Standard Development Roadmap

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:

1. Draft SAR Version 1 posted January 15, 2007
2. Draft SAR Version 1 Comment Period ended February 14, 2007
3. Draft SAR Version 2 and comment responses on SAR version 1 posted March 19, 2007
4. Draft Version 2 SAR comment period ended April 17, 2007
5. SAR version 2 and comment responses for SAR version 2 accepted by SC and SDT appointed in June 2007.
6. First posting of revised standards on August 5, 2008 with comment period closed on September 16, 2008.
7. Draft Version 2of standards and response to comments September 16, 2008–May 26, 2009.
8. Second posting of revised standards on July 10, 2009 with comment period closed on August 9, 2009. (Note that as part of the second posting, the sole requirements retained from IRO-002 were posted for the second time within IRO-001 with a suggestion to retire IRO-002.)
9. RC SDT coordinated with OPCP SDT and RTO SDT on definitions relating to directives and three part communication and Draft Version 3 of standards and response to comments August 9–November 20, 2009.
10. Third posting of revised standards on January 4, 2010 with comment period closed on February 18, 2010. (Note that in this posting, the requirements for IRO-002 were posted in IRO-001.)
11. Fourth posting of revised standards for a comment period with an initial ballot from January 18, 2011 through March 7, 2011. (Note that in this posting, the requirements for IRO-002 were moved from IRO-001 back into IRO-002.)

Proposed Action Plan and Description of Current Draft:

This is the fifth draft of the requirements in this standard posted for a recirculation ballot. The standards that did not receive comments in the initial ballot will move forward for a recirculation ballot; standards needing significant revision will move forward to another comment period and a successive ballot. IRO-005-4 did not have any significant changes following the initial ballot and is being posted for a recirculation ballot.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Standard posted for recirculation ballots.	July 2011
1. Standard sent to BOT for approval.	August 2011
2. Standard filed with regulatory authorities.	September 2011

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.

None

A. Introduction

1. Title: **Reliability Coordination ~~— Facilities~~ – Analysis Tools**

2. Number: IRO-002-~~2~~3

3. Purpose: To ensure that Reliability Coordinators ~~need information, tools and other capabilities to perform~~provide their ~~responsibilities~~System Operators with authority with respect to analysis tool outages and to have procedures to mitigate effects of analysis tool outages.

4. Applicability

4.1. Reliability ~~Coordinators.~~Coordinator

~~Proposed~~ Effective Date: In those jurisdictions where regulatory approval is required, this standard shall become effective on the first day of the first calendar quarter after applicable regulatory approval. In those jurisdictions where no regulatory approval is required, ~~the~~this standard shall become effective on the ~~latter of either April 1, 2009 or the~~ first day of the first calendar quarter~~, three months~~ after Board of ~~Trustee adoption.~~

5. ~~In those jurisdictions where regulatory approval is required, the standard shall become effective on the latter of either April 1, 2009 or the first day of the first calendar quarter, three months after applicable regulatory approval.~~Trustees approval.

B. Requirements

~~R1.~~ ~~Each Reliability Coordinator shall have adequate communications facilities (voice and data links) to appropriate entities within its Reliability Coordinator Area. These communications facilities shall be staffed and available to act in addressing a real-time emergency condition.~~

~~R2.~~ ~~Each Reliability Coordinator or its Transmission Operators and Balancing Authorities shall provide, or arrange provisions for, data exchange to other Reliability Coordinators or Transmission Operators and Balancing Authorities via a secure network.~~

~~R3.~~ ~~Each Reliability Coordinator shall have multi-directional communications capabilities with its Transmission Operators and Balancing Authorities, and with neighboring Reliability Coordinators, for both voice and data exchange as required to meet reliability needs of the Interconnection.~~

~~R4.~~ ~~Each Reliability Coordinator shall have detailed real-time monitoring capability of its Reliability Coordinator Area and sufficient monitoring capability of its surrounding Reliability Coordinator Areas to ensure that potential or actual System Operating Limit or Interconnection Reliability Operating Limit violations are identified. Each Reliability Coordinator shall have monitoring systems that provide information that can be easily understood and interpreted 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.~~

~~R5.~~ ~~Each Reliability Coordinator shall monitor Bulk Electric System elements (generators, transmission lines, buses, transformers, breakers, etc.) that could result in SOL or IROL violations within its Reliability Coordinator Area. Each Reliability Coordinator shall monitor both real and reactive power system flows, and operating reserves, and the status of Bulk Electric System elements that are or could be critical to SOLs and IROLs and system restoration requirements within its Reliability Coordinator Area.~~

~~**R6.** Each Reliability Coordinator shall have adequate analysis tools such as state estimation, pre- and post-contingency analysis capabilities (thermal, stability, and voltage), and wide-area overview displays.~~

~~**R7.** Each Reliability Coordinator shall continuously monitor its Reliability Coordinator Area. Each Reliability Coordinator shall have provisions for backup facilities that shall be exercised if the main monitoring system is unavailable. Each Reliability Coordinator shall ensure SOL and IROL monitoring and derivations continue if the main monitoring system is unavailable.~~

R1. Each Reliability Coordinator shall ~~control~~provide its ~~Reliability Coordinator~~System Operators with the authority to approve, deny or cancel planned outages of its own analysis tools~~, including approvals for planned maintenance.~~ *. [Violation Risk Factor: Medium] [Time Horizon: Real-time Operations, Same Day Operations and Operations Planning]*

~~R8.~~R2. Each Reliability Coordinator shall have procedures in place to mitigate the effects of analysis tool outages. *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations, Same Day Operations and Operations Planning]*

C. Measures

~~**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, that will be used to confirm that it has communication facilities in accordance with Requirements 1 and 3.~~

~~**M2.** Each Reliability Coordinator shall have and provide upon request evidence that could include, but is not limited to, a data link facility description document, computer print-out, training document, or other equivalent evidence that will be used to confirm that it has data links with entities within its Reliability Coordinator Area and with neighboring Reliability Coordinators, as specified in Requirements 1 and 3.~~

~~**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, SCADA data collection system communications performance or equivalent evidence to demonstrate that it has real-time monitoring capability of its Reliability Coordinator Area and monitoring capability of its surrounding Reliability Coordinator Areas to identify potential or actual System Operating Limit or Interconnection Reliability Operating Limit violations.~~

~~**M4.** Each Reliability Coordinator shall have and provide upon request evidence that could include, but is not limited to, documentation from suppliers, operating and planning staff training documents, examples of studies, or other equivalent evidence to show that it has analysis tools in accordance with Requirement 6.~~

~~**M5.** Each Reliability Coordinator shall provide evidence such as equipment specifications, operating procedures, staff records of their involvement in training, or other equivalent evidence to show that it has a backup monitoring facility that can be used to identify and monitor SOLs and IROLs. (Requirement 7)~~

~~M6.~~M1. 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 ~~veto~~approve, deny or cancel planned outages ~~to~~of its own analysis tools~~, including final approvals for planned maintenance as specified in Requirement 8 Part 1.~~. (R1)

~~M7.~~M2. Each Reliability Coordinator shall have and provide upon request ~~its current~~evidence that could include, but is not limited to, a documented procedure or equivalent

evidence that will be used to confirm that that the Reliability Coordinator has procedures ~~used~~in place to mitigate the effects of analysis tool outages ~~as specified in Requirement 8 Part 2.~~. (R2)

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance ~~Monitoring Responsibility~~Enforcement Authority

The Regional Entity is the Compliance Enforcement Authority except where the Reliability Coordinator works for the Regional Entity. Where the Reliability Coordinator works for the Regional Entity, the Regional Entity will establish an agreement with the ERO or another entity approved by the ERO and FERC (i.e. another Regional Entity), to be responsible for compliance enforcement.

~~Regional Reliability Organizations shall be responsible for compliance. Monitoring.~~

~~Compliance **Monitoring and Reset Time Frame**~~

~~One or more of the following methods will be used to assess compliance:~~

- ~~Self-certification (Conducted annually with submission according to schedule.)~~
- ~~Spot Check Audits (Conducted anytime with up to 30 days notice given to prepare.)~~
- ~~Periodic Audit (Conducted once every three years according to schedule.)~~
- ~~Triggered Investigations (Notification of an investigation must be made within 60 days of an event or complaint of noncompliance. The entity will have up to 30 days to prepare for the investigation. An entity may request an extension of the preparation period and the extension will be considered by the Compliance Monitor on a case-by-case basis.)~~

~~The Performance-Reset Period shall be 12 months from the last finding of non-compliance.~~

1.2. Compliance Monitoring and Enforcement Processes:

Compliance Audit

Self-Certification

Spot Checking

Compliance Violation Investigation

Self-Reporting

Complaint

~~1.2.~~1.3. Data Retention

~~Each~~The Reliability Coordinator shall ~~have~~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 ~~used to show compliance with~~in force for the current year and previous calendar year for Requirements R1 and R2 and Measures ~~1 through 7~~M1 and M2.

If ~~an entity~~a Reliability Coordinator is found non-compliant ~~the entity~~, it shall keep information related to the ~~noncompliance~~ non-compliance until found compliant ~~or for two years plus the current year, whichever is longer.~~

- ~~Evidence used as part of a triggered investigation shall be retained by the entity being investigated for one year from the date that the investigation is closed, as determined by the Compliance Monitor,.~~
- The Compliance ~~Monitor~~Enforcement Authority shall keep the last ~~periodic~~ audit ~~report~~records and all requested and submitted subsequent ~~compliance~~audit records.

~~1.3.~~1.4. Additional Compliance Information

None.

2. Violation Severity Levels:

Violation Severity Levels				
Requirement R#	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	The Reliability Coordinator has demonstrated communication facilities for both voice and data exist to all appropriate entities and that they are staffed and available but they are less than adequate.	The Reliability Coordinator has failed to demonstrate that is has: 1) Voice communication links with one appropriate entity or 2) Data links with one appropriate entity.	The Reliability Coordinator has failed to demonstrate that is has: 1) Voice communication links with two appropriate entities or 2) Data links with two appropriate entities.	The Reliability Coordinator has failed to demonstrate that is has: 1) Voice communication links with more than two appropriate entities or 2) Data links with more than two appropriate entities or 3) Communication facilities are not staffed or 4) Communication facilities are not ready.
R2	N/A	The Reliability Coordinator or designated Transmission Operator and Balancing Authority has failed to demonstrate it provided or arranged provision for the exchange of data with one of the other Reliability Coordinators or Transmission Operators and Balancing Authorities.	The Reliability Coordinator or designated Transmission Operator and Balancing Authority has failed to demonstrate it provided or arranged provision for the exchange of data with two of the other Reliability Coordinators or Transmission Operators and Balancing Authorities.	The Reliability Coordinator or designated Transmission Operator and Balancing Authority has failed to demonstrate it provided or arranged provision for the exchange of data with three of the other Reliability Coordinators or Transmission Operators and Balancing Authorities.

R3	N/A	The Reliability Coordinator has failed to demonstrate multi-directional communication capabilities to one of the Transmission Operators and Balancing Authorities in its Reliability Coordinator Area and with neighboring Reliability Coordinators.	The Reliability Coordinator has failed to demonstrate multi-directional communication capabilities to two or more of the Transmission Operators and Balancing Authorities in its Reliability Coordinator Area and with neighboring Reliability Coordinators.	The Reliability Coordinator has failed to demonstrate multi-directional communication capabilities to all of the Transmission Operators and Balancing Authorities in its Reliability Coordinator Area and with all neighboring Reliability Coordinators.
R4	The Reliability Coordinator's monitoring systems provide information in a way that is not easily understood and interpreted by the Reliability Coordinator's operating personnel or particular emphasis was not given to alarm management and awareness systems, automated data transfers and synchronized information systems.	The Reliability Coordinator has failed to demonstrate that is has detailed real-time monitoring capabilities in its Reliability Coordinator Area and sufficient monitoring capabilities of its surrounding Reliability Coordinator Areas to ensure that one potential or actual SOL or IROL violation is not identified.	The Reliability Coordinator has failed to demonstrate that is has detailed real-time monitoring capabilities in its Reliability Coordinator Area and sufficient monitoring capabilities of its surrounding Reliability Coordinator Areas to ensure that two or more potential and actual SOL and IROL violations are not identified.	The Reliability Coordinator has failed to demonstrate that is has detailed real-time monitoring capabilities in its Reliability Coordinator Area and sufficient monitoring capabilities of its surrounding Reliability Coordinator Areas to ensure that all potential and actual SOL and IROL violations are identified.

R5	The Reliability Coordinator failed to monitor: 1) the status, real power flow or reactive power flow of Bulk Electric System elements that could result in one SOL violations or 2) or operating reserves for a small portion of the Reliability Authority Area.	The Reliability Coordinator failed to monitor: 1) the status, real power flow or reactive power flow of Bulk Electric System elements critical to assessing one IROL or to system restoration, 2) the status, real power flow or reactive power flow of Bulk Electric System elements that could result in multiple SOL violations, or 3) operating reserves.	The Reliability Coordinator failed to monitor: 1) the status, real power flow or reactive power flow of Bulk Electric System elements critical to assessing two or more IROLs; or one IROL and to system restoration, 2) the status, real power flow or reactive power flow of Bulk Electric System elements that could result in multiple SOL violations and operating reserves, or 3) the status, real power flow or reactive power flow of Bulk Electric System elements critical to assessing one IROL or system restoration and operating reserves.	The Reliability Coordinator failed to monitor: 1) the status, real power flow or reactive power flow of Bulk Electric System elements critical to assessing all IROLs and to system restoration, or 2) the status, real power flow or reactive power flow of Bulk Electric System elements critical to assessing all SOL violations and operating reserves.
R6	The Reliability Coordinator failed to demonstrate that it has: 1) analysis tools capable of assessing all pre-contingency flows, 2) analysis tools capable of assessing all post-contingency flows, or 3) all necessary wide-area overview displays exist.	The Reliability Coordinator failed to demonstrate that it has: 1) analysis tools capable of assessing the majority of pre-contingency flows, 2) analysis tools capable of assessing the majority of post-contingency flows, or 3) the majority of necessary wide-area overview displays exist.	The Reliability Coordinator failed to demonstrate that it has: 1) analysis tools capable of assessing a minority of pre-contingency flows, 2) analysis tools capable of assessing a minority of post-contingency flows, or 3) a minority of necessary wide-area overview displays exist.	The Reliability Coordinator failed to demonstrate that it has: 1) analysis tools capable of assessing any pre-contingency flows, 2) analysis tools capable of assessing any post-contingency flows, or 3) any necessary wide-area overview displays exist.

~~R7~~	~~The Reliability Coordinator failed to demonstrate that: 1) it or a delegated entity monitored SOLs when the main monitoring system was unavailable or 2) it has provisions to monitor SOLs when the main monitoring system is not available.~~	~~The Reliability Coordinator failed to demonstrate that: 1) it or a delegated entity monitored one IROL when the main monitoring system was unavailable or 2) it has provisions to monitor one IROL when the main monitoring system is not available.~~	~~The Reliability Coordinator failed to demonstrate that: 1) it or a delegated entity monitored two or more IROLs when the main monitoring system was unavailable, 2) it or a delegated entity monitored SOLs and one IROL when the main monitoring system was unavailable 3) it has provisions to monitor two or more IROLs when the main monitoring system is not available, or 4) it has provisions to monitor SOLs and one IROL when the main monitoring system was unavailable.~~	~~The Reliability Coordinator failed to demonstrate that it continuously monitored its Reliability Authority Area.~~
~~R8~~R1	~~Reliability Coordinator has approval rights for planned maintenance outages of analysis tools but does not have approval rights for work on analysis tools that creates a greater risk of an unplanned outage of the tools.~~ N/A	~~Reliability Coordinator has approval rights for planned maintenance but does not have plans to mitigate the effects of outages of the analysis tools.~~ N/A	~~Reliability Coordinator has approval rights for planned maintenance but does not have plans to mitigate the effects of outages of the analysis tools and does not have approval rights for work on analysis tools that creates a greater risk of an unplanned outage of the tools.~~ N/A	The Reliability Coordinator ~~approval is not required for~~failed to provide its System Operator with the authority to approve, deny or cancel planned ~~maintenance.~~ outages of its own analysis tools.
R2	N/A	N/A	N/A	The Reliability Coordinator failed to have a procedure to mitigate the effects of analysis tool outages.

E. **Regional Variances**

None identified.

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~~
1	April 4, 2007	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 to add missing measures and compliance elements
2	October 17, 2008	Deleted R2, M3 and associated compliance elements as conforming changes associated with approval of IRO-010-1	Revised as part of IROL Project
2	October 17, 2008	Adopted by NERC Board of Trustees	IROL Project
2	March 23, 2011	Order issued by FERC approving IRO-002-2 (approval effective 5/23/11)	
3	To be determined	Retired R1-R8 under Project 2006-06.	Project 2006-06