BEFORE THE
RÉGIE DE L'ÉNERGIE
THE PROVINCE OF QUÉBEC

NORTH AMERICAN ELECTRIC	**)**
RELIABILITY CORPORATION	**)**

NOTICE OF FILING OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION OF THREE TRANSMISSION OPERATION STANDARDS, ONE PROTECTION AND CONTROL RELIABILITY STANDARD, AND RETIREMENT OF NINE EXISTING RELIABILITY STANDARDS AND ONE REQUIREMENT FROM AN EXISTING RELIABILITY STANDARD

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May 14, 2013

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NOTICE OF FILING OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION OF THREE TRANSMISSION OPERATION STANDARDS AND FOR RETIREMENT OF NINE EXISTING RELIABILITY STANDARDS AND ONE REQUIREMENT FROM AN EXISTING RELIABIITY STANDARD

The North American Electric Reliability Corporation ("NERC") hereby submits four revised Reliability Standards:

- TOP-001-2—Transmission Operations
- TOP-002-3—Operations Planning
- TOP-003-2—Operational Reliability Data
- PRC-001-2—System Protection Coordination

These proposed Reliability Standards are referred to herein as "TOP Reliability Standards."

NERC also submits the implementation plan for the proposed TOP Reliability Standards and provides notice of the retirement of the following nine Reliability Standards, effective as provided in the implementation plan:

- TOP-001-1a—Reliability Responsibilities and Authorities
- TOP-002-2.1b—Normal Operations Planning
- TOP-003-1—Planned Outage Coordination
- TOP-004-2—Transmission Operations
- TOP-005-2a—Operational Reliability Information

- TOP-006-2—Monitoring System Conditions
- TOP-007-0—Reporting System Operating Limit (SOL) and Interconnection Reliability Operating Limit (IROL) Violations
- TOP-008-1—Response to Transmission Limit Violations
- PER-001-0.2—Operating Personnel Responsibility and Authority

NERC also provides notice that Requirements R2, R5, and R6 of PRC-001-1—System Protection Coordination will be retired.

On May 9, 2012, the NERC Board of Trustees approved the proposed TOP Reliability Standards.[1] Prior to that, the NERC Board of Trustees approved, on August 4, 2011, the proposed IRO-001-2, IRO-002-3, IRO-005-4, and IRO-014-2 Reliability Standards ("IRO Reliability Standards") and the associated implementation plans.[2] NERC is submitting the proposed IRO Reliability Standards in a separate filing that is being filed contemporaneously with this filing.[3] The proposed TOP Reliability Standards and the corresponding proposed IRO Reliability Standards presented in these filings should be approved simultaneously given that the proposed IRO Reliability Standards remove requirements from the existing IRO standards for Transmission Operators that are added as requirements in the proposed TOP Reliability Standards. Similarly, the proposed TOP Reliability Standards remove requirements for Reliability Coordinators from the existing TOP standards that are added as requirements in the proposed IRO Reliability Standards. Accordingly, simultaneous approval of both filings will

[1] NERC notes that these proposed standards were delayed in being filed given that a separate analysis was performed by NERC staff after Board approval comparing the proposed TOP Reliability Standards to the events of the September 2011 Southwest Blackout Event. The details of this analysis are described in more detail in the Executive Summary section of this filing and in Attachment H.

[2] The Board approved a proposed IRO-001-2 Reliability Standard on August 4, 2011, that was subsequently revised by the standard drafting team before it was filed with the applicable governmental authorities. The revision, designated as IRO-001-3, was approved by the Board on August 16, 2012, and is included in a separate petition filed contemporaneously with this filing.

[3] Unless otherwise designated, all capitalized terms shall have the meaning set forth in the Glossary of Terms Used in NERC Reliability Standards, available here: http://www.nerc.com/files/Glossary_of_Terms.pdf.

help ensure a smooth transition and implementation of the proposed Reliability Standards for both the industry and the ERO.

This filing presents the technical basis and purpose of the proposed TOP Reliability Standards, a summary of the development proceedings, and a demonstration that the proposed Reliability Standards meet the criteria identified for Reliability Standards.

I. EXECUTIVE SUMMARY

The proposed Transmission Operations ("TOP") Reliability Standards address the important reliability goal of ensuring that the transmission system is operating within operating limits. Each of the proposed TOP standards has a clear reliability goal. Proposed TOP-001-2 — Transmission Operations, specifically establishes the requirements that describe what a Transmission Operator must do with respect to actual Real-time operations.[4] Proposed TOP-002-3 - Operations Planning, specifically describes what a Transmission Operator must do with respect to operational planning of the transmission system. Proposed TOP-003-2 - Operational Reliability Data, specifically describes what the Transmission Operator and Balancing Authority must do to obtain the data it requires.

The original eight TOP Reliability Standards were filed on April 4, 2006. The proposed Reliability Standards included in this filing represent significant revision and improvement to the current set of enforceable Reliability Standards by upgrading the overall quality of the standards, eliminating gaps in the requirements, eliminating ambiguity, eliminating redundancies, and addressing Federal Energy Regulatory Commission ("FERC") Order No. 693 directives. The

[4] "Real-time" is defined in the NERC Glossary of terms as:" An examination of existing and expected system conditions, conducted by collecting and reviewing immediately available data."

proposed TOP Reliability Standards are also more efficient than the currently-enforceable TOP Reliability Standards because they incorporate the necessary requirements from the eight currently-effective TOP Reliability Standards (TOP-001-1a, TOP-002-2.1b, TOP-003-1, TOP-004-2, TOP-005-2a, TOP-006-2, TOP-007-0, TOP-008-1) and the PER-001-0.2 Reliability Standard into three cohesive, comprehensive Reliability Standards that are focused on achieving a specific result. The corresponding changes in proposed PRC-001-2 are administrative in nature and are limited to removal of three requirements in currently-effective PRC-001-1 that are now addressed in proposed TOP-003-2, included herein.

A significant improvement to the existing TOP Reliability Standards is the designation of requirements in the proposed TOP Reliability Standards almost exclusively to Transmission Operators rather than to various functional entities. The standard drafting team reviewed existing Reliability Standards in concert with other Reliability Standards under development and revised the proposed TOP Reliability Standards to focus on the responsibilities of Transmission Operators. Other Reliability Standards, such as the proposed IRO Reliability Standards being filed concurrently with this filing, add the relevant requirements for Reliability Coordinators from the currently-effective body of TOP Reliability Standards.

The proposed TOP Reliability Standards also raise the bar on system performance by mandating that all Interconnection Reliability Operating Limits ("IROLs") be resolved within the IROL T_v[5], which is a significant increase in performance over the existing Reliability Standards. Because T_v may actually be less than 30 minutes, this mandates a tighter time frame for action than the 30-minute time that is mandated in the currently-effective standards, thereby improving

[5] The Interconnection Reliability Operating Limit T_v is defined in the NERC Glossary of Terms as: "The maximum time that an Interconnection Reliability Operating Limit can be violated before the risk to the interconnection or other Reliability Coordinator Area(s) becomes greater than acceptable. Each Interconnection Reliability Operating Limit's Tv shall be less than or equal to 30 minutes."

reliability of the bulk power system. Additionally, the proposed TOP Reliability Standards include a requirement that provides for the identification of a sub-set of non-IROL System Operating Limits ("SOLs") that are identified as important for local areas. The proposed requirements mandate exceedances of these non-IROL SOLs to be monitored and reported to the Reliability Coordinator. This gives Transmission Operators the ability to ensure that any non-IROL SOLs about which it is concerned will be monitored to ensure local consequences are managed. Transmission Operators may also identify and communicate to their Reliability Coordinator any of the non-IROL SOLs that are believed or anticipated to have potential to develop into IROLs and, thus, to ensure that they too, are monitored and managed.

During the course of development of the proposed TOP Reliability Standards, NERC staff met with FERC staff on several occasions to discuss the proposed standards. After the September 2011 Southwest Blackout Event ("Event"),[6] FERC staff expressed a concern that the proposed TOP Reliability Standards, if they were enforceable at the time of the event, would not have prevented the event from happening.[7] As a result of FERC's concern, NERC staff undertook an analysis of the facts of that Event as applied to the proposed TOP Reliability Standards. Specifically, NERC staff analyzed the recommendations from the 2011 Southwest Outage Blackout Report that apply to Real-Time Transmission Operators and compared the recommendations to the currently-enforceable Reliability Standards and the proposed Reliability Standards. Based on this analysis, NERC staff believes that if entities complied with the proposed TOP Reliability Standards, the likelihood of such an event occurring would be

[6] Additional information regarding this event is available at: http://www.nerc.com/page.php?cid=5|407.
[7] *See*, *Arizona-Southern California Outages on September 8, 2011, Causes and Recommendations* ("2011 Southwest Outage Blackout Report"), prepared by the Staffs of the Federal Energy Regulatory Commission and the North American Electric Reliability Corporation, April 2012. This report is available at: http://www.nerc.com/files/AZOutage_Report_01MAY12.pdf. While that report contained a number of recommendations that were not specific to real-time operations, those were not included in this analysis because they were not pertinent to the standards in question (*i.e.*, the proposed TOP Reliability Standards).

significantly diminished. A detailed report on this analysis, including the relevant 2011 Southwest Outage Blackout Report recommendations with an explanation of how the relevant recommendations would be addressed in the proposed TOP Reliability Standards is provided in **Exhibit H**.

The proposed Reliability Standards were developed by a standard drafting team that consists of some of the foremost experts in the field of Transmission Operations, as explained in **Exhibit G**. The standard drafting team included members from all of the major interconnections in North America – CAISO, ERCOT, PJM, Midwest ISO, and NPCC. The members unanimously support the position espoused in the proposed TOP Reliability Standards.

II. NOTICES AND COMMUNICATIONS

Notices and communications with respect to this filing may be addressed to the following:

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III. BACKGROUND

NERC Project 2007-03 – Real Time Operations was initiated in March 2007 as part of NERC's five-year cycle of review for the existing Reliability Standards that address

Transmission Operators' actions to prevent instability, uncontrolled separation, or cascading outages. The proposed Reliability Standards will eliminate redundancies and remove ambiguity in the requirements.

A. NERC Reliability Standards Development Procedure

NERC develops Reliability Standards in accordance with Section 300 (Reliability Standards Development) of its Rules of Procedure and the NERC *Reliability Standards Development Procedure*, which is incorporated into the Rules of Procedure as Appendix 3A. NERC's proposed rules provide for reasonable notice and opportunity for public comment, due process, openness, and a balance of interests in developing Reliability Standards and thus satisfies certain of the criteria for approving Reliability Standards.

The development process is open to any person or entity with a legitimate interest in the reliability of the bulk power system. NERC considers the comments of all stakeholders and a vote of stakeholders and the NERC Board of Trustees is required to approve a Reliability Standard before its submission to the applicable governmental authorities.

The proposed Reliability Standards set out in **Exhibit A** have been developed and approved by industry stakeholders using NERC's *Reliability Standards Development Procedure*. They were approved by the NERC Board of Trustees on May 9, 2012.

IV. JUSTIFICATION

A. Basis and Purpose of Proposed TOP Reliability Standards

The proposed TOP Reliability Standards provide a set of coordinated Reliability Standards that Transmission Operators must utilize in their operations of the bulk power system. With the standards proposed herein and the proposed IRO Reliability Standards filed

concurrently with this filing, the NERC Reliability Standards will help to ensure better coordination for Transmission Operators and Reliability Coordinators to plan and operate the interconnected Bulk Electric System in a synchronized manner to perform reliably under normal and abnormal conditions.

NERC is also developing a set of Reliability Standards in Project 2009-02, which is expected to be completed in 2014, that will establish requirements for the functionality, performance, and maintenance of Real-time monitoring and analysis capabilities for Reliability Coordinators, Transmission Operators, Generator Operators, and Balancing Authorities for use by their System Operators in support of reliable system operations. According to the August 2003 Blackout Report,[8] a principal cause of the August 14, 2003 blackout was a lack of situational awareness, which was in turn the result of inadequate reliability tools. In addition, the failure of control computers and alarm systems, incomplete tool sets, and the failure to supply network analysis tools with correct System data on August 14, contributed directly to this lack of situational awareness. Also, the need for improved visualization capabilities over a wide geographic area has been a recurrent theme in blackout investigations.

There are two directives in FERC Order No. 693 relating to minimum tool capabilities. One directive pertains to IRO-002 and is described in Paragraphs 905 and 906. The second directive pertains to TOP-006 and is described in Paragraph 1660. Rather than addressing these directives in the proposed TOP Reliability Standards and concurrently-filed proposed IRO Reliability Standards, they were deliberately chosen to be addressed by the Project 2009-02 Standard Drafting Team. As noted above, these proposed Reliability Standards addressing Real-time tools are anticipated to be completed in 2014.

[8] The *Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations Report*, dated April 5, 2004, is available at: http://www.nerc.com/filez/blackout.html.

Each of the proposed TOP Reliability Standards with a description of each of the requirements is described in more detail below. Additionally, **Exhibit J**, includes a detailed mapping of changes to the currently-effective TOP standards to the proposed TOP Reliability Standards.

1. Improvements Reflected in Proposed TOP Reliability Standards

The proposed TOP Reliability Standards are a significant improvement from the currently-effective TOP Reliability Standards by:

- Raising the bar on system performance by mandating that all IROLs be resolved within the IROL $T_{v,}$ which is a significant increase in performance over the existing Reliability Standards. Additionally, the proposed TOP Reliability Standards adopt an approach for operating within a subset of SOLs that more closely aligns with the original NERC Operating Guidelines.[9]

- Designating requirements in the proposed TOP Reliability Standards to Transmission Operators and removing several of the requirements applicable to Reliability Coordinators. These requirements have been added to the proposed IRO Reliability Standards being filed concurrently with this petition.

- Consolidating all of the necessary requirements from the eight existing TOP Reliability Standards into three cohesive, comprehensive Reliability Standards that are focused on achieving a specific result.

2. Requirements in Proposed TOP Reliability Standards

This section summarizes the development of the proposed TOP Reliability Standards and explains the reliability goal of the requirements proposed. All of the requirements from the currently-effective TOP Reliability Standards proposed for approval or retirement in this filing are addressed in the section below and are organized by type of requirement (*e.g.*, Requirements Related to Transmission Operator's Reliability Directives; Requirements Related to Emergencies

[9] Prior to becoming the ERO, NERC guidelines for power system operation and accreditation were referred to as the NERC Operating Guidelines, for which compliance was strongly encouraged yet ultimately voluntary. The NERC Operating Guidelines are available at the following link: http://www.nerc.com/page.php?cid=1|9|117|161|226.

and Emergency Assistance, *etc.*). NERC, in its analysis of the proposed Reliability Standards, determined that the proposed standards are just, reasonable, not unduly discriminatory or preferential, and in the public interest.

TOP-001-2 Proposed Requirements

The primary purpose of proposed TOP-001-2 is to specifically establish the requirements that describe what a Transmission Operator must do with respect to Real-time operations. The proposed TOP-001-2 requirements are as follows:

> **Requirements Related to Transmission Operators' Reliability Directives**
>
> **R1.** Each Balancing Authority, Generator Operator, Distribution Provider, and Load-Serving Entity shall comply with each Reliability Directive issued and identified as such by its Transmission Operator(s), unless such action would violate safety, equipment, regulatory, or statutory requirements. *[Violation Risk Factor: High] [Time Horizon: Same-day Operations, Real-Time Operations]*
>
> **R2.** Each Balancing Authority, Generator Operator, Distribution Provider, and Load-Serving Entity shall inform its Transmission Operator of its inability to perform an identified Reliability Directive issued by that Transmission Operator. *[Violation Risk Factor: High] [Time Horizon: Operations Planning, Same Day Operations, Real-time Operations]*

The proposed TOP-001-2, Requirements R1 and R2 are important because actions required to ensure reliability of the interconnected grid must be carried out quickly, efficiently, and without delay. Minutes and seconds can be critical to the effort to save the system from instability, Cascading, and voltage collapse. Requirements R1 and R2 allow for this to happen in an orderly and controlled environment.

Proposed TOP-001-2, Requirement R1 recognizes the reliability need to give Transmission Operators the ability to issue Reliability Directives to Balancing Authorities,

Generator Operators, Distribution Providers, and Load-Serving Entities, subject to limited exceptions in cases where such actions would violate safety, equipment, regulatory, or statutory requirements. Proposed TOP-001-2, Requirement R2 requires entities receiving the directive from the Transmission Operator to inform the Transmission Operator in situations where an identified Reliability Directive issued by the Transmission Operator cannot be performed. These requirements give Transmission Operators the authority to issue Reliability Directives when needed, but also provide Transmission Operators the flexibility to take different action in those situations where an entity notifies its Transmission Operator of its inability to comply with the Reliability Directive.

Requirements Related to Emergencies and Emergency Assistance

R3. Each Transmission Operator shall inform its Reliability Coordinator and Transmission Operator(s) that are known or expected to be affected by each actual and anticipated Emergency based on its assessment of its Operational Planning Analysis. *[Violation Risk Factor: High] [Time Horizon: Operations Planning,]*

R4. Each Transmission Operator shall render emergency assistance to other Transmission Operators, as requested and available, provided that the requesting entity has implemented its comparable emergency procedures, unless such actions would violate safety, equipment, regulatory, or statutory requirements. *[Violation Risk Factor: High] [Time Horizon: Real-Time Operations]*

R5. Each Transmission Operator shall inform its Reliability Coordinator and other Transmission Operators of its operations known or expected to result in an Adverse Reliability Impact on those respective Transmission Operator Areas unless conditions do not permit such communications. Examples of such operations are relay or equipment failures, and changes in generation, Transmission, or Load. *[Violation Risk Factor: High] [Time Horizon: Same-day Operations, Real-Time Operations]*

R6. Each Balancing Authority and Transmission Operator shall notify its Reliability Coordinator and negatively impacted interconnected NERC registered entities of planned outages of telemetering equipment, control equipment and associated communication channels between the affected entities. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning, Same-day Operations, Real-Time Operations]*

The proposed TOP-001-2, Requirements R3 through R6 are important because they help ensure that entities are aware of the interconnected environment, where actions in one area can impact other areas. Visibility of such actions, as required by these requirements, allows others to see what is going on and to react accordingly in a coordinated and cohesive manner.

Proposed TOP-001-2, Requirement R3 requires Transmission Operators to inform its Reliability Coordinators and other Transmission Operators of actual and anticipated Emergencies based on its assessment of its Operational Planning Analysis. In situations where emergency assistance is needed, proposed TOP-001-2, Requirement R4 requires that Transmission Operators render emergency assistance to other Transmission Operators when it is requested and available. Similarly, proposed TOP-001-2, Requirement R5 requires Transmission Operators to inform other entities (Reliability Coordinators and other Transmission Operators) of operations that may adversely impact them. This proposed requirement also addressed FERC's directive to consider whether a requirement that requires Transmission Operators to notify the Reliability Coordinator or the Balancing Authority that it is removing facilities from service is needed.[10] Proposed Requirement R6 requires Balancing Authorities and Transmission Operators to notify the Reliability Coordinator and negatively impacted interconnected NERC registered entities of planned outages of telemetering equipment. Requirements R3, R5, and R6 apply to the coordination aspects of interconnected operations.

Requirements Related to IROLs and SOLs

R7. Each Transmission Operator shall not operate outside any identified Interconnection Reliability Operating Limit (IROL) for a continuous duration exceeding its associated IROL Tv. *[Violation Risk Factor: High] [Time Horizon: Real-time Operations]*

[10] Order No. 693 at P 1588.

R8. Each Transmission Operator shall inform its Reliability Coordinator of each SOL which, while not an IROL, has been identified by the Transmission Operator as supporting reliability internal to its Transmission Operator Area based on its assessment of its Operational Planning Analysis**.** *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*

R9. Each Transmission Operator shall not operate outside any System Operating Limit (SOL) identified in Requirement R8 for a continuous duration that would cause a violation of the Facility Rating or Stability criteria upon which it is based. *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

R10. Each Transmission Operator shall inform its Reliability Coordinator of its actions to return the system to within limits when an IROL, or an SOL identified in Requirement R8, has been exceeded. *[Violation Risk Factor: Medium] [Time Horizon: Real-Time Operations]*

R11. Each Transmission Operator shall act or direct others to act, to mitigate both the magnitude and duration of exceeding an IROL within the IROL's Tv, or of an SOL identified in Requirement R8. *[Violation Risk Factor: High] [Time Horizon: Real-time Operations]*

The proposed TOP-001-2 Requirements R7, R8, R9, R10, and R11 addresses the Transmission Operator's responsibilities over IROLs or SOLs that have been identified by the Transmission Operator as necessary to support reliability internal to its Transmission Operator Area. The responsibility for monitoring and handling IROLs is primarily given to the Reliability Coordinator, but the Transmission Operator has the primary responsibility to designate any SOLs that require special attention. Accordingly, the delineation in the proposed TOP Reliability Standards with respect to operating within an identified IROL and in designating important SOLs is an important distinction in the proposed TOP Reliability Standards that is necessary for reliability.

During the standards development process, the standard drafting team looked closely at the requirements around SOLs and IROLs in the currently-effective TOP Reliability Standards to

make certain that they accurately reflected what was needed for the reliability of the Bulk Electric System. SOLs are defined in the NERC Glossary as:

> The value (such as MW, MVar, Amperes, Frequency or Volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria. System Operating Limits are based upon certain operating criteria. These include, but are not limited to:
>
> • Facility Ratings (Applicable pre- and post-Contingency equipment or facility ratings)
> • Transient Stability Ratings (Applicable pre- and post-Contingency Stability Limits)
> • Voltage Stability Ratings (Applicable pre- and post-Contingency Voltage Stability)
> • System Voltage Limits (Applicable pre- and post-Contingency Voltage Limits)

IROLs are defined in the NERC Glossary of Terms as:

> The value (such as MW, MVar, Amperes, Frequency or Volts) derived from, or a subset of the System Operating Limits, which if exceeded, could expose a widespread area of the Bulk Electric System to instability, uncontrolled separation(s) or cascading outages.

An IROL violation occurs when the IROL limit is exceeded continuously for greater than the T_v. An IROL is exceeded, but not violated, if the IROL limit is exceeded for less than T_v. This is an important concept to understand as the terms 'exceedance' and 'violation' are often used interchangeably even though they have two distinctly separate meanings—an IROL violation has compliance violation implications and an IROL exceedance does not.

In enhancing the proposed TOP Reliability Standards, the standard drafting team reviewed the currently-effective TOP Reliability Standards to determine whether they adequately addressed the handling of these limits. In particular, the standard drafting team was concerned

that the transition from the NERC Operating Guidelines[11] to the Version 0 standards had resulted in an incorrect emphasis on non-IROL SOLs versus IROLs. The pertinent existing requirements where these limits were addressed are in the following, currently-enforceable Reliability Standards:

- TOP-002-2a, R10: Each Balancing Authority and Transmission Operator shall plan to meet all System Operating Limits (SOLs) and Interconnection Reliability Operating Limits (IROLs).
- TOP-004-2, R1: Each Transmission Operator shall operate within the Interconnection Reliability Operating Limits (IROLs) and System Operating Limits (SOLs).
- TOP-007-0, R2: Following a Contingency or other event that results in an IROL violation, the Transmission Operator shall return its transmission system to within IROL as soon as possible, but not longer than 30 minutes.

The standard drafting team noted a discrepancy among the three requirements. That is, in the first two requirements (TOP-002-2a, R10 and TOP-004-2, R1), applicable entities are expected to plan and operate to meet all SOLs and IROLs, while in TOP-007-0, R1, entities are only instructed to take action for IROLs. The standard drafting team considered why, in this particular case, there are requirements to plan and operate for non-IROL SOLs while actions are only required to be taken for IROLs. This led the standard drafting team to perform historical research into the NERC Operating Guidelines to determine the original intent of the guidelines on which the Reliability Standards were derived.

The NERC Operating Guidelines clearly stated that the dangers to the reliability of the bulk power system resulted from violations of IROLs.[12] This document laid out the requirements for operating within IROLs and their respective T_v. However, it did not mention

[11] Prior to becoming the ERO, NERC guidelines for power system operation and accreditation were referred to as the NERC Operating Guidelines, for which compliance was strongly encouraged yet ultimately voluntary. The NERC Operating Guidelines are available at the following link:

[12]The NERC Operating Guidelines are available at: http://www.nerc.com/page.php?cid=1|9|117|161|226.

operating within non-IROL SOLs. This led the standard drafting team to determine that the translation to Version 0 standards did not accurately reflect what the operating policies stated. However, through this technical analysis, the standard drafting team determined that non-IROL SOLs are still important. Applicable entities must be aware of non-IROL SOLs and must consider whether exceeding an individual non-IROL SOL or multiple non-IROL SOLs would or could become a bulk power system reliability issue. True reliability risk to the System exists when the System is operating in conditions such that an IROL limit is exceeded for a time exceeding T_v.

In light of this analysis, the standard drafting team revised the requirements related to operating within limits (both IROLs and SOLs). These proposed revisions move the standards to where the NERC Operating Guidelines intended them to be and ensures that the reliability of the Interconnected System will be maintained and even enhanced because System Operators will not be distracted from true reliability issues by local system issues. Indeed, the revised standards further enhance reliability of the bulk power system by tying actions to T_v. Because T_v may actually be less than 30 minutes, this mandates a tighter time frame for action than the 30-minute time that is mandated in the currently-effective standards, thereby improving reliability of the bulk power system.

The standard drafting team further determined that, while non-IROL SOLs are similar to IROLs in that non-IROL SOLs must respect the ratings of equipment associated with the facilities to which the non-IROL SOL applies, there is no specific requirement established for a time of exceedance similar to the T_v of an IROL (*see,* Figure 1, below). The standard drafting team recognizes that ratings have a wide range of acceptable operating practices and may have differing associated timeframes. For example, large power transformers may have a significant

thermal inertia which will allow them to operate in excess of their rating for a number of hours. Transmission lines may have many different ratings relevant to them, including continuous ratings (may operate at the level continuously), emergency ratings (may operate at an increased level for a shorter duration of time), or even short-term ratings expressed in terms of a magnitude and a duration of a few (typically 5 to 30) minutes.

The notable difference between non-IROL SOLs and IROLs is expressed in the difference between the consequences to the System (or impact to reliability) should unplanned perturbations of the System occur when the limit is being exceeded. For an IROL, the consequences are described as Cascading, uncontrolled separation, or instability. For a non-IROL SOL, the consequences are typically thought of in terms of equipment damage or loss of life and are restricted to a limited, or local, area. By definition, the impact of exceeding a non-IROL SOL will not result in an Adverse Reliability Impact as defined in the NERC Glossary of Terms:

> Adverse Reliability Impact: The impact of an event that results in frequency-related instability; unplanned tripping of load or generation; or uncontrolled separation or cascading outages that affects a widespread area of the Interconnection.

The standard drafting team received valuable feedback from the open comment periods. While the majority of commenters agreed with the standard drafting team's position on IROLs and SOLs, there were a few concerns regarding non-IROL SOLs becoming IROLs in Real-time operations due to changes in System conditions. In response to those comments, the standard drafting team included a requirement, proposed TOP-001-2, Requirement R8, for identifying a sub-set of non-IROL SOLs that are identified as important for local areas and to monitor, with instances when those non-IROL SOLs are exceeded to be reported to the Reliability Coordinators. It is appropriate for a TOP to identify a subset of non-IROLs that are important to

reliability because SOLs are, by definition, local to a Transmission Operator Area.[13] This proposed requirement will allow for the Transmission Operator to ensure that any non-IROL SOLs about which it is concerned to be established and monitored to ensure local consequences are managed. Transmission Operators may also identify and communicate to its Reliability Coordinator any of the non-IROL SOLs that are believed or anticipated to have potential to develop into IROLs and, thus, to ensure that they too are monitored and managed. While NERC does not believe that all non-IROL SOLs are necessary to be monitored and managed in a manner equal to that of IROLs, this provision will enable such operating practices where they are considered to be necessary. Figure 1, below, demonstrates this concept.

[13] Transmission Operator Area is defined in the NERC Glossary of Terms as: The collection of Transmission assets over which the Transmission Operator is responsible for operating.

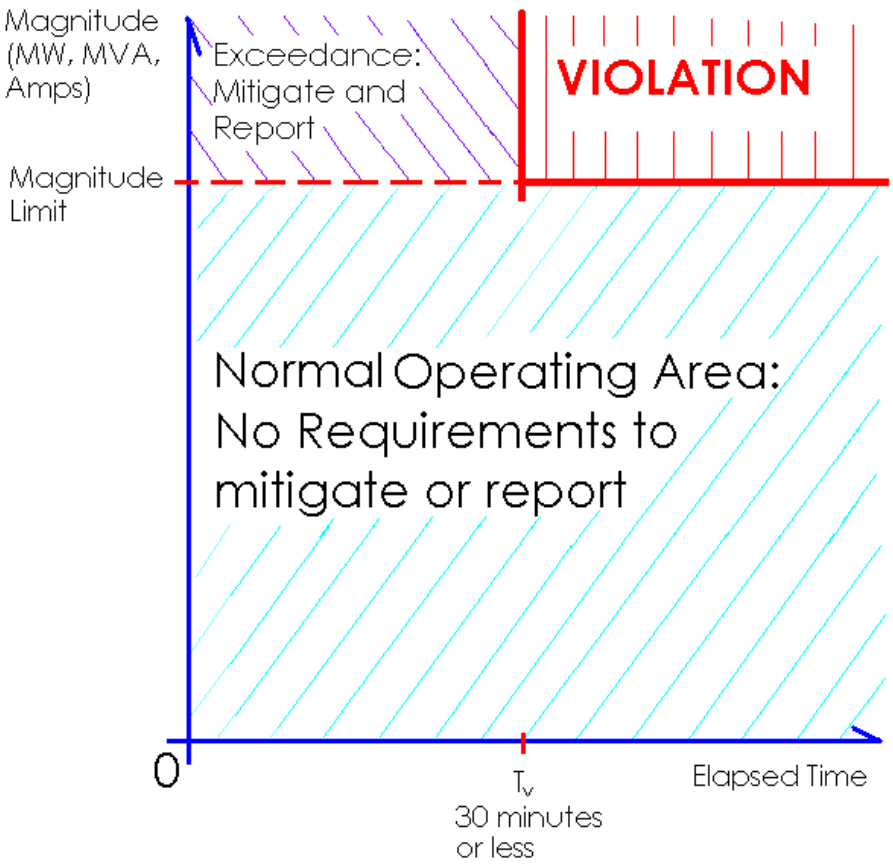

Figure 1. IROL Two Dimensional Limit

Requirements Related to Operations Planning

TOP-002-3 Proposed Requirements

The primary purpose of proposed TOP-002-3 specifically describes what a Transmission Operator must do with respect to operational planning. The proposed TOP-002-3 requirements are as follows:

> **R1.** Each Transmission Operator shall have an Operational Planning Analysis that represents projected System conditions that will allow it to assess whether the planned operations for the next day within its Transmission Operator Area will exceed any of its

Facility Ratings or Stability Limits during anticipated normal and Contingency event conditions. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*

R2. Each Transmission Operator shall develop a plan to operate within each Interconnection Reliability Operating Limit (IROL) and each System Operating Limit (SOL) which, while not an IROL, has been identified by the Transmission Operator as supporting reliability internal to its Transmission Operator Area, identified as a result of the Operational Planning Analysis performed in Requirement R1. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*

R3. Each Transmission Operator shall notify all NERC registered entities identified in the plan(s) cited in Requirement R2 as to their role in those plan(s). *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*

The proposed TOP-002-3 Requirements R1 through R3 call for Operational Planning Analyses from Transmission Operators to ensure operations within IROLs and SOLs that will assure the reliability of the interconnected grid. Proposed TOP-002-3, Requirement R1 requires Transmission Operators to have an Operational Planning Analysis that will allow it to assess whether the planned operations for the next day will exceed any of its Facility Ratings or Stability Limits during anticipated normal and Contingency event conditions. Requirement R2 requires Transmission Operators to develop a plan that will help ensure they do not operate in excess of limits identified in the Operational Planning Analysis. Requirement R3 requires that entities be notified if they are identified in the Transmission Operator's plans. The notification should inform entities of their role in the plans. Having a formal Operational Planning Analysis as referenced by Requirements R1 and R2 that incorporates normal and Contingency situations for next day operations while assuring appropriate limits are not violated assures that the Transmission Operators will have a plan to follow during Real-time operations that accurately reflects the anticipated conditions of the day's operations, including the ability to deliver generation to Load. Requirement R3 follows through on the coordination theme established in

proposed TOP-001-2 by making certain that all entities know what role they need to play in next day operations.

TOP-003-2 Proposed Requirements

The primary purpose of proposed TOP-003-2 is to specifically describe what the Transmission Operator and Balancing Authority must do to obtain the data it requires. The proposed TOP-003-2 requirements are as follows:

> **R1.** Each Transmission Operator shall create a documented specification for the data necessary for it to perform its Operational Planning Analyses and Real-time monitoring. The specification shall include: *[Violation Risk Factor: Low] [Time Horizon: Operations Planning]* **1.1.** A list of data and information needed by the Transmission Operator to support its Operational Planning Analyses and Real-time monitoring.
>
> **1.2.** A mutually-agreeable format.
> **1.3.** A periodicity for providing data.
> **1.4.** The deadline by which the respondent is to provide the indicated data.
>
> **R2.** Each Balancing Authority shall create a documented specification for the data necessary for it to perform its analysis functions and Real-time monitoring. The specification shall include: *[Violation Risk Factor: Low] [Time Horizon: Operations Planning]* **2.1.** A list of data and information needed by the Balancing Authority to support its analysis functions and Real-time monitoring.
>
> **2.2.** A mutually-agreeable format.
> **2.3.** A periodicity for providing data.
> **2.4.** The deadline by which the respondent is to provide the indicated data.
>
> **R3.** Each Transmission Operator shall distribute its data specification, as developed in Requirement R1,to entities that have data required by the Transmission Operator's Operational Planning Analysis and Real-time monitoring process used in meeting its NERC-mandated reliability requirements. *[Violation Risk Factor: Low] [Time Horizon: Operations Planning]*
>
> **R4.** Each Balancing Authority shall distribute its data specification, as developed in Requirement R2, to entities that have data required by the Balancing Authority's analysis functions and Real-time monitoring process used in meeting its NERC-mandated reliability requirements. *[Violation Risk Factor: Low] [Time Horizon: Operations Planning]*

R5. Each Transmission Operator, Balancing Authority, Generator Owner, Generator Operator, Interchange Authority, Load-Serving Entity, Transmission Owner, and Distribution Provider receiving a data specification in Requirement R3 or R4 shall satisfy the obligations of the documented specifications for data. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*

The purpose of the proposed TOP-003-2, Requirements R1 through R5 were adapted for Transmission Operators and Balancing Authorities based on similarrequirements for Reliability Coordinators in IRO-010-1a. They emphasize the need for Transmission Operators and Balancing Authorities to obtain all of the data that they need for reliability purposes and mandate that entities that have this data and that are requested to supply it, provide it to the Transmission Operator and Balancing Authority in an approved and timely manner. Lack of adequate data for Real-time operations and modeling has been pointed out as contributing factors to system incidents in the past. The data specification concept will eliminate this problem by allowing the Transmission Operator and Balancing Authority to require entities to send them any data that is required for them to complete and honor reliability responsibilities.

B. Enforceability of Proposed TOP Reliability Standards

The proposed TOP Reliability Standards contain Measures that support each Requirement by clearly identifying what is required and how the Requirements will be enforced. The measures are included in the proposed standards attached as **Exhibit A.** Additionally, each of the proposed TOP Reliability Standards is assigned a Violation Risk Factor ("VRF") and a Violation Severity Level ("VSL") which supports the determination of a base penalty amount for violations of the requirements as required by the NERC Sanction Guidelines. The VSLs provide further guidance on the way that NERC will enforce the Requirements of the proposed TOP Reliability Standards. The VRFs and VSLs for the proposed TOP Reliability Standards comport

with NERC guidelines related to their assignments. For a detailed review of the VRFs, the VSLs, and the analysis of how the VRFs and VSLs were determined using these guidelines, see **Exhibit E**. The VSLs have been developed based on the situations an auditor may encounter during a compliance audit.

C. Response to FERC Order No. 693 Directives

There were nine directives issued in FERC Order No. 693 related to the proposed TOP Reliability Standards. A summary of each of these directives and the standard drafting team's response is included in **Exhibit I.**

D. Requested Effective Dates

Each of the proposed TOP Reliability Standards will become effective in accordance with the effective date provisions contained therein. Additionally, NERC provides notice of the implementation plan for the proposed TOP Reliability Standards, and the retirement of the following nine Reliability Standards, effective as provided in the implementation plan:

- TOP-001-1a—Reliability Responsibilities and Authorities
- TOP-002-2.1b—Normal Operations Planning
- TOP-003-1—Planned Outage Coordination
- TOP-004-2—Transmission Operations
- TOP-005-2a—Operational Reliability Information
- TOP-006-2—Monitoring System Conditions
- TOP-007-0—Reporting System Operating Limit (SOL) and Interconnection Reliability Operating Limit (IROL) Violations
- TOP-008-1—Response to Transmission Limit Violations
- PER-001-0.2—Operating Personnel Responsibility and Authority

NERC also provides notice that Requirements R2, R5, and R6 of PRC-001-1—System Protection Coordination be retired.

The proposed effective dates are just and reasonable and appropriately balance the urgency in the need to implement the proposed standards against the reasonableness of the time allowed for those that must comply to develop the necessary procedures and take the necessary actions to reflect the requirements and processes identified in the proposed standards. The proposed effective dates will allow affected entities adequate time to ensure compliance with the proposed standards.

V. SUMMARY OF THE RELIABILITY STANDARD DEVELOPMENT PROCEEDINGS

The highlights of the development process for the proposed TOP Reliability Standards are summarized below. **Exhibit F** contains a Summary of the Development Authorization, Posting, and Balloting History of the proposed TOP Reliability Standards as well as the complete record of development for the proposed TOP Reliability Standards. **Exhibit D** contains the Consideration of Comments Reports created during the development of the Proposed TOP Standards.

A. Overview of the Standards Drafting Team

The technical expertise of the ERO is derived from the standard drafting team. For this project, the standard drafting team consisted of six industry experts with a wealth of diverse industry experience across North America, including both the continental United States and Canada. A standard drafting team roster and member biographical information is include as **Exhibit G**.

B. Procedural History of the Proposed TOP Reliability Standards

On March 15, 2007, NERC received, and the Standards Committee accepted, a standards authorization request ("SAR") for Project 2007-03: Real-time Operations. The SAR was posted for two industry comment periods and then approved by the Standards Committee on November 1, 2007, for standard development to begin. The draft standards were posted for seven comment periods, with one initial ballot, two successive ballots, and a final recirculation ballot. The balloting of the proposed TOP Reliability Standards concluded with a recirculation ballot achieving a quorum of 79.36 percent and weighted stakeholder segment approvals of 76.84 percent for proposed TOP-001-2 Transmission Operations, 88.11 percent for proposed TOP-002-3 Operations Planning, and 80.79 percent for proposed TOP-003-2 Operational Reliability Data.

C. Board of Trustees Approval

The final drafts of the proposed TOP Reliability Standards, a NERC staff summary of the revisions, underlying history, minority issues and associated standard drafting team responses, and additional background information, were presented to NERC's Board of Trustees for approval on May 9, 2012. The Board of Trustees approved the revisions to the proposed TOP Reliability Standards and directed NERC staff to make the requisite filings with applicable governmental authorities.

Respectfully submitted,

/s/ Holly A Hawkins

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May 14, 2013

EXHIBITS A, C, D, E, H, I, and J

(Available on the NERC Website at
http://www.nerc.com/fileUploads/File/Filings/Attachments_TOP_filing)

Exhibit B

Criteria for Reliability Standards

1. Proposed Reliability Standards must be designed to achieve a specified reliability goal

The proposed Reliability Standards each have a specific reliability goal. TOP-001-2 — Transmission Operations, specifically establishes the requirements that describe what a Transmission Operator must do with respect to actual Real-time operations. TOP-002-3 - Operations Planning, specifically describes what a Transmission Operator must do with respect to operational planning. TOP-003-2 - Operational Reliability Data specifically describes what the Transmission Operator and Balancing Authority must do to obtain the data it requires.

2. Proposed Reliability Standards must contain a technically sound method to achieve the goal

The proposed Reliability Standards contain technically sound methods to achieve the goals. The standards describe:

- The need for compliance with Reliability Directives issued by the Transmission Operator (TOP-001-2, Requirement R1).
- Informing the Transmission Operator if an entity can not comply with a Reliability Directive (TOP-001-2, Requirement R2).
- Informing entities of actual and anticipated Emergencies (TOP-001-2, Requirement R3)
- Rendering emergency assistance (TOP-001-2, Requirement R4).
- Informing other entities of operations that may adversely impact them (TOP-001-2, Requirement R5).
- Notification of planned outages of telemetry equipment (TOP-001-2, Requirement R6).

- Not operating outside of identified Interconnection Reliability Operating Limits (IROLs) for a duration exceeding the associated T_v (TOP-001-2, Requirement R7).
- Notifying the Reliability Coordinator of System Operating Limits (SOLs) that support reliability internal to its Transmission Operator Area (TOP-001-2, Requirement R8).
- Not operating outside of the identified SOLs for a continuous duration that would cause a violation of its ratings (TOP-001-2, Requirement R9)
- Informing the Reliability Coordinator of actions to return the system within limits (TOP-001-2, Requirement R10)
- Mitigating the magnitude and duration of limit exceedances (TOP-001-2, Requirement R11)
- Requirements to have an Operational Planning Analysis (TOP-002-3, Requirement R1)
- Planning to preclude operating in excess of limits identified in the Operational Planning Analysis (TOP-002-3, Requirement R2)
- Notifying entities identified in plans of their roles in the plan (TOP-002-3, Requirement R3)
- Development of a data specification for all needed operating and planning data (TOP-003-2, Requirement R1 for the Transmission Operator and Requirement R2 for the Balancing Authority)
- Distribution of the data specification to affected entities (TOP-003-2, Requirement R3 for Transmission Operators and Requirement R4 for Balancing Authorities)
- The need to satisfy the obligations of the data specification (TOP-003-2, Requirement R5)

3. Proposed Reliability Standards must be applicable to users, owners, and operators of the bulk power system, and not others

The proposed Reliability Standards are applicable to users, owners, and operators of the bulk power system, and not others. The proposed standards are specifically applicable to Transmission Operators, Balancing Authorities, Generator Owners, Generator Operators, Interchange Authorities, Load-Serving Entities, Transmission Owners, and Distribution Providers; each is clearly a user, owner, or operator of the bulk power system.

4. Proposed Reliability Standards must be clear and unambiguous as to what is required and who is required to comply

The proposed Reliability Standards are clear and unambiguous as to what is required and who is required to comply. Each requirement clearly states the applicable entity (ies) and what they are required to do.

5. Proposed Reliability Standards must include clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation

The proposed Reliability Standards include clear and understandable consequences. Each requirement is assigned a Violation Risk Factor ("VRF") and a Violation Severity Level ("VSL") which supports the determination of a base penalty amount for violations of the requirements as required by the NERC Sanction Guidelines.

6. Proposed Reliability Standards must identify clear and objective criterion or measure for compliance, so that it can be enforced in a consistent and non-preferential manner

The proposed Reliability Standards identify clear and objective criteria to support enforcement in a consistent and non-preferential manner. Each requirement has an associated measure, and each requirement clearly identifies the expected performance that will serve as the

basis for development of compliance enforcement objectives, typically provided through the Reliability Standard Audit Worksheets. The language used in the requirements clearly identifies what is expected of the applicable entity.

7. Proposed Reliability Standards should achieve a reliability goal effectively and efficiently — but do not necessarily have to reflect "best practices" without regard to implementation cost

The proposed Reliability Standards achieve their reliability goal effectively and efficiently. Expanding the requirements to meet the reliability objectives of the standards was carefully considered in the *Reliability Standards Development Process*, and the standards were structured to address the objective without unduly burdening the applicable entities.

8. Proposed Reliability Standards cannot be "lowest common denominator," *i.e.*, cannot reflect a compromise that does not adequately protect bulk power system reliability

The proposed Reliability Standards are more stringent than current requirements. For example, treatment of IROLs within T_v is a more stringent requirement than in the previous version of the Reliability Standards because T_v may actually be less than 30 minutes and therefore a tighter time frame than what is required in the currently-effective Reliability Standard. This reflects a significant increase in responsibilities and expectations for applicable entities and clearly does not represent a lowest common denominator.

9. Proposed Reliability Standards may consider costs to implement for smaller entities but not at consequence of less than excellence in operating system reliability

The proposed Reliability Standards do not differentiate among entities based on size or cost. These requirements apply to an entity with responsibility for operations.

10. Proposed Reliability Standards must be designed to apply throughout North America to the maximum extent achievable with a single Reliability Standard while not favoring one area or approach

The proposed Reliability Standards are designed to apply throughout North America. The standards as drafted propose no regional differences or variances.

11. Proposed Reliability Standards should cause no undue negative effect on competition or restriction of the grid

There is no basis for anticipating that the proposed Reliability Standards will adversely affect competition or restrict Available Transmission Capability beyond what is necessary for reliability.

12. The implementation time for the proposed Reliability Standards must be reasonable

The proposed Reliability Standards identify the proposed effective dates for the standards. The ten and twelve month periods following regulatory approval are to allow for entities to update processes, develop data specifications, and train operators on the revised requirements.

13. The Reliability Standard development process must be open and fair

NERC develops Reliability Standards in accordance with Section 300 (Reliability Standards Development) of its Rules of Procedure and the NERC *Reliability Standards Development Procedure*, which was incorporated into the Rules of Procedure as Appendix 3A. NERC's proposed rules provide for reasonable notice and opportunity for public comment, due process, openness, and a balance of interests in developing Reliability Standards. The development process is open to any person or entity with a legitimate interest in the reliability of the bulk power system. NERC considers the comments of all stakeholders and a vote of

stakeholders and the NERC Board of Trustees is required to approve a Reliability Standard for submission to the applicable governmental authorities.

The proposed Reliability Standards set out in **Exhibit A** have been developed and approved by industry stakeholders using the process found in NERC's *Reliability Standards Development Procedure*, and were approved by the NERC Board of Trustees on May 9, 2012 for filing with the applicable governmental authorities. Therefore, NERC has utilized its approved standard development process in good faith and in a manner that is open and fair.

14. Proposed Reliability Standards must balance with other vital public interests

These standards are focused on ensuring that the transmission system operates in a reliable fashion. No other environmental, social, or other goals are reflected or considered in these standards.

15. Proposed Reliability Standards must consider any other relevant factors

An overview of the issues raised in consideration of the proposed standards, included in **Exhibit I**, is presented in a matrix and demonstrates how industry comments from previous work, as well as directives from FERC Order No. 693, were addressed in this standard development project.

Exhibit F

Summary of Development
Authorization, Posting, and Balloting History

On March 15, 2007, NERC received, and the Standards Committee accepted, a standards authorization request ("SAR") for Project 2007-03: Real-time Operations. The SAR was posted for two industry comment periods and then approved by the Standards Committee on November 1, 2007 for standard development.

The assigned standard drafting team posted the draft standard for a 45-day industry comment period from October 7, 2008 to November 20, 2008. In response, there were more than 26 sets of comments, including comments from more than 90 different people from approximately 50 companies representing 9 of the 10 Industry Segments. Comments mainly addressed the following issues:

- Deletion of redundant requirements and un-measurable terms
- The twenty-four month Implementation Plan,
- Consolidation of the eight existing TOP standards to three standards,
- Adopting a revised approach to operating within System Operating Limits (SOLs), and
- Deletion of certain core certification level requirements.

The standard drafting team revised the draft standards accordingly and re-posted for industry comment from April 7, 2009 to May 7, 2009. There were 37 sets of comments, including comments from more than 130 different people from over 45 companies representing all 10 Industry Segments. Comments received were mainly focused on support for providing

emergency assistance, the need to coordinate operations, operating within a certain subset of SOLs, emphasizing 'what' is to be done as opposed to 'how' to do it, and the lack of need for a country-wide advance notice for planned outages.

The standard drafting team again revised the draft standards to accommodate industry concerns and re-posted them between August 25, 2009 and September 24, 2009. In response to this posting, there were 26 sets of comments, including comments from more than 80 different people from over 45 companies representing 9 of the 10 Industry Segments. Comments addressed the proposal to remove Balancing Authorities from the requirement dealing with the issuance of Reliability Directives and numerous requests for language clarification.

The fourth draft of the standards was posted from August 4, 2010 through September 3, 2010. There were comments from more than 34 different people from approximately 34 companies representing 7 of the 10 Industry Segments. Based on stakeholder comments, the standard drafting team made several clarifications to the requirements language. The standard drafting team did not believe that the changes were significant and requested approval from the Standards Committee to move to the ballot process.

During the development process, the standard drafting team faced several key decision points:

- The existing Reliability Standards for transmission operations were spread over eight different standards. The standard drafting team decided to incorporate all of the necessary requirements in three cohesive, comprehensive Reliability Standards.
- The existing Reliability Standards contained a number of redundancies and elements that were part of the core certification for Transmission Operators.

The standard drafting team eliminated these requirements wherever possible so that the revised standards addressed true reliability needs.

- The existing standards contained a number of 'how' requirements rather than instructing entities on 'what' to do. The standard drafting team eliminated the prescriptive requirements dictating how something be done and refocused the standards on achieving a specific result.
- The existing Reliability Standards mixed responsibilities for functional entities within the TOP family of standards. This made it difficult for entities to sort out who was responsible for the requirements. The standard drafting team reviewed existing standards and eliminated this confusion through cooperation with other standards projects working on requirements for Reliability Coordinators and by identifying what actual functional entity was truly responsible for the requirements within the TOP family of standards. The result is that the TOP family of standards now applies almost exclusively to the Transmission Operator, and the proposed IRO Reliability Standards filed concurrently with this petition apply almost exclusively to the Reliability Coordinator.
- The standard drafting team moved data exchange requirements to a data specification approach similar to the one approved by the Commission for the Reliability Coordinator in the IRO Reliability Standards.
- The standard drafting team raised the bar on system performance by mandating that all IROLs be resolved within the IROL T_v which is a significant increase in performance over the existing Reliability Standards.

- The standard drafting team worked with industry through the comment periods on adopting an approach for operating within a subset of SOLs that more closely aligns with the original Operating Guidelines.

NERC posted the proposed TOP Reliability Standards for a fifth time from April 26, 2011 to June 9, 2011, while conducting an initial ballot in parallel with this posting from May 31, 2011 through June 9, 2011. With an 88.47 percent quorum participating in the ballot, the proposed Reliability Standards achieved a weighted segment vote of 48.64 percent approval. The standard drafting team addressed all of the ballot comments and made several changes to the standards as a result.

There were 4 main themes to the comments supplied with the initial balloting:

1. Clarifying the language on Reliability Directives
2. Replacing the 30 minute SOL limit with adherence to Facility Ratings and Stability criteria
3. Clarifying the entities involved in operations planning activities
4. Clarifying the language for the data specifications

Due to the number of comments and subsequent changes to the proposed standards, the standard drafting team decided to move to another successive ballot.

The standard drafting team posted its Consideration of Comments report to the initial ballot comments as part of a concurrent posting/successive balloting period from December 14, 2011 through January 12, 2012. During this posting, each of the Reliability Standards were voted separately. TOP-001-2 had an 82.04 percent quorum participating in the ballot, and achieved a weighted segment vote of 59.93 percent approval. TOP-002-3 had an 82.04 percent quorum participating in the ballot, and achieved a weighted segment vote of 77.08 percent

approval. TOP-003-2 had an 82.04 percent quorum participating in the ballot, and achieved a weighted segment vote of 78.95 percent approval.

TOP-001-2 required another successive ballot due to its failure to receive approval by the required margin. While TOP-003-2 had passed its successive ballot, the standard drafting team added the Distribution Provider to the standard due to industry comments. This amounted to a substantive change to the standard and required it to go back to a successive ballot. TOP-002-3 passed its ballot but the effective date of the standard was changed which required TOP-002-3 also move to a successive ballot.

The main themes addressed by the standard drafting team were:

- The need for clarifying language to allow for multiple Transmission Operators (TOP-001-2)
- Clarifying the term 'internal area reliability' by changing to 'internal to its Transmission Operator Area' (TOP-001-2)
- The need for semantic changes to several requirements (TOP-001-2)
- Changes to the VSLs for Requirements R1, R3, R5, and R10 (TOP-001-2)
- Adding the Distribution Provider as an applicable entity (TOP-003-2)
- Adding analysis functions to the Balancing Authority tasks (TOP-003-2)
- Changing the VSLs for Requirements R1, R2, R3, and R4 (TOP-003-2)

The standard drafting team posted its Consideration of Comments report to the first successive ballot comments as part of a concurrent posting/successive balloting period from March 22, 2012 through April 20, 2012. Once again, each of the applicable Reliability Standards was voted separately. TOP-001-2 had a 77.48 percent quorum participating in the ballot, and achieved a weighted segment vote of 75.42 percent approval. TOP-002-3 had a 77.21

percent quorum participating in the ballot, and achieved a weighted segment vote of 87.42 percent approval. TOP-003-2 had a 77.48 percent quorum participating in the ballot, and achieved a weighted segment vote of 79.98 percent approval.

NERC conducted the recirculation ballot from April 27, 2012 to May 6, 2012. The proposed Reliability Standards achieved the required two-thirds weighted segment vote and at least a 75 percent quorum of the ballot pool. TOP-001-2 achieved a quorum of 79.36 percent and an approval rating of 76.84 percent. TOP-002-3 achieved a quorum of 79.36 percent with an approval of 88.11 percent. TOP-003-2 reached a quorum of 79.36 percent and an approval rate of 80.79 percent.

During the course of the project, the standard drafting team addressed several contentious issues:

- Communication protocols: The standard drafting team revised the TOP standards to specifically address only those requirements for responding to Reliability Directives. The standard drafting team also decided that the revised definition of Reliability Directive being created in Project 2006-06 was sufficient for the needs of the TOP standards. The standard drafting team determined to remove all other communication protocols from the TOP standards to allow standard drafting teams focusing on the COM family of standards to cover all other necessary communication requirements.
- The proper handling of IROLs and SOLs: In the course of their deliberations, the standard drafting team began to look closely at the requirements around SOLs and IROLs to make certain that they accurately reflected what was needed for the reliability of the Bulk Electric System.

- Handling deliverability issues in operations planning: Power must always be deliverable to Load. There was some confusion in the past on how this deliverability was being handled in operations planning. The standard drafting team clarified this issue by tying the operations planning process to a defined activity, Operational Planning Analysis (OPA), which requires an entity to consider Contingencies and to observe all applicable limits. When all power inputs and Loads are represented in the OPA, with all applicable limits observed, energy is deliverable to Load.
- Data specification concept: The data specification approach represented a departure from the previous table-driven approach that was in existence. This caused some apprehension at first but over time the standard drafting team was able to answer industry questions and concerns. The approach was further validated when the Commission accepted a similar data specification approach for approved IRO-010-1a. The data specification requirements in TOP-003-2 are modeled after IRO-010-1a.

Minority issues expressed during the project were as follows:

- Some commenters asked for a formal definition of this term. The standard drafting team determined that the Transmission Operator should have some degree of freedom in this determination and that they are best suited to determine what affects its internal area. Therefore, the best approach is to leave the term as is and not to constrain the Transmission Operator to specific definition. This way, each situation can be determined on its own merits and the responsibility for correctly assigning SOLs to the list rests solely with the individual Transmission

Operator. Furthermore, the individual Transmission Operator is free to develop its own definition.

- Questions arose about the role of the Balancing Authority in the actions described in the revised TOP standards. The standard drafting team has clearly defined each element of responsibility that was previously defined for the Balancing Authority in the existing TOP standards and how it was handled in the revised TOP standards. The standard drafting team does not believe that any gaps have been created by the revisions.

The NERC Board of Trustees approved the proposed TOP Reliability Standards during its May 9, 2012 meeting.

Exhibit G

Project 2010-17 Definition of Bulk Electric System Standard Drafting Team Roster

Name and Title	Company and Address	Contact Info	Bio
James Case, P.E. Director, Weekly Operations & standard drafting team Chair	Entergy Services 6540 Watkins Drive Jackson, MS 39213	1.601.985.2345 jcase@entergy.com	Jim Case was named director of weekly operations in June 2008. Immediately prior to being named to this position, Mr. Case served in transmission operations as manager of transmission system security. As director of weekly operations, Mr. Case is responsible for the design, implementation and maintenance of procedures and processes necessary to ensure compliance with Entergy's transmission tariff on file with the Federal Energy Regulatory Commission that governs Entergy's weekly procurement process. Mr. Case also leads the implementation of integration into the MISO RTO for Entergy's transmission function. Mr. Case has over thirty-eight years of electric utility experience, most recently in transmission operations. He has experience in all phases of transmission and distribution, including field engineering, construction management, distribution standards, and bulk power operations. Mr. Case currently directs a group that performs security-constrained unit commitment including independent offers on a week-ahead basis for Entergy. In addition to his previous assignment in transmission operations, he has served as manager of transmission security coordination, staff engineer in distribution standards, and district engineer in the south-central district of Entergy Mississippi. Before

			joining Entergy, Mr. Case worked for the Union Carbide Nuclear Division and Gulf Power Company. Mr. Case is active internationally in NERC. He is a member of the NERC Operating Committee, Chair of the SERC Operating Committee, Chair of the NERC Real-time Operations Standards Drafting Team, member of the Reliability Coordination Standards Drafting Team, member of the Interconnected Reliable Operations Standards Drafting Team, past member of the Version 0 Standards Drafting Team, the Reliability Coordination Working Group, the Congestion Management Working Group, and the ANSI C62 working group concerned with surge arrester standards. Mr. Case has a bachelor's degree in electrical engineering from Mississippi State University and a master's degree in business administration from the University of Arkansas at Little Rock. Mr. Case is a senior member of the Institute of Electrical and Electronics Engineers, Inc., a member of the Power Engineering Society, and is a registered professional engineer in Mississippi. Mr. Case is a member of Eta Kappa Nu, Tau Beta Pi, Beta Gamma Sigma and Alpha Epsilon Lambda.
Karl Tammar Transmission	Sharyland Utilities 6900 Interstate 40	1.806.358.9070 ktammar@sharyland.com	Karl Tammar is the Manager of Transmission Operations for Sharyland Utilities, LLP. Mr. Tammar joined Sharyland Utilities in October 2010. He is responsible for developing and

Operations Manager & standard drafting team Vice Chair	West, Suite 100 Amarillo, TX 79119		leading the transmission operations organization for Sharyland Utilities, including building a new transmission operations center to control and operate Sharyland's transmission assets. Mr. Tammar has over 30 years of experience in the electric utility industry that includes management and engineering positions with electric utility companies including Northeast Utilities, Montana-Dakota Utilities, and the New York Independent System Operator. He has served on numerous NERC and regional reliability committees, task forces, and working groups; most recently as the Vice Chair of the NERC Real-time Operations Standards Drafting Team. Mr. Tammar has an MBA in Accounting from Union College and a Master's in Electric Power Engineering from Rensselaer Polytechnic Institute. He is a member of the Institute of Electrical and Electronics Engineers (IEEE), and a member of the IEEE's Power and Energy Society and Technology Management Council.
Albert DiCaprio Strategist	PJM 955 Jefferson Ave. Valley Forge Corporate Center Norristown, PA 19403	1.610.666.8854 dicapram@pjm.com	Mr. DiCaprio has been employed by PJM since 1970. His experience at PJM includes the System Operations Department in which he helped develop PJM's generation control program, PJM's Accounting for regulation program, and PJM's Fuel Supply Emergency procedures; in the System Performance Department he initiated performance monitoring and benchmarking programs and PJM's

			Energy by Fuel type tracking system; and he helped launch PJM's first retail customer support program. As Senior Strategist, Mr. DiCaprio provides analysis and support for PJM positions on NERC standards and FERC initiatives. Mr. DiCaprio has served on various NERC committees most notably as Chairman of the Performance Subcommittee when the first Control Performance Standard was approved and on the Task Force whose efforts led to the development of the NERC Functional Model. Mr. DiCaprio serves as the chairman of the ISO/RTO's Standards Review Committee who review and comment on NERC Reliability Standards, NAESB Business Practices, and FERC initiatives related to reliability standards. Active in the IEEE, Mr. DiCaprio is a senior member and has published various papers and has served on Technical Activities committees for two Joint IEEE-CIGRE conferences. Internationally, Mr. DiCaprio serves as the chairman of the International Group on Comparison of Transmission Operation Practices. Mr. DiCaprio has been part of CIGRE's initiative into Energy Markets and has been active with Study Committee C5 (Markets and Regulation) since its beginning in 2000 and received the CIGRE 2009 Technical Committee Award for his contributions to the Study Committee. Mr. DiCaprio is also active in a Joint Working Group

			with Markets and Operations, and Working Groups on System Design (WG C5-7) and on Integration of Renewable resources and Demand-side Management (WG C5-11). Mr. DiCaprio has a Bachelor's Degree in Electrical Engineering from Drexel University and a Master's Degree in System Operations from the University of PA.
Jason Marshall Director, Reliability Compliance	ACES Power marketing 4140 West 99th Street Carmel, IN 46032	1.317.344.7204 jmarshall@acespower.com	Jason Marshall is currently Director of Reliability Compliance for ACES Power Marketing (APM) in Carmel, IN. Mr. Marshall joined APM in April 2011 in this role. Mr. Marshall is currently responsible for leading APM's reliability compliance support service which provides advice, guidance, and processes to share resources and reliability compliance intelligence among APM's members and the National Rural Electric Cooperative Association (NRECA). Mr. Marshall has 15 years of experience in the energy industry including extensive experience in bulk power operations and ERO compliance. Mr. Marshall began his career in 1996 with Duke Energy as an Associate Engineer supporting their transmission tariff and bulk power operations. Immediately prior to joining APM, Mr. Marshall held positions of progressively increasing responsibility in operations engineering and ERO standards development and compliance at Midwest ISO in Carmel, IN. Mr. Marshall also has worked as a reliability coordinator for the MAIN

			Coordination Center in Lombard, IL. Mr. Marshall's industry experience includes reliability coordination, transmission operations, balancing authority operations, operations planning, EMS support, transmission tariff administration, reliability policy analysis, and new business start up. He has served on numerous NERC committees, drafting teams, and task forces. Mr. Marshall also has served as chairman of several RFC standards drafting teams and vice-chairman of the ISO/RTO Council's Standards Review Committee. Mr. Marshall graduated with a Bachelor of Science degree in electrical engineering from Rose-Hulman Institute of Technology. He also received a Master of Science in Electrical Engineering (with a power systems emphasis) from Clemson University and a Master of Business Administration from the University of Indianapolis. Mr. Marshall is a NERC-certified Reliability Operator and a Registered Professional Engineer in the states of North Carolina and Indiana.
H. Steven Myers Principal, Operating & Planning Standards	ERCOT 2705 West Lake Drive Taylor, TX 76574	1.512.248.3077 smyers@ercot.com	Steve Myers, Principal, Operating & Planning Standards at the Electric Reliability Council of Texas (ERCOT), has over forty-two years of electric system operations experience. Mr. Myers first joined ERCOT in 1996 as the Security Center Manager at the inception of the ERCOT Independent System Operator (ISO). During his time at ERCOT, he has served as Security Center Manager, Manager of System Operations, Manager of Operations

			Support, Manager of Operating Standards, and now as Principal, Operating & Planning Standards. Mr. Myers has served in various positions related to NERC activities, standards development, and reliability standards compliance. He has been a member of the NERC RCWG, NERC ORS, the original RRSWG, the Version 0 Operating Standards standard drafting team , numerous Reliability Standards standard drafting teams, the NERC FMWG, and is presently an ISO/RTO Segment representative to the NERC Standards Committee. Mr. Myers is also a member of the ISO/RTO Council Standards Review Committee (SRC). Prior to joining ERCOT, Mr. Myers served as Manager of the North Texas Security Center. He also served as Operations Supervisor and as Supervisor of Operations Engineering for an investor-owned electric utility; including generation and transmission operations. As a more junior engineer, he served as an engineer in electrical distribution, with responsibilities including supervision of a transformer repair shop, supervision of an underground network group, and as an operations engineer at the system control center. Mr. Myers is a graduate of New Mexico State University, with a Bachelor of Science in Electrical Engineering (BSEE). He has a Master of Business Administration (MBA) degree in Management from the University of

			Texas at Arlington, and is a Registered Professional Engineer in the State of Texas. Mr. Myers served as an officer in the U. S. Naval Reserve as an Assistant Resident Officer in Charge of Construction in San Diego, California. His electrical engineering training enabled his oversight of all contracts for electrical systems on all bases in the San Diego area. Mr. Myers also gained experience with oversight of contracts of every nature on three assigned Navy bases in the area.
Gregory Van Pelt	CAISO 250 Outcropping Way Folsom, CA 95630	1.916.351.2190 gvanpelt@caiso.com	Gregory Van Pelt is currently an External Affairs Manager for the California Independent System Operator (ISO). Mr. Van Pelt has been involved in power system operations for nearly 40 years and was part of the original start-up staff at the ISO. Prior to his current assignment, his responsibilities included real-time operations, operations training, outage management, regional coordination and compliance, as well as developing and coordinating emergency response actions. Before coming to the ISO, Mr. Van Pelt spent 25 years with the Southern California Edison Company where his responsibilities were primarily in Electric System Operations and Emergency Management.