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.
4. SDT posted first draft for comment from May 25–June 25, 2007

Description of Current Draft:

This is the second draft of the proposed standard posted for stakeholder comments. This draft includes the modifications identified in the SAR with consideration of stakeholder comments and applicable FERC directives from FERC Order 693 and Order 890.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Respond to comments.	February 1, 2008
2. Post for 30-day pre-ballot review.	February 1, 2008
3. First ballot of standard.	March 3, 2008
4. Respond to comments.	April 10, 2008
5. Recirculation ballot.	April 10, 2008
6. 30-day posting before board adoption.	March 2, 2008
7. Board adoption.	April 24, 2008

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 Reliability Standards Glossary of Terms 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:

1.) A designated point on the Transmission system through which the Interchange Distribution Calculator calculates the power flow from Interchange Transactions.

2.) A mathematical construct, comprised of one or more monitored Facilities and optionally one or more contingency Facilities, used to analyze the impact of power flows upon the Bulk Electric System.

Total Flowgate Capability (TFC): The maximum flow on a Flowgate that will respect all System Operating Limits for that Flowgate.

Available Flowgate Capability (AFC): The flow capability remaining on a Flowgate for further commercial activity over and above already committed uses.

Power Transfer Distribution Factor (PTDF): In the pre-contingency configuration of a system under study, a measure of the responsiveness or change in electrical loadings on system facilities due to a change in electric power transfer from one area to another, expressed in percent (up to 100%) of the change in power transfer .

Outage Transfer Distribution Factor (OTDF): In the post-contingency configuration of a system under study, the electric Power Transfer Distribution Factor (PTDF) with a specific system facility removed from service (outaged).

Flowgate Methodology: The Flowgate methodology is characterized by identification of key Facilities as Flowgates. Total Flowgate Capabilities are determined based on facility ratings. The impacts of Existing Transmission Commitments (ETCs) are determined by simulation. The impacts of ETC, Capacity Benefit Margin (CBM) and Transmission Reliability Margin (TRM) are subtracted from the Transmission Flowgate Capability to determine the Available Flowgate Capability (AFC) value for that Flowgate. AFCs are used to determine Available Transmission Capability (ATC).

A. Introduction

1. Title: **Flowgate Methodology**

2. Number: MOD-030-1

3. Purpose: To increase consistency and transparency in the development and documentation of transfer capability calculations for short-term Transmission services performed by entities using the Flowgate Methodology to support reliable system operations.

4. Applicability:

4.1.1 Each Transmission Operator that uses the Flowgate Methodology to support the calculation of Available Transfer Capabilities (ATCs) for Posted Paths.

4.1.2 Each Transmission Service Provider that uses the Flowgate Methodology to calculate ATCs for Posted Paths.

5. Proposed Effective Date: First day of the first calendar quarter that is twelve months beyond the date that all six (MOD-001-1, MOD-004-1, MOD-008-1, MOD-028-1, MOD-029-1, MOD-030-1)ATC-related standards are approved by applicable regulatory authorities, or in those jurisdictions where regulatory approval is not required, the standard becomes effective on the first day of the first calendar quarter that is twelve months beyond the date the set of standards is approved by the NERC Board of Trustees.

B. Requirements

R1. The Transmission Service provider shall include in its "Available Transfer Capability Implementation Document" (ATCID) the criteria used by the Transmission Operator to identify sets of Transmission Facilities as Flowgates that are to be considered in Available Flowgate Capability (AFC) calculations. [*Violation Risk Factor: Lower*] [*Time Horizon: Operations Planning*]

R2. The Transmission Operator shall perform the following: [*Violation Risk Factor: Lower*] [*Time Horizon: Operations Planning*]

R2.1. Identify Flowgates for used in the AFC process based, at a minimum, on the following criteria:

R2.1.1. Any Facility within the Transmission Operator's area based on thermal, stability or voltage limits is a Flowgate.

R2.1.2. All first Contingency transfer analyses from all adjacent Balancing Authority source sink combinations such that at a minimum the first three limiting Elements/Contingency combinations within the Transmission Operator's system are included as Flowgates.

2.1.2.1. Use Contingencies consistent with the Contingencies used in operations studies and planning studies for the applicable time periods.

R2.1.3. Any limiting Element/Contingency combination within the Transmission model that has been subjected to an Interconnection-wide congestion management procedure OR any limiting element/contingency combination within the Transmission model that has been requested to be included by any other Transmission Service Provider using the Flowgate Methodology or Area Interchange Methodology, where

2.1.3.1. If the coordination of the limiting element/contingency combination is not already addressed through a different methodology, and

- Any generator within the Transmission Service Provider's area has at least a 5% Power Transfer Distribution Factor (PTDF) impact on the Flowgate when delivered to the aggregate load of its own area, or
- A transfer from any Balancing Area within the Transmission Service Provider's area to a Balancing Area adjacent has at least a 5% PTDF impact on the Flowgate.

R2.2. At a minimum, update the list of Flowgates to create, modify, or delete Flowgate definitions at least once per calendar quarter.

R2.3. Determine the TFC of each of the defined Flowgates as equal to:

- For thermal limits, the System Operating Limit (SOL) of the Flowgate.
- For voltage or stability limits, the flow that will respect the SOL of the Flowgate.

R2.4. At a minimum, update the TFC once per calendar year.

R2.5. Provide the Transmission Service Provider with the updated TFCs within seven calendar days of their determination.

R3. The Transmission Operator shall use a Transmission model to determine Available Flowgate Capability (AFC) that meets the following criteria: [*Violation Risk Factor: Medium*] [*Time Horizon: Operations Planning*]

R3.1. Contains Facility Ratings specified by the Transmission Owners and Generator Owners of the Facilities within the model.

R3.2. Updated at least once per day for AFC calculations for intra-day, next day, and days two through 30.

R3.3. Updated at least once per month for AFC calculations for months two through 13.

R3.4. Contains modeling data and topology for the Facilities within its Reliability Coordinator's Area.

R3.5. Contains modeling data and topology for at least three contiguous busses of the Bulk Electric System directly and synchronously connected to the tie-lines into the systems of each adjacent Reliability Coordinator Area.

R3.6. Contains modeling data and topology (or equivalent representation) for synchronous Facilities beyond three busses.

R4. When calculating AFCs, the Transmission Service Provider shall Use assumptions consistent with the assumptions used in operations studies and planning studies for the applicable time periods, including: [*Violation Risk Factor: Lower*] [*Time Horizon: Operations Planning*]

R4.1. Contingencies.

R4.2. Modeling the impact of point-to-point reservations as follows:

- If the source has been specified in the reservation and it is discretely modeled in the Transmission Service Provider's Transmission model, use the discretely modeled point as the source.
- If the source has been specified in the reservation and the point can be mapped to an "equivalence" modeled in the Transmission Service Provider's Transmission model, use the modeled equivalence as the source.
- If the source has been specified in the reservation and the point cannot be mapped to a discretely modeled point or an "equivalence" modeled in the Transmission Service Provider's Transmission model, use the interface point with the adjacent upstream Transmission Service Provider as the source.
- If the source has not been specified, use the interface point with the adjacent upstream Transmission Service Provider as the source.
- If the sink has been specified in the reservation and it is discretely modeled in the Transmission Service Provider's Transmission model, use the discretely modeled point as the sink.
- If the sink has been specified in the reservation and the point can be mapped to an "equivalence" modeled in the Transmission Service Provider's Transmission model, use the modeled equivalence as the sink.
- If the sink has been specified in the reservation and the point can not be mapped to a discretely modeled point or an "equivalence" modeled in the Transmission Service Provider's Transmission model, use the interface point with the adjacent downstream Transmission Service Provider as the sink.
- If the sink has not been specified, use the interface point with the adjacent downstream Transmission Service Provider as the sink.

R5. When calculating AFCs, the Transmission Service Provider shall: [*Violation Risk Factor: Medium*] [*Time Horizon: Operations Planning*]

R5.1. Include all expected generation and Transmission outages, additions, and retirements in effect during the period calculated for the Transmission Service Provider's area, all adjacent Transmission Service Providers, and any Transmission Service Providers with which coordination agreements have been executed.

R5.2. For external (third-party) Flowgates, use any AFC for each specific Flowgate provided by that third party as the AFC for that Flowgate.

R6. When calculating the impact of ETC for firm commitments (ETC_{Fi}) for all time periods for a Flowgate, the Transmission Service Provider shall sum: [*Violation Risk Factor: Medium*] [*Time Horizon: Operations Planning*]

R6.1. The impact of Firm Network and Native Load Service, for the Transmission Service Provider's area, all adjacent Transmission Service Providers, and any other Transmission Service Providers with which coordination agreements have been executed, based on:

R6.1.1. For on-peak intra-day and next-day AFCs

6.1.1.1. Peak Load forecast for the on-peak period calculated, consistent with that used for planning and operations for applicable time periods, including native load and network service load

6.1.1.2. Unit commitment and dispatch order, to include all designated network resources and other resources that are committed or have the legal obligation to run, as they are expected to run.

R6.1.2. For off-peak intra-day and next-day AFCs

6.1.2.1. Peak Load forecast for the off-peak period calculated, consistent with that used for planning and operations for applicable time periods, including Native Load and network service Load

6.1.2.2. Unit commitment and dispatch order, to include all designated network resources and other resources that are committed or have the legal obligation to run, as they are expected to run.

R6.1.3. For days two through 31AFCs

6.1.3.1.1 Peak Load forecast for the day calculated, consistent with that used for planning and operations for applicable time periods, including native load and network service load

6.1.3.2. Unit commitment and dispatch order, to include all designated network resources and other resources that are committed or have the legal obligation to run, as they are expected to run.

R6.1.4. For months two through 13 AFCs

6.1.4.1. Peak Load forecast for the month calculated, consistent with that used for planning and operations for applicable time periods, including native load and network service load

6.1.4.2. Unit commitment and dispatch order, to include all designated network resources and other resources that are committed or have the legal obligation to run, as they are expected to run.

R6.2. The impact of all confirmed firm Point-to-Point Transmission Service expected to be scheduled, including roll-over rights for Firm Transmission Service contracts, for the Transmission Service Provider's area not included in the model.

R6.3. The impact of any confirmed firm Point-to-Point Transmission Service expected to be scheduled, filtered to reduce or eliminate duplicate impacts from transactions using Transmission service from multiple Transmission Service Providers, including roll-over rights for Firm Transmission Service contracts, not included in the model in excess of 3%[1] for all adjacent Transmission Service Providers and any other Transmission Service Providers with which coordination agreements have been executed. The impact of any Grandfathered firm contracts expected to be scheduled for the Transmission Service Provider's area not included in the model.

R6.4. The impact of any Grandfathered firm contracts expected to be scheduled not included in the model in excess of 3%[2] for all adjacent Transmission Service Providers and any other Transmission Service Providers with which coordination agreements have been executed. When calculating the impact of ETC for non-firm

[1] Transmission Service Providers may use a threshold lower than 3% if desired.

[2] Transmission Service Providers may use a threshold lower than 3% if desired.

commitments (ETC_{NFi}) for all time periods for a Flowgate the Transmission Service Provider shall sum: [*Violation Risk Factor: Lower*] [*Time Horizon: Operations Planning*]

R6.5. The impact of all confirmed non-firm Point-to-Point Transmission Service not included in the model for the Transmission Service Provider's area

R6.6. The impact of any confirmed non-firm Point-to-Point Transmission Service not included in the model in excess of 3%[3] for all adjacent Transmission Service Providers and any other Transmission Service Providers with which coordination agreements have been executed.

R6.7. The impact of any Grandfathered non-firm contracts not included in the model for the Transmission Service Provider's area

R6.8. The impact of any Grandfathered non-firm contracts not included in the model in excess of 3%[4] for all adjacent Transmission Service Providers, and any other Transmission Service Providers with which coordination agreements have been executed.

R7. When calculating firm AFC for a Flowgate for a specified period, the Transmission Service Provider shall use the following algorithm: [*Violation Risk Factor: Medium*] [*Time Horizon: Operations Planning*]

$$AFC_F = TFC - ETC_{Fi} - CBM_i - TRM_i + Postbacks_{Fi} + Counterflows_{Fi}$$

Where:

AFC_F is the firm Available Flowgate Capability for the Flowgate for that period,

TFC is the Total Flowgate Capability of the Flowgate,

ETC_{Fi} is the sum of the impacts of existing firm Transmission commitments for the Flowgate during that period,

CBM_i is the impact of the Capacity Benefit Margin on the Flowgate during that period,

TRM_i is the impact of the Transmission Reliability Margin on the Flowgate during that period,

$Postbacks_{Fi}$ are adjustments to firm AFC due to postbacks for that period, as defined in Business Practices, and

$Counterflows_{Fi}$ are adjustments to firm ATC as determined by the Transmission Service Provider and described in their ATCID.

R8. When calculating non-firm AFC for a Flowgate for a specified period, the Transmission Service Provider shall use the following algorithm: [*Violation Risk Factor: Lower*] [*Time Horizon: Operations Planning*]

$$AFC_{NF} = TFC - ETC_{Fi} - ETC_{NFi} - CBM_{Si} - TRM_{Ui} + Postbacks_{NFi} + Counterflows$$

Where:

[3] Transmission Service Providers may include impacts less than 3% if desired.

[4] Transmission Service Providers may include impacts less than 3% if desired.

ATC_{NF} is the non-firm Available Flowgate Capability for the Posted Path for that period.

TFC is the Total Flowgate Capability of the Flowgate.

ETC_{Fi} is the sum of the impacts of existing firm Transmission commitments for the Flowgate during that period.

ETC_{NFi} is the sum of the impacts of existing non-firm Transmission commitments for the Flowgate during that period.

CBM_{Si} is the impact of any schedules during that period using Capacity Benefit Margin.

TRM_{Ui} is the impact on the Flowgate of the Transmission Reliability Margin that has not been released for sale as non-firm capacity by the Transmission Service Provider during that period.

$Postbacks_{NF}$ are adjustments to non-firm Available Flowgate Capability due to postbacks for that period, as defined in business practices.

$Counterflows_{NF}$ are adjustments to non-firm AFC as determined by the Transmission Service Provider and described in their ATCID.

R9. The Transmission Service Provider shall convert Flowgate AFCs to ATCs (and TFCs to TTCs) for Posted Paths based on the following algorithm: [*Violation Risk Factor: Lower*] [*Time Horizon: Operations Planning*]

$$TC = \min\{PTC_1, PTC_2, \ldots PTC_n\} \text{ and } PTC_n = \frac{FC_n}{DF_{np}}$$

Where:

TC is the Transfer Capability (either 'Available' or 'Total').

P is the set of partial Transfer Capabilities (either available or total) for all "impacted" Flowgates honored by the Transmission Service Provider; a Flowgate is considered "impacted" by a path if the Distribution Factor for that path is greater than 3% on an OTDF Flowgate or PTDF Flowgate.

PTC_n is the partial Transfer Capability (either 'Available' or 'Total') for a path relative to a Flowgate *n.*

FC_n is the Flowgate Capability ('Available' or 'Total') of a Flowgate *n*.

DF_{np} is the distribution factor for Flowgate *n* relative to path *p*.

C. Measures

M1. Each Transmission Service Provider shall provide its ATCID and other evidence (such as written documentation) to show that its ATCID contains the criteria used by the Transmission Operator to identify sets of Transmission Facilities as Flowgates that are to be considered in AFC calculations. (R1)

M2. The Transmission Operator shall provide evidence (such as studies and working papers) that all Flowgates that meet the criteria described in R2.1 are considered in its AFC calculations. (R2.1)

M3. The Transmission Operator shall provide evidence (such as logs) that it updated its list of Flowgates at least once per quarter. (R2.2)

M4. The Transmission Operator shall provide evidence (such as data and models) that it determined the TFC for each Flowgate as defined in R2.3.(R2.3)

M5. The Transmission Operator shall provide evidence (such as logs) that it updated the TFCs for each Flowgate at least once per calendar year. (R2.4)

M6. The Transmission Operator shall provide evidence (such as logs and electronic communication) that it provided the Transmission Service Provider with updated TFCs within seven calendar days of their determination. (R2.5)

M7. The Transmission Operator shall provide evidence (such as written documentation, logs, models, and data) that the Transmission model used to determine AFCs contains the information specified in R3. (R3)

M8. The Transmission Service Provider shall provide evidence (such as written documentation and studies) that the assumptions used in AFC calculation were consistent with those used in operations and planning studies for the same period. (R4.1)

M9. The Transmission Service Provider shall provide evidence (such as written documentation and data) that the modeling of point-to-point reservations was based on the rules described in R4. (R4)

M10. The Transmission Service Provider shall provide evidence (such as written documentation, electronic communications, and data) that all expected generation and Transmission outages, additions, and retirements were included in the AFC calculation. (R5.1)

M11. The Transmission Service Provider shall provide evidence (such as logs, electronic communications, and data) that AFCs provided by third parties were used instead of those calculated by the Transmission Operator. (R5.2)

M12. The Transmission Service Provider shall provide evidence (such as documentation and data) that the determination of firm ETC included the elements described in R6 and did not include any additional elements. (R6)

M13. The Transmission Service Provider shall provide evidence (such as documentation and data) that the determination of non-firm ETC included the elements described in R7 and did not include any additional elements. (R7)

M14. The Transmission Service Provider shall provide evidence (such as documentation and data) that the determination of firm AFC used the algorithm and the elements described in R8 and did not include any additional elements. (R8)

M15. The Transmission Service Provider shall provide evidence (such as documentation and data) that the determination of non-firm AFC used the algorithm and the elements described in R9 and did not include any additional elements. (R9)

M16. The Transmission Service Provider shall provide evidence (such as documentation and data) that the determination of Transfer Capabilities follows the procedure described in R10. (R10)

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

Regional Entity.

1.2. Compliance Monitoring Period and Reset Time Frame

Not applicable.

1.3. Data Retention

- The Transmission Service Provider shall retain its current, in force ATCID and any prior versions of the ATCID that were in force since the last compliance audit to show compliance with R1.
- The Transmission Operator shall have its latest model used to calculate TTC and evidence of the previous version to show compliance with R2 and R3.
- The Transmission Operator shall retain evidence to show compliance with R2.1, R2.3 for the most recent 12 months.
- The Transmission Operator shall retain evidence to show compliance with R2.2, R2.4 and R2.5 for the most recent three calendar years plus current year.
- The Transmission Service Provider shall retain evidence to show compliance with R4 for 12 months or until the model used to calculate TTC is updated, whichever is longer.
- The Transmission Service Provider shall retain evidence to show compliance with R5, R6, R7, R8, R9, and R10 for the most recent calendar year plus current year.
- If a Transmission Service Provider or Transmission Operator is found non-compliant, it shall keep information related to the non-compliance until found compliant.
- The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

1.4. Compliance Monitoring and Enforcement Processes:

The following processes may be used:

- Compliance Audits
- Self-Certifications
- Spot Checking
- Compliance Violation Investigations
- Self-Reporting
- Complaints

1.5. Additional Compliance Information

None.

2. Violation Severity Levels