replace the eight currently-effective TOP standards.8 Additionally, on April 16, 2013, in Docket No. RM13-15-000, NERC submitted for Commission approval four revised IRO Reliability Standards to replace six currently-effective IRO Reliability Standards. On November 21, 2013, the Commission issued the Remand NOPR in which the Commission expressed concern that NERC had “removed critical reliability aspects that are included in the currently-effective standards without adequately addressing these aspects in the proposed standards.” The Commission identified two main concerns and asked for clarification and comment on a number of other issues. Among other things, the Commission expressed concern that the proposed TOP Reliability Standards did not require transmission operators to plan and operate within all SOLs, which is a requirement in the currently-effective standards. In addition, the Commission expressed concern that the proposed IRO Reliability Standards did not require outage coordination.

13. Pursuant to section 215(d) of the FPA, we adopt our NOPR proposal and approve NERC’s revisions to the TOP and IRO Reliability Standards, including the associated definitions, violation risk factors, violation severity levels, and implementation plans, as just, reasonable, not unduly discriminatory or preferential and in the public interest.

14. We also determine that the proposed TOP and IRO Reliability Standards should improve reliability by defining an appropriate division of responsibilities between reliability coordinators and transmission operators.

17. Furthermore, the revised definitions of operational planning analysis and real-time assessment are critical components of the proposed TOP and IRO Reliability Standards and, together with the definitions of SOLs, IROLs and operating plans, work to ensure that reliability coordinators, transmission operators and balancing authorities plan and operate the bulk electric system within all SOLs and IROLs to prevent instability, uncontrolled separation, or cascading. In addition, the revised definitions of operational planning analysis and real-time assessment address other concerns raised in the Remand NOPR as well as multiple recommendations in the 2011 Southwest Outage Blackout Report.

19. However, as we discuss below we direct NERC to modify the standards to include transmission operator monitoring of non-BES facilities, and to specify that data exchange capabilities include redundancy and diverse routing; as well as testing of the alternate or less frequently used data exchange capability, within 18 months of the effective date of this Final Rule.

47. We agree with NERC and other commenters that there is a reliability need for the reliability coordinator, transmission operator and balancing authority to have data exchange capabilities that are redundant and diversely routed. However, we are concerned that the TOP and IRO Standards do not clearly address redundancy and diverse routing so that registered entities will unambiguously recognize that they have an obligation to address redundancy and diverse routing as part of their TOP and IRO compliance obligations. NERC’s comprehensive approach to establishing communications capabilities necessary to maintain reliability in the COM standards is applicable to data exchange capabilities at issue here. Therefore, pursuant to section 215(d)(5) of the FPA, we direct NERC to modify Reliability Standards TOP-001- 3, Requirements R19 and R20 to include the requirement that the data exchange capabilities of the transmission operators and balancing authorities require redundancy and diverse routing. In addition, we direct NERC to clarify that “redundant infrastructure” for system monitoring in Reliability Standards IRO-002-4, Requirement R4 is equivalent to redundant and diversely routed data exchange capabilities.

Selected Glossary Terms

Please refer to the NERC web site for the current enforceable terms.

Specific Glossary terms suggested to be included in this RSAW:

**Real-time Assessment** (revised definition effective 1/1/2017):

An evaluation of system conditions using Real-time data to assess existing (pre-Contingency) and potential (post-Contingency) operating conditions. The assessment shall reflect applicable inputs including, but not limited to: load, generation output levels, known Protection System and Special Protection System status or degradation, Transmission outages, generator outages, Interchange, Facility Ratings, and identified phase angle and equipment limitations. (Real-time Assessment may be provided through internal systems or through third-party services.)

**Operational Planning Analysis** (adopted 3/17/2011):

An analysis of the expected system conditions for the next day’s operation. (That analysis may be performed either a day ahead or as much as 12 months ahead.) Expected system conditions include things such as load forecast(s), generation output levels, and known system constraints (transmission facility outages, generator outages, equipment limitations, etc.).

Revision History for RSAW

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| --- | --- | --- | --- |
| **Version** | **Date** | **Reviewers** | **Revision Description** |
| 1 | 06/20/2014 | Initial Posting | New Document |
| 2 | 08/29/2014 | NERC Compliance, NERC Standards, RSAWTF | Revisions for updated standard language and comments received during comment period. |
| 3 | 10/16/2014 | NERC Compliance, NERC Standards | Revisions for comments received during second comment period. |
| 4 | 11/3/2016 | NERC Compliance Assurance, RSAWTF | Revised for consistency with the final approved Standard. |

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 applicable 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. [↑](#footnote-ref-1)
2. Compliance Assessment Date(s): The date(s) the actual compliance assessment (on-site audit, off-site spot check, etc.) occurs. [↑](#footnote-ref-2)
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. [↑](#endnote-ref-1)