

A. Introduction

1. **Title:** Available Transmission System Capability

2. **Number:** MOD-001-2

3. **Purpose:**

To ensure that determinations of available transmission system capability are determined in a manner that supports the reliable operation of the Bulk-Power System (BPS) and that the methodology and data underlying those determinations are disclosed to those registered entities that need such information for reliability purposes.

4. **Applicability:**

4.1. Functional Entity

4.1.1 Transmission Operator

4.1.2 Transmission Service Provider

4.2. Exemptions: The following is exempt from MOD-001-2.

4.2.1 Functional Entities operating within the Electric Reliability Council of Texas (ERCOT)

5. **Effective Date:**

5.1. The standard shall become effective on the first day of the first calendar quarter that is 18 months after the date that the standard is approved by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter that is 18 months after the date the standard is adopted by the NERC Board of Trustees or as otherwise provided for in that jurisdiction.

B. Requirements and Measures

- R1.** Each Transmission Operator that determines Total Flowgate Capability (TFC) or Total Transfer Capability (TTC) shall develop a written methodology (or methodologies) for determining TFC or TTC values. The methodology (or methodologies) shall reflect the Transmission Operator’s current practices for determining TFC or TTC values. *[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]*
- 1.1** Each methodology shall describe the method used to account for the following limitations in both the pre- and post-contingency state:
- 1.1.1** Facility ratings;
 - 1.1.2** System voltage limits;
 - 1.1.3** Transient stability limits;
 - 1.1.4** Voltage stability limits; and
 - 1.1.5** Other System Operating Limits (SOLs).
- 1.2** Each methodology shall describe the method used to account for each of the following elements, provided such elements impact the determination of TFC or TTC:
- 1.2.1** The simulation of transfers performed through the adjustment of generation, Load, or both;
 - 1.2.2** Transmission topology, including, but not limited to, additions and retirements;
 - 1.2.3** Expected transmission uses;
 - 1.2.4** Planned outages;
 - 1.2.5** Parallel path (loop flow) adjustments;
 - 1.2.6** Load forecast; and
 - 1.2.7** Generator dispatch, including, but not limited to, additions and retirements.
- 1.3** Each methodology shall describe the process for including any reliability-related constraints that are requested to be included by another Transmission Operator, provided that (1) the request references this specific requirement, and (2) the requesting Transmission Operator includes those constraints in its TFC or TTC determination.
- 1.3.1** Each Transmission Operator that uses the Flowgate Methodology shall include in its methodology an impact test process for including requested constraints. If a generator to Load transfer in a registered entity’s area or a transfer to a neighboring registered entity impacts the requested constraint by five percent or greater, the requested constraint shall be included in the TFC determination, otherwise the requested constraint is not required to be included.
 - 1.3.2** Each Transmission Operator that uses the Area Interchange or Rated System Path Methodology shall describe in its methodology the process it uses to account for requested constraints that have a five percent or greater distribution factor for a transfer

between areas in the TTC determination; otherwise the requested constraint is not required to be included. When testing transfers involving the requesting Transmission Operator's area, the requested constraint may be excluded.

1.3.3 A different method for determining whether requested constraints need to be included in the TFC or TTC determination may be used if agreed to by the Transmission Operators.

M1. Each Transmission Operator that determines TFC or TTC shall provide its current written methodology (or methodologies) or other evidence (such as written documentation) to show that its methodology (or methodologies) contains the following:

- A description of the method used to account for the limits specified in part 1.1. Methods of accounting for these limits may include, but are not limited to, one or more of the following:
 - TFC or TTC being determined by one or more limits.
 - Simulation being used to find the maximum TFC or TTC that remains within the limit.
 - The application of a distribution factor in determining if a limit affects the TFC or TTC value.
 - Monitoring a subset of limits and a statement that those limits are expected to produce the most severe results.
 - A statement that the monitoring of a select limit(s) results in the TFC or TTC not exceeding another set of limits.
 - A statement that one or more of those limits are not applicable to the TFC or TTC determination.
- A description of the method used to account for the elements specified in part 1.2, provided such elements impact the determination of TFC or TTC. Methods of accounting for these elements may include, but are not limited to, one or more of the following:
 - A statement that the element is not accounted for since it does not affect the determination of TFC or TTC.
 - A description of how the element is used in the determination of TFC or TTC.
- A description of the process for including any reliability-related constraints that are requested to be included by another Transmission Operator, as specified in parts 1.3, 1.3.1, 1.3.2, or 1.3.3).
- Each Transmission Operator that determines TFC or TTC shall provide evidence that currently active TFC or TTC values were determined based on its current written methodology, as specified in Requirement R1.

R2. Each Transmission Service Provider that determines Available Flowgate Capability (AFC) or Available Transfer Capability (ATC) shall develop an Available Transfer Capability Implementation Document (ATCID) that describes the methodology (or methodologies) for determining AFC or ATC values. The methodology (or methodologies) shall reflect the Transmission Service Provider's current practices for determining AFC or ATC values. *[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]*

- 2.1.** Each methodology shall describe the method used to account for the following elements, provided such elements impact the determination of AFC or ATC:
 - 2.1.1.** The simulation of transfers performed through the adjustment of generation, Load, or both;
 - 2.1.2.** Transmission topology, including, but not limited to, additions and retirements;
 - 2.1.3.** Expected transmission uses;
 - 2.1.4.** Planned outages;
 - 2.1.5.** Parallel path (loop flow) adjustments;
 - 2.1.6.** Load forecast; and
 - 2.1.7.** Generator dispatch, including, but not limited to, additions and retirements.
 - 2.2.** Each Transmission Service Provider that uses the Flowgate Methodology shall, for reliability-related constraints identified in part 1.3, use the AFC determined by the Transmission Service Provider for that constraint.
- M2.** Each Transmission Service Provider that determines AFC or ATC shall provide its current ATCID or other evidence (such as written documentation) to show that its ATCID contains the following:
- A description of the method used to account for the elements specified in part 2.1, provided such elements impact the determination of AFC or ATC. Methods of accounting for these elements may include, but are not limited to, one or more of the following:
 - A description of how the element is used in the determination of AFC or ATC.
 - A statement that the element is not accounted for since it does not affect the determination of AFC or ATC.
 - A statement that the element is accounted for in the determination of TFC or TTC by the Transmission Operator, and does not otherwise affect the determination of AFC or ATC.
 - For each Transmission Service Provider that uses the Flowgate Methodology, a description of the method in which AFC provided by another Transmission Service Provider was used for the reliability-related constraints identified in part 1.3.
 - Each Transmission Service Provider that determines AFC or ATC shall provide evidence that currently active AFC or ATC values were determined based on its current written methodology, as specified in Requirement R2.
- R3.** Each Transmission Service Provider that determines Capacity Benefit Margin (CBM) values shall develop a Capacity Benefit Margin Implementation Document (CBMID) that describes its method for determining CBM values. The method described in the CBMID shall reflect the Transmission Service Provider's current practices for determining CBM values. *[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]*

- M3.** Each Transmission Service Provider that determines CBM shall provide evidence, including, but not limited to, its current CBMID, current CBM values, or other evidence (such as written documentation, study reports, or supporting information) to demonstrate that it determined CBM values consistent with its methodology described in the CBMID. If a Transmission Service Provider does not maintain CBM, examples of evidence include, but are not limited to, an attestation, statement, or other documentation that states the Transmission Service Provider does not maintain CBM.
- R4.** Each Transmission Operator that determines Transmission Reliability Margin (TRM) values shall develop a Transmission Reliability Margin Implementation Document (TRMID) that describes its method for determining TRM values. The method described in the TRMID shall reflect the Transmission Operator’s current practices for determining TRM values. *[Violation Risk Factor: Lower][Time Horizon: Operations Planning]*
- M4.** Each Transmission Operator that determines TRM shall provide evidence including, but not limited to, its current TRMID, current TRM values, or other evidence (such as written documentation, study reports, or supporting information) to demonstrate that it determined TRM values consistent with its methodology described in the TRMID. If a Transmission Operator does not maintain TRM, examples of evidence include, but are not limited to, an attestation, statement, or other documentation that states the Transmission Operator does not maintain TRM.
- R5.** Within 45 calendar days of receiving a written request that references this specific requirement from a Planning Coordinator, Reliability Coordinator, Transmission Operator, Transmission Planner, Transmission Service Provider, or any other registered entity that demonstrates a reliability need, each Transmission Operator or Transmission Service Provider shall provide: *[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]*
 - 5.1.** A written response to any request for clarification of its TFC or TTC methodology, ATCID, CBMID, or TRMID. If the request for clarification is contrary to the Transmission Operator’s or Transmission Service Provider’s confidentiality, regulatory, or security requirements then a written response shall be provided explaining the clarifications not provided, on what basis and whether there are any options for resolving any of the confidentiality, regulatory, or security concerns.
 - 5.2.** If not publicly posted on OASIS or its company website, the Transmission Operator’s effective:
 - 5.2.1** TRMID; and
 - 5.2.2** TFC or TTC methodology.
 - 5.3.** If not publicly posted on OASIS or its company website, the Transmission Service Provider’s effective:
 - 5.3.1** ATCID; and
 - 5.3.2** CBMID.

M5. Examples of evidence include, but are not limited to:

- Dated records of the request and the Transmission Operator's or Transmission Service Provider's response to the request;
- A statement by the Transmission Operator or Transmission Service Provider that they have received no requests; or
- A statement by the Transmission Operator or Transmission Service Provider that they do not determine one or more of these values: AFC, ATC, CBM, TFC, TTC or TRM.

R6. Each Transmission Operator or Transmission Service Provider that receives a written request from another Transmission Operator or Transmission Service Provider for data related to AFC, ATC, TFC, or TTC determinations that (1) references this specific requirement, and (2) specifies that the requested data is for use in the requesting party's AFC, ATC, TFC, or TTC determination shall take one of the actions below. [*Violation Risk Factor: Lower*] [*Time Horizon: Operations Planning*]

- 6.1.** In responding to a written request for data on an ongoing basis, the Transmission Service Provider or Transmission Operator shall make available its data on an ongoing basis no later than 45 calendar days from receipt of the written request. Unless otherwise agreed upon, the Transmission Operator or Transmission Service Provider is not required to:
- 6.1.1** Alter the format in which it maintains or uses the data; or
 - 6.1.2** Make available the requested data on a more frequent basis than it produces the data and in no event shall it be required to provide the data more frequently than once an hour.
- 6.2** In responding to all other data requests, each Transmission Operator or Transmission Service Provider shall make available the requested data within 45 calendar days of receipt of the written request. Unless otherwise agreed upon, the Transmission Operator or Transmission Service Provider is not required to alter the format in which it maintains or uses the data.
- 6.3** If making available any requested data under parts 6.1 or 6.2 of this requirement is contrary to the Transmission Operator's or Transmission Service Provider's confidentiality, regulatory, or security requirements, the Transmission Operator or Transmission Service Provider shall not be required to make available that data; provided that, within 45 calendar days of the written request, it responds to the requesting registered entity specifying the data that is not being provided, on what basis and whether there are any options for resolving any of the confidentiality, regulatory or security concerns.

M6. Examples of evidence for a data request that involves providing data on an ongoing basis (6.1), include, but are not limited to:

- Dated records of a registered entity's request, and examples of the response being met;
- Dated records of a registered entity's request, and a statement from the requestor that the request was met (demonstration that the response was met is not required if the requestor confirms it is being provided); or

- A statement by the Transmission Operator or Transmission Service Provider that they have received no requests under this requirement.

Examples of evidence for all other data requests (6.2) include, but are not limited to:

- Dated records of a registered entity's request, and the response to the request;
- Dated records of a registered entity's request, and a statement from the requestor that the request was met; or
- A statement by the Transmission Operator or Transmission Service Provider that they have received no requests under this requirement.

An example of evidence of a response by the Transmission Operator or Transmission Service Provider that providing the data would be contrary to the registered entity's confidentiality, regulatory, or security requirements (6.3) is a response to the requestor specifying the data that is not being provided, on what basis and whether there are any options for resolving any of the confidentiality, regulatory, or security concerns.

C. Compliance

1. Compliance Monitoring Process:

1.1. Compliance Enforcement Authority:

As defined in the NERC Rules of Procedure, “Compliance Enforcement Authority” refers to NERC or the Regional Entity in their respective roles of monitoring and enforcing compliance with the NERC Reliability Standards.

1.2. Evidence Retention:

The following evidence retention periods identify the period of time a registered entity is required to retain specific evidence to demonstrate compliance. For instances in which the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask the registered entity to provide other evidence to show that it was compliant for the full time period since the last audit.

- Implementation and methodology documents shall be retained for five years.
- Components of the calculations and the results of such calculations for all values contained in the implementation and methodology documents.
 - Hourly values for the most recent 14 days;
 - Daily values for the most recent 30 days; and
 - Monthly values for the most recent 60 days.
- If a Transmission Operator or Transmission Service Provider is found non-compliant, it shall keep information related to the non-compliance until mitigation is complete and approved.
- The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

1.3. Compliance Monitoring and Assessment Processes:

- “Compliance Monitoring and Assessment Processes” refers to the identification of the processes that will be used to evaluate data or information for the purpose of assessing performance or outcomes with the associated reliability standard.

1.4. Additional Compliance Information:

- None

Table of Compliance Elements

R #	Time Horizon	VRF	Violation Severity Levels (VSLs)			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operations Planning	Lower	Each Transmission Operator that determines TFC or TTC has not described its method for accounting for one of the limitations listed in part 1.1 in its written methodology. (1.1)	Each Transmission Operator that determines TFC or TTC has not described its method for accounting for two of the limitations listed in part 1.1 in its written methodology. (1.1)	Each Transmission Operator that determines TFC or TTC has not described its method for accounting for any of the limitations listed in part 1.1 in its written methodology. (1.1)	Each Transmission Operator that determines TFC or TTC did not develop a written methodology for describing its current practices for determining TFC or TTC values.
			OR	OR	OR	OR
			Each Transmission Operator that determines TFC or TTC has not described its method for accounting for one of the element listed in part 1.2 in its written methodology, provided that element impacts its TFC or TTC determination. (1.2)	Each Transmission Operator that determines TFC or TTC has not described its method for accounting for two, three, or four elements listed in part 1.2 in its written methodology, provided those elements impacts its TFC or TTC determination. (1.2)	Each Transmission Operator that determines TFC or TTC has not described its method for accounting for five, six, or seven elements of listed in part 1.2 in its written methodology, provided those elements impacts its TFC or TTC determination. (1.2)	Each Transmission Operator that determines TFC or TTC developed a written methodology for determining TFC or TTC but the methodology did not reflect its current practices for determining TFC or TTC values.
					OR	

R #	Time Horizon	VRF	Violation Severity Levels (VSLs)			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
					<p>Each Transmission Operator that determines TFC or TTC has not described the process for including any reliability-related constraints that have been requested by another Transmission Operator, provided the constraints are also used in the requesting Transmission Operator’s TFC or TTC calculation and the request referenced part 1.3. (1.3)</p> <p>OR</p> <p>Each Transmission Operator that determines TFC or TTC has not used (i) an impact test process for including requested constraints, (ii) a process to account for requested constraints</p>	

R #	Time Horizon	VRF	Violation Severity Levels (VSLs)			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
					that have a five percent or greater distribution factor for a transfer between areas in the TTC determination, or (iii) a mutually agreed upon method for determining whether requested constraints need to be included in the TFC or TTC determination. (1.3.1, 1.3.2, 1.3.3)	
R2	Operations Planning	Lower	Each Transmission Service Provider that determines AFC or ATC has not described its method for accounting for one of the elements listed in part 2.1 in its written methodology, provided that element impacts its AFC or ATC determination. (2.1)	Each Transmission Service Provider that determines AFC or ATC has not described its method for accounting for two, three, or four elements listed in part 2.1 in its written methodology, provided the elements impact its AFC or ATC determination. (2.1)	Each Transmission Service Provider that determines AFC or ATC has not described its method for accounting for five, six, or seven elements listed in part 2.1 in its written methodology, provided the elements impact its AFC or ATC determination. (2.1) OR	Each Transmission Service Provider that determines AFC or ATC did not develop an ATCID describing its AFC or ATC methodology. OR Each Transmission Service Provider that determines AFC or ATC did not reflect its current practices for

R #	Time Horizon	VRF	Violation Severity Levels (VSLs)			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
					Each Transmission Service Provider that uses the Flowgate Methodology did not use the AFC determined by the Transmission Service Provider for reliability-related constraints identified in part 1.3. (2.2)	determining AFC or ATC values in its ATCID.
R3	Operations Planning	Lower	None.	None.	None.	Each Transmission Service Provider that determines CBM values did not develop a CBMID describing its method for determining CBM values. OR Each Transmission Service Provider that determines CBM values did not reflect its current practices for determining CBM values in its CBMID.

R #	Time Horizon	VRF	Violation Severity Levels (VSLs)			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R4	Operations Planning	Lower	None.	None.	None.	Each Transmission Operator that determines TRM values did not develop a TRMID describing its method for determining TRM values. OR Each Transmission Operator that determines TRM values did not reflect its current practices for determining TRM values in its TRMID.
R5	Operations Planning	Lower	Each Transmission Operator or Transmission Service Provider did not respond in writing to a written request by one or more of the registered entities specified in Requirement R5 within 45 calendar days from	Each Transmission Operator or Transmission Service Provider did not respond in writing to a written request by one or more of the registered entities specified in Requirement R5 within 76 calendar days from	Each Transmission Operator or Transmission Service Provider did not respond in writing to a written request by one or more of the registered entities specified in Requirement R5 within 106 calendar days	Each Transmission Operator or Transmission Service Provider failed to respond in writing to a written request by one or more of the registered entities specified in Requirement R5.

R #	Time Horizon	VRF	Violation Severity Levels (VSLs)			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
			the date of the request, but did respond in writing within 75 calendar days.	the date of the request, but did respond in writing within 105 calendar days.	from the date of the request, but did respond in writing within 135 calendar days.	
R6	Operations Planning	Lower	Each Transmission Operator or Transmission Service Provider did not respond to a written request for data by one or more of the registered entities specified in Requirement R6 by making the requested data available within 45 calendar days from the date of the request, but did respond within 75 calendar days.	Each Transmission Operator or Transmission Service Provider did not respond to a written request for data by one or more of the registered entities specified in Requirement R6 by making data available within 76 calendar days from the date of the request, but did respond within 105 calendar days.	Each Transmission Operator or Transmission Service Provider did not respond to a written request by one or more of the registered entities specified in Requirement R6 by making data available within 106 calendar days from the date of the request, but did respond within 135 calendar days.	Each Transmission Operator or Transmission Service Provider failed to respond to a written request for data by making data available to one or more of the entities specified in Requirement R6.

D. Regional Variances

None.

E. Interpretations

None.

F. Associated Documents

None.

Guidelines and Technical Basis

Please see the MOD A White Paper for further information regarding the technical basis for each requirement.

Rationale:

During development of this standard, text boxes were embedded within the standard to explain the rationale for various parts of the standard. Upon BOT approval, the text from the rationale text boxes was moved to this section.

Rationale for R1:

Total Flowgate Capability (TFC) and Total Transfer Capability (TTC) are the starting points for the Available Flowgate Capability (AFC) and Available Transfer Capability (ATC) values. AFC and ATC values influence Real-time conditions and have the ability to impact Real-time operations. A Transmission Operator (TOP) shall clearly document its methods of determining TFC and TTC so that any TOP or Transmission Service Provider (TSP) that uses the information can clearly understand how the values are determined. The TFC and TTC values shall account for any reliability-related constraints that limit those values as well as system conditions forecasted for the time period for which those values are determined. The TFC and TTC values shall also incorporate constraints on external systems when appropriate, in addition to constraints on the TOP's own system. Requirement R1 sets requirements for the determination of TFC or TTC, but does not establish if a TOP must determine TFC or TTC.

Rationale for R2:

A TSP must clearly document its methods of determining AFC and ATC so that TOPs or other entities can clearly understand how the values are determined. The AFC and ATC values shall account for system conditions at the time those values would be used. Each TSP that uses the Flowgate Methodology shall also use the AFC value determined by the TSP responsible for an external system constraint where appropriate. Requirement R2 sets requirements for the determination of AFC or ATC, but does not establish if a TSP must determine AFC or ATC.

Rationale for R3:

Capacity Benefit Margin (CBM) is one of the values that may be used in determining the AFC or ATC value. CBM is the amount of firm transmission transfer capability preserved by the transmission provider for Load-Serving Entities (LSEs), whose Loads are located on that TSP's system, to enable access by the LSEs to generation from interconnected systems to meet resource reliability requirements. A clear explanation of how the CBM value is developed is an important aspect of the TSP's ability to communicate to other entities how that AFC or ATC value was determined. Therefore anytime CBM is used (non-zero) a CBMID is required to communicate the method of determining CBM.

Rationale for R4:

Transmission Reliability Margin (TRM) is one of the values that may be used in determining the AFC or ATC value. TRM accounts for the inherent uncertainty in system conditions and the need for operating flexibility to ensure reliable system operation as system conditions change. An explanation by the TOP of how the TRM value is developed for use in the TSP's determination of AFC and ATC is an important aspect of the TSP's ability to communicate to other entities how that AFC or ATC value was determined. Therefore, anytime a TOP provides a non-zero TRM to a TSP, a Transmission Reliability Margin Implementation Document (TRMID) is required to communicate the method of determining TRM.

Rationale for R5:

Clear communication of the methods of determining AFC, ATC, CBM, TFC, TRM, and TTC are necessary to the reliable operation of the Bulk-Power System (BPS). A TOP and TSP are obligated to make available their methodologies for determining AFC, ATC, CBM, TFC, TRM, and TTC to those with a reliability need. The TOP and TSP are further obligated to respond to any requests for clarification on those methodologies, provided that responding to such requests would not be contrary to the registered entities confidentiality, regulatory, or security concerns. The purpose of this requirement is not to monitor every communication that occurs regarding these values, but to ensure that those with reliability need have access to the information. Therefore, the requirement is very specific on when it is invoked so that it does not create an administrative burden on regular communications between registered entities.

Rationale for R6:

This requirement provides a mechanism for each TOP or TSP to access the best available data for use in its calculation of AFC, ATC, CBM, TFC, TRM, and TTC values. Requirement R6 requires that a TOP or TSP share their data, with the caveat that the TOP or TSP is not required to modify that data from the form that they use or maintain it in. For data requests that involve providing data on a regular interval, the TOP or TSP is not obligated to provide the data more frequently than either (1) once an hour, or (2) as often as they update the data. The data provider is also not obligated to provide data that would violate any of its confidentiality, regulatory, or security obligations. The purpose of this requirement is not to monitor every data exchange that occurs regarding these values, but to ensure that those with reliability need have access to the information. Therefore, the requirement is very specific on when it is invoked so that it does not create an administrative burden on regular communications between registered entities.

Version History

Version	Date	Action	Change Tracking
1	August 26, 2008	Adopted by the NERC Board of Trustees.	
1a	November 5, 2009	NERC Board Adopted Interpretation of R2 and R8	Interpretation (Project 2009-15)
2	February 6, 2014	Adopted by the NERC Board of Trustees.	Consolidation of MOD-001-1a, MOD-004-1, MOD-008-1, MOD-028-1, MOD-029-1a, and MOD-030-2.