NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

ATCT Standards Drafting Team

January 11, 2007: noon[1] – 5:00 pm (Central Time)
Conference call phone number 1(732)694-2061 Conference code is 1134101112007#
Meeting number: 712 084 711 Meeting password: 123456
https://nerc.webex.com

January 12, 2007: 8:00 am – noon (Central Time)
Conference call phone number 1(732)694-2061 Conference code is 1134201122007#
Meeting number: 714 788 821 Meeting password: 123456
https://nerc.webex.com

Agenda

1. Administration

a. Welcome and Introductions — Larry Middleton
   i. NERC ATCT Drafting Team Roster (**Attachment 1a**)

Chairman Middleton will lead the welcome of the ATCT drafting team members and guests.

b. Antitrust Compliance Guidelines — Bill Lohrman (**Attachment 1b**)

Bill Lohrman will review the NERC Antitrust Compliance Guidelines provided in Attachment 1b. It is NERC's policy and practice to obey the antitrust laws and to avoid all conduct that unreasonably restrains competition. This policy requires the avoidance of any conduct that violates, or that might appear to violate, the antitrust laws. Among other things, the antitrust laws forbid any agreement between or among competitors regarding prices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that unreasonably restrains competition. It is the responsibility of every NERC participant and employee who may in any way affect NERC's compliance with the antitrust laws to carry out this commitment.

c. Review of Agenda — L. Middleton

Chairman Middleton will review the objectives of the meeting.

2. MOD-001-1

a. Chairman Middleton will lead the drafting team in a review of the format changes requested to be made to the proposed MOD-001-1 standard (**Attachment 2a**). Real-time requirements will be separated from the methodology specifications. Timeframes should be more specific.
b. The drafting team will review the comment form to determine whether changes are required (**Attachment 2b**)
c. **Attachment 2c** is included as further information for reformatting MOD-001-1.
d. **Attachment 2d** is included as further information for reformatting MOD-001-1.

[1] Working lunch at noon

3. **Fill-in-the-blank Modifications**
    a. Chairman Middleton will lead the drafting team in a review of the changes began at the last drafting team meeting necessary to remove the fill-in-the-blank references from the MOD-001 to MOD-009 and FAC-12 and FAC-13 standards. (**Attachments 3a1 – 3a10**).

4. **TRM** – L. Middleton
    a. Chairman Middleton will lead the drafting team in a review of the changes began at the last drafting team meeting to the TRM standards using the CBM/TRM SAR (**Attachment 4a1**) and proposed NAESB business practice (**Attachment 4a2**) as the basis for beginning work.

5. **CBM** – L. Middleton
    a. Chairman Middleton will prepare drafting assignments for changes to the CBM standards using the CBM/TRM SAR (**Attachment 4a1**) and proposed NAESB business practice (**Attachment 4a2**) as the basis for beginning work.

6. **Review of meeting and posting schedules** – L. Middleton

ATC-TTC-AFC-CBM-TRM Standards Drafting Team

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NERC ANTITRUST COMPLIANCE GUIDELINES

I. GENERAL

It is NERC's policy and practice to obey the antitrust laws and to avoid all conduct that unreasonably restrains competition. This policy requires the avoidance of any conduct that violates, or that might appear to violate, the antitrust laws. Among other things, the antitrust laws forbid any agreement between or among competitors regarding prices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that unreasonably restrains competition.

It is the responsibility of every NERC participant and employee who may in any way affect NERC's compliance with the antitrust laws to carry out this commitment.

Antitrust laws are complex and subject to court interpretation that can vary over time and from one court to another. The purpose of these guidelines is to alert NERC participants and employees to potential antitrust problems and to set forth policies to be followed with respect to activities that may involve antitrust considerations. In some instances, the NERC policy contained in these guidelines is stricter than the applicable antitrust laws. Any NERC participant or employee who is uncertain about the legal ramifications of a particular course of conduct or who has doubts or concerns about whether NERC's antitrust compliance policy is implicated in any situation should consult NERC's General Counsel immediately.

II. PROHIBITED ACTIVITIES

Participants in NERC activities (including those of its committees and subgroups) should refrain from the following when acting in their capacity as participants in NERC activities (e.g., at NERC meetings, conference calls and in informal discussions):

- Discussions involving pricing information, especially margin (profit) and internal cost information and participants' expectations as to their future prices or internal costs.
- Discussions of a participant's marketing strategies.
- Discussions regarding how customers and geographical areas are to be divided among competitors.
- Discussions concerning the exclusion of competitors from markets.
- Discussions concerning boycotting or group refusals to deal with competitors, vendors or suppliers.

Approved by NERC Board of Trustees, June 14, 2002
Technical revisions, May 13, 2005

III. ACTIVITIES THAT ARE PERMITTED

From time to time decisions or actions of NERC (including those of its committees and subgroups) may have a negative impact on particular entities and thus in that sense adversely impact competition. Decisions and actions by NERC (including its committees and subgroups) should only be undertaken for the purpose of promoting and maintaining the reliability and adequacy of the bulk power system. If you do not have a legitimate purpose consistent with this objective for discussing a matter, please refrain from discussing the matter during NERC meetings and in other NERC-related communications.

You should also ensure that NERC procedures, including those set forth in NERC's Certificate of Incorporation and Bylaws are followed in conducting NERC business. Other NERC procedures that may be applicable to a particular NERC activity include the following:

- Reliability Standards Process Manual
- Organization and Procedures Manual for the NERC Standing Committees
- System Operator Certification Program

In addition, all discussions in NERC meetings and other NERC-related communications should be within the scope of the mandate for or assignment to the particular NERC committee or subgroup, as well as within the scope of the published agenda for the meeting.

No decisions should be made nor any actions taken in NERC activities for the purpose of giving an industry participant or group of participants a competitive advantage over other participants. In particular, decisions with respect to setting, revising, or assessing compliance with NERC reliability standards should not be influenced by anti-competitive motivations.

Subject to the foregoing restrictions, participants in NERC activities may discuss:

- Reliability matters relating to the bulk power system, including operation and planning matters such as establishing or revising reliability standards, special operating procedures, operating transfer capabilities, and plans for new facilities.

- Matters relating to the impact of reliability standards for the bulk power system on electricity markets, and the impact of electricity market operations on the reliability of the bulk power system.

- Proposed filings or other communications with state or federal regulatory authorities or other governmental entities.

- Matters relating to the internal governance, management and operation of NERC, such as nominations for vacant committee positions, budgeting and assessments, and employment matters; and procedural matters such as planning and scheduling meetings.

Any other matters that do not clearly fall within these guidelines should be reviewed with NERC's General Counsel before being discussed.

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Standard Development Roadmap

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

Development Steps Completed:

1. SAC Authorized posting TTC/ATC/AFC SAR Development June 20 2005.
2. SAC Authorized the SAR to be development as a standard on February 14 2006.
3. SC appointed a Standard Drafting Team on March 17, 2006.

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Description of Current Draft:

This is the first draft of the proposed standard posted for stakeholders comment.

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Future Development Plan:

1. Post revised standard for stakeholder comments.	January 2 – February 2, 2007
2. Respond to comments.	February 7 - 8, 2007
3. Post revised standard for stakeholder comment.	TBD
4. Respond to comments.	TBD
5. First ballot of standard.	TBD
6. Respond to comments.	TBD
7. Post for recirculation.	TBD
8. 30 Day posting before board adoption.	TBD
9. Board adopts MOD-001-1.	TBD
10. Effective date.	TBD

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Definitions of Terms Used in Standard

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

Flowgate: A single transmission element, group of transmission elements and any associated contingency (ies) intended to model MW flow impact relating to transmission limitations and transmission service usage. (This definition is from Harvard's web site, i.e., Bill Hogan. They state that a flowgate is simply 'a link in a transmission system.' This is simple and elegant and a good idea normally for definitions. This definition is convoluted and incorrect. Somebody is trying to do far too much with it. Flowgate is a physical thing and not associated with contingencies or limitations – those are measurements.)

Total Flowgate Capability (TFC): The amount of electric power that can flow across the Flowgate under specified system conditions without exceeding the capability of the Facilities. Typically expressed in the form of thermal capability. Flowgates can be proxies for Stability and other limiting criteria. (The last sentence is a bit of a stretch for definition purposes and should probably be deleted. Any stability limits will typically be taken care of in the thermal calculations. Also, terminology usage is not consistent across the board – some use capability and some use capacity. This definition should probably mention that fact.)

Available Flowgate Capability (AFC): A measure of the flowgate capability remaining in the Flowgate for further commercial activity over and above already committed uses. It is equal to the Total Flowgate Capability less the impacts of existing Transmission commitments (including retail customer service), less the impacts of Capacity Benefit Margin and less the impacts of Transmission Reliability Margin. (The second sentence is going too far for definition purposes. My preference would be to leave it with the words and not go into the calculation as part of the formal definition.)

Network Response: A method of calculating Transfer Capability for transmission networks where customer Demand, generation sources, and the Transmission systems are closely interconnected. (I'm not familiar with this term but it certainly isn't what one would expect. I suspect that this term would elicit many different responses if industry was polled. Not sure that it is a true definition but rather what was used in this document. It also begs the question as to what network response is if the elements are not closely connected. This just doesn't make sense.)

Rated System Path: Method of calculating transfer capability for transmission networks where the critical transmission paths between areas of the network have been identified and rated as to their achievable transfer loading capabilities for a range of system conditions. (Mixing and matching things again. This definition shouldn't contain anything about calculation of transfer capability. It should simply be the rating of the designated system path. Transfer capability is another thing entirely.)

Existing Transmission Commitments (ETC): Any combination of Native Load uses, Contingency Reserves not included in Transmission Reliability Margin or Capacity Benefit Margin, existing commitments for purchases, exchanges, deliveries, or sales, existing commitments for transmission service, and other pending potential uses of Transfer Capability.

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Transmission Reservation – A reservation is a confirmed Transmission Service Request.

Transmission Service Request – A service provided to [requested by] the Transmission Customer by [to] the Transmission Service Provider to move energy from a Point of Receipt to a Point of Delivery. (I'm not sure that this goes both ways as indicated.)

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Introduction

1. **Title:** ATC, TFC, and AFC Calculation Methodologies
2. **Number:** MOD-001-1
3. **Purpose:** To promote the consistent and uniform application and documentation of Available Transfer Capability (ATC), Total Flowgate Capability (TFC), and Available Flowgate Capability (AFC) calculations for reliable system operations. (The word 'methodology' has to appear here somewhere.)
4. **Applicability:**
   - **4.1.** Planning Coordinator
   - **4.2.** Reliability Coordinator
   - **4.3.** Transmission Service Provider
   - **4.4.** Transmission Operator (has to operate to the limits being defined here so may be applicable – I could go either way)
   - **4.5.** Transmission Planner (definitely should be included as whatever methodology is being used in real-time or marketing/scheduling should be used in planning)
5. **Effective Date:** TBD

B. Requirements

R1. Three distinct methodologies exist for determining Available Transfer Capability or Available Flowgate Capability:

- Rated System Path Methodology - ATC (using TTC and ATC components)
- Network Response Methodology - ATC (using TTC and ATC components)
- Network Response Methodology - AFC (using TFC and AFC components)

The Transmission Service Provider must first, in conjunction with either the Planning Coordinator or Reliability Coordinator, determine which one and only one of the three methodologies to use, and second, follow that methodology as laid out in this standard.

(These things shouldn't be lumped together. They are different animals in that ATC applies to a single element and AFC applies to multiple elements that are being lumped together and considered as a single element. In theory, you could have both ATC and AFC being utilized within a single entity. Flowgates are a defined item within OASIS and AFC is the only methodology that can be used for them. The ATC decision must be made as shown but the wording is poor as it leaves it floating between the PC or the RC. This should probably be an 'and' relationship so as to include both in the process so as to avoid confusion. I would suggest that there be separate requirements listed for ATC and AFC.)

[Risk Factor – Medium] [Mitigation Time Horizon – T.B.D]

R1.1. **Rated System Path Methodology – ATC [Risk Factor: Medium]** [Mitigation Time Horizon – Operations Planning]

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R1.1.1. The Transmission Service Provider shall calculate ATC in accordance with the equation below:

ATC = TTC – TRM – CBM – ETC
Where:
TTC = Total Transfer Capability
TRM = Transmission Reliability Margin
CBM = Capacity Benefit Margion
ETC = Existing Transmission Commitments

R1.1.2. The Transmission Service Provider shall recalculate ATC when one of the ATC components [TTC, TRM, CBM, or ETC] changes. (Need to specify a timeframe in which this must be done. Technically, this isn't part of the methodology and should be a separate requirement.)

R1.1.3. At a minimum, the Transmission Service Provider, shall, when requested, provide the following values to adjacent Transmission Service Providers:

1.1.3.1. ATC (You should show these in the order in which they are used in the equation – also need to be careful that all values are supplied each time or someone could get confused. Also – this step doesn't have anything to do with the major heading, it is a separate requirement.)

1.1.3.2. TRM

1.1.3.3. CBM

1.1.3.4. TTC

1.1.3.5. ETC

R1.1.4. The Transmission Service Provider shall require that both ultimate source and ultimate sink be identified on the transmission service request and shall require the same source and sink on Interchange Transaction Tags. (Again, this has nothing to do with the requirement which is about selecting this methodology and utilizing the equation that goes with it. This is a separate requirement with nothing to do with the methodology selected.)

R1.2. **Network Response Methodology – ATC [Risk Factor: Medium]** [Mitigation Time Horizon – T.B.D.]

R1.2.1. The Transmission Service Provider shall calculate ATC in accordance with the following equation:

ATC = TTC – TRM – CBM – ETC (This isn't any different than the first one! All other comments from above apply.)

Where:
TTC = Total Transfer Capability
TRM = Transmission Reliability Margin
CBM = Capacity Benefit Margion
ETC = Existing Transmission Commitments

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R1.2.2. The Transmission Service Provider shall recalculate ATC when one of ATC components [TTC, TRM, CBM, ETC] changes.

R1.2.3. As a minimum, the Transmission Service Provider, shall, when revised, provide the following values to adjacent Transmission Service Providers.

1.2.3.1. ATC
1.2.3.2. TRM
1.2.3.3. CBM
1.2.3.4. TTC
1.2.3.5. ETC

R1.2.4. The Transmission Service Provider shall require that both ultimate source and ultimate sink be identified on the transmission service request and shall require the same source and sink on Interchange Transaction Tags.

R1.3. Network Response Methodology – AFC [Risk Factor Medium]

R1.3.1. The Transmission Service Provider shall calculate the AFC value by subtracting the impacts of existing transmission commitments (including retail customer service), as well as the impacts of CBM and TRM in accordance from TFC according to the following equation: (The order fo the wording shold agree with the order shown in the equation.)

AFC = TFC – (TRM * Distribution Factor) – (CBM * Distribution Factor) – (the sum of ETC impacts * respective Distribution Factors) (This last term is not mathematically incorrect. If it is the sum of ETC, then you can't multiply a single value against a list of respective factors.)

R1.3.2. The Transmission Service Provider shall separately consider the Transmission Reservation(s) for Firm (non-recallable) and Non-firm (recallable) Transmission Service inside the Transmission Service Provider's system in the AFC calculation with respect to how each is treated in the Transmission Service Provider's counter flow rules. (Counter flow rules is a non-defined term.) For firm AFC, ETC shall not be decremented for Non-firm Transmission Service. (Firm AFC has not been introduced as a term or concept. There is simply a single equation shown. That makes this sentence puzzling at best.)

R1.3.3. The Transmission Service Provider shall separately consider the Schedules for Firm (non-recallable) and Non-firm (recallable) Transmission Service inside the Transmission Service Provider's system in the AFC calculation with respect to how each is treated in the Transmission Service Provider's counter flow rules. For firm AFC, ETC shall not be decremented for Non-firm Transmission Service. (Same comments as above.)

R1.3.4. The Transmission Service Provider shall require that both ultimate source and ultimate sink be identified on the transmission service request and shall require the same source and sink on Interchange Transaction Tags. (This has nothing to do with methodology. It is an OASIS requirement. We aren't talking about tags here.)

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R1.3.5. The Transmission Service Provider shall include assumptions used for base case and transfer generation dispatch for both external and internal systems on OASIS (or its successor). (Same comment as 1.3.4.)

R1.3.6. At a minimum, the Transmission Service Provider shall provide the following data to Transmission Service Providers with whom AFC is coordinated. (What does this have to do with methodology? Provide how – posted, sent out via ICCP?)

1.3.6.1. **Transmission Outage Schedules:** Data describing coordinated transmission system elements scheduled to be taken out of or returned to service, which shall be updated and provided as changes occur. (Need a specific timeframe, not just when changes occur.)

1.3.6.2. **Generation Outage Schedules:** Data describing coordinated generation resources scheduled to be taken out of or returned to service, which shall be updated and provided as changes occur.

1.3.6.3. **Generation dispatch order:** Provide a typical generation dispatch order or the generation participation factors of all units on an affected Balancing Authority basis. The generation dispatch order shall be updated as required by changes in the status of the unit; however, a new generation dispatch order need not be provided more often than prior to each peak load season. (Second part of the last sentence contradicts the first.)

1.3.6.4. **Powerflow model:** The baseline power flow model for calculating AFC shall be made available. (Not specific enough – how is it made available – posted to a web site?) Updates to the power flow model used to calculate AFC shall be provided to reflect facility changes. (Again, how to provide – just changes, the whole model? What about formats?)

1.3.6.5. **Load Forecast:** This information shall be updated as changes occur and provided daily. (Again, the words contradict themselves, as occurred vs. daily.)

1.3.6.6. **Criteria and definitions:** Flowgates and Flowgate definitions and criteria shall be provided to neighboring Transmission Service Providers on a seasonal basis, or when revised.

1.3.6.7. **Total Flowgate Capability:** Total Flowgate Capability (TFC) shall be provided daily. This information shall be provided when initially established or when revised. (Again, the sentences contradict themselves.)

1.3.6.8. **Total Flowgate Capability Used:** The Transmission Service Provider shall use the same TFC as provided by the Transmission Owner of the facility. (The words here don't match the heading. TFC used should be a number – and it is a number that hasn't been defined. The words are about something else entirely.)

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1.3.6.9. **Flowgate AFC data:** Firm and non-firm (still need to clear up this concept) AFC values shall be provided at the minimum update intervals listed below:

1.3.6.9.1 Hourly AFC once-per-hour, (on the hour?)

1.3.6.9.2 Daily AFC once-per-day, (midnight?)

1.3.6.9.3 Weekly AFC once per day (midnight?), and

1.3.6.9.4 Monthly AFC once per month. (first day of month at midnight?)

1.3.6.10. **Existing Transmission Commitments:** This information shall be reflected in Power Flow models or otherwise provided and coordinated when revised. (How? When? What does it include?)

1.3.6.11. **Transmission Service Reservation:** This information shall be provided when revised. (Why, it is part of OASIS. But if so, how and in what format?)

1.3.6.12. **Frequency of Data Exchange:**

1.3.6.12.1 For the evaluation of transmission service requests, transmission providers shall update their AFC values utilizing the updated information received from neighboring systems at the frequency noted below:

- For hourly, once per hour.
- For daily, once per day
- Weekly , once per day
- Monthly, once a week

R2. Each Transmission Service Provider shall document which one of the ATC or AFC calculation methodologies has been chosen to be used for the operating and planning horizons. (Again, I feel that an entity could have both in play.) [Risk Factor: Low] [Mitigation Time Horizon – T.B.D.]

The documentation must address each of the requirements in R1 for the methodology selected by the Transmission Service Provider.

R3. The Transmission Service Provider's documentation of its chosen calculation methodology shall identify how the Transmission Reservations and Interchange Schedules (Note use of Interchange Schedules here but Schedules in 1.3.4.) for Firm (non-recallable) and Non-firm (recallable) Transmission Service inside the Transmission Service Provider's system are accounted for in its chosen calculation methodology. [Risk Factor: Low] [Mitigation Time Horizon – T.B.D.]

R4. Each Transmission Service Provider shall consistently use the ATC, or the TFC and AFC, calculation methodology chosen by the Transmission Service Provider for coordinating, calculating and posting ATC or TFC and AFC values. (TFC is not shown in any equation.) [Risk Factor: Medium] [Mitigation Time Horizon – T.B.D.]

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R5. Each Transmission Service Provider shall post the most recent version of its ATC or TFC (TFC is not shown in any equation.) and AFC calculation methodology documentation on its OASIS (or its successor). [Risk Factor: Low] [Mitigation Time Horizon – T.B.D.]

R6. Each Transmission Service Provider shall provide the Planning Coordinator(s), Transmission Planner(s), Reliability Coordinator(s), Transmission Operator(s) and other Transmission Service Provider(s), within its region(s), with the information required by the applicable methodology described in R1. (Somewhat duplicative of 1.3.6.) [Risk Factor: Medium] [Mitigation Time Horizon – T.B.D.]

R7. Each Transmission Service Provider's ATC, or TFC (?) and AFC, calculation methodology documentation shall identify the parties responsible for posting the ATC or TFC (?) and AFC values on OASIS. [Risk Factor: Low] [Mitigation Time Horizon – T.B.D.] (R7 through R14 should be a single documentation requirement with the different items as bulleted requirements of the documentation.)

R8. Each Transmission Service Provider's ATC, or TFC (?) and AFC, calculation methodology documentation shall define the calculation horizons (e.g. operating horizon, and planning horizon), and any other horizons used in the methodology). (What other horizons are ther? What is the definition of operating vs. planning horizon?) [Risk Factor: *Medium or Low*] [Mitigation Time Horizon – T.B.D.]

R9. Each Transmission Service Provider's ATC, or TFC (?) and AFC, calculation methodology documentation shall define the Transmission Operator's operating and Transmission Planner's planning criteria used in the calculation of ATC, or TFC (?) and AFC, for the operating and planning horizons.[Risk Factor: *Medium or Low*] [Mitigation Time Horizon – T.B.D.]

R10. Each Transmission Service Provider's ATC, or TFC (?) and AFC, calculation methodology documentation shall describe how the assumptions for the calculations of ATC, or TFC (?) and AFC, values change over different operating and planning horizons.[Risk Factor: Low] [Mitigation Time Horizon – T.B.D.]

R10.1. Long-term ATC (one year and longer) shall be based on the same power flow models, assumptions regarding load, generation dispatch, special protection systems, post contingency switching, and transmission and generation facility additions and retirements as those used in the expansion planning for the same time frame.

R11. Each Transmission Service Provider's ATC, or TFC (?) and AFC, calculation methodology documentation shall explain the rationale for differences between the criteria used for calculating ATC, or TFC (?) and AFC, values for the scheduling, operating and planning horizons.[Risk Factor: Low] [Mitigation Time Horizon – T.B.D.]

R12. Each Transmission Service Provider's ATC, or TFC (?) and AFC, calculation methodology documentation shall identify with which Transmission Service Providers the data used in the calculation of ATC, or TFC (?) and AFC, is coordinated. [Risk Factor: Low] [Mitigation Time Horizon – T.B.D.]

R13. Each Transmission Service Provider's ATC, or TFC (?) and AFC, calculation methodology documentation shall identify the contingencies considered in the TTC and ATC, or TFC (?) and /AFC, calculations methodology.[Risk Factor: Low] [Mitigation Time Horizon – T.B.D.]

R14. If counter flows are used, each Transmission Service Provider's ATC, or TFC (?) and AFC, calculation methodology documentation shall describe assumptions used for counter flow (netting) of transmission reservations, and schedules, including the basis for the assumptions

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and effect on the ATC, or AFC and /TFC (?), values.[Risk Factor: Low] [Mitigation Time Horizon – T.B.D.]

R15. In addition, an explanation for all items listed in Requirements R1 throught R14 must also include any Transmission Service Provider process that produces values that can override the AFC or ATC values. [Risk Factor: Medium] (What is an explanation? It isn't explained anywhere above. Also, how can anything override what has been explained above? There didn't seem to be any room for exceptions noted in the text.)

R16. Place holder for Total Flowgate Capability (TFC). – Depending on the results of the comments, the drafting team will include requirements for TFC in either MOD-001 or FAC-12 and FAC-13. (I don't think this is appropriate for a posting.)

C. Measures (There should be a 1:1 correspondence betweenmeasures and requirements.)

M1. Documentation of the Transmission Service Provider's chosen methodology of either (Rated System Path methodology – ATC (using TTC and ATC components), Network Response methodology – ATC (using TTC and ATC components) or Network Response methodology – AFC (using TFC and AFC components) for the ATC or AFC calculation used for the scheduling, operating and planning horizons for R1 through R 15 is available on the Transmission Service Provider's OASIS (or its successor). (Insufficient – what format? How soon after changes?

M2. Documentation of the Transmission Service Provider's chosen calculation methodology (available on the Transmission Service Provider's OASIS or its successor) includes all of the items identified in MOD-001-1 Requirement 2 through MOD-001-1 Requirement 15 for the methodology being used for the scheduling, operating and planning horizons. (This is no different than M1.)

M3. Evidence that each Transmission Service Provider uses the chosen TTC and ATC, or TFC and AFC, calculation methodology in accordance with Requirement 1. (First, this isn't a sentence. Second, what type of evidence would be acceptable

M4. Evidence that the Transmission Service Provider has provided data to those Transmission Service Provider(s) required in accordance with Requirement 6 (Same as M3.)

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Compliance Monitor: Regional Entity.

1.2. Compliance Monitoring Period and Reset Timeframe

One Calendar Year

1.3. Data Retention

3 years

1.4. Additional Compliance Information

None.

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2. **Violation Severity Levels**

2.1. **Lower:** There shall be a level one non-compliance if either of the following conditions is present:

2.1.1 The Transmission Service Provider's documented ATC, or TFC and AFC, methodology does not address one or two of the items required under Reliability Standard MOD-001-1 R1 through 15 for a method being used to calculate ATC or AFC values.

2.2. **Moderate:** There shall be a level two non-compliance if either of the following conditions is present:

2.2.1 The Transmission Service Provider's documented ATC, or TFC and AFC methodology does not address three of the items required for documentation under Reliability Standard MOD-001-1 through 16 for a method being used to calculate ATC/AFC values.

2.2.2 The Transmission Service Provider does not provide data specified in the chosen methodology in accordance with MOD-001-1 R6.

2.3. **High:** There shall be a level three non-compliance if the following conditions is present:

2.3.1 The Transmission Service Provider's documented ATC, or TFC and AFC, methodology does not address four of the items required for documentation under Reliability Standard MOD-001-1 through 16 for a method being used to calculate ATC/AFC values.

2.4. **Severe:** There shall be a level four non-compliance if either of the following conditions is present:

2.4.1 The Transmission Service Provider's documented TTC and ATC, or TFC and AFC, methodology does not address five or more of the items required for documentation under Reliability Standard MOD-001-1 through 16 for a method being used to calculate ATC/AFC values.

2.4.2 The Transmission Service Provider does not use the chosen methodology it develops in accordance with MOD-001-1.

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E. Regional Differences

1. None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
0	January 13, 2006	Fixed numbering from R.5.1.1, R5.1.2., and R5.1.3 to R1.5.1., R1.5.2., and R1.5.3. Changed "website" and "web site" to "Web site."	Errata

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1	November 3, 2006	Revised Applicability, risk factors, and violation severity levels	New
1	November 28, 2006	Revised comment form and draft standard	New
1	December 20, 2006	Revised comment form and proposed standard	New

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[Current definition in the *Glossary of Terms Used in Reliability Standards]* A designated point on the transmission system through which the Interchange Distribution Calculator calculates the power flow from Interchange Transactions.

[Working definition from drafting team] A single transmission element, group of transmission elements and any associated contingency (ies) intended to model MW flow impact relating to transmission limitations and transmission service usage. Transfer Distribution Factors are used to approximate MW flow impact on the flowgate caused by power transfers.

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The Transmission Service Provider must determine with the Planning Coordinator and Reliability Coordinator which one of the three methodologies to use and follow that methodology as laid out in the following requirements.

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Rated System Path Methodology – TTC

The Planning Coordinator or the Reliability Coordinator, as applicable, will provide TTC values (as determined in FAC- 012/013) to the Transmission Service Provider, at least semi-annually for summer and winter, or whenever the Transmission Owner or Transmission Operator indicates that operating or system contingencies or changes in system topology have changed the TTC. [Risk Factor: Medium]

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and its relationship to the TTC calculation

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The Transmission Service Provider shall recalculate ATC as one of its components [TTC, TRM, CBM, ETC] change.

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Network Response Methodology – TTC [Risk Factor: Medium]

The Planning Coordinator or the Reliability Coordinator, as applicable, shall provide TTC values (as determined in FAC- 012/013) to the Transmission Service Provider, at least semi-annually for summer and winter, or whenever the Transmission Owner or Transmission Operator indicates that operating or system contingencies or changes in system topology have changed the TTC. [Risk factor: Medium]

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by its relationship to Total Flowgate Capability (TFC) and the impact of CBM and TRM by

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the TTC/ATC

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and TFC/AFC calculation methodology

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Each Transmission Service Provider's documentation shall identify the parties responsible for performing the TTC/ATC and TFC/AFC calculations within the area.[Risk Factor: Low]

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Adopted by NERC Board of Trustees:

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Documentation that the Transmission Service Provider's Total Flowgate Capability and ATC/AFC methodology(s) is available on its OASIS (or its successor) in accordance with Requirement 2 through Requirement 16.

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Evidence that the Planning Coordinator provides the TSP with the TTC values required in accordance with Requirements 1.1.1 and 1.3.1

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Adopted by NERC Board of Trustees:

Please use this form to submit comments on the first draft of the ATC/TFC/AFC Methodology Documentation Standard (MOD-001-1 ATC, TFC, and AFC Calculation Methodologies). Comments must be submitted by **T.B.D**. You must submit the completed form by emailing it to sarcomm@nerc.com with the words "ATC/AFC Methodology" in the subject line. If you have questions please contact Bill Lohrman at wwlohrman@praguepower.com or 908-630-0289.

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ALL DATA ON THIS FORM WILL BE TRANSFERRED AUTOMATICALLY TO A DATABASE.

DO: **Do** enter text only, with no formatting or styles added.

Do use punctuation and capitalization as needed (except quotations).

Do use more than one form if responses do not fit in the spaces provided.

Do submit any formatted text or markups in a separate WORD file.

DO NOT: **Do not** insert tabs or paragraph returns in any data field.

Do not use numbering or bullets in any data field.

Do not use quotation marks in any data field.

Do not submit a response in an unprotected copy of this form.

Individual Commenter Information **(Complete this page for comments from one organization or individual.)**		
Name:		
Organization:		
Telephone:		
E-mail:		
NERC Region		**Registered Ballot Body Segment**
☐ **ERCOT** ☐ **FRCC** ☐ **MRO** ☐ **NPCC** ☐ **RFC** ☐ **SERC** ☐ **SPP** ☐ **WECC** ☐ **NA – Not Applicable**	☐	1 — Transmission Owners
	☐	2 — RTOs, ISOs, Regional Reliability Councils
	☐	3 — Load-serving Entities
	☐	4 — Transmission-dependent Utilities
	☐	5 — Electric Generators
	☐	6 — Electricity Brokers, Aggregators, and Marketers
	☐	7 — Large Electricity End Users
	☐	8 — Small Electricity End Users
	☐	9 — Federal, State, Provincial Regulatory or other Government Entities

Group Comments (Complete this page if comments are from a group.)

Group Name:

Lead Contact:

Contact Organization:

Contact Segment:

Contact Telephone:

Contact E-mail:

Additional Member Name	Additional Member Organization	Region*	Segment*

*If more than one Region or Segment applies, indicate the best fit for the purpose of these comments. Regional acronyms and segment numbers are shown on the prior page.

Background Information

The Long-Term AFC/ATC Task Force (LTATF) was formed to develop specific recommendations for the calculation and coordination of AFC[1]/ATC[2] with the goal of increasing market liquidity and enhancing grid reliability. The task force's work was coordinated with NAESB[3] to separate business practices from reliability concerns. The LTATF evaluated the results of the short-term recommendations in the Alliant West area for summer 2004[4], and used this evaluation when considering whether to recommend the Alliant West short-term recommendations continue. The work resulted in the formation of a SAR[5] Drafting Team who formed recommendations that are the basis for the formation of a Standard Drafting Team.

In developing their recommendations the NERC LTATF considered the calculation for AFC/ATC, communication and coordination of AFC/ATC, and consistency between transmission planning and AFC/ATC calculations. A final LTATF report[6] was presented to the Standing Committees in March 2005. The task force used the report and recommendations to develop proposed standards for AFC/TFC[7]/ATC/TTC[8] and CBM/TRM. The proposed "MOD-001-1 Documentation of ATC and AFC Calculation" Standard is the culmination of the work of the NERC LTATF and Standard Drafting Team and is the subject matter for this Comment Form.

The proposed standard labeled MOD-001-1 outlines requirements for the calculation of ATC and AFC, but does not provide requirements for the calculation of TFC or TTC. The proposed standard may reference NERC Standard(s) FAC-012 and/or FAC-013 as the source for the requirements for calculation of TTC and/or TFC. Currently FAC-012 identifies requirements for the calculation of inter-regional and intra-regional Transfer Capabilities (TC). The term TTC is not mentioned in FAC-012, as described in the FERC NOPR[10]. The drafting team has put a placeholder for TFC requirements in the proposed MOD-001-1 standard pending the receipt of industry comments on the appropriate standard in which to place TFC.

A distinct definition for the TC and TTC terms appears in the NERC *Glossary of Terms Used in Reliability Standards*[11]. The members of the drafting team are proposing that they are basically the same quantity and should be covered in a single standard in FAC-012 . Consequently, the draft version of MOD-001-1 does not contain calculation requirements for TTC. The drafting team is seeking input from the industry on this question (see Comment Form questions 9 and 10). The comment form includes questions asking whether the values for TC and TTC should be considered the same value. The questions in the comment form also ask for feedback regarding the appropriate standard in which to determine TTC and TFC (see Comment Form question 11).

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[1] AFC = Available Flowgate Capability
[2] ATC = Available Transfer Capability
[3] NAESB = North American Energy Standards Board
[4] ftp://www.nerc.com/pub/sys/all_updl/docs/pubs/AWTTF_Final_Report_032604.pdf
[5] SAR = Standards Authorization Request
[6] ftp://www.nerc.com/pub/sys/all_updl/mc/ltatf/LTATF_Final_Report_Revised.pdf
[7] TFC = Total Flowgate Capability
[8] TTC = Total Transfer Capability
[10] http://www.ferc.gov/whats-new/comm-meet/051806/E-1.pdf
[11] ftp://www.nerc.com/pub/sys/all_updl/standards/rs/Glossary_02May06.pdf

If the calculation of AFC and ATC are ultimately dependent upon values derived in the FAC-012 and/or the FAC-013 standard(s), the drafting team will revise FAC-012 and/or FAC-013 as necessary prior to balloting MOD-001-1 so that industry will know how those precursor values will be developed. A partial list of these precursor values could include:

- Semi-annual summer and winter TTC values
- Assumptions used for modeling generation dispatch
- Transmission and generation outage schedules
- Power flow models
- Load forecasts
- Path definitions and facility ratings
- Algorithms

Clarification of Capacity Benefit Margin and Transmission Reserve Margin will be addressed by the drafting team in proposed revisions to the respective standards.

The Standards Committee and Standard Drafting Team (ATCTDT) would like to receive industry comment on the proposed standard.

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You do not have to answer all questions. Enter All Comments in Simple Text Format.

Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.

1. Is the definition for ETC contained in this standard sufficient for the industry to calculate the ETC in a consistent and reliable manner? If not, please explain.

   ☐ Yes

   ☐ No

   Comments:

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☐ Yes ¶
☐ No ¶
Comments:¶

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2. Should the definition for Transmission Service Request in this proposed standard be expanded or changed? Please explain your answer.

   ☐ Yes

   ☐ No

   Comments:

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3. Should the drafting team definition for Flowgate be used to replace the Flowgate definition in the NERC *Glossary of Terms Used in Reliability Standards*[12]? Please explain your answer.

   ☐ Yes

   ☐ No

   Comments:

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4. Do you agree with the remaining definition of terms used in the proposed standard? If not, please explain which terms need refinement and how.

   ☐ Yes

   ☐ No

   Comments:

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5. Does the proposed standard include the correct Reliability Functions in the applicability section of the proposed standard? If not, please explain which functions need to be added or deleted and why.

   ☐ Yes

   ☐ No

   Comments:

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[12] ftp://www.nerc.com/pub/sys/all_updl/standards/rs/Glossary_02May06.pdf

6. The standard drafting team has identified three methodologies in which the ATC and AFC are calculated (Rated System Path - ATC, Network Response - ATC and Network Response - AFC, methodologies). In developing this standard has the standard drafting team adequately addressed these methodologies? Please explain if you feel the team has not adequately addressed these methodologies within the proposed standard.

- ☐ Yes
- ☐ No

Comments:

7. Do you agree with the proposed requirements included in the proposed standard? If not please explain with which requirements you do not agree and why.

- ☐ Yes
- ☐ No

Comments:

8. Does the proposed standard sufficiently address the reliability concerns expressed in the NERC LTATF Report[13] or the FERC NOPR[14]? If not, then please explain.

- ☐ Yes
- ☐ No

Comments:

9. Should the proposed standard include further standardization for the components of the calculation of ATC or AFC (i.e., should the proposed standard be more prescriptive regarding the consistency and standardization of determining TTC, TFC, ETC, TRM, and CBM)? If so, please explain.

- ☐ Yes
- ☐ No

Comments:

10. If it is determined that additional requirements and measures are needed for the calculation of ETC, should these requirements and measures for the calculation of ETC be contained within this standard, or should a new standard strictly for ETC be written? If so please explain.

- ☐ Yes
- ☐ No

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☐ Yes ¶
☐ No ¶
Comments:¶
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[13] ftp://www.nerc.com/pub/sys/all_updl/mc/ltatf/LTATF_Final_Report_Revised.pdf
[14] http://www.ferc.gov/whats-new/comm-meet/051806/E-1.pdf

11. Do you agree that Total Transfer Capability (TTC) referenced in the MOD standards and Transfer Capability (TC) references in the FAC-012-1 and/or FAC-013-1 standards are the same and should be treated as such in developing this standard? Please explain your answer.

☐ Yes

☐ No

Comments:

12. If you agree in question 11 that TTC and TC represent the same values, should MOD-001-1 address the Total Transfer Capability (TTC) methodology and documentation, as opposed to having the TTC methodology addressed by revising the existing Facility Rating FAC-012-1 and/or FAC-013-1 standards as proposed by FERC NOPR[15]? Please explain your answer.

☐ Yes

☐ No

Comments:

13. If you do not agree in question 11 that TTC and TC represent the same values, how should the drafting team address the similarity between Transfer Capability (TC) and Total Transfer Capability (TTC) methodology and documentation? Please explain your answer.

Comments:

14. As mentioned in the introduction, the drafting team has deferred development of requirements for the calculation of Total Flowgate Capability (TFC) pending industry comments. The drafting team would like to know whether the industry believes that MOD-001-1needs to address TFC methodology and documentation as opposed to having the TFC methodology addressed by revising the existing Facility Rating FAC-012-1 and/or FAC-013-1 standards? Please explain your answer.

☐ Yes

☐ No

Comments:

15. Is the requirement in this proposed standard to specify the ultimate source and sink necessary for the ATC methodologies (see requirements R1.2.3 and R1.4.4)? Please explain your answer.

☐ Yes

☐ No

Comments:

[15] http://www.ferc.gov/whats-new/comm-meet/051806/E-1.pdf

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16. Would the provision of a link to the location of a TSP's data be sufficient in satisfying the requirement(s) to exchange data for this proposed standard? Please explain.

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☐ Yes

☐ No

Comments:

17. When calculating monthly, daily, weekly, and hourly ATC and/or AFC values, what planning horizon(s) should be used for the inclusion of CBM in the calculation of monthly, daily, and hourly ATC and/or AFC, and which reliability function(s) should make the CBM calculations? Please explain.

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Comments:

18. When calculating monthly, daily, and hourly ATC and/or AFC values, what planning horizon(s) should be used for the inclusion of TRM in the calculation of monthly, daily, and hourly ATC and/or AFC, and which reliability function(s) should make the TRM calculations? Please explain.

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Comments:

19. Should NERC work with NAESB to determine whether updates to ETC and ATC values should be posted after the transmission request is accepted or after it has been confirmed? Please explain.

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20. In order to maintain consistency with planning requirements, should NERC work with NAESB to establish a business practice to monitor Load Serving Entities (LSE), Generation Operators, or Purchasing/Selling Entities that might reserve transmission service in multiple directions in excess of either the LSE load or the capacity of the generator? If so, please explain.

- ☐ Yes
- ☐ No

Comments:

21. Does the proposed standard address the goals of the related SAR[16] and the LTATF report[17] to improve communication, coordination, standardization, and transparency? If not, please explain.

- ☐ Yes
- ☐ No

Comments:

22. Do you agree with the Risk Factors[18] assigned to the Requirements in this proposed standard? If not which do you disagree with and why (please specify if the Risk Factor is too high or too low)?

- ☐ Yes
- ☐ No

Comments:

23. Do you agree with the Violation Severity Levels[19] in this proposed standard? If not, with which do you disagree and why (please specify)?

- ☐ Yes
- ☐ No

Comments:

24. Should any of the data elements required to be exchanged among Transmission Service Providers in this proposed standard be provided to any other functional entities? Please explain your answer.

- ☐ Yes
- ☐ No

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[16] ftp://www.nerc.com/pub/sys/all_updl/standards/sar/SAR_ATC-TTC_R2_15Feb06.pdf
[17] ftp://www.nerc.com/pub/sys/all_updl/mc/ltatf/LTATF_Final_Report_Revised.pdf
[18] Please see APPENDIX attached to this comment form
[19] Please see APPENDIX attached to this comment form

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Comments:

25. Is the frequency of providing data specified in this proposed standard appropriate? Please explain your answer.

☐ Yes

☐ No

Comments:

26. Are you aware of any conflicts between the proposed standard and any regulatory function, rule/order, tariff, rate schedule, legislative requirement or agreement?

Comments:

27. Do you agree with the Measures listed in the proposed standard? If not, please explain your answer.

☐ Yes

☐ No

Comments:

28. Do you have other comments on the proposed standard?

Comments:

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☐ Yes ¶
☐ No ¶
Comments:¶
¶

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☐ Yes ¶
☐ No ¶
Comments:¶
¶
<#>Should the drafting team working definition for Flowgate be used to replace the Flowgate definition in the NERC *Glossary of Terms Used in Reliability Standards*[20]? Please explain your answer.¶
☐ Yes ¶
☐ No ¶
Comments:¶

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APPENDIX

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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

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.

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' replace 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.

- **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.

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- **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.
- **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.

Notes to ATC DT

Format:

David Cook will not allow the use of a slash '/' in a standard. You need to eliminate these by using specific language to identify what is meant. In some cases it looks like the DT means 'and' – in other cases it looks like the DT means, 'or'.

Likewise, we cannot abbreviate the names of 'functions' – so TSP must be replaced in the measures with Transmission Service Provider.

We don't put the word, 'Draft' in the body of the text of the documents – it is placed in the footer.

Remove the comments from the body of the document.

Remove the footnotes that aren't part of the standard from the standard.

Definitions

See recommended changes to the proposed definitions – what you post is what you are asking people to approve – so the footnotes with explanatory information need to be eliminated. If you want to provide stakeholders with information explaining your recommendations – then do that in a supplementary document to accompany your comment form or use a text box to put an explanation adjacent to the definition. When you put explanatory information in the footnote, it looks permanent, as though the footnote will be approved with the definition.

See recommended changes to definitions on attachment.

TC versus TTC

You need to make a recommendation to the industry on use of either the term, TC or TTC – and then make sure your proposed standard adheres to your recommendation. It looks like you are recommending the use of TC in some places and TTC in other places – it looks like FERC supports keeping TTC in FAC-012 and FAC-013 with minor changes – I'd recommend you modify the standard so that you use 'TC' and eliminate the requirements that duplicate requirements in FAC-012 and FAC-013.

Title:

The titles in the 'header' and in the 'Title' section of the standard don't match. We are required to select short titles so they will fit on one line in posted documents – it makes it much easier for stakeholders to find. I'd suggest the following (assuming you leave TTC or TC in FAC-012 and FAC-013): Available Transfer Capability, Total Flowgate Capability, and Available Flowgate Capability Calculation Methodologies

Purpose:

The purpose statement in the standard is a mix of background and requirements. This should be revised to a sentence or two that explains the reliability benefit of having this standard. Everything beyond the first sentence in the existing purpose statement is unnecessary in the purpose statement and should be removed.
If you use an acronym in the purpose statement, you need to use the term first, and then put the acronym in parenthesis.

Requirements

R1 states: Three distinct methodologies exist for determining TTC, ATC, TFC, and AFC. As I look at the standard, what I find is the following:

- Two methods of determining TTC.
  - Since the DT believes that TTC and TC are identical, and there are two standards approved for TC (FAC-012 and FAC-013), you should not duplicate its requirements in your standard. This means you should eliminate R1.1.1 and R1.3.1 or make a conforming change to FAC-012 and FAC-013 to eliminate the duplication.
- Two methods of determining ATC (R1.2 and R1.4)
- One method of determining AFC (R1.5)
- No method of determining TFC.

R1, therefore, doesn't make sense to me. I expected to find three distinctly different methods of calculating TTC, ATC, TFC and AFC – or 12 methods all together. This requirement needs to be clarified because its intention is not clear.

R1.1.1 is identical to R1.3.1 – and both should be eliminated since they duplicate requirements in the FAC-012 and FAC-013 standards.

R1.1.1 The Planning Coordinator or the Reliability Coordinator, as applicable, will provide TTC values (as determined in FAC- 012/013) to the Transmission Service Provider, at least semi-annually for summer and winter, or whenever the Transmission Owner or Transmission Operator indicates that operating or system contingencies or changes in system topology have changed the TTC. [Risk Factor: Medium]

R1.3.1 The Planning Coordinator or the Reliability Coordinator, as applicable, shall provide TTC values (as determined in FAC- 012/013) to the Transmission Service Provider, at least semi-annually for summer and winter, or whenever the Transmission Owner or Transmission Operator indicates that operating or system contingencies or changes in system topology have changed the TTC. [Risk factor: Medium]

R1.2.1 Try to use the same terminology from requirement to requirement – rather than use the word, ‘determine’ (R1.2.1) in the first sentence and ‘recalculate’ in the next sentence – replace, ‘determine’ with ‘calculate.’

> R1.2.1 I’m not sure what this requirement is asking for. It says the TSP shall ‘determine’ (I think you mean calculate) ATC and its relationship to the TTC calculation in accordance with the following equation:
> ATC = TTC – TRM – CBM – ETC

This is confusing because it isn’t clear WHY the phrase ‘and its relationship to the TTC calculation’ is part of this requirement. Its inclusion is confusing because TTC is one of the variables in the equation. If there is no reason for this phrase, omit it so that the requirement is clear.

You need to use the full term before you use its associated acronym. I suggest you add the following text below the definition:

> ATC = TC – TRM – CBM – ETC
> Where:
> TC = Transfer Capability
> TRM = Transmission Reliability Margin
> CBM = Capacity Benefit Margin
> ETC = Existing Transmission Commitments

R1.2.2 Do you mean ‘exchange’ or ‘provide’ in the requirement to provide the results of new calculations? ‘Exchange’ means that both the parties are distributing **AND** receiving something – ‘provide’ means the TSP is giving a set of numbers to another entity but is not receiving something in return.

R1.2.3 The terms, ‘ultimate source’ and ‘ultimate sink’ are not defined terms. Do you mean ‘Source Balancing Authority’ and ‘Sink Balancing Authority’? If yes, then you should use these defined terms.

R1.2.3 ‘E-tag’ is not a defined term, but Interchange Transaction Tag is defined. You should use the defined term.

R1.2.3 Rather than saying, ‘this methodology’ it would be better to say, ‘the Rated System Path Methodology’.

R1.4.1 Same comment as in R1.2.1 for use of the equation.

R1.4.3 Do you mean ‘exchange’ or ‘provide’ in the requirement to provide the results of new calculations? ‘Exchange’ means that both the parties are distributing **AND** receiving something – ‘provide’ means the TSP is giving a set of numbers to another entity but is not receiving something in return.

R1.4.4 The terms, ‘ultimate source’ and ‘ultimate sink’ are not defined terms. Do you mean ‘Source Balancing Authority’ and ‘Sink Balancing Authority’? If yes, then you should use these defined terms.

R1.4.4 Rather than saying, ‘this methodology’ it would be better to say, ‘the Network Response Methodology’.

R1.5 This requirement is confusing because it is a mix of what must be included in the methodology with other requirements. It would be better to subdivide this and put the real-time requirements in separate requirements.

R1.5 This requirement starts as though it is focusing on the methodology for calculating AFC – but also has embedded requirements for calculating TFC. Elsewhere the language in the standard implies that there is a distinct methodology for calculating TFC – so it would be better (at least more clear) if the requirement to have a documented methodology for calculating TFC were separate from the requirement to have a documented methodology for AFC.

R1.5.1 It isn’t clear why the following phrase is included in the requirement since the language is duplicated in the equation, ‘. . . by its relationship to Total Flowgate Capability (TFC) and the impact of CBM and TRM. . . ‘

R1.5.1 ‘Distribution factor’ is a defined term and should be capitalized.

R1.5.1 The equation, as written, is confusing – is the last parenthetical phrase something to calculate and multiply by the sum of ETC impacts – or is this explaining what you mean by the sum of ETC impacts? (Sorry – my ignorance of this subject matter is showing.)

R1.5.2 and R1.5.3 The term, ‘shall account for’ is pretty non-specific. What does this look like? Can you come up with a term that would describe your expectation more specifically – do you mean that the TSP shall ‘identify’?

R1.5.2 and R1.5.3 The word, ‘firm’ is capitalized and its not clear why. ‘Firm Demand’ and ‘Firm Transmission Service’ are defined terms, but the word, ’Firm’ alone is not defined – therefore unless you define ‘Firm AFC’ and Firm ETC’ the word, ‘Firm’ should not be capitalized in R`1.5.2 and R1.5.3.

R1.5.2 and R1.5.3 The term, ‘non-firm transmission service’ is a defined term and should be capitalized in the last sentence of each of these sub-requirements.

R1.5.2 The phrase, ‘Transmission Reservation’ is not a defined term and should not be capitalized or underlined.

R1.5.3 The word, ‘schedule’ is a defined term when used as a synonym for ‘Interchange Schedule. If this is your intended meaning, then the word, ‘schedule’ should be capitalized but should not be underlined.

R1.5.4 The terms, ‘ultimate source’ and ‘ultimate sink’ are not defined terms. Do you mean ‘Source Balancing Authority’ and ‘Sink Balancing Authority’? If yes, then you should use these defined terms.

R1.5.4 Rather than saying, ‘this methodology’ it would be better to say, ‘the Network Response Methodology’

R1.5.5 Does the AFC document posted on OASIS have a proper title? If yes, it would be best to include the title rather than using the generic term, ‘document’.

R1.5.6 Do you want the TSPs to work only with their adjacent TSPs – or does coordination need to take place at a higher level – at the interconnection level?
The data and information identified in the subrequirements is treated unevenly, so that the stakeholder will not know how often to update and distribute some of the data. If you put the data into a table – you’ll see the ‘holes’:

Type of Data or Information	Description	Frequency of Update	Frequency of Exchange
Transmission Outage Schedules	Identification of transmission system elements scheduled to be taken out of or returned to service		
Generation Outage Schedules	Identification of generation resources scheduled to be taken out of or returned to service		
Generation dispatch order	A typical generation dispatch order or the generation participation factors of all units on an affected Balancing Authority basis.	Generation Dispatch Order - updated as required by changes in the status of the unit	At least prior to each peak load season.
Powerflow model	The baseline power flow model used to calculate AFC	Update to reflect facility changes	Provide updates to reflect facility changes
Daily Load Forecast			Daily
Flowgate Criteria and definitions			Provide on a seasonal basis, or when revised
Total Flowgate Capability			Provide when initially established or when revised

Total Flowgate Capability Used	Entities identified in R13 shall have the same TFC as provided by the Transmission Owner of the facility.		
Hourly AFC values	Firm and non-firm AFC values		Once-per-hour
Daily AFC values	Firm and non-firm AFC values		Once-per-day
Weekly AFC values	Firm and non-firm AFC values		Once-per-day
Monthly AFC values			Once-per-month
Existing Transmission Commitments	Reflected in Power Flow models		Provided when revised
Transmission Service Reservation			Provided when revised

R1.5.6.1 The TSP exchanges data but does not have responsibility for coordinating maintenance outages. I think this requirement needs to be revised to clarify that they are exchanging outage data. There is no timing element to this requirement, so I wouldn't know how often the data needs to be exchanged. Do you have some frequency in mind?

R1.5.6.1 The TSP exchanges data but does not have responsibility for coordinating maintenance outages. I think this requirement needs to be revised to clarify that they are exchanging outage data. There is no timing element to this requirement, so I wouldn't know how often the data needs to be exchanged. Do you have some frequency in mind?

R1.5.6.4 The word, 'will' needs to be replaced with 'shall'. The second half of the phrase isn't needed since the main requirement stated that the list is of data to be exchanged between TSPs. Suggest replacing the sub-requirement with the following: The baseline power flow model used to calculate AFC.
R1.5.6.12 The word, 'should' needs to be replaced with 'shall'. If compliance is optional, then remove this from the standard – the standard only includes mandatory requirements.

R1.5.6.12 It looks like this is referring to the data in the list above (R1.5.6.1 through R1.5.6.12) but the timing of the data provision and the use of the data doesn't seem to match. Should the time periods noted in 1.5.6.9 match those in 1.5.6.12?

R2 The requirement assumes this standard will include TTC yet the DT has indicated it doesn't support the inclusion of TTC and the NOPR supports the DT's position. It would be better to eliminate TTC from this standard.

R2 The operating and planning horizons, while not defined terms, are referenced in the Functional Model and will most likely be recognized. The term, 'scheduling horizon' is not clear. If you are talking about scheduling within a year, then the scheduling horizon is within the time frame generally accepted as the operating

horizon (real time through one year). Is there another way of saying what you are trying to say here? The reliability-related need for R2 isn't immediately clear. Are you trying to say that each entity must select a single methodology and use it consistently for all its operating and planning uses?

R2 The word, 'must' needs to be replaced with the word, 'shall'.

R3 Is this 'documentation' something that must be included in the methodology – if yes, then tell us which methodology.

R3 By, 'reservations and schedules' do you mean Transmission Service Reservations and Interchange Schedules? We need to use the defined terms consistently, even when it seems duplicative. Each requirement has to have enough information to stand on its own.

R3, R4, R5 The requirements are written as though there is a **single** methodology for developing both TTC and ATC – and for developing both TFC and AFC. The standard's requirements (R1.2 and R1.5) are written as though these are separate methodologies – and again it isn't clear why the DT has included requirements for the TTC methodology in this standard.

R6 Which requirements in this standard identify information required by the applicable methodology? As you go through the various requirements, what information is required for the AFC methodology – are you talking about all the information identified in R1.5.6.1 through R1.5.6.12? What is the 'required information' for the ATC methodology be ATC, TRM, CBM, TTC, ETC – or would it be all of these plus source and sink BAs?

R7 Is there a reliability-related need for this requirement? Isn't the TSP responsible for calculating these values (except for TTC)?

R9 The definitions for the operating, planning and scheduling horizons are unique and don't match the horizons generally used in the Functional Model and other standards.

R11 and R12 Would the assumptions in R11 be different from the rationale in R12?

R13 Somewhere is there a requirement that establishes the range of TSPs that must coordinate their methodologies?

R15 The use of the term, 'counter flows' is new. Should this term be defined? (I know it was used in the NOPR – but is it commonly used in the industry?)

R16 This requirement does not identify the responsible entity and implies there is a 'list' but there is no list under the requirement.

General Observation:

The standard is very difficult to follow because it mixes up the requirements for the methodologies, isn't clear on how many methodologies an entity must have, and isn't clear on the scope of coordination that is required between TSPs. I think the drafting team is very close to having a well-defined standard, but it does need some additional work before it is ready to post.

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Standard Development Roadmap

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

Development Steps Completed:

1. SAC Authorized posting TTC/ATC/AFC SAR Development June 20, 2005.
2. SAC Authorized the SAR to be Developed as a standard February 14, 2006.
3. SC appointed a Standard Drafting Team March 17, 2006.

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Description of Current Draft:

This is the first draft of the proposed standard posted for stakeholder comment.

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Future Development Plan:

1. Post revised standard for stakeholder comments.	December 15 – January 29, 2007
2. Respond to comments.	TBD
3. Post revised standard for stakeholder comment.	TBD
4. Respond to comments.	TBD
5. First ballot of standard.	TBD
6. Respond to comments.	TBD
7. Post for recirculation.	TBD
8. 30 Day posting before board adoption.	TBD
9. Board adopts MOD-001-1.	TBD
10. Effective date.	TBD

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Definitions of Terms Used in Standard

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

Flowgate: A single transmission element, group of transmission elements and any associated contingency (ies) intended to model MW flow impact relating to transmission limitations and transmission service usage.

Total Flowgate Capability (TFC): The amount of electric power that can flow across the Flowgate under specified system conditions without exceeding the capability of the Facilities, typically expressed in the form of thermal capability. Flowgates can be proxies for Stability and other limiting criteria.

Available Flowgate Capability (AFC): A measure of the flow capability remaining in the Flowgate for further commercial activity over and above already committed uses. It is equal to the Total Flowgate Capability less the impacts of existing Transmission commitments (including retail customer service), less the impacts of Capacity Benefit Margin and less the impacts of Transmission Reliability Margin.

Network Response: A method of calculating Transfer Capability for transmission networks where customer Demand, generation sources, and the Transmission systems are closely interconnected.

Rated System Path: A method of calculating Transfer Capability for transmission networks where the critical transmission paths between areas of the network have been identified and rated as to their achievable transfer loading capabilities for a range of system conditions.

Existing Transmission Commitments (ETC): Any combination of Native Load uses; Contingency Reserves not included in Transmission Reliability Margin or Capacity Benefit Margin; existing commitments for purchases, exchanges, deliveries, sales, existing commitments for transmission service; and other pending potential uses of Transfer Capability.

Transmission Reservation: A confirmed Transmission Service Request.

Transmission Service Request: A service provided to [requested by] the Transmission Customer by [to] the Transmission Service Provider to move energy from a Point of Receipt to a Point of Delivery.

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[Current definition in the *Glossary of Terms Used in Reliability Standards*]

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[1] Has been known as Flowgate Rating by some – the term is being standardized for sake of consistency. It has been suggested that the term Flowgate Rating be added as a footnote to the standardized term.

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[2] The drafting team determined that merely using a definition would likely not satisfy the need to establish consistency in the standard, and that the drafting will propose that it work on an additional ETC requirements section for this standard. A question dealing with this is contained in the comment form.

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[3] Clarification needed

A. Introduction

1. **Title:** **Transfer Capability Methodology**

2. **Number:** FAC-012-1

3. **Purpose:** To ensure that Transfer Capabilities used in the reliable planning and operation of the Bulk Electric System (BES) are determined based on an established methodology or methodologies.

4. **Applicability**

   4.1. Reliability Coordinator required by its Regional Reliability Organization to establish inter-regional and intra-regional Transfer Capabilities

   4.2. Planning Authority required by its Regional Reliability Organization to establish inter-regional and intra-regional Transfer Capabilities

5. **Effective Date:** August 7, 2006

B. Requirements

R1. The Reliability Coordinator and Planning Authority shall each document its current methodology used for developing its inter-regional and intra-regional Transfer Capabilities (Transfer Capability Methodology). The Transfer Capability Methodology shall include all of the following:

R1.1. A statement that Transfer Capabilities shall respect all applicable System Operating Limits (SOLs).

R1.2. A definition stating whether the methodology is applicable to the planning horizon or the operating horizon.

R1.3. A description of how each of the following is addressed, including any reliability margins applied to reflect uncertainty with projected BES conditions:

R1.3.1. Transmission system topology

R1.3.2. System demand

R1.3.3. Generation dispatch

R1.3.4. Current and projected transmission uses

R2. The Reliability Coordinator shall issue its Transfer Capability Methodology, and any changes to that methodology, prior to the effectiveness of such changes, to all of the following:

R2.1. Each Adjacent Reliability Coordinator and each Reliability Coordinator that indicated a reliability-related need for the methodology.

R2.2. Each Planning Authority and Transmission Planner that models any portion of the Reliability Coordinator's Reliability Coordinator Area.

R2.3. Each Transmission Operator that operates in the Reliability Coordinator Area.

R3. The Planning Authority shall issue its Transfer Capability Methodology, and any changes to that methodology, prior to the effectiveness of such changes, to all of the following:

R3.1. Each Transmission Planner that works in the Planning Authority's Planning Authority Area.

R3.2. Each Adjacent Planning Authority and each Planning Authority that indicated a reliability-related need for the methodology.

R3.3. Each Reliability Coordinator and Transmission Operator that operates any portion of the Planning Authority's Planning Authority Area.

R4. If a recipient of the Transfer Capability Methodology provides documented technical comments on the methodology, the Reliability Coordinator or Planning Authority shall provide a documented response to that recipient within 45 calendar days of receipt of those comments. The response shall indicate whether a change will be made to the Transfer Capability Methodology and, if no change will be made to that Transfer Capability Methodology, the reason why.

C. Measures

M1. The Planning Authority and Reliability Coordinator's methodology for determining Transfer Capabilities shall each include all of the items identified in FAC-012 Requirement 1.1 through Requirement 1.3.4.

M2. The Reliability Coordinator shall have evidence it issued its Transfer Capability Methodology in accordance with FAC-012 Requirement 2 through Requirement R2.3.

M3. The Planning Authority shall have evidence it issued its Transfer Capability Methodology in accordance with FAC-012 Requirement 3 through Requirement 3.3.

M4. If the recipient of the Transfer Capability Methodology provides documented comments on its technical review of that Transfer Capability Methodology, the Reliability Coordinator or Planning Authority that distributed that Transfer Capability Methodology shall have evidence that it provided a written response to that commenter in accordance with FAC-012 Requirement 4.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organization

1.2. Compliance Monitoring Period and Reset Timeframe

Each Planning Authority and Reliability Coordinator shall self-certify its compliance to the Compliance Monitor at least once every three years. New Planning Authorities and Reliability Coordinators shall each demonstrate compliance through an on-site audit conducted by the Compliance Monitor within the first year that it commences operation. The Compliance Monitor shall also conduct an on-site audit once every nine years and an investigation upon complaint to assess performance.

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

1.3. Data Retention

The Planning Authority and Reliability Coordinator shall each keep all superseded portions to its Transfer Capability Methodology for 12 months beyond the date of the change in that methodology and shall keep all documented comments on the Transfer Capability Methodology and associated responses for three years. In addition, entities found non-compliant shall keep information related to the non-compliance until found compliant.

The Compliance Monitor shall keep the last audit and all subsequent compliance records.

1.4. Additional Compliance Information

The Planning Authority and Reliability Coordinator shall each make the following available for inspection during an on-site audit by the Compliance Monitor or within 15 business days of a request as part of an investigation upon complaint:

1.4.1 Transfer Capability Methodology.

1.4.2 Superseded portions of its Transfer Capability Methodology that have been made within the past 12 months.

1.4.3 Documented comments provided by a recipient of the Transfer Capability Methodology on its technical review of the Transfer Capability Methodology, and the associated responses.

2. Levels of Non-Compliance

2.1. Level 1: There shall be a level one non-compliance if either of the following conditions exists:

2.1.1 The Transfer Capability Methodology is missing any one of the required statements or descriptions identified in FAC-012 R1.1 through R1.3.4.

2.1.2 No evidence of responses to a recipient's comments on the Transfer Capability Methodology.

2.2. Level 2: The Transfer Capability Methodology is missing a combination of two of the required statements or descriptions identified in FAC-012 R1.1 through R1.3.4, or a combination thereof.

2.3. Level 3: The Transfer Capability Methodology is missing a combination of three or more of the required statements or descriptions identified in FAC-012 R1.1 through R1.3.4.

2.4. Level 4: The Transfer Capability Methodology was not issued to all of the required entities.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
1	08/01/05	1. Lower cased the word "draft" and "drafting team" where appropriate. 2. Changed incorrect use of certain hyphens (-) to "en dash" (–) and "em dash (—)." 3. Changed "Timeframe" to "Time Frame" in item D, 1.2.	01/20/06

A. Introduction

1. Title: **Establish and Communicate Transfer Capabilities**

2. Number: FAC-013-1

3. Purpose: To ensure that Transfer Capabilities used in the reliable planning and operation of the Bulk Electric System (BES) are determined based on an established methodology or methodologies.

4. Applicability

4.1. Reliability Coordinator required by its Regional Reliability Organization to establish inter-regional and intra-regional Transfer Capabilities

4.2. Planning Authority required by its Regional Reliability Organization to establish inter-regional and intra-regional Transfer Capabilities

5. Effective Date: October 7, 2006

B. Requirements

R1. The Reliability Coordinator and Planning Authority shall each establish a set of inter-regional and intra-regional Transfer Capabilities that is consistent with its current Transfer Capability Methodology.

R2. The Reliability Coordinator and Planning Authority shall each provide its inter-regional and intra-regional Transfer Capabilities to those entities that have a reliability-related need for such Transfer Capabilities and make a written request that includes a schedule for delivery of such Transfer Capabilities as follows:

R2.1. The Reliability Coordinator shall provide its Transfer Capabilities to its associated Regional Reliability Organization(s), to its adjacent Reliability Coordinators, and to the Transmission Operators, Transmission Service Providers and Planning Authorities that work in its Reliability Coordinator Area.

R2.2. The Planning Authority shall provide its Transfer Capabilities to its associated Reliability Coordinator(s) and Regional Reliability Organization(s), and to the Transmission Planners and Transmission Service Provider(s) that work in its Planning Authority Area.

C. Measures

M1. The Reliability Coordinator and Planning Authority shall each be able to demonstrate that it developed its Transfer Capabilities consistent with its Transfer Capability Methodology.

M2. The Reliability Coordinator and Planning Authority shall each have evidence that it provided its Transfer Capabilities in accordance with schedules supplied by the requestors of such Transfer Capabilities.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility
Regional Reliability Organization

1.2. Compliance Monitoring Period and Reset Timeframe

The Reliability Coordinator and Planning Authority shall each verify compliance through self-certification submitted to the Compliance Monitor annually. The Compliance

Monitor may conduct a targeted audit once in each calendar year (January–December) and an investigation upon a complaint to assess compliance.

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

1.3. Data Retention

The Planning Authority and Reliability Coordinator shall each keep documentation for 12 months. In addition, entities found non-compliant shall keep information related to the non-compliance until found compliant.

The Compliance Monitor shall keep the last audit and all subsequent compliance records.

1.4. Additional Compliance Information

The Planning Authority and Reliability Coordinator shall each make the following available for inspection during a targeted audit by the Compliance Monitor or within 15 business days of a request as part of an investigation upon complaint:

1.4.1 Transfer Capability Methodology.

1.4.2 Inter-regional and Intra-regional Transfer Capabilities.

1.4.3 Evidence that Transfer Capabilities were distributed.

1.4.4 Distribution schedules provided by entities that requested Transfer Capabilities.

2. Levels of Non-Compliance

2.1. Level 1: Not applicable.

2.2. Level 2: Not all requested Transfer Capabilities were provided in accordance with their respective schedules.

2.3. Level 3: Transfer Capabilities were not developed consistent with the Transfer Capability Methodology.

2.4. Level 4: No requested Transfer Capabilities were provided in accordance with their respective schedules.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
1	08/01/05	1. Changed incorrect use of certain hyphens (-) to "en dash (–)." 2. Lower cased the word "draft" and "drafting team" where appropriate. 3. Changed Anticipated Action #5, page 1, from "30-day" to "Thirty-day." 4. Added or removed "periods."	01/20/05

A.Introduction

1.Title: Review of Transmission Service Provider Total Transfer Capability and Available Transfer Capability Calculations and Results

2.Number: MOD-002-0

3.Purpose: To promote the consistent and uniform application of transfer capability calculations among Transmission Service Providers, the Regional Reliability Organizations need to review adherence to Regional methodologies for calculating Total Transfer Capability (TTC) and Available Transfer Capability (ATC).

4.Applicability:

4.1. Regional Reliability Organizations

5.Effective Date: April 1, 2005

6.Requirements

R7. Each Regional Reliability Organization, in conjunction with its members, shall develop and implement a procedure to periodically review (at least annually) and ensure that the TTC and ATC calculations and resulting values of member Transmission Service Providers comply with the Regional TTC and ATC methodology and applicable Regional criteria.

R8. Each Regional Reliability Organization shall document the results of its periodic reviews of TTC and ATC.

R9. The Regional Reliability Organization shall provide the results of its most current reviews of TTC and ATC to NERC on request (within 30 calendar days).

B.Measures

M1. The Regional Reliability Organization's written procedure for the performance of periodic reviews of Regional TTC and ATC calculations shall comply with Reliability Standard MOD-002-0_R1.

M2. The Regional Reliability Organization shall have evidence that it provided documentation of the results of its periodic reviews of TTC and ATC to NERC within 30 calendar days.

C.Compliance

1.Compliance Monitoring Process

1.1.Compliance Monitoring Responsibility

Compliance Monitor: NERC.

1.2.Compliance Monitoring Period and Reset Timeframe

Procedure on Request (within 30 calendar days).

Documentation provided by NERC on request (within 30 calendar days).

1.3.Data Retention

None specified.

1.4.Additional Compliance Information

None.

2.Levels of Non-Compliance

2.1.Level 1: Not applicable.

2.2.Level 2: The Regional Reliability Organization did not perform an annual review of all Transmission Service Providers within its Region for consistency with its TTC and ATC methodology.

2.3.Level 3: Not applicable.

2.4.Level 4: The Regional Reliability Organization does not have a procedure for performing a TTC and ATC methodology consistency review of all Transmission Service Providers within its Regional Reliability Organization, or has not performed such annual reviews.

D.Regional Differences

1.None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New

The ATCT drafting team believes that this MOD-002-0 should be retired, since the compliance requirements will be covered in the compliance measures in MOD-001-1 and will be part of the NERC compliance program.

The drafting team will recommend that MOD-002-0 be retired upon approval of the new MOD-001-1.

Standard MOD-003-1 — Procedure to resolve comments and questions regarding TTC and ATC Methodologies and Values

A. Introduction

1. **Title:** Procedure to resolve comments and questions regarding TTC and ATC Methodologies and Values

2. **Number:** MOD-003-1

3. **Purpose:** To promote the communication of Transmission Service Provider calculation methodologies and values used for calculating Total Transfer Capability (TTC), Available Transfer Capability (ATC), Total Flowgate Capability (TFC) and Available Flowgate Capability (AFC) among Transmission Customers.

4. **Applicability:**

   4.1. Transmission Service Provider

5. **Effective Date:** April 1, 2005

B. Requirements

R1. The Transmission Service Provider shall post on OASIS[1] the telephone number and email address of a contact person to whom concerns are to be addressed regarding the TFC and AFC and the TTC and ATC methodologies and their associated numeric values. [Risk factor:Low]

R2. Each Transmission Service Provider shall create on its OASIS[2] an electronic data input field for the specific purpose of receiving queries regarding the TFC and AFC and the TTC and ATC methodologies and their associated numeric values. [Risk factor:Low]

R3. Subject to commercial confidentiality constraints, within one week of the electronic receipt of a query received via the aforementioned field, the Transmission Service Provider shall post on OASIS[3] an answer to the received query. [Risk factor: Low]

C. Measures

M1. The Transmission Service Provider shall have evidence that information required by MOD-003-1 R1 was posted on OASIS[4].

M2. The Transmission Service Provider will provide the internet location of the OASIS website containing the information required by MOD-003-1 R2.

M3. The Transmission Service Provider will provide a log containing the information required by MOD-003-1 R3.

D. Compliance

[1] Entities not required to have an OASIS may publish this information on a publicly available website

[2] Entities not required to have an OASIS may publish this information on a publicly available website

[3] Entities not required to have an OASIS may publish this information on a publicly available website

[4] Entities not required to have an OASIS may publish this information on a publicly available website

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1. **Compliance Monitoring Process**

   1.1. **Compliance Monitoring Responsibility**

   Compliance Monitor: NERC.

   1.2. **Compliance Monitoring Period and Reset Timeframe**

   Rolling 3 years

   1.3. **Data Retention**

   Rolling 3 years.

   1.4. **Additional Compliance Information**

   None.

2. **Mitigation Time Horizon - ask for examples**

   2.1. **Long-term planning – n/a**

   2.2. **Operations Planning - n/a**

   2.3. **Same-day Operation – n/a**

   2.4. **Real-time Operations – n/a**

   2.5. **Operations Assessment – n/a**

3. **Violation Severity Level**

   3.1. **Lower:**

   1.3.1. R3: 1 to 5% of the inquiries received were not answered within 1 week during the prior twelve (12) months

   3.2. **Moderate:**

   2.3.1. R3: more than 5% and up to and including 15% of the inquiries received were not answered within 1 week during the prior twelve (12) months

   3.3. **High:**

   3.3.1. R3: more than 15% and up to and including 30% of the inquiries received were not answered within 1 week during the prior twelve (12) months

   3.3.2. R1: Contact information is incorrect

   3.4. **Severe:**

   4.3.1. R1: Contact information is not posted

   4.3.2. R2: Inquiry form is not posted

   4.3.3. R3: more than 5% of the inquires were never responded to.

   4.3.4. R3: more than 30% of the inquiries received were not answered within 1 week during the prior twelve (12) months.

E. Regional Differences

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1. None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
1	Dec 13, 2006	T.B.D	Revised

Page 1: [1] Deleted **Administrator** **12/13/2006 9:20:00 AM**

Each Regional Reliability Organization, in conjunction with its members, shall develop and document a procedure on how transmission users can input their concerns or questions regarding the TTC and ATC methodology and values of the Transmission Service Provider(s), and how these concerns or questions will be addressed. The Regional Reliability Organization's procedure shall specify the following:

The name, telephone number and email address of a contact person to whom concerns are to be addressed.

The amount of time it will take for a response

.

The manner in which the response will be communicated (e.g., email, letter, telephone, etc).

What recourse a customer has if the response is deemed unsatisfactory.

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Regional Reliability Organization

Page 1: [3] Deleted **Administrator** **12/13/2006 9:23:00 AM**

a web site that is accessible by the Regional Reliability Organizations, NERC, and transmission users,

Page 1: [4] Deleted **Administrator** **12/13/2006 9:39:00 AM**

its procedure for receiving and addressing concerns about

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the TTC and ATC methodology and TTC and ATC values of member Transmission Service Providers

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Regional Reliability Organization

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that its procedure for receiving input for ATC and TTC methodologies and values meets Reliability Standard MOD-003-0_R1.

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The Regional Reliability Organization shall have evidence that its procedure for receiving input for ATC and TTC methodologies and values is available on a web site accessible by the Regional Reliability Organizations, NERC, and transmission users.

A. Introduction

1. **Title:** **Documentation of Regional Reliability Organization Capacity Benefit Margin Methodologies**

2. **Number:** MOD-004-0

3. **Purpose:** To promote the consistent and uniform application of transmission Transfer Capability margins calculations, Capacity Benefit Margin (CBM) must be calculated in a consistent manner.

4. **Applicability:**

   4.1. Regional Reliability Organization

5. **Effective Date:** April 1, 2005

B. Requirements

R1. Each Regional Reliability Organization, in conjunction with its members, shall develop and document a Regional CBM methodology. The Regional Reliability Organization's CBM methodology shall include each of the following ten items, and shall explain its use in determining CBM value. Other items that are Regional Reliability Organization specific or that are considered in each respective Regional Reliability Organization methodology shall also be explained along with their use in determining CBM values.

R1.1. Specify that the method used by each Regional Reliability Organization member to determine its generation reliability requirements as the basis for CBM shall be consistent with its generation planning criteria.

R1.2. Specify the frequency of calculation of the generation reliability requirement and associated CBM values.

R1.3. Require that generation unit outages considered in a Transmission Service Provider's CBM calculation be restricted to those units within the Transmission Service Provider's system.

R1.4. Require that CBM be preserved only on the Transmission Service Provider's System where the Load-Serving Entity's Load is located (i.e., CBM is an import quantity only).

R1.5. Describe the inclusion or exclusion rationale for generation resources of each Load-Serving Entity including those generation resources not directly connected to the Transmission Service Provider's system but serving Load-Serving Entity loads connected to the Transmission Service Provider's system.

R1.6. Describe the inclusion or exclusion rationale for generation connected to the Transmission Service Provider's system but not obligated to serve Native/Network Load connected to the Transmission Service Provider's system.

R1.7. Describe the formal process and rationale for the Regional Reliability Organization to grant any variances to individual Transmission Service Providers from the Regional Reliability Organization's CBM methodology.

R1.8. Specify the relationship of CBM to the generation reliability requirement and the allocation of the CBM values to the appropriate transmission facilities. The sum of the

CBM values allocated to all interfaces shall not exceed that portion of the generation reliability requirement that is to be provided by outside resources.

R1.9. Describe the inclusion or exclusion rationale for the loads of each Load-Serving Entity, including interruptible demands and buy-through contracts (type of service contract that offers the customer the option to be interrupted or to accept a higher rate for service under certain conditions).

R1.10. Describe the inclusion or exclusion rationale for generation reserve sharing arrangements in the CBM values.

R2. The Regional Reliability Organization shall make the most recent version of the documentation of its CBM methodology available on a website accessible by NERC, the Regional Reliability Organizations, and transmission users.

C. Measures

M1. The Regional Reliability Organization's most recent CBM methodology documentation shall meet Reliability Standard MOD-004-0_R1.

M2. The Regional Reliability Organization's CBM methodology shall be available on a website accessible by NERC, the Regional Reliability Organizations, and transmission users.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Compliance Monitor: NERC.

1.2. Compliance Monitoring Period and Reset Timeframe

The most recent version of CBM methodology documentation available on a website accessible by NERC, the Regional Reliability Organizations, and transmission users.

1.3. Data Retention

None specified.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance

2.1. Level 1: The Regional Reliability Organization's documented CBM methodology does not address one or two of the ten items required for documentation under Reliability Standard MOD-004-0_R1.

2.2. Level 2: Not applicable.

2.3. Level 3: Not applicable.

2.4. Level 4: The Regional Reliability Organization's documented CBM methodology does not address three or more of the ten items required for documentation under Reliability Standard MOD-004-0_R1, or the Regional Reliability Organization does not have a documented CBM methodology available on a website in accordance with Reliability Standard MOD-004-0_R2.

E. Regional Differences

1. None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New

A. Introduction

1. **Title:** **Procedure for Verifying Capacity Benefit Margin Values**

2. **Number:** MOD-005-0

3. **Purpose:** To promote the consistent and uniform application of Transfer Capability calculations among transmission system users, the Regional Reliability Organizations need to review adherence to Regional methodologies for calculating Capacity Benefit Margin (CBM).

4. **Applicability:**

   4.1. Regional Reliability Organization

5. **Effective Date:** April 1, 2005

B. Requirements

R1. Each Regional Reliability Organization, in conjunction with its members, shall develop and implement a procedure to review (at least annually) the CBM calculations and the resulting values of member Transmission Service Providers to ensure that they comply with the Regional Reliability Organization's CBM methodology. The procedure shall include the following four requirements:

R1.1. Indicate the frequency under which the verification review shall be implemented.

R1.2. Require review of the process by which CBM values are updated, and their frequency of update, to ensure that the most current CBM values are available to transmission users.

R1.3. Require review of the consistency of the Transmission Service Provider's CBM components with its published planning criteria. A CBM value is considered consistent with published planning criteria if the components that comprise CBM are addressed in the planning criteria. The methodology used to determine and apply CBM does not have to involve the same mechanics as the planning process, but the same uncertainties must be considered and any simplifying assumptions explained.

R1.4. Require CBM values to be periodically updated (at least annually) and available to the Regional Reliability Organizations, NERC, and transmission users.

R2. Each Regional Reliability Organization shall document its CBM procedure and shall make its CBM review procedure available to NERC on request (within 30 calendar days).

R3. The Regional Reliability Organization shall provide documentation of the results of the most current implementation of its CBM review procedure to NERC on request (within 30 calendar days).

C. Measures

M1. The Regional Reliability Organization's written procedure for the performance of periodic reviews of Regional CBM calculations shall comply with Reliability Standard MOD-005_R1.

M2. The Regional Reliability Organization shall have documentation of the results of its periodic reviews of CBM calculations, in accordance with Reliability Standard MOD-005-0_R2 and MOD-005-0_R3.

M3. The Regional Reliability Organization shall have evidence that it provided documentation of its CBM review procedure and the results of the most current implementation of the procedure to NERC as requested (within 30 calendar days).

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Compliance Monitor: NERC.

1.2. Compliance Monitoring Period and Reset Timeframe

The documentation of the Regional Reliability Organization's CBM review procedure shall be available to NERC on request (within 30 calendar days). Documentation of the results of the most current implementation of the review procedure shall be available to NERC on request (within 30 calendar days).

1.3. Data Retention

None specified.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance

2.1. Level 1: Not applicable.

2.2. Level 2: The Regional Reliability Organization did not perform an annual review of all Transmission Service Providers within its Region for consistency with the Regional CBM methodology.

2.3. Level 3: Not applicable.

2.4. Level 4: The Regional Reliability Organization does not have a procedure for performing a CBM methodology consistency review of all Transmission Service Providers within its Region, or has not performed any annual reviews.

E. Regional Differences

1. None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New

A. Introduction

1. **Title:** **Procedures for the Use of Capacity Benefit Margin Values**
2. **Number:** MOD-006-0
3. **Purpose:** To promote the consistent and uniform use of transmission Transfer Capability margins calculations among transmission system users,
4. **Applicability:**
   - **4.1.** Transmission Service Provider
5. **Effective Date:** April 1, 2005

B. Requirements

R1. Each Transmission Service Provider shall document its procedure on the use of Capacity Benefit Margin (CBM) (scheduling of energy against a CBM preservation). The procedure shall include the following three components:

- **R1.1.** Require that CBM be used only after the following steps have been taken (as time permits): all non-firm sales have been terminated, Direct-Control Load Management has been implemented, and customer interruptible demands have been interrupted. CBM may be used to reestablish Operating Reserves.
- **R1.2.** Require that CBM shall only be used if the Load-Serving Entity calling for its use is experiencing a generation deficiency and its Transmission Service Provider is also experiencing Transmission Constraints relative to imports of energy on its transmission system.
- **R1.3.** Describe the conditions under which CBM may be available as Non-Firm Transmission Service.

R2. Each Transmission Service Provider shall make its CBM use procedure available on a web site accessible by the Regional Reliability Organizations, NERC, and transmission users..

C. Measures

M1. The Transmission Service Provider's procedure for the use of CBM (scheduling of energy against a CBM preservation) shall meet Reliability Standard MOD-006-0_R1.

M2. The Transmission Service Provider's procedure for the use of CBM (scheduling of energy against a CBM preservation) shall be available on a web site accessible by the Regional Reliability Organizations, NERC, and transmission users.

D. Compliance

1. **Compliance Monitoring Process**
   - **1.1. Compliance Monitoring Responsibility**

     Compliance Monitor: Regional Reliability Organizations
   - **1.2. Compliance Monitoring Period and Reset Timeframe**

     Each Regional Reliability Organization shall report compliance and violations to NERC via the NERC compliance reporting process.

1.3. Data Retention

None specified.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance

2.1. Level 1: The Transmission Service Provider's procedure for use of CBM is available and addresses only two of the three requirements for such documentation as listed above under Reliability Standard MOD-006-0_R1.

2.2. Level 2: Not applicable.

2.3. Level 3: Not applicable.

2.4. Level 4: The Transmission Service Provider's procedure for use of CBM addresses one or none of the three requirements as listed above under Reliability Standard MOD-006-0_R1, or is not available.

E. Regional Differences

1. None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New

A. Introduction

1. **Title:** **Documentation of the Use of Capacity Benefit Margin**

2. **Number:** MOD-007-0

3. **Purpose:** To promote the consistent and uniform application of Transfer Capability margin calculations among transmission system users by developing methodologies for calculating Capacity Benefit Margin (CBM). This methodology shall comply with NERC definitions for CBM, the NERC Reliability Standards, and applicable Regional criteria.

4. **Applicability:**

   4.1. Transmission Service Provider

5. **Effective Date:** April 1, 2005

B. Requirements

R1. Each Transmission Service Provider that uses CBM shall report (to the Regional Reliability Organization, NERC and the transmission users) the use of CBM by the Load-Serving Entities' Loads on its system, except for CBM sales as Non-Firm Transmission Service. (This use of CBM shall be consistent with the Transmission Service Provider's procedure for use of CBM.)

R2. The Transmission Service Provider shall post the following three items within 15 calendar days after the use of CBM for an Energy Emergency. This posting shall be on a web site accessible by the Regional Reliability Organizations, NERC, and transmission users.

R2.1. Circumstances.

R2.2. Duration.

R2.3. Amount of CBM used.

C. Measures

M1. The Transmission Service Provider shall have evidence that it posted an after-the-fact disclosure that energy was scheduled against a CBM preservation (for purposes other than Non-Firm Transmission Sales) on a website accessible by the Regional Reliability Organizations, NERC, and transmission users.

M2. If the Transmission Service Provider had energy scheduled against a CBM preservation (for purposes other than Non-Firm Transmission Sales) the Transmission Service Provider shall have evidence it posted an after-the-fact disclosure that includes the elements required by Reliability Standard MOD-007_R2.

D. Compliance

1. **Compliance Monitoring Process**

   1.1. Compliance Monitoring Responsibility

   Compliance Monitor: Regional Reliability Organizations.

   1.2. Compliance Monitoring Period and Reset Timeframe

   Within 15 calendar days of the use of CBM (excluding Non-Firm Transmission Sales)

   1.3. Data Retention

   None specified.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance

2.1. Level 1: Not applicable.

2.2. Level 2: Information pertaining to the use of CBM during an Energy Emergency was provided, but was not made available on a web site accessible by the Regional Reliability Organizations, NERC, and transmission users, or meets only two of the three requirements as listed in Reliability Standard MOD-007-0_R2.

2.3. Level 3: Not applicable.

2.4. Level 4: After the use of CBM (excluding Non-Firm Transmission Sales), information pertaining to the use of CBM was provided but meets one or none of the three requirements as listed above under Reliability Standard MOD-007-0_R2, or no information was provided.

E. Regional Differences

1. None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New

Transmission Reliability Margin - TRM The amount of transmission transfer capability necessary to provide reasonable assurance that the interconnected transmission network will be secure. TRM accounts for the inherent uncertainty in system conditions and the need for operating flexibility to ensure reliable system operation as system conditions change.

A. Introduction

1. **Title:** **Documentation and Content of Transmission Reliability Margin Methodologies**
2. **Number:** MOD-008-0
3. **Purpose:** To promote the consistent calculation and application of Transmission Reliability Margin calculations among Transmission Service Providers and Transmission Owners.
4. **Applicability:**
   - **4.1.** Transmission Service Provider
   - **4.2.** Transmission Owners
5. **Effective Date:** April 1, 2005

B. Requirements

R1. Each Transmission Service Provider shall document its methodology for calculating Transmission Reliability Margin (TRM). A Transmission Service Provider TRM value may be less than but shall not exceed three percent (3%) of the facility ratings unless the Transmisson Service Provider provides on its OASIS justification for exceeding the 3% threshold.

- **R1.1.** Reserve Sharing MW amount
- **R1.2.** Percentage criteria

R2. The TRM methodology shall specify or describe each of the following four items, and shall explain its use, if any, in determining TRM values.

- **R2.1.** The update frequency of TRM calculations shall be updated no less than quarterly on the first day of the quarter.
- **R2.2.** Specify the uncertainties accounted for in TRM and the methods used to determine their impacts on the TRM values. The components of uncertainty identified in MOD-008-1 R1.3.1 through MOD-008-1 R1.3.7, if applied, shall be accounted for solely in TRM and not CBM, components accounted for in CBM shall not be included in TRM.
  - **R1.2.1.** Aggregate Load forecast error (not included in determining generation reliability requirements).
  - **R1.2.2.** Load distribution error.
  - **R1.2.3.** Variations in facility Loadings due to balancing of generation within a Balancing Authority Area.
  - **R1.2.4.** Forecast uncertainty in transmission system topology.
  - **R1.2.5.** Allowances for parallel path (loop flow) impacts.

Any component of uncertainty, other than those identified in MOD-008-0_R1.3.1 through MOD-008-0_R1.3.7, shall benefit the interconnected transmission systems as a whole before they shall be permitted to be included in TRM calculations. Other items that are considered in each respective TRM methodology shall also be explained along with their use in determining ~~TRM values.~~

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R1.2.6. Allowances for simultaneous path interactions.

R1.2.7. Variations in generation dispatch.

R1.2.8. Short-term System Operator response (Operating Reserve actions not exceeding a 59-minute window).

R2.3. Describe the conditions, if any, under which TRM may be available to the market as Non-Firm Transmission Service.

R2.4. Describe the formal process to grant any variances to individual Transmission Service Providers from the TRM methodology.

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R3. The Transmission Service Provider shall make its most recent version of the documentation of its TRM methodology available on a web site accessible by NERC, the Regional Reliability Organizations, and transmission users.

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R4. Each Regional Reliability Organization, in conjunction with its members, shall develop and implement a procedure to review Transmission Reliability Margin (TRM) calculations and resulting values of member Transmission Service Providers to ensure they comply with the Regional TRM methodology, and are periodically updated and available to transmission users. This procedure shall include the following four required elements:

R4.1. Indicate the frequency under which the verification review shall be implemented.

R4.2. Require review of the process by which TRM values are updated, and their frequency of update, to ensure that the most current TRM values are available to transmission users.

R4.3. Require review of the consistency of the Transmission Service Provider's TRM components with its published planning criteria. A TRM value is considered consistent with published planning criteria if the same components that comprise TRM are also addressed in the planning criteria. The methodology used to determine and apply TRM does not have to involve the same mechanics as the planning process, but the same uncertainties must be considered and any simplifying assumption explained.

R4.4. Require TRM values to be periodically updated (at least prior to each season — winter, spring, summer, and fall), as necessary, and made available to the Regional Reliability Organizations, NERC, and transmission users.

R5. The Regional Reliability Organization shall make documentation of its Regional TRM review procedure available to NERC on request (within 30 calendar days).

R6. The Regional Reliability Organization shall make documentation of the results of the most current implementation of its TRM review procedure available to NERC on request (within 30 calendar days).

R7.

C. Measures

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M1. The Transmission Service Providers's most recent version of the documentation of its TRM methodology is available on a website accessible by NERC, the Regional Reliability Organizations, and transmission users.

M2. The Regional Reliability Organization's most recent version of the documentation of its TRM contains all items in Reliability Standard MOD-008-0_R1.

D. Compliance

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1. **Compliance Monitoring Process**

   1.1. Compliance Monitoring Responsibility

   Compliance Monitor: NERC.

   1.2. Compliance Monitoring Period and Reset Timeframe

   Each Regional Reliability Organization shall report compliance and violations to NERC via the NERC Compliance Reporting process.

   1.3. Data Retention

   None specified.

   1.4. Additional Compliance Information

   None.

2. **Levels of Non-Compliance**

   2.1. Level 1: The Regional Reliability Organization's documented TRM methodology does not address one of the five items required for documentation under Reliability Standard MOD-008-0_R1.

   2.2. Level 2: Not applicable.

   2.3. Level 3: Not applicable.

   2.4. Level 4: The Regional Reliability Organization's documented TRM methodology does not address two or more of the five items required for documentation under Reliability Standard MOD-008-0_R1.

   Or

   The Regional Reliability Organization does not have a documented TRM methodology.

E. Regional Differences

1. None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New

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Any component of uncertainty, other than those identified in MOD-008-0_R1.3.1 through MOD-008-0_R1.3.7, shall benefit the interconnected transmission systems as a whole before they shall be permitted to be included in TRM calculations.

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A. Introduction

1. **Title:** **Procedure for Verifying Transmission Reliability Margin Values**

2. **Number:** MOD-009-0 - This will likely be recommended for deletion, since it is mostly a requirement for compliance monitoring by the Regional Entities. A few of the requirements will be moved to MOD-008-1.

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3. **Purpose:** To promote the consistent application of transmission Transfer Capability margin calculations among Transmission System Providers and Transmission Owners.

4. **Applicability:**

   4.1. Regional Reliability Organization

5. **Effective Date:** April 1, 2005

B. Requirements

R1. Each Regional Reliability Organization, in conjunction with its members, shall develop and implement a procedure to review Transmission Reliability Margin (TRM) calculations and resulting values of member Transmission Service Providers to ensure they comply with the Regional TRM methodology, and are periodically updated and available to transmission users. This procedure shall include the following four required elements:

R1.1. Indicate the frequency under which the verification review shall be implemented.

R1.2. Require review of the process by which TRM values are updated, and their frequency of update, to ensure that the most current TRM values are available to transmission users.

R1.3. Require review of the consistency of the Transmission Service Provider's TRM components with its published planning criteria. A TRM value is considered consistent with published planning criteria if the same components that comprise TRM are also addressed in the planning criteria. The methodology used to determine and apply TRM does not have to involve the same mechanics as the planning process, but the same uncertainties must be considered and any simplifying assumption explained.

R1.4. Require TRM values to be periodically updated (at least prior to each season — winter, spring, summer, and fall), as necessary, and made available to the Regional Reliability Organizations, NERC, and transmission users.

R2. The Regional Reliability Organization shall make documentation of its Regional TRM review procedure available to NERC on request (within 30 calendar days).

R3. The Regional Reliability Organization shall make documentation of the results of the most current implementation of its TRM review procedure available to NERC on request (within 30 calendar days).

C. Measures

M1. The Regional Reliability Organization shall have evidence that it provided to NERC upon request (within 30 calendar days) a copy of its written procedure developed for the performance of periodic reviews of Regional TRM calculations.

M2. The Regional Reliability Organization shall have evidence it provided to NERC on request (within 30 calendar days) documentation of the results of the most current implementation of its TRM review procedure.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Compliance Monitor: NERC.

1.2. Compliance Monitoring Period and Reset Timeframe

Each Regional Reliability Organization shall report compliance and violations to NERC via the NERC Compliance Reporting process.

1.3. Data Retention

None specified.

1.4. Additional Compliance Information

None.

2. Levels of Non-Compliance

2.1. Level 1: Not applicable.

2.2. Level 2: The Regional Reliability Organization did not perform an annual review of all Transmission Service Providers within its Region for consistency with its Regional TRM methodology.

2.3. Level 3: Not applicable.

2.4. Level 4: The Regional Reliability Organization does not have a procedure for performing a TRM methodology consistency review of all Transmission Service Providers within its Region, or has not performed any such annual reviews.

E. Regional Differences

1. None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New

When completed, e-mail to: gerry.cauley@nerc.net

Standard Authorization Request Form

Title of Proposed Standard	Revision to Standards MOD 004, MOD005, MOD006, MOD 008, and MOD 009
Request Date	revised February 15, 2006

SAR Requestor Information	**SAR Type** (Put an 'x' in front of one of these selections)	
Name ATCT SAR Drafting Team atctdt_plus@nerc.com	☐	New Standard
Primary Contact Larry Middleton SAR Drafting Team Chair	☐ X	Revision to existing Standard(s)
Telephone (317) 249-5447 Fax	☐	Withdrawal of existing Standard
E-mail lmiddleton@midwestiso.org	☐	Urgent Action

Purpose/Industry Need (Provide one or two sentences)

The existing standards on TRM should be revised to require crisp and clear documentation of the calculation of TRM and make various components of the methodology mandatory so there is more consistency across methodologies.

The existing standards on CBM should be revised to require crisp and clear documentation of the calculation of CBM and make various components (zero values could be acceptable, if applicable) of the methodology mandatory so there is more consistency across methodologies. The Standard drafting team should identify and clarify the various definitions of CBM.

The SAR drafting team will not be addressing the measures, compliance, and regional differences. Those will be reserved for the Standard Drafting Team. The Standard Drafting Team should also consider whether the definitions of CBM and TRM should be revised.

The Standard Drafting Team should coordinate its work with the related proposal for the draft NAESB business practice R05004.

Detailed Description (Provide enough detail so that an independent entity familiar with the industry could draft, modify, or withdraw a Standard based on this description.)

Below is a list of issues/items that should be addressed in the revision to MOD-004, 5, 6, 8, and 9. The SAR drafting team does not believe any of the existing requirements should be eliminated during this revision; however, the SAR drafting team expects some existing requirements may be modified and/or re-organized during the revision.

In addition to the specific changes suggested in the SAR Appendix 1, the revisions to these standards should address these additional issues:

- Cataloging of various uses and interpretations of CBM
    - How should they be differentiated?
- Should CBM be an explicit reservation?
    - How and if it would be made a requirement
    - Would it be source to sink or partial path?
- How it might impact systems that use CBM for resource adequacy?
- Whether there should be a reciprocal agreement for the use of CBM.
- Should CBM be based on required or recommended planning reserve.
- Whether entities should plan and reinforce their systems for the amount of CBM being reserved.
- How would RRO (and NERC?) approve CBM/TRM methodologies
- How should TRM be made consistent with applicable planning criteria?

The SAR drafting team has included suggested changes related to these issues in Appendix 1 to this SAR. These are a result of discussions during the SAR drafting and are provided as information that may aide the standard drafting team during their work.

Reliability Functions

The Standard will Apply to the Following Functions *(Check box for each one that applies by double clicking the grey boxes.)*		
☐x	Reliability Authority	Ensures the reliability of the bulk transmission system within its Reliability Authority area. This is the highest reliability authority.
☐x	Balancing Authority	Integrates resource plans ahead of time, and maintains load-interchange-resource balance within its metered boundary and supports system frequency in real time
☐x	Interchange Authority	Authorizes valid and balanced Interchange Schedules
☐x	Planning Authority	Plans the bulk electric system
☐x	Resource Planner	Develops a long-term (>1year) plan for the resource adequacy of specific loads within a Planning Authority area.
☐x	Transmission Planner	Develops a long-term (>1 year) plan for the reliability of transmission systems within its portion of the Planning Authority area.
☐**x**	Transmission Service Provider	Provides transmission services to qualified market participants under applicable transmission service agreements
☐x	Transmission Owner	Owns transmission facilities
☐x	Transmission Operator	Operates and maintains the transmission facilities, and executes switching orders
☐	Distribution Provider	Provides and operates the “wires” between the transmission system and the customer
☐x	Generator Owner	Owns and maintains generation unit(s)
☐x	Generator Operator	Operates generation unit(s) and performs the functions of supplying energy and Interconnected Operations Services
☐x	Purchasing-Selling Entity	The function of purchasing or selling energy, capacity and all necessary Interconnected Operations Services as required
☐x	Market Operator	Integrates energy, capacity, balancing, and transmission resources to achieve an economic, reliability-constrained dispatch.
☐x	Load-Serving Entity	Secures energy and transmission (and related generation services) to serve the end user

Applicability to be determined by standard drafting team.

Reliability and Market Interface Principles

Applicable Reliability Principles *(Check boxes for all that apply by double clicking the grey boxes.)*	
x☐	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.
☐	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.
☐**x**	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.
☐	Plans for emergency operation and system restoration of interconnected bulk electric systems shall be developed, coordinated, maintained and implemented.
☐**x**	Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk electric systems.
☐**x**	Personnel responsible for planning and operating interconnected bulk electric systems shall be trained, qualified and have the responsibility and authority to implement actions.
☐	The security of the interconnected bulk electric systems shall be assessed, monitored and maintained on a wide area basis.
Does the proposed Standard comply with all of the following Market Interface Principles? *(Select 'yes' or 'no' from the drop-down box by double clicking the grey area.)*	
The planning and operation of bulk electric systems shall recognize that reliability is an essential requirement of a robust North American economy. Yes	
An Organization Standard shall not give any market participant an unfair competitive advantage.Yes	
An Organization Standard shall neither mandate nor prohibit any specific market structure. Yes	
An Organization Standard shall not preclude market solutions to achieving compliance with that Standard. Yes	
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	

Related Standards

Standard No.	Explanation
t.b.d	LTATF SAR for ATC/AFC and TTC (submitted with this SAR).
R05004	NAESB proposed Business Practice for a single Business Practice Standard.

Related SARs

SAR ID	Explanation
	Resource Adequacy SAR/Standard

Regional Differences

Region	Explanation
ECAR	
ERCOT	
FRCC	
MRO	
NPCC	
RFC	
SERC	
SPP	
WECC	

Related NERC Operating Policies or Planning Standards

ID	Explanation

Appendix 1

proposed changes are highlighted in green

SUGGESTED REVISIONS to MOD-004-0

R1. Each Regional Reliability Organization, in conjunction with its members, shall develop and document a CBM methodology that is approved by the RRO. A Transmission Service Provider that crosses multiple RRO boundaries shall get approval for its CBM methodology either from each of the respective RROs, or from NERC.

Each CBM methodology shall :

R1.1 Specify that the method used to determine generation reliability requirements as the basis for CBM shall be consistent with the respective generation planning criteria.

R1.2 Specify the frequency of calculation of the generation reliability requirement and associated CBM values.

- Require that the calculations must be verified at least annually.
- Require that the dates seasonal CBM values apply must be specified.

R1.3 Require that generation unit outages considered in a transmission provider's CBM calculation be restricted to those units within the transmission provider's system.

[The standard drafting team should discuss whether CBM should be an explicit reservation and how it would be made a requirement.]

R1.4 Require that CBM be preserved only on the transmission provider's system where the load serving entity's load is located (i.e., CBM is an import quantity only).

[The standard drafting team should discuss whether there could be a reciprocal agreement for the use of CBM.]

R1.5 Describe the inclusion or exclusion rationale in the CBM calculation for generation resources of each LSE including those generation resources not directly connected to the transmission provider's system but serving LSE loads connected to the transmission provider's system. The following rationale must be included in all methodologies:

R1.7.1 All generation directly connected to the transmission provider's system being used to serve load directly connected to that system will be considered in the CBM requirement determination.

R1.7.2 The availability of generation not directly connected to the transmission provider's system being used to serve load directly connected to that system would be considered available per the terms under which it was arranged.

R1.6 Describe the inclusion or exclusion rationale for generation connected to the transmission provider's system. The following rationale must be included in all methodologies:

R1.7.1 The following units shall be included in the CBM requirement determination because they are considered to be the installed generation capacity, committed to

serve load, directly connected to the transmission system for which the CBM requirement is being determined:

i. Generation directly connected to the transmission provider's system but not obligated to serve load directly connected to that system, will be incorporated into the CBM requirement determination as follows:

1. Generation directly connected to the transmission provider's system, but committed to serve load on another system, will not be included in the CBM requirement determination for the transmission system to which the generator is directly connected.)

2. Generation directly connected to the TSP's system, but not committed to serve load on any system, will be included in the CBM requirement determination for the transmission system to which the generator is directly connected as follows:

The TSP will use the best information available to them (i.e. confirmed or requested transmission service/no service) to determine how these units should be considered in the CBM requirement determination. All assumptions made must be documented and approved by the entity responsible for the methodology.

R1.7 Describe the formal process and rationale for the RRO to grant any variances to individual transmission providers from the Regional CBM methodology.

R1.7.1 Require any variances must also be approved by NERC or its designate.

R1.8 Specify the relationship of CBM to the generation reliability requirement and the allocation of the CBM values to the appropriate transmission facilities. The sum of the CBM values allocated to all interfaces shall not exceed that portion of the generation reliability requirement that is to be provided by outside resources.

R1.9 Describe the inclusion or exclusion rationale for the loads of each LSE, including interruptible demands and buy-through contracts (type of service contract that offers the customer the option to be interrupted or to accept a higher rate for service under certain conditions).

R1.10 Describe any adjustments to CBM values to account for generation reserve sharing arrangements (i.e. Use of CBM and a reserve sharing event simultaneously occurring that is not planned for). Explain how the simultaneous application of CBM and TRM amounts being implemented in the ATC calculations are being taken into consideration during the planning process.

[The standard drafting team should consider paragraph below:]

R1.11 Require that CBM be based on the required or recommended planning reserve. In other words, a load serving entity that does not arrange for resources at least equal to the recommended or required planning reserve levels does not benefit by causing a higher CBM.

[The standard drafting team should consider the option below:]

R1.12 Require that the appropriate entities will plan and reinforce the transmission system for the amount of CBM being preserved.

R2. The RRO's most recent version of the documentation of each entity's CBM methodology shall be available on a web site accessible by NERC, the RROs, and the stakeholders in the electricity market.

M3. Each RRO, in conjunction with its members, shall develop and implement a procedure to review the CBM calculations and values of member transmission providers to ensure that they comply with the Regional CBM methodology and are periodically updated (at least annually) and available to stakeholders. Documentation of the results of the most current Regional reviews shall be provided to NERC or its designate within 30 days of completion.

- The RRO must review and approve the TSP methodology to ensure it is consistent with the RRO's Planning Criteria. The TSP is responsible for ensuring that CBM calculations are consistent with the individual TOs planning criteria.

SUGGESTED REVISIONS to MOD-005-0

R1. Each Regional Reliability Organization, in conjunction with its members, shall develop and implement a procedure to review (at least annually) the CBM calculations and the resulting values of member Transmission Service Providers. The CBM review procedure shall:

R1.1 Indicate the frequency is at least annual, under which the verification review shall be implemented.

R1.2 Require review of the process by which CBM values are updated, and their frequency of update, to ensure that the most current CBM values are available to stakeholders.

R1.3 Require review of the consistency of the transmission provider's CBM components with its published planning criteria. A CBM value is considered consistent with published planning criteria if the same components that comprise CBM are also addressed in the planning criteria. The methodology used to determine and apply CBM does not have to involve the same mechanics as the planning process, but the same uncertainties must be considered and any simplifying assumptions explained. It is recognized that ATC determinations are often time constrained and thus will not permit the use of the same mechanics employed in the more rigorous planning process. The procedure must specify how the consistency would be verified.

R1.3.1 Require verification that the appropriate entities are planning and reinforcing the transmission system for the amount of CBM being preserved. The procedure must specify how the verification would be determined. Transmission service providers must also perform this verification and report on the findings as specified below.

R1.4 Require CBM values to be updated at least annually and available to the Regions, NERC, and stakeholders in the electricity markets.

R2. The documentation of the Regional CBM procedure shall be available to NERC on request (within 30 days).

R3. Documentation of the results of the most current implementation of the procedure shall be sent to NERC within 30 days of completion.

SUGGESTED **REVISIONS to MOD-008-0**

R1. Each RRO in conjunction with its members, shall jointly develop and document a TRM methodology. This methodology shall be available to NERC, the Regions, and the transmission users in the electricity market. If a RRO's members TRM values are determined by a RTO or ISO, than a jointly developed regional methodology is not required for those members. RRO members not covered by an RTO/ISO would be required to have a regional methodology.

Each TRM methodology shall:

R1.1 Specify the update frequency of TRM calculations.

- Require that calculations be verified at least annually if determined to be required
- Require that dates that seasonal TRM values apply must be specified

R1.2 Specify how TRM values are incorporated into ATC calculations.

R1.3 Specify the uncertainties accounted for in TRM and the methods used to determine their impacts on the TRM values. The following components of uncertainty, if applied, shall be accounted for solely in TRM and not CBM:

R1.3.1 aggregate load forecast error (not included in determining generation reliability requirements).
R1.3.2 load distribution error.
R1.3.3 variations in facility loadings due to balancing of generation within a Balancing Authority Area.
R1.3.4 forecast uncertainty in transmission system topology.
R1.3.5 allowances for parallel path (loop flow) impacts.
R1.3.6 allowances for simultaneous path interactions.
R1.3.7 variations in generation dispatch
R1.3.8 short-term operator response (operating reserve actions not exceeding a 59-minute window).
R1.3.9 Any additional components of uncertainty shall benefit the interconnected transmission systems, as a whole, before they shall be permitted to be included in TRM calculations.
R1.3.10 Additional detail on how variations in generation dispatch are handled from intermittent generation sources such as wind and hydro, need to be provided.

R1.4 Describe the conditions, if any, under which TRM may be available to the market as Non-Firm Transmission Service.

R1.5 Describe the formal process for the granting of any variances to individual transmission service providers from the regional TRM methodology.

R1.5.1 Any variances must also be approved by NERC or its designate

R1.6 Describe the methodology and conditions thereof that are used to reflect if TRM is reduced for the operating horizon.

R1.7 Explain how the simultaneous application of CBM and TRM amounts being implemented in the ATC calculations are being taken into consideration during the planning process.

R1.8 Specify TRM methodologies and values must be consistent with the approved planning criteria.

R1.8.1 Require that the appropriate entities will plan and reinforce the transmission system for the amount of TRM being preserved. The methodology must specify how the verification of the consistency would be determined.

R1.8.2 Each TRM methodology shall address each of the items above and shall explain its use, if any, in determining TRM values. Other items that are entity specific or that are considered in each respective methodology shall also be explained along with their use in determining TRM values.

SUGGESTED **REVISIONS to MOD-009-0**

R1. Each group of transmission service providers/and or AFC/ATC/TTC calculators within a region, in conjunction with the members of that region , in conjunction with its members, shall develop and implement a procedure to review the TRM calculations and resulting values of member transmission providers to ensure that they comply with the regional TRM methodology and are updated at least annually and available to transmission users.

- The RRO must review and approve the transmission service provider(s)' methodology to ensure it is consistent with the RRO's Planning Criteria. The RRO is responsible for ensuring that TRM calculations are consistent with the individual TOs planning criteria.

The TRM review procedure shall:

R1.1 Indicate the frequency is at least annual, under which the verification review shall be implemented.

R1.2 Require review of the process by which TRM values are updated, and their frequency of update, to ensure that the most current TRM values are available to stakeholders.

R1.3 Require review of the consistency of the transmission service provider's or Transmission Owner's TRM components with its published planning criteria. A TRM

value is considered consistent with published planning criteria if the same components that comprise TRM are also addressed in the planning criteria. The methodology used to determine and apply TRM does not have to involve the same mechanics as the planning process, but the same uncertainties must be considered and any simplifying assumption explained. It is recognized that ATC determinations are often time constrained and thus will not permit the use of the same mechanics employed in the more rigorous planning process. The review process used by a transmission service provider or transmission owner also needs to be documented.

R1.3.1 Explain how the simultaneous application of CBM and TRM amounts being implemented in the ATC calculations are being taken into consideration during the planning process.

R1.4 TRM methodologies and values must be consistent with the applicable planning criteria

- The methodology must specify how the verification of the consistency would be determined

R2. The documentation of the regional TRM procedure shall be available to NERC on request (within 30 days). Documentation of the results of the most current implementation of the procedure shall be available to NERC within 30 days of completion.

R3. Documentation of the results of the most current regional reviews shall be provided to NERC within 30 days of completion.

R4. Require TRM values to be verified at least annually and made available to the RROs, NERC, and stakeholders.

North American Energy Standards Board

Request for Initiation of a NAESB Business Practice Standard, Model Business Practice or Electronic Transaction
or
Enhancement of an Existing NAESB Business Practice Standard, Model Business Practice or Electronic Transaction

Instructions:

1. **Please fill out as much of the requested information as possible. It is mandatory to provide a contact name, phone number and fax number to which questions can be directed. If you have an electronic mailing address, please make that available as well.**

2. **Attach any information you believe is related to the request. The more complete your request is, the less time is required to review it.**

3. **Once completed, send your request to:**

   Rae McQuade
   NAESB, Executive Director
   1301 Fannin, Suite 2350
   Houston, TX 77002

   Phone: 713-356-0060
   Fax: 713-356-0067

   by either mail, fax, or to NAESB's email address, naesb@naesb.org.

Once received, the request will be routed to the appropriate subcommittees for review.

Please note that submitters should provide the requests to the NAESB office in sufficient time so that the NAESB Triage Subcommittee may fully consider the request prior to taking action on it. It is preferable that the request be submitted a minimum of 3 business days prior to the Triage Subcommittee meetings. Those meeting schedules are posted on the NAESB web site at http://www.naesb.org/monthly_calendar.asp.

North American Energy Standards Board

Request for Initiation of a NAESB Business Practice Standard, Model Business Practice or Electronic Transaction
or
Enhancement of an Existing NAESB Business Practice Standard, Model Business Practice or Electronic Transaction

Date of Request: ___ December 12, 2005_____

1. Submitting Entity & Address:

   _____

   __ATCT_SAR_Drafting_Team_____
   _____
   _____

2. Contact Person, Phone #, Fax #, Electronic Mailing Address:

   Name : _____
   Title : _____
   Phone : _____
   Fax : _____
   E-mail : _ **atct_plus@nerc.com**_____

3. Description of Proposed Standard or Enhancement:

   It is proposed that the following items be addressed by either modifying NAESB Business Practice for Open Access Same-time Information Systems (OASIS) WEQ BPS-001-000, WEQSCP-001-000, and WEQDD-001-000 be modified or developing a new business practice standard(s) as required:

   1) the processing of transmission service requests, which use TTC/ATC/AFC,in coordination with NERC changes to MOD-001, such as:

      a. where the allocation of flowgate capability based on historical Network Native Load impacts the evaluation of transmission service requests, requiring the posting of those allocation values in conjunction with queries of service offerings on OASIS (new requirement)

      b. granting of partial service by capacity requested, both partial period and partial MW (for example WEQSCP-001-4.2.13.2)

c. defining methodology for determining prioritization of competing requests for bumping and matching (for example WEQBPS-001-4.18 and WEQSCP-001-4.2.13.6)

d. defining whether contract path (for systems using flow-based analysis) is between control areas or between Transmission Service Providers (new requirement, would not apply to Western or ERCOT interconnections).

2) the processing of transmission service requests, which use CBM/TRM

a. including the amount of CBM to be made available as Non-firm Transmission Service (for example, WEQSCP-001-4.5).

3) Additional Items required in the NOPR on Preventing Undue Discrimination and Preference in Transmission Service (Docket No. RM05-25-000 and RM05-17-000) that have not been identified as requirements for complementary business practices to the reliability standards for ATC:

a. Any required additional OASIS posting requirements to document methodologies that are developed(Paragraph 155)

b. NAESB companion business practices for ETC (Paragraph 158)

i. NERC has identified the ETC definition to be included in the ATC calculation

c. Additional OASIS business practices for the posting of information in native load use of transmission (Paragraph 158)

i. Business practices developed may include standards for transmission commitments, specifically components to be included in ETC

d. CBM OASIS business practice development will be required (NERC is developing reliability standards to support CBM) and:

I. business practices for a new OASIS transaction that allows an LSE to "call" on CBM (Paragraph 161)

II. business practices for a separate rate schedule for CBM set-aside (Paragraph 162)

III. business practices for new transfer capability reservation for designated network resources (Paragraph 163)

e. business practices for calculation and frequency of posting ATC calculations (Paragraph 168)

f. business practices for existing transmission reservations including counterflows, ATC calculation frequency, and Source/sink modeling identification (Paragraph 169)

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g. informational postings to complement the reliability standards MOD-001 for development of consistent methodologies for ATC/TTC/AFC. Development of business practices to determine which information should be posted to support ATC/TTC/AFC (Paragraph 181)

h. provide the mechanism for a standardized navigation to access the narrative explanations for changes in ATC values. (Paragraph 186)

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4. Use of Proposed Standard or Enhancement (include how the standard will be used, documentation on the description of the proposed standard, any existing documentation of the proposed standard, and required communication protocols):

   a. The proposed standard will be applicable to transmission service providers to ensure that consistent practices are employed among transmission service providers when processing requests for transmission service,

   b. Each Transmission Service Provider TSP should, assure comparability of service for long term firm point to point and network service customers; and

   c. The proposed standard will be applicable to transmission service providers to ensure that details of the practices and procedures are available to market participants.

5. Description of Any Tangible or Intangible Benefits to the Use of the Proposed Standard or Enhancement:

   Providing increased standardization of procedures and better informing market participants of these procedures would enhance market liquidity.

   Additionally, this should result in better utilization of the transmission system.

6. Estimate of Incremental Specific Costs to Implement Proposed Standard or Enhancement:

   t.b.d.

7. Description of Any Specific Legal or Other Considerations:

Development of this Business Practice needs to be closely coordinated with any work undertaken by NERC that impacts the calculation and coordination of AFC/ATC.

NERC's Long Term ATC/AFC TF (LTATF), which included NAESB participation, has identified a number of issues related to the calculation and coordination of ATC and AFC. .

It is recommended that NAESB develop a Business Practice Standard that would ensure full disclosure by which Transmission Service Providers (TSPs) determine the quantity of transmission service to be made available for sale to market participants.

8. If This Proposed Standard or Enhancement Is Not Tested Yet, List Trading Partners Willing to Test Standard or Enhancement (Corporations and contacts):

N/A

9. If This Proposed Standard or Enhancement Is In Use, Who are the Trading Partners:

N/A

10. Attachments (such as : further detailed proposals, transaction data descriptions, information flows, implementation guides, business process descriptions, examples of ASC ANSI X12 mapped transactions):

Please see final Long Term AFC/ATC Task Force report on the NERC website at:

ftp://www.nerc.com/pub/sys/all_updl/mc/ltatf/LTATF_Final_Report_Revised.pdf