

## Assess Transmission Future Needs Standard Drafting Team

January 15–16, 2007

### Meeting Notes

#### 1. Administrative Items

##### a. Introductions and Quorum

The meeting was called to order at 1245 on January 15, 2007. The group provided self-introductions. Attendees were:

Dale Bodden (guest)	Darrin Church	Doug Hohlbaugh
Bob Jones	Brian Keel	Lloyd Linke
Tom Mielnik	Bob Millard (vice chair)	John Odom (chair)
Mahendra Patel	Bob Pierce	Paul Rocha
Chifong Thomas	Yury Tsimberg	Jim Useldinger
Robert Williams	Gerry Cauley (NERC)	Ed Dobrowolski (NERC)

A quorum was present. John thanked those members who gave up their holiday to attend this meeting.

##### b. NERC Antitrust Compliance Guidelines — Ed Dobrowolski

Ed projected the antitrust guidelines and briefly reviewed them.

##### c. Review Meeting Agenda & Objectives — John Odom

John reviewed the agenda and objectives for the meeting as well as the schedule for the two days.

#### 2. SDT Overview Session — Gerry Cauley

Gerry provided a Power Point presentation that is attached to these notes as Attachment A. Highlights included:

- An overview of the Standards Process
- A review of what the topic of industry consensus means — there is a limit to the extent of consensus; you will probably never reach unanimity.
- The definition of a SAR – clear description is required; you cannot go beyond the scope identified in a SAR without a new SAR but you can eliminate certain elements based on group consensus. Therefore, it is important to provide enough flexibility in a SAR to make sure that work can continue as new ideas come to pass.
- The need (or lack of need) for field tests

- The need for a posted implementation plan – round dates such as start of a quarter or start of a year will be used from this point forward
- NERC is encouraging FERC staff to take an active role in the standards process so that FERC inputs come earlier in the process rather than later
- A review of the balloting process
- A review of the changes that need to be made to standards including:
  - One-line titles
  - Specific applicability with no applicability assigned to an RRO
  - Use of Functional Model V3
  - Measures can roll up requirements but all requirements must be addressed specifically somewhere in a measure
  - Violation severity levels replace levels of non-compliance; this is a separate item from risk

All members are encouraged to review the Standards Process Development Guidelines for complete requirements for drafting teams.

### **3. Finalize Supplemental SAR — Bob Millard**

Bob drafted a supplement to the original SAR to accommodate the addition of TPL-005 and TPL-006 as well as the various items identified in the Reliability Standards Development Work Plan. The team reviewed the draft and made changes during the meeting. There was a question about capturing comments made by TIS. It was felt that the present wording of the supplement was flexible enough to allow the TIS comments to be accommodated. Several members of the SDT are also members of TIS as well so there will be a close liaison between the two groups. The finalized document is included as Attachment B.

The SDT agreed that the supplement is now ready to be delivered to the SC for posting.

### **4. Review Typical Standard Development Schedule — Ed Dobrowolski**

Ed reviewed the proposed schedule for this project that was sent out to the team last week for review. This is an aggressive schedule and will require considerable commitment from all the team members. Dividing the work into sub-tasks with small group assignments will probably be the only way to make this work. The general schedule presented will allow the team to complete its work within the schedule shown in the Reliability Standards Development Work Plan.

### **5. Review Proposed Approach to Standard Development — John Odom**

The team was reminded that a broad view is required for this work. The existing requirements should not serve as constraints to the team. If we can validate the reasoning, existing requirements can be deleted or replaced. In addition, the team should not feel constrained to continue with 6 separate standards for TPL if consolidation makes sense.

John and Bob ran through the spreadsheet explaining that it was designed to let the team focus on the issues involved as opposed to simply ‘wordsmithing’ the existing documents. It was thought that a wordsmith operation would end up letting important issues fall through the cracks. A detailed review followed where the team identified specific questions/comments that the project will need to address in order to produce a quality standard. The revised work sheet will be sent out via the server.

## **6. Review Scope of Work and Develop Assignments — John Odom**

John & Bob will draft sub-teams and team leaders to tackle the main categories shown in the work sheet. These sub-teams will work independently but any outputs should be shared with the entire team.

The project work will need to be coordinated with TADS activities.

We will need to see copies of the appropriate sections of the regional delegation agreements that deal with transmission assessments in order to handle TPL-005 correctly.

## **7. Report from Probabilistic Sub-Team & TIS — Tom Mielnik & Yury Tsimberg**

Tom presented a summary of the sub-team report. It is included as Attachment C to these notes. The original task was to investigate the WECC probability based reliability criteria that is viewed as being more stringent than the NERC requirement. This presentation was designed as an introduction with more detailed discussions to be held down the road as we progress with the standards revisions.

Tom handed out:

- A draft paper on steps that would allow the incorporation of the WECC approach in TPL-001 through TPL-004.
- Sample definitions from IEEE on reporting and analyzing outages.
- A red-lined copy of TPL-004 as revised by the sub-team to reflect probabilistic techniques (including a 'revised' Table 1).
  - Note – the data shown on the tables is to be considered confidential and is not to be shared outside this group at this time.

Tom will e-mail this material to the server.

Yuri then provided a presentation on related TIS activities. The material was e-mailed to the server.

## **8. Schedule Next Meetings**

- a. Wednesday, February 7, 2007 — Conference call from 1100 to 1300 EST
- b. Thursday, March 1, 2007 at 0800 and Friday, March 2, 2007 until noon — Dallas, TX (tentative — waiting on hotel information): coordinated with TADS meeting
- c. Friday, March 16, 2007 — Conference call from 1100 to 1300 EST (other dates that had been suggested were not viable due to conflicts with other NERC meetings that SDT members must attend)
- d. Wednesday, April 4, 2007 at 8 a.m. to Thursday, April 5, 2007 at 5 p.m. — hosted by Center Point Energy in Houston, TX

## **9. Review Action Items — Ed Dobrowolski**

The following action items were generated at this meeting:

1. Ed will e-mail the finalized supplemental SAR to Maureen for processing and submittal to the SC.
2. Ed will investigate how to obtain the transmission assessment sections of the regional delegation agreements for the SDT.
3. John & Bob will assign team leaders and members for the working sub-teams.

4. Tom will e-mail the hard copy material handed out at the meeting to the server.
5. Ed will schedule the February 7 conference call.

#### **10. Adjourn**

The meeting was adjourned at 1500 on January 16.

# Attachment A

## Drafting Team Orientation

Gerry Cauley  
VP, Director of Standards

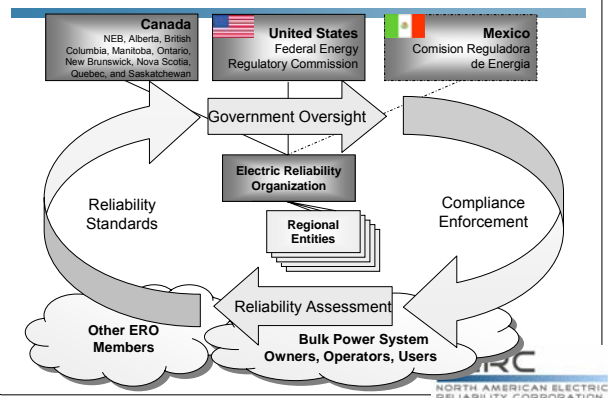


## Topics

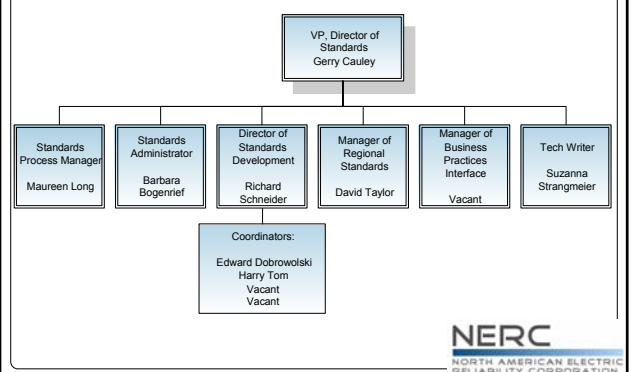
- Review of standards processes and roles
- Drafting team responsibilities and decision-making
- Work plan and improvements to standards
- Drafting team products and tools
  - Standard authorization request (SAR)
  - Reliability standard
  - Comment form
  - Response to comments
  - Implementation plan
  - Field test
  - On-line resources



## Electric Reliability Organization Overview



## Standards Staff



## Status of NERC Standards

April 2005	90 Version 0 standards go into effect
April 2006	102 standards filed for approval
August 2006	16 new/11 revised standards filed
October 2006	FERC issues standards NOPR
November 2006	3 new/20 revised standards filed
December 2006	3-year standards work plan filed

24	Pending further information "good utility practice"	Pending – Cyber Security Standards	8
83	Proposed for Approval	Pending – System Limits Standards	3

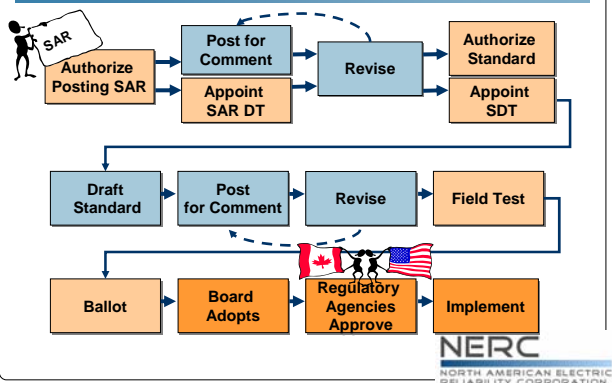


## ANSI Accreditation

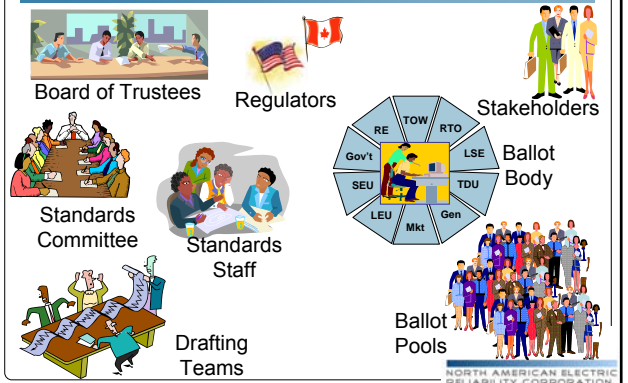
- NERC process accredited by American National Standards Institute (ANSI)
- ANSI 16 'essential requirements'
  - Open
  - Inclusive
  - Fair
  - Balanced
- Standards Committee ensures standards process adheres to these principles



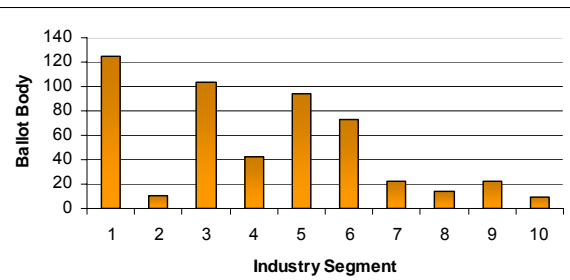
## Standards Process Overview



## Key Roles in Standards Process



## 515 Members of Registered Ballot Body



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## Drafting Teams

- SAR drafting teams
  - SC appoints as needed to assist requester with SAR development and response to comments
  - Requester 'owns' request until authorized for development
- Standard drafting teams
  - SC appoints expert team to draft standard
  - Works on behalf of stakeholders
  - Reports to Standards Committee
- Considerations
  - Necessary expertise and competencies provided
  - Balanced and inclusive perspectives
  - Efficient use of industry resources

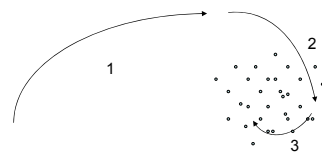
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## Standard Authorization Request (SAR)

- Establishes purpose and scope of proposed standard
- Sponsored by requester until standard authorized for development
- SC may appoint SAR drafting team to assist requester
- Public comments on SAR (multiple postings possible)
- SC authorizes development when consensus reached on purpose and scope

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## What Is "Consent of the Industry?"



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## Key Decision Points

- **Standards Committee**
  - **Authorize Posting SAR/Standard** - complete; without conflict
  - **Authorize Standard Development** – (consensus on reliability-related need, scope, applicability)
  - **Authorize Field Test** – evidence test justified (technical committees, compliance program, stakeholder comments)
  - **Authorize Ballot** – evidence process followed (all documents complete; no significant changes without a comment period; evidence of consensus; all comments considered)
- **Drafting Team**
  - **Request Posting SAR/Standard** - complete; without conflict
  - **Request Standard Development** – (consensus on reliability-related need, scope, applicability)
  - **Request Field Test** – evidence test justified (technical committees, compliance program, stakeholder comments)
  - **Request Ballot** – evidence process followed (all documents complete; no significant changes without a comment period; evidence of consensus; all comments considered)



## Field Tests

- As needed to validate concepts, methods, measures in a standard
- Drafting team develops field test plan
- Standards Committee approves and oversees field test
- Complete tests before ballot



## Implementation Plan

- Part of final standard going to ballot
- Must be posted for comment at least once
- Includes
  - Proposed effective date(s) and implementation into compliance program
  - Withdrawal or modification of existing standards
  - Any tools, training, or other implementation considerations



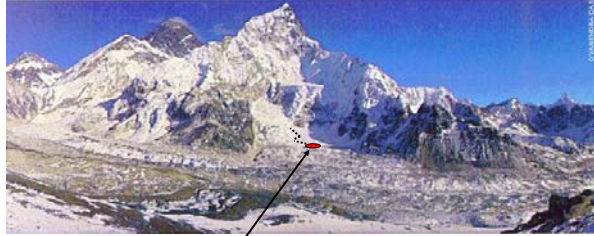
## Standard Approval (High Threshold)

- Ballot pool votes to approve industry standard
  - Subset of RBB enrolled to vote on a standard
  - Must enroll before ballot starts
- Electronic ballot over a 10-day period
- Initial ballot and recirculation ballot
  - Recirculation required if 1 or more negative votes with reasons on first ballot
  - Recirculation ballot is by exception
- Quorum is 75% of ballot pool
- Stakeholder approval requires  $\geq 2/3$  weighted average of segments
- Board approves filing standards





## The Climb To Really Excellent Reliability Standards



Camp 'Version 0'

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## Benchmarks of Excellent Standards

1. Applicability
2. Purpose
3. Performance requirements
4. Measurability
5. Technical basis
6. Completeness
7. Known consequences
8. Clear language
9. Practicality
10. Consistent terminology

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## Standards Work Plan: Overview

- Filed 12/1/06 in U.S. and 12/7/06 in Canada
- *Dynamic* management tool
  - Communicate vision
  - Coordinate work
  - Measure progress
- 31 projects grouped by subject matter
- Aggressive but achievable schedule
- Detailed project descriptions listing 'to dos'
- More efficient use of drafting teams
- Integrates 'fill-in-the-blank' plan

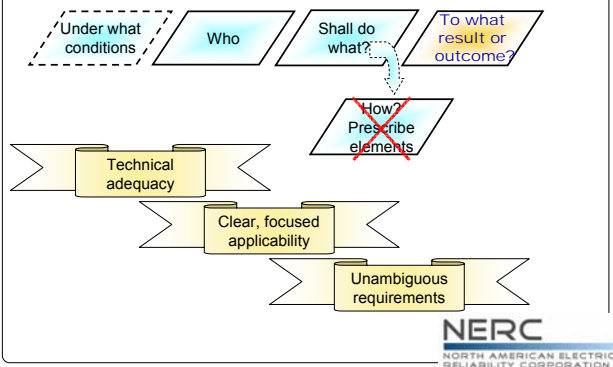
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## Representative Changes to Standards

- Concise title/purpose with a reliability value
- **Applicability**
  - More specific with regard to entity, facilities, and responsibilities
  - Changes from Functional Model, V3
  - Remove RRO (RE remains compliance monitor)
- **Compliance elements**
  - Measures; violation severity levels; risk factors; time horizons; etc.

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## Excellent Reliability Standards



## Other Improvements

- Review technical adequacy and performance metrics
- Address 'fill-in-the-blank' standards
- Reorganize, streamline standards
- Merge in organization certification standards
- References
- Variances

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## Projects Starting in 2006

- 2006-01 System Personnel Training
- 2006-02 Transmission Assessments & Plans
- 2006-03 System Restoration and Blackstart
- 2006-04 Backup Facilities
- 2006-05 Phase III & IV Field Tests
- 2006-06 Reliability Coordination
- 2006-07 ATC, TTC, CBM, and TRM
- 2006-08 Transmission Loading Relief
- 2006-09 Facility Ratings

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## Projects Starting in 2007

- 2007-01 Underfrequency Load Shedding
- 2007-02 Personnel Communications
- 2007-03 TOP and BA Operations
- 2007-04 Certifying System Operators
- 2007-05 Balancing Authority Controls
- 2007-06 System Protection
- 2007-07 Vegetation Management
- 2007-08 Emergency Operations
- 2007-09 Generator Verification
- 2007-10 Modeling Data
- 2007-11 Disturbance Monitoring

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## Projects Starting in 2008

- 2008-01 Voltage and Reactive Control
- 2008-02 Undervoltage Load Shedding
- 2008-03 Demand Data
- 2008-04 Protection Systems
- 2008-05 Cyber Security
- 2008-06 Phasor Measurement Units
- 2008-07 Resource Adequacy Assessments

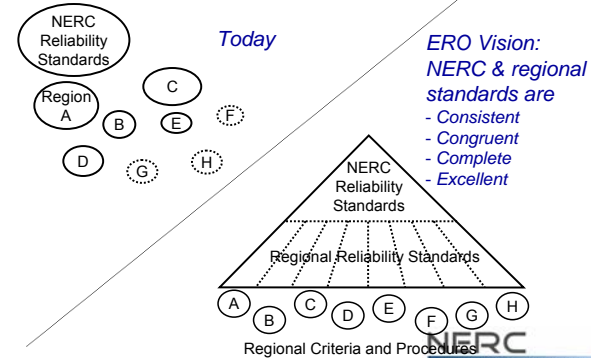


## Projects Starting in 2009/10

- 2009-01 Disturbance/Sabotage Reporting
- 2009-02 Facility Connections
- 2009-03 Interchange Information
- 2010-01 Support Personnel Training

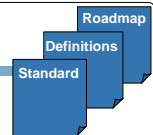


## Vision for Regional Standards



## Standard

- Standard roadmap
- Definitions
- Standard
  - Requirements – risk factors and measures
- Compliance personnel add (SDT is backup)
  - Monitoring responsibility
  - Monitoring period and reset timeframe
  - Data retention
  - Other compliance information
  - Severity levels for requirements



## Standard Roadmap

Roadmap

- Shows where DT is in standard development progress
  - Lists steps completed
  - Lists steps to be completed with anticipated dates
  - Must be up to date when drafts posted
- Schedule provided to SC in progress reports
- Removed when standard is approved by BOT



## Standard Definitions

Definitions

- Limit terms to those with unique definitions
- Capitalize already defined terms
- Don't include explanatory information



## Reliability Standard

Standard

- Title
- Purpose (reliability benefit or value of standard)
- Applicability (tells what functions must comply)
- Effective date (FERC-dependent)
- Requirements (tells what must be accomplished)
  - Violation Risk Factor (impact on reliability if violated)
- Measures (tells what will be reviewed to determine if entity is compliant)
- Variances
- Compliance – added by compliance personnel



## Introduction Section

Standard

### Introduction

1. Title:
2. Number:
3. Purpose:
4. Applicability:
  - 4.1. Functional Entity
  - 4.2. Facility Limitations
5. Effective Date:



## Introduction Section

Standard

- Title – Keep it short; main topic and modifiers; minimize verbs
- Purpose – from SAR (condense into a sentence or two); clear indication of reliability value/benefit; no 'shall' or 'must' requirements
- Applicability:
  - Functions - lists the "functional entities" that must comply with the standard's requirements along with any specific qualifications (i.e., that own UVLS programs)
  - Facilities – lists any qualifications to limit the scope of facilities addressed (i.e., 100 kV and above)

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## Requirements Section

Standard

### B. Requirements

- **R1.** (requirement) (risk factor)
  - **R1.1.** (sub-requirement)
  - **R1.2.** (sub-requirement)
- **R2.** (requirement) (risk factor)
- **R3.** (requirement) (risk factor)
- **R4.** (requirement) (risk factor)

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## Requirements Section

Standard

- Requirements specifically state the technical, performance, and preparedness details that each entity must meet using the NERC reliability benchmark.
- The benchmark for a performance requirement is measured by the question: "Who shall do what, under what conditions and to what level, for what reliability result?" The benchmark breaks down into 5 construction elements that follow the sequence below:
  - Who (1) + "**shall**" do what (2) + under what conditions (3) and to what level (4) + for what expected reliability result (5)?
- The word **shall** is used before the verb to modify the meaning of the main verb, in the case of the NERC reliability standards, to express **necessity**. Using the 5 construction elements of the benchmark – with one and two in sequence – ensures that the performance requirement is written in active voice and clearly states the expected reliability objective.

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## Requirements

Standard

- Write in "active voice" ("shall be" is passive)
- Identify any qualifying conditions (if any) under which the performance is required
- Identify the responsible entity or entities
- Include the word "shall"
- Identify the required performance or outcome
- Identify what the performance will achieve
- Write as simply as possible
  - Avoid use of "negatives"
- Avoid use of ambiguous or subjective terms
- Don't tell "how"

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## Avoid Use of Ambiguous Words

Standard

- Adequate
- Data
- Immediately
- Timely
- Detailed
- Sufficient
- Comprehensive
- As appropriate
- Coordinate



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## Violation Risk Factors

Standard

- High – violation could lead to cascading failures
- Medium – violation could have an adverse impact on system conditions capability, or situational awareness
- Lower – violation would not be expected to affect the electrical state or capability of the bulk power system, or the ability to effectively monitor and control the bulk power system

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## Measures

Measures

### C. Measure

- M1.
- M1.1.
- M1.2.
- M2.
- M3.

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## Measures

Measures

### C.Measure

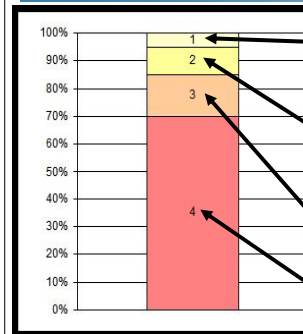
- M1. Each standard shall include one or more measures that will be used to assess performance and outcomes for the purpose of determining compliance with requirements.
- The DT should write measurements that identify how a third party or auditor would measure required performance or outcomes, e.g., compliance, including identification of each entity to which the measure applies.
  - Each measure shall be tangible, objective, and as practical as possible

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## Compliance Elements

- Compliance Monitoring – who will be monitor?
- Identify how to demonstrate compliance:
  - Self-certification
  - Periodic reporting
  - Exception reporting
  - Triggered investigation
  - Spot reviews
  - Periodic audits
- Performance Monitoring & Reset Period
  - Time period for measuring performance & then re-starting measurement period
- Data Retention
  - What data must be kept & for how long & by whom

## Violation Severity Levels



- Level 1: mostly compliant with minor exceptions
- Level 2: mostly compliant with significant exceptions
- Level 3: marginal performance or results
- Level 4: poor performance or results

## Comment Forms

- Ask very pointed questions
- If you've made changes, ask for feedback
- Ask for feedback on implementation plan
- Ask if field testing is needed
- Ask if there are any Variances
- Ask if there are any known conflicts with existing regulations

## Responding to Comments

- Read through comments to get a 'sense' of stakeholders' reactions
- Consider and respond to **every** comment
  - Responses must be respectful
  - Responses should provide a justification
- Develop a 'summary response' to each form question
- Add an overview of the changes made – including the issues resolved and those that weren't resolved
- Make conforming changes to the standard
- Can't expand scope of SAR but can develop a standard that is smaller than the scope of the SAR – if needed, revise the SAR to expand the scope

### Incorporating Suggested Changes

If the suggestion is submitted by	And the suggestion ...	Then ...	Ask stakeholders to ...
Multiple entities in multiple regions	Does /may have technical merit	Incorporate suggestion	Confirm change

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### Incorporating Suggested Changes

If the suggestion is submitted by	And the suggestion ...	Then ...	Ask stakeholders to ...
Multiple entities in multiple regions	Does /may have technical merit	Incorporate suggestion	Confirm change
	Does <b>not</b> have obvious technical merits	<b>Tell why</b> suggestion lacks technical merit	

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### Incorporating Suggested Changes

If the suggestion is submitted by	And the suggestion ...	Then ...	Ask stakeholders to ...
Multiple entities in multiple regions	Does /may have technical merit	Incorporate suggestion	Confirm change
	Does <b>not</b> have obvious technical merits	<b>Tell why</b> suggestion lacks technical merit	
Single entity or by multiple entities in a single region	Does /may have technical merit	If widespread support anticipated, incorporate suggestion	Confirm change

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### Incorporating Suggested Changes

If the suggestion is submitted by	And the suggestion ...	Then ...	Ask stakeholders to ...
Multiple entities in multiple regions	Does /may have technical merit	Incorporate suggestion	Confirm change
	Does <b>not</b> have obvious technical merits	<b>Tell why</b> suggestion lacks technical merit	
Single entity or by multiple entities in a single region	Does /may have technical merit	If widespread support anticipated, incorporate suggestion	Confirm change
		If widespread support not anticipated, don't incorporate	Indicate preference for suggestion

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### Incorporating Suggested Changes

If the suggestion is submitted by	And the suggestion . . .	Then . . .	Ask stakeholders to . . .
Multiple entities in multiple regions	Does /may have technical merit	Incorporate suggestion	Confirm change
	Does <b>not</b> have obvious technical merits	<b>Tell why</b> suggestion lacks technical merit	
Single entity or by multiple entities in a single region	Does /may have technical merit	If widespread support anticipated, incorporate suggestion	Confirm change
		If widespread support not anticipated, don't incorporate	Indicate preference for suggestion
	Does <b>not</b> have obvious technical merits	<b>Tell why</b> suggestion lacks technical merit	


### Implementation Plan

- Tells stakeholders how/when standard will be implemented and identifies:
  - Any already approved standards that should be modified as a result of the proposed standards
  - Functional entities that must comply and when
- Choosing proposed effective date(s)
  - NERC approval process
  - Regulatory process (at least 90 days)
  - Implementation time
  - Phase in of requirements
  - Start on calendar quarter/year



### Field Testing

- Ask stakeholders for their views
- Document drafting team's views
- Ask VP, Director of Compliance to send SC a recommendation
- SC makes final determination – may ask a tech committee to oversee field test



### Downloading the SAR form

- 1 - Log on the NERC Website at <http://www.nerc.net>
- 2 - Click on the Reliability Standards link, emphasized with the arrow  seen below




**Downloading the SAR form**

- 1 - On the Reliability Standards Home Page exists a column of links on the left side
- 2 - Click on the Standards Under Development link, emphasized with the arrow seen below

**Reliability Standards Home Page**

Welcome

NERC reliability standards define the reliability requirements for planning and operating the North American bulk electric system. NERC's ANSI accredited standards development process is defined in the Reliability Standards Development Procedure and is guided by reliability and market structure principles. The Reliability Functional Model defines the functions that need to be performed to ensure the bulk electric system operates reliably, and is the foundation upon which the reliability standards are based.

The Standards Authorization Committee (SAC) oversees and prioritizes NERC's standards development activities. The User Interface Committee coordinates the development of reliability standards by NERC with the development of wholesale electric business practices by the North American Energy Standards Board.

The Registered Ballot Study (RBS) compiles all entities that qualify and register for one of the nine industry segments as defined in the Reliability Standards Process Manual. Members of the RBS may vote on all proposed standards. Anyone who is directly and materially affected may propose a new standard or a revision to an existing one. Anyone may submit comments on a standard under development.

Subscribe to the standards mailing list to receive the Standards Development Bulletin and be notified when new standards are available for review, comment, and ballot.

Click here to view the most recent standards announcements.

For more information contact Richard Schneider at [richard.schneider@nerc.net](mailto:richard.schneider@nerc.net).

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**Downloading the SAR form**

- 1 - On the Reliability Standards Under Development page are several links centered at the top.
- 2 - Click on the Standard Authorization Request (SAR) Form link, emphasized with the arrow seen below

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Reliability Standards Under Development

Approved Standards | Reliability Standards Home Page | Standards Development References | Conference Call/Work Schedule

From this page you can keep track of and link to all proposed reliability standards under development. If you would like to propose a new reliability standard, please download and fill out a Standard Authorization Request (SAR) Form.

Standard Title	Start Date	End Date
<b>Current Ballots</b>		
<b>Period for 30-day Pre-Ballot Review (Open Ballot Period)</b>		
Determine Feasibility, Review, Operating Limits, and Transfer Capabilities (PAC-039-014, PAC-014)	08/14/08	09/14/08
Operating Procedures Coordination - Interconnection of Resources 2 (PAC-009)	08/14/08	09/14/08
<b>Period for Comment</b>		
Midwest Bulk Factors Second Survey for Version 3	08/21/08	08/21/08
Midwest Bulk Factors Survey for Version 1	07/21/08	08/20/08
<b>Drafting Team Revisions Open</b>		
None		
<b>Ballot and Standards Under Development (Not currently posted for comment)</b>		
None		
<b>Recent Development Action Items and Critical Information Page</b>		
ATC/TC/ACC and C&M/TM Revisions		
Reliability Processes and Demand (RM-007 through RM-013)		
Operating Reserves		
Nuclear Plant Off-site Event Study Coordinator (NAC-001)		
Operate Within Interconnection Reliability Operating Limits (RM-007 through RM-013)		
Operate Within Interconnection Reliability Operating Limits (RM-007 through RM-013)		
Reliable Operation, Performance and Compliance Elements in Existing Standards		
Reliable Availability of NERC Standards		
Resource Adequacy Assessments		

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**Downloading the SAR form**

- 1 - Once you click on the Standard Authorization Request (SAR) form, the template will open in a new window.
- 2 - Click File on the menu, to chose the save option.

**Standard Authorization Request Form**

Title of Proposed Standard

Request Date

**SAR Requester Information**

Name

Primary Contact

Telephone

Fax

E-mail

**SAR Type** (Check a box for each one that applies.)

New Standard

Revision to existing Standard

Withdrawal of existing Standard

Urgent Action

**Purpose** (Describe the purpose of the standard – what the standard will achieve in support of reliability.)

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**Downloading the Reliability Standards Template**

- 1 - Click on the File option of the menu to save the template to your desktop as a Word document, emphasized with the arrow seen below.

**Reliability Standard Template**

**A. Introduction**

1. Title

2. Number

3. Purpose

4. Applicability

5. (Proposed) Effective Date

**B. Requirements**

RL. Title

RL1. Additional paragraph

RL2. Title

**C. Measures**

M1. Title

M2. Title

**D. Compliance**

1.1. Compliance Monitoring Period

1.2. Compliance Monitoring Responsibility

1.3. Compliance Monitoring Period and Route

1.4. Data Retention

1.5. Additional Compliance Information

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Questions?

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**DRAFT ~~12/21/06~~1/17/07 Standard Authorization  
Request Form**

Title of Proposed Project: Revisions to TPL-001 through TPL-006, Transmission System Performance and Assessment

(This SAR is intended to supplement the SAR for Assess Transmission Future Needs and Develop Transmission Plans dated 4/30/06 in support of Standards Project 2006-02.)

Request Date ~~December XX, 2006~~January 17, 2007

<b>SAR Requestor Information</b>	<b>SAR Type</b> <i>(Check a box for each one that applies.)</i>
Name            Assess Transmission Future Needs Standard Drafting Team	<input type="checkbox"/> New Standard
Primary Contact     Robert Millard – Vice-Chair, ATFNSTD	<input checked="" type="checkbox"/> Revision to existing Standards
Telephone     (708) 588-9886 Fax            none	<input checked="" type="checkbox"/> Withdrawal of existing Standard (possible)
E-mail            bob.millard@rfirst.org	<input type="checkbox"/> Urgent Action

## Standards Authorization Request Form

**Purpose** (Describe the purpose of the standard — what the standard will achieve in support of reliability.)

[This SAR is intended to supplement the SAR for Assess Transmission Future Needs and Develop Transmission Plans dated 4/30/06 in support of Standards Project 2006-02.](#)

The revisions to the following standards would improve technical clarity and address concerns identified by stakeholders and FERC:

- TPL-001 — System Performance under Normal Conditions
- TPL-002 — System Performance Following Loss of a Single BES Element
- TPL-003 — System Performance Following Loss of Two or More BES Elements
- TPL-004 — System Performance Following Extreme BES Events
- TPL-005 — Regional and Interregional Self-Assessment Reliability Reports
- TPL-006 — Data from the Regional Reliability Organization Needed to Assess Reliability

Revisions to TPL-001 through TPL-004 are already underway (Assess Transmission Future Needs and Develop Transmission Plans Standard Drafting Team) with the primary focus to clarify the associated Table 1, Transmission System Standards – Normal and Emergency Conditions, used to identify the criteria for system assessments. The expansion of the work already underway with TPL-001 through TPL-004 will focus on the general improvements to the standard identified through the attached [Appendix A: Reliability Standard Review Guidelines](#) and the FERC and stakeholder concerns identified in the attached [Appendix B: TPL-001 through TPL-006 Technical Issues List](#).

TPL-005 and TPL-006, which require regional and inter-regional assessments based on the system performance requirements stated in TPL-001 through TPL-004, need to be modified or retired to address the “fill-in-the blank” components and establish requirements within the standards or through a contractual arrangement as to which entity should perform and provide the subject assessment and data. If these requirements are addressed through the delegation agreements each Region has with the [Electric Reliability Organization \(ERO\)](#), TPL-005 and TPL-006 could be retired.

The purpose of modifying this set of standards is to:

1. Provide an adequate level of reliability for the North American bulk power systems — ensure each of the standards is complete and the requirements are set at an appropriate level to ensure reliability.
2. Ensure each of the standards is enforceable as a mandatory reliability standard with financial penalties — the applicability to bulk power system owners, operators, and users, and as appropriate particular classes of facilities, is clearly defined; the purpose, requirements, and measures are results-focused and unambiguous; the consequences of violating the requirements are clear.
3. [Make general improvements using the Reliability Standard Review Guidelines and Technical Issues Lists which attempt to capture comments from the FERC NOPR, Version 0 and Phase 3&4 standards development, and the VRF drafting team. Make general improvements using the Reliability Standard Review Guidelines and consider the items mentioned in the Technical Issues Lists prepared by the NERC staff which attempt to capture comments from the:](#)
  - [FERC NOPR \(Docket # RM06-16-00 dated October 20, 2006\).](#)

## Standards Authorization Request Form

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- FERC staff report dated May 11, 2006 concerning NERC standards submitted with ERO application,
- Version 0 and Phase 3&4 standards development (see note 1),
- Violations Risk Factors (VRF) drafting team (see note 1),
- Regional Fill-in-the-Blank Team (RRSWG – a NERC working group involved with regional standards development), and
- Draft SAR for Planning Authority

The SDT should also consider any other issues that were not completely captured but were stated or referenced in the above materials.

Note 1: Comments received from the industry during public postings of the TPL subject matter were sometimes outside the work being posted or outside the drafting team's scope and were not reflected in the drafting of the final work product. These should now be considered by this SDT.  
3.

**Industry Need** (Provide a detailed statement justifying the need for the proposed standard, along with any supporting documentation.)

The six standards in this set are all Version 0 standards. As the ~~electric reliability organization~~ ERO begins enforcing compliance with reliability standards under Section 215 of the Federal Power Act in the United States and applicable statutes and regulations in Canada, the industry needs a set of clear, measurable, and enforceable reliability standards. The Version 0 standards, while a good foundation, were translated from historical operating and planning policies and guides that were appropriate in an era of voluntary compliance. The Version 0 standards and recent updates were put in place as a temporary starting point to start-up the ~~electric reliability organization~~ ERO and begin enforcement of mandatory standards. However, it is important to update the standards in a timely manner, incorporating improvements to make the standards more suitable for enforcement and to capture prior recommendations that were deferred during the Version 0 translation and any subsequent standards development that have implications to the TPL standards.

**Brief Description:** (Describe the proposed standard in sufficient detail to clearly define the scope in a manner that can be easily understood by others.)

The proposed work effort will address three main issues:

1. Conformance to the new rules and regulations brought about by Section 215 of the Federal Power Act and the creation of the ERO,
2. Supplement the approved work of the existing ATFNSDT to include the necessary revisions to TPL-005 & TPL-006, and
3. Address technical issues raised by FERC and industry stakeholders.



**Standards Authorization Request Form**

***Reliability Functions***

<b>The Standard will Apply to the Following Functions</b> <i>(Check box for each one that applies.)</i>		
<input checked="" type="checkbox"/>	Reliability Coordinator	Responsible for the real-time operating reliability of its Reliability Coordinator Area in coordination with its neighboring Reliability Coordinator's wide area view.
<input type="checkbox"/>	Balancing Authority	Integrates resource plans ahead of time, and maintains load-interchange-resource balance within a Balancing Authority Area and supports Interconnection frequency in real time.
<input type="checkbox"/>	Interchange Authority	Ensures communication of interchange transactions for reliability evaluation purposes and coordinates implementation of valid and balanced interchange schedules between Balancing Authority Areas.
<input checked="" type="checkbox"/>	Planning Coordinator	Assesses the longer-term reliability of its Planning Coordinator Area.
<input checked="" type="checkbox"/>	Resource Planner	Develops a (>one year) plan for the resource adequacy of its specific loads within its portion of a Planning Coordinator area.
<input checked="" type="checkbox"/>	Transmission Planner	Develops a (>one year) plan for the reliability of the interconnected Bulk Electric System within its portion of the Planning Coordinator area.
<input type="checkbox"/>	Transmission Service Provider	Administers the transmission tariff and provides transmission services under applicable transmission service agreements (e.g., the pro forma tariff).
<input checked="" type="checkbox"/>	Transmission Owner	Owns and maintains transmission facilities.
<input type="checkbox"/>	Transmission Operator	Ensures the real-time operating reliability of the transmission assets within a Transmission Operator Area.
<input type="checkbox"/>	Distribution Provider	Delivers electrical energy to the End-use customer.
<input checked="" type="checkbox"/>	Generator Owner	Owns and maintains generating facilities.
<input type="checkbox"/>	Generator Operator	Operates generation unit(s) to provide real and reactive power.
<input type="checkbox"/>	Purchasing-Selling Entity	Purchases or sells energy, capacity, and necessary reliability-related services as required.
<input type="checkbox"/>	Market Operator	Interface point for reliability functions with commercial functions.
<input checked="" type="checkbox"/>	Load-Serving Entity	Secures energy and transmission service (and related reliability-related services) to serve the End-use Customer.



**Standards Authorization Request Form**

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***Reliability and Market Interface Principles***

<b>Applicable Reliability Principles</b> <i>(Check box for all that apply.)</i>	
<input checked="" type="checkbox"/>	1. Interconnected bulk electric systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
<input type="checkbox"/>	2. The frequency and voltage of interconnected bulk electric systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
<input checked="" type="checkbox"/>	3. Information necessary for the planning and operation of interconnected bulk electric systems shall be made available to those entities responsible for planning and operating the systems reliably.
<input type="checkbox"/>	4. Plans for emergency operation and system restoration of interconnected bulk electric systems shall be developed, coordinated, maintained and implemented.
<input type="checkbox"/>	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk electric systems.
<input type="checkbox"/>	6. Personnel responsible for planning and operating interconnected bulk electric systems shall be trained, qualified, and have the responsibility and authority to implement actions.
<input checked="" type="checkbox"/>	7. The security of the interconnected bulk electric systems shall be assessed, monitored and maintained on a wide area basis.
<b>Does the proposed Standard comply with all of the following Market Interface Principles?</b> <i>(Select 'yes' or 'no' from the drop-down box.)</i>	
1. The planning and operation of bulk electric systems shall recognize that reliability is an essential requirement of a robust North American economy. Yes	
2. An Organization Standard shall not give any market participant an unfair competitive advantage. Yes	
3. An Organization Standard shall neither mandate nor prohibit any specific market structure. Yes	
4. An Organization Standard shall not preclude market solutions to achieving compliance with that Standard. Yes	
5. An Organization Standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards. Yes	

**Detailed Description (Provide enough detail so that an independent entity familiar with the industry could draft a standard based on this description.)**

This SAR expands on the work already underway with the Assess Transmission Future Needs and Develop Transmission Plans Standard Drafting Team, by requiring that TPL-001 through TPL-006 be upgraded in accordance with the Reliability Standards Development Plan 2007 – 2009. These revisions include the following:

This SAR will be appended to the already approved SAR for Assess Transmission Future Needs and Develop Transmission Plans and will include modifications to all of the following standards:

- TPL-001 — System Performance under Normal Conditions
- TPL-002 — System Performance Following Loss of a Single BES Element
- TPL-003 — System Performance Following Loss of Two or More BES Elements
- TPL-004 — System Performance Following Extreme BES Events
- TPL-005 — Regional and Interregional Self-Assessment Reliability Reports
- TPL-006 — Data from the Regional Reliability Organization Needed to Assess Reliability

The revisions would improve technical clarity and address concerns identified by stakeholders and FERC. The drafting team will focus on the general improvements to the standards and use as a starting point for the expanded work the subject matter identified ~~on the attached in Appendix A: Reliability Standard Review Guidelines~~ and the FERC and stakeholder concerns identified in ~~the attached Appendix B: TPL-001 through TPL-006 Technical Issues List~~.

The expanded scope also will include elimination of the ‘fill-in-the-blank’ elements of TPL-005 and TPL-006, which require regional and inter-regional assessments based on the system performance requirements stated in TPL-001 through TPL-004. The standards need to be modified or retired to address the “fill-in-the blank” components. If the ‘fill-in-the-blank’ requirements are addressed through the contractual arrangements each Region has with the ERO, TPL-005 and TPL-006 could be retired.

The drafting team must ensure that there is consistency in the requirements across the set of TPL standards

The overall development may include other improvements to the standards deemed appropriate by the drafting team, with the consensus of stakeholders, consistent with establishing high quality, enforceable and technically sufficient bulk power system reliability standards, using the attached, Reliability Standard Review Guidelines. In addition, the drafting team will need to make conforming changes to standards impacted by changes made to these six standards.

***Related Standards***

Standard No.	Explanation

**Standards Authorization Request Form**

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***Related SARs***

<b>SAR ID</b>	<b>Explanation</b>

***Regional Differences***

<b>Region</b>	<b>Explanation</b>
ERCOT	
FRCC	
MRO	
NPCC	
SERC	
RFC	
SPP	
WECC	

### **Appendix A: Reliability Standard Review Guidelines**

#### **Applicability**

Does this reliability standard clearly identify the functional classes of entities responsible for complying with the reliability standard, with any specific additions or exceptions noted? Where multiple functional classes are identified is there a clear line of responsibility for each requirement identifying the functional class and entity to be held accountable for compliance? Does the requirement allow overlapping responsibilities between Registered Entities possibly creating confusion for who is ultimately accountable for compliance?

Does this reliability standard identify the geographic applicability of the standard, such as the entire North American bulk power system, an interconnection, or within a regional entity area? If no geographic limitations are identified, the default is that the standard applies throughout North America.

Does this reliability standard identify any limitations on the applicability of the standard based on electric facility characteristics, such as generators with a nameplate rating of 20 MW or greater, or transmission facilities energized at 200 kV or greater or some other criteria? If no functional entity limitations are identified, the default is that the standard applies to all identified functional entities.

#### **Purpose**

Does this reliability standard have a clear statement of purpose that describes how the standard contributes to the reliability of the bulk power system? Each purpose statement should include a value statement.

#### **Performance Requirements**

Does this reliability standard state one or more performance requirements, which if achieved by the applicable entities, will provide for a reliable bulk power system, consistent with good utility practices and the public interest?

Does each requirement identify who shall do what under what conditions and to what outcome?

#### **Measurability**

Is each performance requirement stated so as to be objectively measurable by a third party with knowledge or expertise in the area addressed by that requirement?

Does each performance requirement have one or more associated measures used to objectively evaluate compliance with the requirement?

If performance results can be practically measured quantitatively, are metrics provided within the requirement to indicate satisfactory performance?

#### **Technical Basis in Engineering and Operations**

Is this reliability standard based upon sound engineering and operating judgment, analysis, or experience, as determined by expert practitioners in that particular field?

#### **Completeness**

Is this reliability standard complete and self-contained? Does the standard depend on external information to determine the required level of performance?

#### **Consequences for Noncompliance**

## Reliability Standard Review Guidelines

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In combination with guidelines for penalties and sanctions, as well as other ERO and regional entity compliance documents, are the consequences of violating a standard clearly known to the responsible entities?

### **Clear Language**

Is the reliability standard stated using clear and unambiguous language? Can responsible entities, using reasonable judgment and in keeping with good utility practices, arrive at a consistent interpretation of the required performance?

### **Practicality**

Does this reliability standard establish requirements that can be practically implemented by the assigned responsible entities within the specified effective date and thereafter?

### **Capability Requirements versus Performance Requirements**

In general, requirements for entities to have ‘capabilities’ (this would include facilities for communication, agreements with other entities, etc.), should be located in the standards for certification. The certification requirements should indicate that entities have a responsibility to ‘maintain’ their capabilities.

### **Consistent Terminology**

To the extent possible, does this reliability standard use a set of standard terms and definitions that are approved through the NERC reliability standards development process?

If the standard uses terms that are included in the NERC Glossary of Terms Used in Reliability Standards, then the term must be capitalized when it is used in the standard. New terms should not be added unless they have a ‘unique’ definition when used in a NERC reliability standard. Common terms that could be found in a college dictionary should not be defined and added to the NERC Glossary.

Are the verbs on the ‘verb list’ from the DT Guidelines? If not – do new verbs need to be added to the guidelines or could you use one of the verbs from the verb list?

### **Violation Risk Factors (Risk Factor)**

#### **High Risk Requirement**

A requirement that, if violated, could directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures;

or a requirement in a planning time frame that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.

#### **Medium Risk Requirement**

This is a requirement that, if violated, could directly affect the electrical state or the capability of the bulk electric system, or the ability to effectively monitor and control the bulk electric system. However, violation of a medium risk requirement is unlikely to lead to bulk electric system instability, separation, or cascading failures;

or a requirement in a planning time frame that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. However, violation of a medium risk requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead to bulk electric system instability, separation, or cascading failures, nor to hinder restoration to a normal condition.

### **Lower Risk Requirement**

A requirement that, if violated, would not be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor and control the bulk electric system. A requirement that is administrative in nature;

Or a requirement in a planning time frame that, if violated, would not, under the emergency, abnormal, or restorative conditions anticipated by the preparations, be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. A planning requirement that is administrative in nature.

### **Mitigation Time Horizon**

The drafting team should also indicate the time horizon available for mitigating a violation to the requirement using the following definitions:

- **Long-term Planning** — a planning horizon of one year or longer.
- **Operations Planning** — operating and resource plans from day-ahead up to and including seasonal.
- **Same-day Operations** — routine actions required within the timeframe of a day, but not real-time.
- **Real-time Operations** — actions required within one hour or less to preserve the reliability of the bulk electric system.
- **Operations Assessment** — follow-up evaluations and reporting of real time operations.

### **Violation Severity Levels**

The drafting team should indicate a set of violation severity levels that can be applied for the requirements within a standard. ('Violation severity levels' replaces the existing 'levels of non-compliance.')

The violation severity levels may be applied for each requirement or combined to cover multiple requirements, as long as it is clear which requirements are included.

**The violation severity levels should be based on the following definitions:**

- **Lower: mostly compliant with minor exceptions** — the responsible entity is mostly compliant with and meets the intent of the requirement but is deficient with respect to one or more minor details. Equivalent score: 95% to 99% compliant.
- **Moderate: mostly compliant with significant exceptions** — the responsible entity is mostly compliant with and meets the intent of the requirement but is deficient with respect to one or more significant elements. Equivalent score: 85% to 94% compliant.

## Reliability Standard Review Guidelines

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- **High: marginal performance or results** — the responsible entity has only partially achieved the reliability objective of the requirement and is missing one or more significant elements. Equivalent score: 70% to 84% compliant.
- **Severe: poor performance or results** — the responsible entity has failed to meet the reliability objective of the requirement. Equivalent score: less than 70% compliant.

### Compliance Monitor

Replace, 'Regional Reliability Organization' with 'Electric Reliability Organization'

### Bulk Electric System

Replace, 'Bulk Electric System' with 'bulk power system'

### Fill-in-the-blank Requirements

Do not include any 'fill-in-the-blank' requirements. These are requirements that assign one entity responsibility for developing some performance measures without requiring that the performance measures be included in the body of a standard – then require another entity to comply with those requirements.

Every reliability objective can be met, at least at a threshold level, by a North American standard. If we need regions to develop regional standards, such as in under-frequency load shedding, we can always write a uniform North American standard for the applicable functional entities as a means of encouraging development of the regional standards.

### Requirements for Regional Reliability Organization

Do not write any requirements for the Regional Reliability Organization. Any requirements currently assigned to the RRO should be re-assigned to the applicable functional entity.

### Effective Dates

Must be 1<sup>st</sup> day of 1<sup>st</sup> quarter after entities are expected to be compliant – must include time to file with regulatory authorities and provide notice to responsible entities of the obligation to comply. If the standard is to be actively monitored, time for the Compliance Monitoring and Enforcement Program to develop reporting instructions and modify the Compliance Data Management System(s) both at NERC and Regional Entities must be provided in the implementation plan.

### Associated Documents

If there are standards that are referenced within a standard, list the full name and number of the standard under the section called, 'Associated Documents'.

**Appendix B: TPL-001 through TPL-006 Technical Issues List**

Excerpted from NERC Reliability Standards Development Plan: 2007 - 2009



### TPL-001

#### FERC NOPR

- Require that critical system conditions be determined by conducting sensitivity studies; *(Not necessarily “cook book” but what are the processes someone reasonably skilled in the art would follow.)*
- Require that system conditions and contingencies assessed be reviewed by neighboring systems; *(Looking for coordination with neighboring systems)*
- Modify Requirement R1.3 to substitute the reference to regional reliability organization with Regional Entity;
- Require consideration of planned outages of critical equipment; and
- Modify footnote (a): footnote (a) to Table 1 requires clarification. The NERC Transmission Issues Subcommittee (TIS) 325 recommended that footnote (a) be modified to state explicitly that emergency ratings apply to Category B and C (contingency conditions) and not to Category A (system intact). The Commission proposes that footnote (a) be modified in the revised Reliability Standard as recommended by TIS and that the normal facility rating be in accordance with Reliability Standard FAC-008-1 and normal voltages be in accordance with Reliability Standard VAR-001-1.

#### FERC Staff Report

- Only for normal
- Doesn't consider planned outages
- Clarify footnote 'a' & 'b' in table
- Stress system during simulations
- Include sensitivity studies
- Include extreme events

#### | **Version 0 Industry Comments**

- Several semantic issues
- Clarify timing for submittal of corrective plan
- Clarify use of applicable ratings in Table 1, note 'a'
- Need to address deliverability to load
- Define critical system conditions
- Allow for engineering judgment in setting conditions for power flow
- Do planned facilities include just those under construction?
- Need to include multiple time frames
- What is a major load center?
- Table 1 – C.5 goes beyond double circuit outage criteria
- Table 1, items 6, 7, 8 & 9 need footnote stating that they do not apply to generator breaker failure
- Table 1, note 'b' – clarify when to curtail firm deliveries

## TPL-001 through TPL-006 Technical Issues List

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### Phase III/IV Comments

- Add a requirement to verify that there are sufficient reactive resources
- Add a requirement to identify where UVLS should be installed

### **Violation Risk Factors (VRF) Drafting Team Comment**

- R1 – time horizon should be long-term planning

### **Comment from Draft SAR on Planning Authority**

- Provide clarity where the Planning Authority is mentioned

## TPL-001 through TPL-006 Technical Issues List

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### TPL-002:

#### FERC NOPR

- Require that critical system conditions be determined in the same manner as we propose to require for TPL-001-0;
- Require the inclusion of the reliability impact of the entities' existing spare equipment strategy; (*Only looking for consideration of spare equipment that has a long lead time such as a transformer*)
- Explicitly require all generators to ride through the same set of Category B and C contingencies as required for wind generators in Order No. 661; (*Document explicit definition of ride through capability for generators*)
- Require documentation of load models used in system studies and supporting rationale for their use;
- Clarify the phrase "permit operating steps necessary to maintain system control;" and
- Clarify footnote (b): modify footnote (b) to state that load shedding for a single contingency is not permitted except in very special circumstances where such interruption is limited to the firm load associated with the failure (consequential load loss).<sup>330</sup> For purposes of clarity, the Commission proposes to require that the phrase "to prepare for the next contingency, system adjustments are permitted, including curtailments of contracted Firm (non-recallable reserved) electric power transfers" be deleted from footnote (b). This statement is more appropriate for Category C events and is already captured by footnote (c) to Table 1, which is applicable to Category C events.

#### FERC staff report

- Only includes loss of single element
- NERC TIS Report recommendations not addressed

| ○

#### | **Version 0 Industry Comments**

- Define critical system conditions
- Clarify timing for corrective plan
- Address deliverability of generation to load
- Clarify applicable ratings in Table 1, note 'a'
- Don't include generation runback or re-dispatch
- Must study all contingencies and multiple demand levels & time frames
- Don't include planning outage
- Single terminals are not included

#### **Phase III/IV comments**

- Add a requirement to verify that there are sufficient reactive resources
- Add a requirement to identify where UVLS should be installed

#### **VRF comments**

- Time horizon should be long-term planning and R2.2 – redundant with R1.3.8

#### **Comment from draft SAR on Planning Authority**

- Provide clarity where the Planning Authority is mentioned

## **TPL-001 through TPL-006 Technical Issues List**

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### **TPL-003:**

#### **FERC NOPR**

- Require that critical system conditions be determined by conducting sensitivity studies (as elaborated in our discussion of TPL-001-0);
- Clarify footnote c: modify footnote (c) to provide specificity regarding the use of the term “controlled interruption” of load.
- Require the applicable entities to define and document the proxies necessary to simulate cascading outages; and
- Tailor the purpose statement to reflect the specific goal of the Reliability, as discussed above.

#### **FERC Staff Report**

- Same as TPL-001 & 002

#### **Version 0 Industry Comments**

- Same as TPL-001 & 002
- TO should provide plan of action
- Don't base penalties on low probability, low consequence events
- Use NERC Compliance Reporting Process
- Clearly identify outages

#### **Phase III/IV Comments**

- Add a requirement to verify that there are sufficient reactive resources
- Add a requirement to identify where UVLS should be installed

#### **VRF Comment**

- Time horizon should be long-term planning
- R2 – lack of consistency with TPL-001 & TPL-002
- R2.1 - lack of consistency with TPL-001
- R2.1.1 - lack of consistency with TPL-001 & TPL-004
- R2.1.2 - lack of consistency with TPL-001 & TPL-005
- R2.1.3 - lack of consistency with TPL-001 & TPL-006
- R2.2 - lack of consistency with TPL-001 & TPL-007

#### **Comment from Draft SAR on Planning Authority**

- Provide clarity where the Planning Authority is mentioned

## TPL-001 through TPL-006 Technical Issues List

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### TPL-004:

#### FERC NOPR

- Require that critical system conditions be determined in the same manner as proposed for TPL-001-0;
- Require the identification of options for reducing the probability or impacts of extreme events that cause cascading;
- Require that, in determining the range of extreme events to be assessed, the contingency list of Category D be expanded to include recent events; and
- Tailor the purpose statement to reflect the specific goal of the Reliability Standard.

#### FERC Staff Report

- Need to reduce the probability of loss of multiple elements and mitigating impact
- Share assessments
- Need to be more severe than weather
- Same as TPL-001

#### **Version 0 Industry Comments**

- Same as TPL-001
- Perform analysis on credible contingency
- R1.3.9 – remove from extreme events
- TO should determine which events to study

#### Phase III/IV Comments

- Add a requirement to verify that there are sufficient reactive resources
- Add a requirement to identify where UVLS should be installed

#### Comment from Draft SAR on Planning Authority

- Provide clarity where the Planning Authority is mentioned

**TPL-005:**

**FERC NOPR**

- Commission will not propose any action on TPL-005-0, as it applies only to regional reliability organizations.
- The term and extent of assessment, as well as the study years, are not appropriately defined; the process for determining load levels needs to be standardized; and local area networks and system adjustments need to be specifically defined.

**Regional Fill-in-the-Blank Team Comments**

- New SAR needed

**Version 0 Industry Comments**

- Define fuel adequacy
- An RRO can't make a mandatory request for another RRO to perform a study

## **TPL-001 through TPL-006 Technical Issues List**

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### **TPL-006:**

#### **FERC NOPR**

- Commission will not propose any action on TPL-006-0, as it applies only to regional reliability organizations.



## Probabilistic Sub-Team Progress Report

Tom Mielnik MidAmerican Energy (Chair)  
Brian Keel Salt River Project  
Chifong Thomas Pacific Gas & Electric  
Yury Tsimberg Hydro One  
January 16, 2007



## Deterministic vs. Probabilistic

- Deterministic approach
  - Cannot reflect stochastic nature of power system equipment failures, load changes, system behavior, etc.
    - Deterministic approach prone to inappropriate building of system adequacy since no quantification of system risk
    - Primarily a qualitative assessment



## Deterministic vs. Probabilistic

- Probabilistic approach
  - Probability mathematics provides quantitative assessment of random behavior of power system
  - Permits quantitative cost-benefit assessment of reliability improvement, where cost of reliability and benefit of reliability are balanced



## First Sub-Team Item


- WECC Probability Based Reliability Criteria
  - Annual Reporting of Outage Data
  - Exceptions List of Facilities
  - WECC Criteria is equal or more stringent than NERC Criteria
  - Allow adjustments of Criteria for Particular Facilities – Never less stringent than NERC Criteria





## First Sub-Team Item

- Proposal to use WECC approach at NERC – See First Draft.
  - Requires Resources at NERC and/or RE
  - Annual reporting of only forced transmission outage data
  - Only aggregate data released
  - Compute indices
  - Exceptions List
  - Subsequent activities – more difficult



## Second Sub-Team Item

- Investigate Probabilistic Analysis into TPL-004
- Reliability Analysis
  - Balance Costs with Customer Benefits
  - Quantitative Not Qualitative Comparison
  - Failure rates and outage durations
  - Outages are convolved with power flow cases and load factor
  - Possibly Expected Unserved Energy before and after project completion
  - Possibly estimate Customer Interruption Costs - Customer Surveys
  - Use Programs or Hand Calculations



## Second Sub-Team Item

- FERC Staff Comments on Category D Extreme Events – “Extreme events must be assessed to evaluate their risks and consequences.” Implication to require “consideration be given either”:
  - “to reducing the probability of the loss of multiple events”
  - “or mitigating the impact”
- Do not deterministically comprehensively build for these low probability events
- Do develop reasonable cost mitigation
- Do respond to events with large consequences
- Could evaluate with probabilistic analysis



## Second Sub-Team Item

- Possible Probabilistic Requirement for Category D – See First Draft.
  - What would the analysis need to provide?
  - What outage data definitions should be used?
  - What outage data is acceptable?
  - What kind of analysis?
- Probabilistic requirement
  - Raise the bar on the TPL-004
  - Respond to issues raised by FERC staff

## Third Sub-Team Item

- Review Events and Categories Using Available Outage Data
- Combine MEC and SRP Outage Data
- Put Outage Data on Event Table
- Review Events and Categories

## Third Sub-Team Item

- Probability of an equipment outage:  
 $P = \lambda \times r / 8760$  **Not just MTBF based upon  $\lambda$**   
 Where,  $\lambda$  is failure rate of an equipment in failures/year  
 $r$  is average outage duration in hours
- Average frequency, duration and probability of two elements out at the same time:  
 $\lambda_{12} = \lambda_1 \lambda_2 (r_1 + r_2) / 8760$   
 $r_{12} = r_1 r_2 / (r_1 + r_2)$   
 $P_{12} = \lambda_{12} r_{12} / 8760$   
 Relative Likelihood:  
 (Generator probability) / individual contingency probability

## Third Sub-Team Item

345 kV Outage Data

Contingency	Outage Rate, occ./year	Duration, hours	Probability	Relative Likelihood
Generator B1	9	81	0.08321918	1
Two generators C3	1.5	40.5	0.00693493	12
Bipolar DC line * (Similar to B4)	1.41	21	0.00328014	24
Line * B2	0.8065	18	0.00165719	50
Transformer B3	0.0642	157	0.00115062	72
Bipolar DC Line * + Generator ( Sim. to 1 Pole DC line + gen. C3 )	0.1478	16.68	0.00028143	296
Line * + Generator C3	0.0820	14.7	0.00013760	605
Generator + Transformer C3	0.0187	53.4	0.00009571	870
Common tower * C5	0.007	113	0.00009030	922
Breaker Failure - Insulation Breakdown C2	0.001423	163	0.00002647	3,144
CONSIDER RECLASSIFYING				
Bipolar DC line **Bipolar DC line* (Sim. to Two 1 Pole DC lines - C3 )	0.009532	10.5	0.00001143	7,281
CONSIDER RECLASSIFYING				
Stuck breaker C6 -C9	0.00635	4	0.00000290	28,696
CONSIDER RECLASSIFYING				
Line * + Line * (independent) C3	0.00267	9	0.00000275	30,262
CONSIDER RECLASSIFYING				
Line * + Transformer C3	0.0010	16.1	0.00000184	45,228
CONSIDER RECLASSIFYING				
Two transformers C3	0.00014774	78.5	0.00000132	63,045
CONSIDER RECLASSIFYING				
Bus Section**	0.0023	4.7	0.00000123	67,438
CONSIDER RECLASSIFYING				

\* Per 100 mile -year.

\*\* Based upon 230 kV data.

## Third Sub-Team Item

- Review Events and Categories Using Available Outage Data
- Combine MEC and SRP Outage Data
  - See First Draft of Multiple Voltages
  - See First Draft with Faults
- See First Draft Event Table – Yury



## Third Sub-Team Item

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- Multiple Voltages
  - Separate by voltage.
  - Breaker failure versus Stuck Breaker
  - Two lines dependent



## Third Sub-Team Item

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- MAPP Data on Faults
  - SLG - 79.9%
  - LL - 16.4%
  - LLG – 1.4%
  - LLL – 2.4%
  - LLLG – 0.06%
  - Faults as a percentage of total events – 89.9%



## Third Sub-Team Item

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- Define Bi-Polar DC events
  - Single Pole Block
  - Double Pole Block
  - Single Pole to Ground (?)
  - No Double Pole to Ground
  - What else?



## Third Sub-Team Item

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- Common Tower Event
  - Simultaneous SLG on both circuits
  - Other events which depend on the conductor configuration on the structure
    - Phase A One Circuit to Phase A Second Circuit
    - Phases A through C One Circuit to Phases A through C Second Circuit
  - Anything else?



## Conclusions

- Deterministic Criteria does not reflect stochastic nature of power systems
- Only probabilistic methods can quantify these impacts
- Probabilistic Sub-Team Progress
  - First Draft WECC Approach at NERC
  - First Draft TPL-004 Probabilistic Change
  - First Draft Combined Outage Data
  - First Draft Event Table