

## Standard Development Timeline

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

### Development Steps Completed

SAR posted February 21, 2014 – March 24, 2014

First posting May 19, 2014 – July 2, 2014

### Description of Current Draft

This is the ~~first~~second posting of the revised standard under Project 2014-03 Revisions to the TOP/IRO Reliability Standards. The SDT is working under a deadline for filing the revised standards with FERC of January 31, 2015.

Anticipated Actions	Anticipated Date
<del>Additional ballot</del>	<del>August 2014</del>
Final ballot	October 2014
BOT	November 2014

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
0	August 8, 2005	Removed "Proposed" from Effective Date	Errata
1	November 1, 2006	Adopted by Board of Trustees	Revised
2		Deleted R2, M3 and associated compliance elements Replaced Levels of Non-compliance with the Feb 28, BOT approved Violation Severity Levels (VSLs) Corrected typographical errors in BOT approved version of VSLs	Revised
<u>2</u>	<u>October 17, 2008</u>	<u>Adopted by NERC Board of Trustees</u>	<u>Revised</u>
<u>2</u>	<u>March 17, 2011</u>	<u>Order issued by FERC approving IRO-002-2 (approval effective 5/23/11)</u>	<u>FERC approval</u>
<u>2</u>	<u>February 24, 2014</u>	<u>Updated VSLs based on June 24, 2013 approval.</u>	<u>VSLs revised</u>
<u>3</u>	<u>July 25, 2011</u>	<u>Revised under Project 2006-06</u>	<u>Revised</u>
<u>3</u>	<u>August 4, 2011</u>	<u>Approved by Board of Trustees</u>	
<u>4</u>	<u>April 2014</u>	<u>Revisions as per Project 2014-03</u>	<u>Revised</u>
<del>2</del>	<del>October 17, 2008</del>	<del>Adopted by NERC Board of Trustees</del>	
<del>2</del>	<del>March 17, 2011</del>	<del>Order issued by FERC approving IRO-002-2 (approval effective 5/23/11)</del>	
<del>2</del>	<del>February 24, 2014</del>	<del>Updated VSLs based on June 24, 2013 approval.</del>	
<del>-3</del>	<del>August 4, 2011</del>	<del>Approved by Board of Trustees</del>	
<del>-4</del>	<del>April 2014</del>	<del>Revisions as per Project 2014-03</del>	

### Definitions of Terms Used in Standard

*This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.*

~~There are no new or revised definitions proposed in this standard revision.~~

**Real-time Assessment:** 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 ~~contracted~~third-party services.)

**Operational Planning Analysis:** An evaluation of projected system conditions to assess anticipated (pre-Contingency) and potential (post-Contingency) conditions for next-day operations. The evaluation shall reflect applicable inputs including, but not limited to, load forecasts; generation output levels; Interchange; known Protection System and Special Protection System status or degradation; Transmission outages; generator outages; Facility Ratings; and identified phase angle and equipment limitations. (Operational Planning Analysis may be provided through internal systems or through ~~contracted~~third-party services.)

Rationale - Changes made to the proposed definitions were made in order to respond to issues raised in NOPR paragraphs 55, 73, and 74 dealing with analysis of SOLs in all time horizons, questions on Protection Systems and Special Protection Systems in NOPR paragraph 78, and recommendations on phase angles from the SW Outage Report (recommendation 27). The intent of such changes is to ensure that Real-time Assessments contain sufficient details to result in an appropriate level of situational awareness. Some examples include: 1) analyzing phase angles which may result in the implementation of an Operating Plan to adjust generation or curtail transactions so that a Transmission facility may be returned to service, or 2) evaluating the impact of a modified Contingency resulting from the status change of a Special Protection Scheme from enabled/in-service to disabled/out-of-service.

*When this standard has received ballot approval, the text boxes will be moved to the Application Guidelines Section of the Standard.*

### A. Introduction

1. **Title:** Reliability Coordination – Monitoring and Analysis
2. **Number:** IRO-002-4
3. **Purpose:** Provide System Operators with the capabilities necessary to monitor and analyze data needed to perform their reliability functions.
4. **Applicability**
  - 4.1. Reliability Coordinator
5. **Effective Date:**

The standard shall become effective on the first day of the first calendar quarter that is twelve (12) months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter that is twelve (12) months after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.

6. **Background:**

~~On April 16, 2013, NERC submitted two petitions requesting Commission approval of TOP and IRO standards. One petition addresses three revised TOP Reliability Standards: TOP-001-2 (Transmission Operations), TOP-002-3 (Operations Planning), TOP-003-2 (Operational Reliability Data), and one Protection Systems (PRC) Reliability Standard, PRC-001-2 (System Protection Coordination) to replace the eight currently-effective TOP standards. The second petition addresses four revised IRO Reliability Standards: IRO-001-3 (Responsibilities and Authorities), IRO-002-3 (Analysis Tools), IRO-005-4 (Current Day Operations), and IRO-014-2 (Coordination Among Reliability Coordinators) to replace six currently-effective IRO standards.~~

~~On November 21, 2013, the Commission issued a NOPR proposing to remand these TOP and IRO Standards, stating that NERC “has removed critical reliability aspects that are included in the currently-effective standards without adequately addressing these aspects in the proposed standards.” For example, the Commission cites the fact that the proposed TOP Standards do not require Transmission Operators to plan and operate within all System Operating Limits (“SOLs”), which is a requirement in the currently-effective standards.~~

~~On December 20, 2013, NERC filed a motion requesting that the Commission defer action on the NOPR until January 31, 2015 to provide NERC and the industry the~~

~~opportunity to thoroughly examine the technical concerns raised in the NOPR and afford time to review the proposed TOP and IRO Standards through the NERC standards development process to ensure that a technically justified set of solutions is in place for reliability. That motion to defer action was granted on January 14, 2014.~~

~~On February 12, 2014, the Standards Committee appointed a Standard Drafting Team to take on the task of revising the aforementioned standards in response to the NOPR issues and the recommendations made by the Independent Expert Review Panel, the IRO FYRT, and the SW Outage Report. [See the Project 2014-03 project page.](#)~~

## B. Requirements and Measures

**Rationale:** Requirements R1 and R2 from IRO-002-2 have been added back into IRO-002-4 in order to ensure that there is no reliability gap. The SDT found no proposed requirements in the current project that covered the issues. The currently-effective requirement in IRO-002-2 has been separated into two parts (Requirements R1 and R2 below) to distinguish voice and data requirements. Staffing of communications and facilities in corresponding requirements from IRO-002-2 is addressed in approved PER-004-2, Requirement R1 and has been deleted from this draft.

- ~~R1. Each Reliability Coordinator shall have voice communications facilities with Transmission Operators, Balancing Authorities, and Generator Operators within its Reliability Coordinator Area and with neighboring Reliability Coordinators. [Violation Risk Factor: High] [Time Horizon: Operations Planning, Same-Day Operations, Real-time Operations]~~
- ~~M1. Each Reliability Coordinator shall have and provide upon request, evidence that could include, but is not limited to, a document that lists its voice communications facilities with Transmission Operators, Balancing Authorities, and Generator Operators within its Reliability Coordinator Area and with neighboring Reliability Coordinators.~~
- ~~R2. Each Reliability Coordinator shall have data linksexchange capabilities with 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. ~~with Balancing Authorities, Planning Coordinators, Transmission Planners, Generator Owners, Generator Operators, Load Serving Entities, Transmission Operators, Transmission Owners, and Distribution Providers within its Reliability Coordinator Area and with neighboring Reliability Coordinators.~~ [Violation Risk Factor: High] [Time Horizon: Operations Planning, Same-Day Operations, Real-time Operations]~~
- ~~M2. Each Reliability Coordinator shall have and provide upon request, evidence that could include, but is not limited to, a document that lists its data linksexchange capabilities~~

with Balancing Authorities, ~~Planning Coordinators, Transmission Planners, Generator Owners, Generator Operators, Load-Serving Entities, and~~ Transmission Operators, ~~Transmission Owners, and Distribution Providers~~ and with other entities it deems necessary, for it to perform its operational Planning Analyses, Real-time monitoring, and real-time Assessments within its Reliability Coordinator Area and with neighboring Reliability Coordinators.

- R3.** Each Reliability Coordinator shall provide its System Operators with the authority to approve planned outages and maintenance of its telecommunication, monitoring and analysis capabilities. *[Violation Risk Factor: High] [Time Horizon: Operations Planning, Same-Day Operations, Real-time Operations]*
- M3.** 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.

**Rationale:** Requirement R2 from IRO-002-3 has been deleted because approved EOP-008-1, Requirement R1, part 1.6.2 addresses redundancy and back-up concerns for outages of analysis tools. New Requirement R4 has been added to address NOPR paragraphs 96 and 97: “...As we explain above, the reliability coordinator’s obligation to monitor SOLs is important to reliability because a SOL can evolve into an IROL during deteriorating system conditions, and for potential system conditions such as this, the reliability coordinator’s monitoring of SOLs provides a necessary backup function to the transmission operator...”

- R4.** Each Reliability Coordinator shall monitor Facilities, the status of Special Protection Systems, and sub-100 kV facilities identified as necessary by the Reliability Coordinator, within its Reliability Coordinator Area and neighboring Reliability Coordinator Areas to ~~determine~~identify any ~~potential~~ System Operating Limit exceedances and to determine any Interconnection Reliability Operating Limit exceedances within its Reliability Coordinator Area, ~~including sub-100 kV facilities needed to make this determination and the status of Special Protection Systems in its Reliability Coordinator Area~~. *[Violation Risk Factor: High] [Time Horizon: Real-Time Operations]*
- M4.** 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 Special Protection Systems, and sub-100 kV facilities identified as necessary by the Reliability Coordinator, within its Reliability Coordinator Area and neighboring Reliability Coordinator Areas to ~~determine~~identify any ~~potential~~ System Operating Limit exceedances and to determine any Interconnection Reliability Operating Limit exceedances within its Reliability Coordinator Area, ~~including sub-100 kV facilities~~

~~needed to make this determination and the status of Special Protection Systems in its Reliability Coordinator Area.~~

**Rationale for Requirement R5:** Requirement R5 added back from approved IRO-002-2 as the SDT found no proposed requirements that covered the issues.

- R5.** 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 ~~and highly reliable~~ infrastructure. *[Violation Risk Factor: High] [Time Horizon: Real-time Operations]*
- M5.** 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.

## C. Compliance

### 1. Compliance Monitoring Process

#### 1.1. Compliance Enforcement Authority

As defined in the NERC Rules of Procedure, “Compliance Enforcement Authority” (CEA) means NERC or the Regional Entity in their respective roles of monitoring and enforcing compliance with the NERC Reliability Standards.

#### 1.2. Compliance Monitoring and ~~Enforcement~~Assessment Processes:

~~Compliance Audits~~

~~Self-Certifications~~

~~Spot Checking~~

~~Compliance Violation Investigation~~

~~Self-Reporting~~

~~Complaints~~

As defined in the NERC Rules of Procedure, “Compliance Monitoring and Assessment Processes” refers to the identification of the processes that will be used to evaluate data or information for the purpose of assessing performance or outcomes with the associated reliability standard.

#### 1.3. Data Retention

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 its current, in force document and any documents in force for the current year and previous calendar year for Requirements R1, R2, and R3 and Measures M1, M2, and M3.

The Reliability Coordinator shall keep data or evidence for Requirements R4 and R5 and Measures M4 and M5 for the current calendar year and one previous calendar year.

If a Reliability Coordinator is found non-compliant, it shall keep information related to the non-compliance until found compliant.

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

**1.4. Additional Compliance Information**

None.



Table of Compliance Elements

R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operations Planning, Same-Day Operations, Real-time Operations	High	<p>N/A</p> <p><del>The Reliability Coordinator did not have voice communication facilities with one applicable entity, or 5% or less of the applicable entities, whichever is less, as specified in Requirement R1.</del></p>	<p>N/A</p> <p><del>The Reliability Coordinator did not have voice communication facilities with two applicable entities, or more than 5% and less than or equal to 10% of the applicable entities, whichever is less, as specified in Requirement R1.</del></p>	<p>N/A</p> <p><del>The Reliability Coordinator did not have voice communication facilities with three applicable entities, or more than 10% and less than or equal to 15% of the reliability entities, whichever is less, as specified in Requirement R1.</del></p>	<p><del>The Reliability Coordinator doesdid not have voice communication facilities with Transmission Operators, Balancing Authorities, and Generator Operators within its Reliability Coordinator Area or with neighboring Reliability Coordinators four or more applicable entities, or more than 15% of the entities, whichever is less, as specified in Requirement R1.</del></p>
R2	Operations Planning, Same-Day Operations, Real-time Operations	High	<p>N/A</p> <p><del>The Reliability Coordinator did not have data exchange capabilities with one applicable entity, or 5% or less of the applicable entities, whichever is less.</del></p>	<p>N/A</p> <p><del>The Reliability Coordinator did not have data exchange capabilities with two applicable entities, or more than 5% or less than or equal to 10% of the applicable entities, whichever is less.</del></p>	<p>N/A</p> <p><del>The Reliability Coordinator did not have data exchange capabilities with three applicable entities, or more than 10% or less than or equal to 15% of the applicable entities, whichever is less.</del></p>	<p><del>The Reliability Coordinator doesdid not have data link facilitiesexchange capabilities with Balancing Authorities, Planning Coordinators, Transmission Planners, Generator Owners, Generator Operators, Load-Serving Entities, Transmission Operators, Transmission Owners, and Distribution Providers within its Reliability Coordinator Area or with neighboring Reliability</del></p>

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R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						<u>Coordinators four or more applicable entities or greater than 15% of the applicable entities, whichever is less.</u>
R3	Operations Planning, Same-Day Operations, Real-time Operations	High	N/A	N/A	N/A	The Reliability Coordinator failed to provide its System Operator with the authority to approve planned outages and maintenance of its <u>telecommunication</u> , monitoring and analysis capabilities.
R4	Real-time Operations	High	N/A	N/A	N/A	The Reliability Coordinator did not monitor Facilities, <u>the status of Special Protection Systems, and sub-100 kV facilities identified as necessary by the Reliability Coordinator</u> , within its Reliability Coordinator Area and neighboring Reliability Coordinator Areas to <del>determine</del> <u>identify</u> any <del>potential</del> System Operating Limit <u>exceedances</u> and <u>to determine any</u> Interconnection Reliability Operating Limit exceedances within its Reliability Coordinator Area, <u>including sub-100 kV facilities needed to make this determination and</u>

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R #	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						<del>the status of Special Protection Systems in its Reliability Coordinator Area.</del>
R5	Operations Planning, Same-Day Operations, Real-time Operations	High	N/A	N/A	N/A	The Reliability Coordinator did not 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 <del>and highly reliable</del> infrastructure.

**D. Regional Variances**

None.

**E. Interpretations**

None.

**F. Associated Documents**

None.