

Introduction

Title: ~~Documentation of Total Transfer Capability and Available Transfer Capability 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 on February 14, 2006.
3. SC appointed a standard drafting team on March 17, 2006.

Description of Current Draft:

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

Future Development Plan:

1. <u>Post revised standard for stakeholder comments.</u>	<u>February 15–March 16, 2007</u>
2. <u>Respond to comments.</u>	
3. <u>Post revised standard for stakeholder comment.</u>	<u>TBD</u>
4. <u>Respond to comments.</u>	<u>TBD</u>
5. <u>First ballot of standard.</u>	<u>TBD</u>
6. <u>Respond to comments.</u>	<u>TBD</u>
7. <u>Post for recirculation.</u>	<u>TBD</u>
8. <u>30 Day posting before board adoption.</u>	<u>TBD</u>
9. <u>Board adopts MOD-001-1.</u>	<u>TBD</u>
10. <u>Effective date.</u>	<u>TBD</u>

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.

Available Flowgate Capability (AFC): A measure of the 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.

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.

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. Transfer Distribution Factors are used to approximate MW flow impact on the flowgate caused by power transfers.

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

Rated System Path Method: 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.

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.

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

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

A. Introduction

1. **Title:** ATC and AFC Calculation Methodologies
2. **Number:** MOD-001-~~01~~
3. **Purpose:** To promote the consistent and uniform application ~~of Transfer Capability calculations among transmission system users, the Regional Reliability Organization shall develop methodologies for calculating Total Transfer Capability (TTC) and~~ and documentation of Available Transfer Capability (ATC) ~~that comply with NERC definitions for TTC and ATC, NERC Reliability Standards, and applicable Regional criteria.~~, and Available Flowgate Capability (AFC) calculation methodologies for reliable system operations.
4. **Applicability:**
 - ~~4.1. Regional Reliability Organization~~
 - 4.1. Transmission Service Provider
5. **Proposed Effective Date:** ~~April 1, 2005~~TBD

B. Requirements

- ~~**R1.** Each Regional Reliability Organization, in conjunction with its members, shall develop and document a Regional TTC and ATC methodology. (Certain systems that are not required to post ATC values are exempt from this standard.) The Regional Reliability Organization's TTC and ATC methodology shall include each of the following nine items, and shall explain its use in determining TTC and ATC values:~~
- ~~**R1.1.** A narrative explaining how TTC and ATC values are determined.~~
- ~~**R1.2.** An accounting for how the reservations and schedules for firm (non-recallable) and non-firm (recallable) transfers, both within and outside the Transmission Service Provider's system, are included.~~
- ~~**R1.3.** An accounting for the ultimate points of power injection (sources) and power extraction (sinks) in TTC and ATC calculations.~~
- ~~**R1.4.** A description of how incomplete or so-called partial-path transmission reservations are addressed. (Incomplete or partial-path transmission reservations are those for which all transmission reservations necessary to complete the transmission path from ultimate source to ultimate sink are not identifiable due to differing reservation priorities, durations, or because the reservations have not all been made.)~~
- ~~**R1.5.** A requirement that TTC and ATC values shall be determined and posted as follows:~~
- ~~**R1.5.1.** Daily values for current week at least once per day.~~
- ~~**R1.5.2.** Daily values for day 8 through the first month at least once per week.~~
- ~~**R1.5.3.** Monthly values for months 2 through 13 at least once per month.~~

- ~~R1.6.~~ — Indication of the treatment and level of customer demands, including interruptible demands.
- ~~R1.7.~~ — A specification of how system conditions, limiting facilities, contingencies, transmission reservations, energy schedules, and other data needed by Transmission Service Providers for the calculation of TTC and ATC values are shared and used within the Regional Reliability Organization and with neighboring interconnected electric systems, including adjacent systems, subregions, and Regional Reliability Organizations. In addition, specify how this information is to be used to determine TTC and ATC values. If some data is not used, provide an explanation.
- ~~R1.8.~~ — A description of how the assumptions for and the calculations of TTC and ATC values change over different time (such as hourly, daily, and monthly) horizons.
- ~~R1.9.~~ — A description of the Regional Reliability Organization's practice on the netting of transmission reservations for purposes of TTC and ATC determination.

~~R2.~~ The Regional Reliability Organization shall make the most recent version of the documentation of its TTC and ATC methodology available on a Web site accessible by NERC, the Regional Reliability Organizations, and transmission users.

R1. The Transmission Service Provider that calculates ATC (using either the Rated System Path Methodology or the Network Response Methodology) shall use the following equation to calculate ATC:

$$\text{ATC} = \text{TTC} - \text{TRM} - \text{CBM} - \text{ETC}$$

Where:

TTC = Total Transfer Capability

TRM = Transmission Reliability Margin

CBM = Capacity Benefit Margin

ETC = Existing Transmission Commitments

The requirements for calculating TTC, TRM, CBM and ETC will be developed in separate sets of standards.

R2. The Transmission Service Provider that calculates ATC shall recalculate ATC when any one of the following components of ATC changes:

R2.1. TTC

R2.2. TRM

R2.3. CBM

R2.4. ETC

The timing requirements for reposting on OASIS will be in accordance with the complementary NAESB Business Practices.

R3. The Transmission Service Provider that calculates ATC, shall, when requested, provide or make available, the following values (within 7 calendar days) to each Transmission Service Provider, Planning Coordinator, Transmission Planner, Reliability Coordinator,

and Transmission Operator that requested the values and has a reliability-related need for the values:

R3.1. ATC

R3.2. TTC

R3.3. TRM

R3.4. CBM

R3.5. ETC

The requirements for calculating TTC, TRM, CBM and ETC will be developed in separate sets of standards.

R4. The Transmission Service Provider that calculates AFC (using a Network Response Methodology) shall use the following equation to calculate AFC:

$AFC = TFC - (TRM * Distribution Factor) - (CBM * Distribution Factor) - \text{the sum of (ETC impacts * respective Distribution Factors)}$

Where:

TFC = Total Flowgate Capability

TRM = Transmission Reserve Margin

CBM = Capacity Benefit Margin

ETC = Existing Transmission Commitments

The requirements for calculating TFC, TRM, CBM and ETC will be developed in separate sets of standards.

R5. The Transmission Service Provider that calculates AFC (using a Network Response Methodology) shall have a methodology that includes the following:

R5.1. Separate consideration of 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.

R5.2. Separate consideration of 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.

R5.3. Assumptions used for base case and transfer generation dispatch for both external and internal systems on OASIS (or its successor).

Please note that it may appear that the AFC methodology contains more requirements than that ATC methodology. Due to the characteristics of the ATC methodology, the corresponding level of detail will be contained in the standard that determines TTC (e.g. FAC 12 or FAC 13) when it is revised

R6. The Transmission Service Provider that calculates AFC (using a Network Response Methodology) shall exchange the following data as agreed upon, or within 7 calendar days, with the Transmission Service Providers with whom AFC is coordinated and

with each Planning Coordinator, Transmission Planner, Reliability Coordinator, and Transmission Operator that requested that data and has a reliability-related need for that data:

- R6.1.** Data describing coordinated transmission system elements scheduled to be taken out of or returned to service, that is updated and provided as changes occur.
- R6.2.** Data describing coordinated generation resources scheduled to be taken out of or returned to service, that is updated and provided as changes occur.
- R6.3.** A typical generation dispatch order that is updated at least prior to each peak load season or the generation participation factors of all units on an affected Balancing Authority basis that is updated as required by changes in the status of the unit.
- R6.4.** The baseline power flow model for calculating AFC updated to reflect facility changes.
- R6.5.** Load Forecast information provided daily and updated as changes occur.
- R6.6.** Flowgates and Flowgate definitions and criteria provided on a seasonal basis, and when revised.
- R6.7.** Total Flowgate Capability (TFC) provided when initially established or revised, and provided daily thereafter.
- R6.8.** Firm and non-firm AFC values at the minimum update intervals listed below:
 - R6.8.1.** Hourly AFC once per hour for 168 hours.
 - R6.8.2.** Daily AFC once per day for thirty days.
 - R6.8.3.** Weekly AFC once per day for four weeks.
 - R6.8.4.** Monthly AFC once per month for 13 months.
- R6.9.** Existing Transmission Commitments (ETC) information as reflected in an initial Power Flow model and provided within seven calendar days of the date the Power Flow Model is updated.
- R6.10.** Transmission Service Reservation information provided when revised once per hour.
- R7.** Each Transmission Service Provider that calculates AFC (using a Network Response Methodology) shall update its AFC values using the updated information received (from Transmission Service Providers with whom AFC is coordinated) at the frequency noted below:

The timing requirements for reposting on OASIS will be in accordance with the complementary NAESB Business Practices.

The requirements for calculating ETC may be developed in a separate standard following input from industry.

The timing requirements for reposting on OASIS will be in accordance with the complementary NAESB Business

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- R7.1. For hourly, once per hour.
- R7.2. For daily, once per day.
- R7.3. For weekly, once per day.
- R7.4. For monthly, once a week.
- R8. The Transmission Service Provider's methodology for calculating ATC or AFC shall identify how it accounts for the Transmission Reservations and Interchange Schedules for Firm (non-recallable) and Non-firm (recallable) Transmission Service inside its Transmission Service Provider system.
- R9. Each Transmission Service Provider shall consistently use its sole ATC or AFC calculation methodology for all instances of coordinating, calculating or posting ATC or AFC values.
- R10. Each Transmission Service Provider shall post the most recent version of its ATC or AFC calculation methodology on its OASIS (or its successor).
- R11. Each Transmission Service Provider's ATC or AFC calculation methodology shall include or address the following:
- R11.1. Identify the parties responsible for posting the ATC or AFC values on OASIS.
 - R11.2. Require that the calculation of ATC or AFC use the same criteria and assumptions used to conduct reliability assessments and internal expansion planning for different time frames (real-time; same day; day-ahead; and from day-ahead up to 13 months).
 - R11.3. Document the criteria used for calculating ATC or AFC values for the different time frames (real-time; same day; day-ahead; and from day-ahead up to 13 months) and the rationale for any differences between these.
 - R11.4. Identify the contingencies considered in the ATC and AFC calculations methodology.
 - R11.5. Require that the calculation of ATC or AFC for use in the 13 months and longer time frame use the same power flow models, and the same 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.
- R12. Identify the Transmission Service Providers with which the data used in the calculation of ATC or AFC is exchanged.
- R13. If the Transmission Service Provider approves a Transmission Service Request using a value other than and less than its value for ATC or AFC, then the Transmission Service Provider shall identify how it calculated the lesser value.

NAESB will be asked to develop a template in their complementary business practice.

R14. The Transmission Service Provider shall require that the Transmission Customer provide both ultimate source and ultimate sink on the Transmission Service Request and shall require that the Transmission Customer use the same source and sink on Interchange Transaction Tags.

C. Measures

~~M1.~~ The Regional Reliability Organization shall provide evidence that its most recent TTC and ATC methodology documentation meets Reliability Standard MOD-001-0_R1.

~~M2.~~ The Regional Reliability Organization shall provide evidence that its TTC and ATC methodology is available on a Web site 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 Time Frame~~

~~Available on a Web site accessible by NERC, the Regional Reliability Organizations, and transmission users.~~

~~1.3. Data Retention~~

~~None identified.~~

~~1.4. Additional Compliance Information~~

~~None.~~

~~2. Levels of Non-Compliance~~

~~2.1. Level 1: The Regional Reliability Organization's documented TTC and ATC methodology does not address one or two of the nine items required for documentation under Reliability Standard MOD-001-0_R1.~~

~~2.2. Level 2: Not applicable.~~

~~2.3. Level 3: Not applicable.~~

~~2.4. Level 4: The Regional Reliability Organization's documented TTC and ATC methodology does not address three or more of the nine items required for documentation under Reliability Standard MOD-001-0_R1 or the Regional Reliability Organization does not have a documented TTC and ATC methodology available on a Web site in accordance with Reliability Standard MOD-001-0_R2.~~

E. Regional Differences

None ~~identified.~~

F. Associated Documents

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