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Review of Standards
Effective October 1, 2011

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Impact of new/revised Standards effective 10/1/2011

- **EOP-002-3**: Capacity and Energy Emergencies
- **FAC-002-1**: Coordination of Plans for New Facilities
- **IRO-002-2**: Reliability Coordination-Facilities
- **IRO-005-3a**: Reliability Coordination- Current Day Operations
- **IRO-006-5**: Transmission Loading Relief (TLR) – (effective 7/1/11)
- **IRO-008-1 new**: Reliability Coordinator Operational and Real-time Assessments
- **IRO-009-1 new**: Reliability Coordinator Actions to Operate Within IROLs
- **IRO-010-1a new**: Reliability Coordinator Data Specification and Collection
- **TOP-003-1**: Planned Outage Coordination
- **TOP-005-2a**: Operational Reliability Information
- **TOP-006-2**: Monitoring System Conditions
- **VAR-001-2**: Voltage and Reactive Control
Standard Revision Drivers

- EOP-002-3: FERC Order 693 paragraph 582
- IRO-002-2: FERC Order 693 paragraph 908
- FAC-002-1: FERC Order 693 paragraph 693
- VAR 001-2: FERC Order 693 paragraphs 1858 and 1879
EOP AND FAC REVISIONS
EOP-002-3 Capacity and Energy Emergencies

- Standard applicable to: BA, RC, LSE
- R2 revision:
  - Each BA shall, when required and appropriate, implement one or more actions as described in its capacity and emergency plan, when required and as appropriate, to reduce risks to the interconnected system.
  - Applicable to BA
  - Clarifies actions BAs take in capacity emergency
- Added Measures 4-7
  - Applicable to BA
  - Evidence-related
FAC-002-1 Coordination of Plans for New Facilities

- Applicable to: GO, TO, DP, LSE
  - Coordinate assessments with TP and PA

- R1.4 revision:
  - Evidence that the assessment included steady-state, short circuit, and dynamic studies as necessary to evaluate system performance under both normal and contingency conditions in accordance with TPL-001-0, TPL-002-0, and TPL-003-0.

- Modified to evaluate system conditions under both normal (TPL-001) and contingency (TPL-002 -003) conditions

- Enforceable for final assessments published 10/1 or later
IRO REVISIONS
IRO-002-2 - Reliability Coordination-Facilities

• Applicable to RC
  – Data requirements from TOP, BA, TO, GO, GOP, IA, and LSEs

• R2 eliminated:
  – Each Reliability Coordinator shall determine the data requirements to support its reliability coordination tasks and shall request such data from its Transmission Operators, Balancing Authorities, Transmission Owners, Generation Owners, Generation Operators, and Load-Serving Entities, or adjacent Reliability Coordinators.

• R2 replaced with new IRO-010-1a - requires RC to provide entities with documented specifications for model data that supports real-time operations

• Added VSL table
IRO-005-3a Reliability Coordination - Current Day Operations

- Applicable to RC, BA, TOP, TSP, GOP, LSE, PSE

- R2 eliminated:
  - Each Reliability Coordinator shall be aware of all Interchange Transactions that wheel through, source, or sink in its Reliability Coordinator Area, and make that Interchange Transaction information available to all Reliability Coordinators in the Interconnection.
  - Applicable to RC

- Eliminated due to implementation of E-Tag system transactions
IRO-005-3a Reliability Coordination Current Day Operations, con’t

• IROL-related requirements now grouped in IRO-008 – 009
• R3, R5 replaced by new IRO-009-1 R1-R4 –applicable to RC
• IRO-009-1 R1-R4 clarifies RC requirements on plans/procedures on addressing an IROL
• R3 eliminated:
  – As portions of the transmission system approach or exceed SOLs or IROLs, the Reliability Coordinator shall work with its Transmission Operators and Balancing Authorities to evaluate and assess any additional Interchange Schedules that would violate those limits. If a potential or actual IROL violation cannot be avoided through proactive intervention, the Reliability Coordinator shall initiate control actions or emergency procedures to relieve the violation without delay, and no longer than 30 minutes. The Reliability Coordinator shall ensure all resources, including load shedding, are available to address a potential or actual IROL violation.
IRO-005-3a Reliability Coordination- Current Day Operations, con’t

• R5 eliminated:
  – Each Reliability Coordinator shall identify the cause of any potential or actual SOL or IROL violations. The Reliability Coordinator shall initiate the control action or emergency procedure to relieve the potential or actual IROL violation without delay, and no longer than 30 minutes. The Reliability Coordinator shall be able to utilize all resources, including load shedding, to address an IROL violation.

• R5 implied RC has information to see all SOLs – not always accurate
  – All TOP facilities have a SOL, but RC not required to see all limits

• Could impact timeframe for RC directives if $T_v$ is less than 30 min.
IRO-005-3a Reliability Coordination- Current Day Operations, con’t

• R9 modified:
  – The Reliability Coordinator shall coordinate with Transmission Operators, Balancing Authorities, and Generator Operators as needed to develop and implement action plans to mitigate potential or actual SOL, IROL, CPS, or DCS violations.

• Applicable to RC

• RC requirements related to IROLs now addressed in IRO-009

• RC is responsible for developing plans for mitigating IROLs
IRO-005-3a  Reliability Coordination- Current Day Operations, con’t

•  R13 modified:

  Each RC shall ensure that all TOP, BA, GO, TSP, LSE, and PSE operate to prevent the likelihood that a disturbance, action or non-action in its RC area will result in a SOL or IROL violation in another area of the interconnection. In instances where there is a difference in derived limits, the RC and its TOP, BA, GOP, TSP, LSE, and PSE shall always operate the BES to the most limiting parameter.

•  Reminder: Still applicable to all entities except RC

•  RC requirements now addressed in new IRO-009 R5

•  Change made because RC may not see all SOLs
IRO-005-3a Reliability Coordination - Current Day Operations, con’t

• R14 modified:

  Each Reliability Coordinator shall make known to Transmission Service Providers within its Reliability Coordinator Area, SOLs or IROLs within its wide-area view. The Transmission Service Providers shall respect these SOLs or and IROLs in accordance with filed tariffs and regional Total Transfer Calculation and Available Transfer Calculation processes.

• Still applicable to TSP

• Removed first sentence (duplicated in FAC-014 R5.1)

• Clarifies TSP’s respect for SOLs and IROLs (not or)
IRO-005-3a Reliability Coordination - Current Day Operations, con’t

• R16 eliminated
  – Each Reliability Coordinator shall confirm reliability assessment results and determine the effects within its own and adjacent Reliability Coordinator Areas. The Reliability Coordinator shall discuss options to mitigate potential or actual SOL or IROL violations and take actions as necessary to always act in the best interests of the Interconnection at all times.

• Applicable to RC
• Too vague to measure: “to always act in best interests of Interconnection”
• Now contained and clarified in IRO-008 - 009
IRO-005-3a Reliability Coordination - Current Day Operations, con’t

• **R17 and associated measures eliminated:**
  – When an IROL or SOL is exceeded, the Reliability Coordinator shall evaluate the local and wide-area impacts, both real-time and post-contingency, and determine if the actions being taken are appropriate and sufficient to return the system to **within IROL in thirty minutes**. If the actions being taken are not appropriate or sufficient, the Reliability Coordinator shall direct the Transmission Operator, Balancing Authority, Generator Operator, or Load-Serving Entity to return the system to within IROL or SOL.

• **Applicable to RC**
• **Related to IROL response time**
• **Now addressed in IRO-009**
New: IRO-006-5 Transmission Loading Relief (TLR) (effective 7/1/11)

• Applicable to RC and BA

R1. Each Reliability Coordinator and Balancing Authority that receives a request pursuant to an Interconnection-wide transmission loading relief procedure (such as Eastern Interconnection TLR, WECC Unscheduled Flow Mitigation, or congestion management procedures from the ERCOT Protocols) from any Reliability Coordinator, Balancing Authority, or Transmission Operator in another Interconnection to curtail an Interchange Transaction that crosses an Interconnection boundary shall comply with the request, unless it provides a valid reliability reason to the requestor that why it cannot comply with the request.

• RC and BA to comply with RC, BA or TOP TLR request across interconnections (DC Tie) unless it provides a reliability reason why it cannot comply
New: IRO-008-1 Reliability Coordinator Operational and Real-time Assessments

• Applicable to RC

• Will replace IRO-004-1 R1, R2

• **Impact:** Requires RC to look at Wide Area rather than RC Area in Operational Planning Analysis

  – **R1.** Each Reliability Coordinator shall perform an **Operational Planning Analysis** to assess whether the planned operations for the next day within its Wide Area, will exceed any of its Interconnection Reliability Operating Limits (IROLs) during anticipated normal and Contingency event conditions.

  – **R2.** Each Reliability Coordinator shall perform a Real-Time Assessment at least once every 30 minutes to determine if its Wide Area is exceeding any IROLs or is expected to exceed any IROLs.

  – **R3.** When a Reliability Coordinator determines that the results of an **Operational Planning Analysis** or Real-Time Assessment indicates the need for specific operational actions to prevent or mitigate an instance of exceeding an IROL, the Reliability Coordinator shall **share its results with those entities** that are expected to take those actions.
New: IRO-009-1  RC Actions to Operate Within IROLs

• Replaces EOP-001-0 R2, IRO-004-1 R3, R6, IRO-005-2 R3, R5, R16, R17 and parts of R9, R13, R14

• Applicable to RC

• Combines IROL requirements from various standards into one standard and clarifies IROL requirements

• 5 requirements
IRO-009-1 RC Actions to Operate Within IROLs, con’t

• R1: Preventative IROL measures
  
  For each IROL (in its Reliability Coordinator Area) that the Reliability Coordinator identifies one or more days prior to the current day, the Reliability Coordinator shall have one or more Operating Processes, Procedures, or Plans that identify actions it shall take or actions it shall direct others to take (up to and including load shedding) that can be implemented in time to prevent exceeding those IROLs.

• RC is responsible for developing IROL mitigation plans
• **R2: IROL mitigation**
  
  For each IROL (in its Reliability Coordinator Area) that the Reliability Coordinator that is identified identifies one or more days prior to the current day, each the Reliability Coordinator shall have one or more Operating Processes, Procedures, or Plans that identify actions it shall take or actions it **shall direct others to take** (up to and including load shedding) to mitigate the magnitude and duration of exceeding that IROL such that the IROL is relieved within the IROL’s Tv.
IRO-009-1 RC Actions to Operate Within IROLs, cont

- **R3**: Language more explicit re: assessments of actual/expected conditions that predict a IROL will be exceeded
  
  - When an assessment of actual or expected system conditions predicts that an IROL in its Reliability Coordinator Area will be exceeded, the Reliability Coordinator shall implement one or more Operating Processes, Procedures or Plans (not limited to the Operating Processes, Procedures, or Plans developed for Requirements R1) to prevent exceeding that IROL.

- **R4**: Current IROL, RC take action to direct others to mitigate
  
  - When actual system conditions show that there is an instance of exceeding an IROL in its Reliability Coordinator Area, the Reliability Coordinator shall, without delay, act or direct others to act to mitigate the magnitude and duration of the instance of exceeding that IROL within the IROL’s Tv.
• **R5**: Indeterminate IROL rating - use most limiting value
  
  - *If unanimity cannot be reached on the value for an IROL or its Tv, each Reliability Coordinator that monitors that Facility (or group of Facilities) shall, without delay, use the most conservative of the values (the value with the least impact on reliability) under consideration.*
New: IRO-010-1a Reliability Coordinator Data Specification and Collection

- New Standard with 3 requirements
  - Replaces IRO-002-1 R2, IRO-004-1 R4, R5, IRO -005-2 R2 and Part of TOP-003-0 R1.2, TOP-005-1 R1, R1.1 TOP-006-1 R4
  - Added Appendix 1 to clarify interpretation of R1.2 and R3 re: data requirements

- Applicable to RC, BA, GO, GOP, LSE, TOP, TO, and IA

- Requires RC to provide entities with documented specifications for model data that supports real-time operations

- Entities and RC will work together on “mutually agreeable format” for data
IRO-010-1a Reliability Coordinator Data Specification and Collection

- **R1.** The Reliability Coordinator shall have a documented specification for data and information to build and maintain models to support Real-time monitoring, Operational Planning Analyses, and Real-time Assessments of its Reliability Coordinator Area to prevent instability, uncontrolled separation, and cascading outages.

- **R2.** The Reliability Coordinator shall distribute its data specification to entities that have Facilities monitored by the Reliability Coordinator and to entities that provide Facility status to the Reliability Coordinator.

- **R3.** Each Balancing Authority, Generator Owner, Generator Operator, Interchange Authority, Load-serving Entity, Reliability Coordinator, Transmission Operator, and Transmission Owner shall provide data and information, as specified, to the Reliability Coordinator(s) with which it has a reliability relationship.
IRO Revisions

• NERC implementation plan is a valuable resource for overview of IRO changes:

• NERC Q & A “Operate within IROLs”
  http://www.nerc.com/docs/standards/sar/Tech-Ref-for-IROL-11-17-03.pdf
TOP REVISIONS
TOP-003-1 Planned Outage Coordination

• Applicable to GOP, TOP, BA, RC
• Takes RC responsibility out of R1.2
  – R1.2- Each Transmission Operator shall provide outage information daily to its Reliability Coordinator, and to affected Balancing Authorities and Transmission Operators for scheduled generator and bulk transmission outages planned for the next day that may collectively cause or contribute to an SOL or IROL violation or a regional operating area limitation. The Reliability Coordinator shall establish the outage reporting requirements.

• RC responsibility now in IRO-010-1
• IRO-010 - RC will distribute data specifications, including timeframe, to entities
• Added VSLs
TOP-005-2 Operational Reliability Information

- Applicable to TOP, BA
- R1 and R1.1 eliminated
  - R1- Each Transmission Operator and Balancing Authority shall provide its Reliability Coordinator (RC) with the operating data that the RC requires to perform operational reliability assessments and to coordinate reliable operations within the RC area.
  - R1.1- Each RC shall identify the data requirements for the list in Attachment 1-TOP-005-0 “Electric System Reliability Data” and any additional operating info requirements relating to operation of the BPS within the RC area.
- Placed these requirements in IRO-010-1 R3 and requires underlying Entities to supply data back to RC
- Added VSLs
TOP-006-2 Monitoring System Conditions

- Applicable to TOP, BA, GOP, RC
- Eliminates RC responsibility from R4
  - R4-Each Reliability Coordinator, Transmission Operator and Balancing Authority shall have information, including weather forecasts and past load patterns, available to predict the systems’ near-term load pattern.
- RC responsibility now in IRO-010-1
- Added VSLs
VAR-001-2 Voltage and Reactive Control Revision

- Applicable to TOP, PSE, LSE
  - Added LSE to the list of Applicable Entities
- R2 modified to clarify “reactive resources”
  - R2. Each Transmission Operator shall acquire sufficient reactive resources—which may include, but is not limited to, reactive generation scheduling; transmission line and reactive resource switching; controllable load, and, if necessary, controllable load shedding—within its area to protect the voltage levels under normal and Contingency conditions. This includes the Transmission Operator’s share of the reactive requirements of interconnecting transmission circuits.
• R5 modified to include LSEs and clarify “reactive resources”
  – R5. Each Purchasing-Selling Entity and Load Serving Entity shall arrange for (self-provide or purchase) reactive resources – which may include, but is not limited to, reactive generation scheduling; transmission line and reactive resource switching; controllable load, and, if necessary, controllable load load shedding – to satisfy its reactive requirements identified by its Transmission Service Provider.

• R8 and R9 modified to clarify “reactive resources”
  – R8. Each Transmission Operator shall operate or direct the operation of capacitive and inductive reactive resources within its area – which may include, but is not limited to, including reactive generation scheduling; transmission line and reactive resource switching; controllable load; and, if necessary, load shedding – to maintain system and Interconnection voltages within established limits.
  – R9. Each Transmission Operator shall maintain reactive resources – which may include, but is not limited to, reactive generation scheduling; transmission line and reactive resource switching; controllable load; and, if necessary, controllable load, load shedding – to support its voltage under first Contingency conditions.
Summary

- 11 Standards effective 10/1/2011 and one effective 7/1/2011
  - Nine revisions
  - Three new
- Many revisions related to new IRO-008, 009, and 010 re:
  - RC operational models/assessments
  - Data RC requires from entities
  - RC’s actions to prevent/mitigate IROLs
- Most changes are applicable to RC - be aware of data requirements or actions RC may ask of you
Questions or Comments