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Standard Authorization Request Form

Title of Proposed Standard	Revision to Existing Standard MOD-001-0
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 atct_plus@nerc.com	<input type="checkbox"/>	New Standard
Primary Contact	Larry Middleton SAR Drafting Team Chair	<input checked="" type="checkbox"/>	Revision to existing Standard
Telephone	(317) 249-5447	<input type="checkbox"/>	Withdrawal of existing Standard
Fax			
E-mail	lmiddleton@midwestiso.org	<input type="checkbox"/>	Urgent Action

Purpose/Industry Need (Provide one or two sentences)

This request changes existing modeling standard(s) by adding a requirement for transmission providers to coordinate the calculation of TTC/ATC/AFC and requires that specific reliability practices be incorporated into the TTC/ATC/AFC calculation and coordination methodologies.

Such changes will enhance the reliable use of the transmission system without needlessly limiting commercial activity. This request adds a requirement for documentation of the methodologies used to coordinate TTC/ATC/AFC*. In addition, a requirement is added for the enhanced documentation of the calculation methodology.

The Standards Authorization Request (SAR) drafting team did not address the measures, compliance, and regional differences. Those will be reserved for the standard drafting team.

*TTC – Total Transfer Capability

*ATC – Available Transfer Capability

*AFC – Available Flowgate Capability

*the drafting team may also deem it appropriate to define TFC – Total Flowgate Capability

Reliability Functions

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

Reliability and Market Interface Principles

Applicable Reliability Principles (Check boxes for all that apply by double clicking the grey boxes.)	
<input checked="" type="checkbox"/>	1. Interconnected bulk electric systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
<input type="checkbox"/>	2. The frequency and voltage of interconnected bulk electric systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
<input checked="" type="checkbox"/>	3. Information necessary for the planning and operation of interconnected bulk electric systems shall be made available to those entities responsible for planning and operating the systems reliably.
<input type="checkbox"/>	4. Plans for emergency operation and system restoration of interconnected bulk electric systems shall be developed, coordinated, maintained and implemented.
<input type="checkbox"/>	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk electric systems.
<input checked="" type="checkbox"/>	6. Personnel responsible for planning and operating interconnected bulk electric systems shall be trained, qualified and have the responsibility and authority to implement actions.
<input type="checkbox"/>	7. 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.)	
1. The planning and operation of bulk electric systems shall recognize that reliability is an essential requirement of a robust North American economy. Yes	
2. An Organization Standard shall not give any market participant an unfair competitive advantage. Yes	
3. An Organization Standard shall neither mandate nor prohibit any specific market structure. Yes	
4. An Organization Standard shall not preclude market solutions to achieving compliance with that Standard. Yes	
5. An Organization Standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards. Yes	

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

Definitions of Terms used in standard:

The standard drafting team should develop a definition for AFC (and TFC, if needed), and if necessary, revise the definitions for ATC and TTC. (some straw man definitions are contained in Appendix 2)

In those definitions, the standard drafting team should provide clarification (and differentiation) between the uses and application of the defined terms, particularly as the terms would be applied to either specific facilities or paths between two areas.

The standard drafting team should specify how criteria for determining flowgates would be used in an AFC/ATC process.

The standard drafting team should add a requirement for transmission providers to coordinate the calculation of TTC/ATC/AFC and require that specific reliability practices be incorporated into the TTC/ATC/AFC calculation and coordination methodologies.

The standard drafting team should add a requirement for the enhanced documentation of the TTC/ATC/AFC calculation methodology.

NOTE: Many of the specific recommendations for changes to the standard(s) from the SAR drafting team have been moved to Appendix 1 so as to not bind the hands of the standard drafting team.

Below is a list of issues/items that should be addressed in the revision to MOD-001.

The SAR drafting team does not believe any of the existing requirements should be eliminated during this revision; however, the SAR DT expects some existing requirements may be modified and/or re-organized during the revision.

The revisions to this standard should:

- Finalize definitions for TTC (possibly add a definition for TFC), ATC and AFC
- Address the issue of methodology documentation and review of the methodology where an ISO/RTO may span multiple NERC regions
- Include a requirement that will enhance the required documentation of TTC and ATC calculations, increasing transparency of those calculations to the marketplace; also ensure it clearly defines who is responsible for that documentation.
- Require that the methodology document(s) are available to the industry
- Include a list of required data that must be coordinated for TTC and/or ATC/AFC calculations; such as, but not limited to: generation dispatch, transmission and generation outage, load forecasts, flowgate definitions/criteria.
- Consider trying to develop common criteria for establishing flowgates.
- Include a requirement that addresses issues surrounding the need to assign responsibility for analysis of third-party flowgates in TTC/ATC/AFC calculations to avoid double and triple evaluating of the same reservation request.

- Consider adding requirements to address that parties need to ensure 'agreement' between the coordinated ATC/AFCs values and require documentation of a process to define how discrepancies will be handled. For example, TSP1 should be denying service for a path that impacts a flowgate in TSP2 if the data received from TSP2 shows no service is available.
- Ensure requirements exist to document consistency between operational and planning TTC/ATC/AFC calculations.
- Consider changing the current approach of referencing TTC/ATC/AFC requirements as one group and separating them into TTC requirement(s) and AFC/ATC requirement(s)
- Consider adding more description on what is considered a 'standard' methodology (at what level of detail does the 'standard methodology' document need to go and can there be variations/options allowed within the methodology document?);
- Ensure that any mention of a standard methodology clearly refers to TTC or ATC or AFC.
- Consider requiring that the regional document describe what data is being coordinated between what TSPs and why that 'set' of TSPs are coordinating such data. Set a guideline/criteria associated with who must coordinate.
- Ensure that all requirements are stated in such a way that they can be quantified and measured
- Provide clarification of how the standard(s) would apply to the Western and Eastern (also ERCOT) Interconnections. (For example, WECC uses “committed uses or existing transmission commitments”).
- Establish a consistent set of definitions across the Western, Eastern, and ERCOT Interconnections, considering aspects of each.
- Establish a baseline set of equations for ATC and AFC and any appropriate component, which would include margins such as those specified in MOD 2, MOD 3, MOD 4, MOD 5, MOD 6, MOD 8, and MOD 9, that will incorporate the set of definitions referred to above, allowing for a zero value for a variable that is not used in a specific interconnection. E.g. : $ATC = TTC - \text{committed uses} - CBM - TRM$. (committed uses may be referred to as base flow or existing transmission commitments.)

This SAR lists items that the Long Term AFC/ATC Task Force (LTATF) and the SAR drafting team believe are required to be addressed in the standard revision. However, this list does not prevent the standard drafting team from proposing additional requirements to ensure the objectives of this standard revision are met.

The SAR drafting team has included suggested changes related to these issues as 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.

If during the development of changes to MOD-001, corresponding changes are required to MOD-002 and MOD-003 for consistency the Standard DT should propose such changes to those standards.

A. Introduction

- 1. Title: Development and Documentation of Total Transfer Capability and Available Transfer Capability Calculation Methodologies**
- 2. Number: MOD-001-0**

3. **Purpose:** The purpose of the standard is to promote the consistent and uniform application of Transfer Capability calculations among Transmission Service Providers. The standard will require methodologies to be developed and documented for calculating Total Transfer Capability (TTC), Available Transfer Capability (ATC), and Available Flowgate Capability (AFC) that comply with NERC definitions for TTC, ATC, and AFC; NERC Reliability Standards; and applicable Regional Reliability Organization criteria.
4. **Applicability:**
 - 4.1. Transmission Service Providers and Regional Reliability Organizations
 - 4.2. Others as may be deemed appropriate by the standard drafting team
5. **Effective Date:** t.b.d.

Related Standards

Standard No.	Explanation
MOD-002-0	Review of TTC and ATC Calculations and Results
FAC-005-0	Electrical Facility Ratings for System Modeling
MOD 003-0	Procedure for Input on TTC and ATC Methodologies and Values

Related SARs

SAR ID	Explanation
T.B.D	SAR for TRM and CBM (submitted with this SAR)
R05004	<p>NAESB proposed Business Practice for a single Business Practice Standard to be developed related to:</p> <p>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:</p> <p>1) the processing of transmission service requests, which use TTC/ATC/AFC, in coordination with NERC changes to MOD 001,</p> <p>2) 1) the processing of transmission service requests, which use CBM/TRM.</p>
FAC-010-1	Determine Facility Ratings, Operating Limits, and Transfer Capabilities

Regional Differences – to be determined by standard drafting team

Region	Explanation
ECAR	
ERCOT	
FRCC	
MRO	

NPCC	
RFC	
SERC	
SPP	
WECC	

Related NERC Operating Policies or Planning Standards

ID	Explanation

Appendix 1

B. Requirements

R1. All Transmission Service Providers within a RRO, shall jointly develop and document a TTC, ATC, and/or AFC methodology that is approved by the RRO.

A Transmission Service Provider that crosses multiple RRO boundaries shall get approval for its TTC, ATC, and/or AFC methodology either from each of the respective RROs, or from NERC.

This methodology shall be available to NERC, the Regions, and the stakeholders in the electricity market.

Each TTC and ATC/AFC methodology shall address each of the items listed below:

- R1.1 Include a narrative explaining how TTC and ATC/AFC values are determined and used in evaluating transmission service requests. In addition, an explanation for all items listed here must also include any process that produces values that can override the TTC and ATC/AFC values.
- R1.2 Account for how the reservations and schedules for Firm (non-recallable) and Non- firm (recallable) Transmission Service, both within and outside the Transmission Service Provider's system, are included. An explanation must be provided on how reservations that exceed the capability of the specified source point are accounted for. (i.e. how does the Transmission Service Provider's calculation account for multiple concurrent requests for transmission service in excess of a generator's capacity or in excess of a Load Serving Entity's load).
- R1.3 Account for the ultimate points of power injection (sources) and power extraction (sinks) in TTC and ATC calculations. Source and sink points are further defined in the Source and Sink Points white paper contained in Appendix B of the Final LTATF Report.
- R1.4 Describe 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 that the reservations have not all been made.)

R1.5 Require that TTC/ATC/AFC values and postings be reviewed at a minimum frequency and updated if changed to assure proper representation of the transmission system. These values will be made available to stakeholders at a similar frequency.

R1.6 Indicate the treatment and level of customer demands, including interruptible demands.

R1.7 Require that the data listed below, and other data needed by transmission providers for the calculation of TTC and ATC/AFC values are shared and used between Transmission Service Providers. Transmission Service Providers requiring data should request the data as needed. In addition, specify how this information is coordinated and used to determine TTC and ATC/AFC values. If some data is not used or coordinated, provide an explanation. The required minimum update frequency¹ for each item is listed below:

R1.7.1 Generation Outage Schedules: Minimum 13 month time frame includes all generators (for 20 MW or more) used in the ATC/AFC calculation). The update frequency is daily. The information exchanged shall differentiate between pending and approved outages.

R1.7.2 Generation dispatch order: Generic dispatch participation factors on a control area/market basis. The update frequency is as required.

R1.7.3 Transmission Outage Schedules: Minimum 13 month time frame, updated daily for all bulk electric system facilities that impact ATC/AFC calculations; updated once an hour for unscheduled outages. The information exchanged shall differentiate between pending and approved outages.

R1.7.4 Interchange Schedules : The update frequency is hourly.

R1.7.5 Transmission Service Requests: The update frequency is daily. This will include all requests, regardless of status, for all future time points.

R1.7.6 Load Forecast: supplied via the SDX (or similar method), includes hourly data or peak with profile for the next 7-day time frame. The update frequency is daily. In addition, daily peak for day 8 to 30 updated at least daily, and monthly for next 12 months updated at least monthly.

R1.7.7 Flowgate AFC data exchange: For transmission service providers in the Eastern Interconnection, firm and non-firm AFC values will be exchanged. The minimum update frequency is as follows: Hourly AFC once-per-hour, Daily AFC once-per-day and Monthly AFC once-per-week. [Note to standard drafting team. See Appendix A from LTATF Final Report section 2.1].

R1.7.8 Flowgate rating: Seasonal flowgate ratings will also be provided and exchanged. Users of the flowgate should have the same rating in their calculation as the owner of the facility. Updated as required. [The standard drafting team will need to clarify what

¹ The update frequency specified should allow for improvements in technology, communication, etc, that might better represent actual system conditions.

definitions are used. Would this be TFC, thermal or stability?] [The Standard Drafting team will need to define seasonal.]

- R1.7.9 **Calculation model:** Updated models will be made available to neighboring/affected calculators. Changes/upgrades to facilities that would change the rating of the facilities that are limiting facilities should be included the models [joint modeling results can be utilized where applicable]
- R1.7.10 **Criteria and definitions:** Flowgates and flowgate definitions/criteria should be exchanged with neighboring/affected calculators on a seasonal basis, or more often as required to represent actual system conditions.
- R1.8 Describe how the assumptions for and the calculations of TTC and ATC/AFC values change over different time (such as hourly, daily, and monthly) horizons.
- R1.9 Describe assumptions used for positive impacts and counterflow of transmission reservations, and /or schedules, including the basis for the assumptions.
- R1.10 Describe assumptions used for generation dispatch for both external and internal systems for base case dispatch and transaction modeling, including the basis for the assumptions.
- R1.11 Ensure that the TTC/ATC/AFC calculations are consistent with the Transmission Owner's/Transmission Planner's (leave Functional Model designation to Standard DT) planning criteria and operating criteria [The standard drafting team will need to be more specific regarding time frames].
Note: this regards, for example 1) TSR studies not being subjected to more stringent criteria than what is in the planning studies, and 2) negative ATC/AFC are shown over long periods of time on an operating basis, but planning studies show no anticipated remedies.
- R1.12 Describe the formal process for the granting of any variances to individual transmission service providers from the TTC/ATC/AFC methodology. (Standard Drafting team will describe who is responsible.)
➤ Any variances must be approved by NERC or its designate

R2. The most recent version of the documentation of each TTC, ATC, and AFC methodology shall be available on a web site accessible by NERC, the Regions, and the stakeholders in the electricity market. [standard drafting team: NEED to add a description how this would apply in WECC for TTC.]

C. Measures.

(standard drafting team to develop procedures for audit to ensure adherence to stated methodology – see Appendix 3)

Appendix 2

Strawman Definitions from LTATF:

Total Transfer Capability (TTC):

TTC and ATC are defined in standard 1E1
Existing Transmission Commitments (ETC)
ATC is expressed as:

$$\text{ATC} = \text{TTC} - \text{Existing Transmission Commitments} - \text{CBM} - \text{TRM}$$

Flowgate is the name given to the transmission element(s) and associated contingency(ies) if any, that may limit transfer capability.

Flowgate Criteria – to be determined by SDT

Available Flowgate Capability (AFC)

AFC is expressed as:
AFC = [to be finalized by SDT]

The relationship between ATC and AFC is as follows:

$$\text{ATC}_{(\text{Path A-B})} = \text{AFC}_{(\text{Most Limiting Flowgate for Path A-B})} / \text{Distribution Factor}_{(\text{Path A-B on Limiting Flowgate})}$$

Daily, Monthly, Yearly TTC
Daily, Monthly, Yearly ATC
Daily, Monthly, Yearly TRM
Daily, Monthly, Yearly CBM

Appendix 3 LTATF Suggested Audit Methodology

M1. Each group of transmission service providers within a region, in conjunction with the members of that region, shall jointly develop and implement a procedure to review periodically (at least annually) and ensure that the TTC and ATC/AFC calculations and resulting values of member transmission providers comply with the Regional TTC and ATC/AFC methodology, the NERC Planning Standards, and applicable Regional criteria.

M2. A review to verify that the ATC/TTC/AFC calculations are consistent with the TO's/TP's planning criteria is also required. The procedure used to verify the consistency must also be documented in the report. Documentation of the results of the most current reviews shall be provided to NERC within 30 Days of completion.

M3. Each entity responsible for the TTC and ATC/AFC methodology, in conjunction with its members and stakeholders, shall have and document a procedure on how stakeholders can input their concerns or questions regarding the TTC and ATC/AFC methodology and values of the transmission provider(s), and how these concerns or questions will be addressed. Documentation of the procedure shall be available on a web site accessible by the Regions, NERC, and the stakeholders in the electricity market.

M4. The RRO must review and approve the ATC/TTC/AFC methodology to ensure it is consistent with the RRO's Planning and Operating Criteria.

The RRO is responsible for ensuring that TTC and ATC/AFC calculations are consistent with the individual TOs/TPs planning criteria.

Each procedure shall specify:

- a) The name, telephone number, and email address of a contact person to whom concerns are to be addressed.
- b) The amount of time it will take for a response.
- c) The manner in which the response will be communicated (e.g., email, letter, telephone, etc.)
- d) What recourse a customer has if the response is deemed unsatisfactory.