

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.
4. SDT posted first draft for comment from May 25–June 25, 2007.
5. SDT posted second draft for comment from October 31–December 14, 2007.
6. SC conducted an Initial Ballot of the standard from March 3–12, 2008.

Description of Current Draft:

This is the fourth draft of the proposed standard posted for stakeholder comments. This draft includes consideration of stakeholder comments and applicable FERC directives from FERC Order 693, Order 890, and Order 890-A.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Posting for 30-day industry comment.	April 16, 2008
2. Respond to Comments.	June 20, 2008
3. Posting for 30-day Pre-Ballot Review.	June 21, 2008
4. Initial Ballot.	July 21, 2008
5. Respond to comments.	August 20, 2008
6. Recirculation ballot.	August 21, 2008
7. 30-day posting before board adoption.	June 21, 2008
8. Board adoption.	September 1, 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.

Area Interchange Methodology: The Area Interchange methodology is characterized by determination of incremental transfer capability via simulation, from which Total Transfer Capability (TTC) can be mathematically derived. Capacity Benefit Margin, Transmission Reliability Margin, and Existing Transmission Commitments are subtracted from the TTC, and Postbacks and counterflows are added, to derive Available Transfer Capability. Under the Area Interchange Methodology, TTC results are generally reported on an area to area basis.

A. Introduction

1. **Title: Area Interchange Methodology**
2. **Number: MOD-028-1**
3. **Purpose:** To increase consistency and reliability in the development and documentation of Transfer Capability calculations for short-term use performed by entities using the Area Interchange Methodology to support analysis and system operations.
4. **Applicability:**
 - 4.1. Each Transmission Operator that uses the Area Interchange Methodology to calculate Total Transfer Capabilities (TTCs) for ATC Paths.
 - 4.2. Each Transmission Service Provider that uses the Area Interchange Methodology to calculate Available Transfer Capabilities (ATCs) for ATC Paths.
5. **Proposed Effective Date:** First day of the first calendar quarter that is twelve months beyond the date that all four standards (MOD-001-1, MOD-028-1, MOD-029-1, and MOD-030-1) are approved by all applicable regulatory authorities.

B. Requirements

- R1. Each Transmission Service Provider shall include in its Available Transfer Capability Implementation Document (ATCID), at a minimum, the following information relative to its methodology for determining Total Transfer Capability (TTC): [*Violation Risk Factor: Lower*] [*Time Horizon: Operations Planning*]
 - R1.1. Information describing how the selected methodology has been implemented, in such detail that, given the same information used by the Transmission Operator, the results of the TTC calculations can be validated.
 - R1.2. A description of the manner in which the Transmission Operator will account for Interchange Schedules in the calculation of TTC.
 - R1.3. Any contractual obligations for allocation of TTC.
 - R1.4. A description of the manner in which Contingencies are identified for use in the TTC process.
 - R1.5. The following information on how source and sink for transmission service is accounted for in ATC calculations including:
 - R1.5.1. Define if the source used for Available Transfer Capability (ATC) calculations is obtained from the source field or the Point Of Receipt (POR) field of the transmission reservation
 - R1.5.2. Define if the sink used for ATC calculations is obtained from the sink field or the Point Of Delivery (POD) field of the transmission reservation
 - R1.5.3. The source/sink or POR/POD identification and mapping to the model.

- R1.5.4.** If the Transmission Service Provider's ATC calculation process involves a grouping of generation, the ATCID must identify how these generators participate in the group.
- R2.** When calculating TTC for ATC Paths, the Transmission Operator shall use a Transmission model that contains all of the following: *[Violation Risk Factor: Lower]*
[Time Horizon: Operations Planning]
- R2.1.** Modeling data and topology of its Reliability Coordinator's area of responsibility. Equivalent representation of radial lines and facilities 161 kV or below is allowed.
- R2.2.** Modeling data and topology (or equivalent representation) for immediately adjacent and beyond Reliability Coordination areas.
- R2.3.** Facility Ratings specified by the Generator Owners and Transmission Owners.
- R3.** When calculating TTCs for ATC Paths, the Transmission Operator shall include the following data for the Transmission Service Provider's area. The Transmission Operator shall also include the following data associated with Facilities that are explicitly represented in the Transmission model, as provided by adjacent Transmission Service Providers and any other Transmission Service Providers with which coordination agreements have been executed: *[Violation Risk Factor: Lower]*
[Time Horizon: Operations Planning]
- R3.1.** For on-peak and off-peak intra-day and next-day TTCs, use the following (as well as any other values and additional parameters as specified in the ATCID):
- R3.1.1.** Expected generation and Transmission outages, additions, and retirements, included as specified in the ATCID.
- R3.1.2.** Load forecast for the applicable period being calculated.
- R3.1.3.** Unit commitment and dispatch order, to include all designated network resources and other resources that are committed or have the legal obligation to run, (within or out of economic dispatch) as they are expected to run.
- R3.2.** For days two through 31 TTCs and for months two through 13 TTCs, use the following (as well as any other values and internal parameters as specified in the ATCID):
- R3.2.1.** Expected generation and Transmission outages, additions, and Retirements, included as specified in the ATCID.
- R3.2.2.** Daily load forecast for the days two through 31 TTCs being calculated and monthly forecast for months two through 13 months TTCs being calculated.
- R3.2.3.** Unit commitment and dispatch order, to include all designated network resources and other resources that are committed or have the legal obligation to run, (within or out of economic dispatch) as they are expected to run.

R4. When calculating TTCs for ATC Paths, the Transmission Operator shall meet all of the following conditions: [*Violation Risk Factor: Lower*] [*Time Horizon: Operations Planning*]

R4.1. Use all Contingencies meeting the criteria described in ~~its~~the ATCID.

R4.2. Respect any contractual allocations of TTC.

R4.3. Include, for each time period, the Firm Transmission Service expected to be scheduled as specified in the ATCID (filtered to reduce or eliminate duplicate impacts from transactions using Transmission service from multiple Transmission Service Providers) for the Transmission Service Provider, all adjacent Transmission Service Providers, and any Transmission Service Providers with which coordination agreements have been executed modeling the source and sink as follows:

- If the source, as specified in the ATCID, has been identified 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, as specified in the ATCID, has been identified in the reservation and the point can be mapped to an "equivalence" or "aggregate representation" in the Transmission Service Provider's Transmission model, use the modeled equivalence or aggregate as the source.
- If the source, as specified in the ATCID, has been identified in the reservation and the point cannot be mapped to a discretely modeled point, an "equivalence," or an "aggregate representation" in the Transmission Service Provider's Transmission model, use the immediately adjacent Balancing Authority associated with the Transmission Service Provider from which the power is to be received as the source.
- If the source, as specified in the ATCID, has not been identified in the reservation, use the immediately adjacent Balancing Authority associated with the Transmission Service Provider from which the power is to be received as the source.
- If the sink, as specified in the ATCID, has been identified in the reservation and it is discretely modeled in the Transmission Service Provider's Transmission model, use the discretely modeled point shall as the sink.
- If the sink, as specified in the ATCID, has been identified in the reservation and the point can be mapped to an "equivalence" or "aggregate representation" in the Transmission Service Provider's Transmission model, use the modeled equivalence or aggregate as the sink.
- If the sink, as specified in the ATCID, has been identified in the reservation and the point can not be mapped to a discretely modeled point, an "equivalence," or an "aggregate representation" in the Transmission Service Provider's Transmission model, use the immediately adjacent

Balancing Authority associated with the Transmission Service Provider to which the power is to be delivered as the sink.

- If the sink, as specified in the ATCID, has not been identified in the reservation, use the immediately adjacent Balancing Authority associated with the Transmission Service Provider to which the power is being delivered as the sink.

R5. Each Transmission Operator shall establish TTC for each ATC Path as defined below: *[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]*

R5.1. At least once within the seven calendar days in the calendar week prior to the specified period for TTCs used in hourly and daily ATC calculations.

R5.2. At least once per calendar month for TTCs used in monthly ATC calculations.

R5.3. Within 24 hours of the unexpected outage of a 500 kV or higher transmission Facility or a transformer with a low-side voltage of 200 kV or higher for TTCs in effect during the anticipated duration of the outage, provided such outage is expected to last 24 hours or longer.

R6. Each Transmission Operator shall establish TTC for each ATC Path using the following process: *[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]*

R6.1. Determine the incremental Transfer Capability for each ATC Path by increasing generation and/or decreasing load within the source Balancing Authority area and decreasing generation and/or increasing load within the sink Balancing Authority area until either:

- A System Operating Limit is reached on the Transmission Service Provider's system, or
- A SOL is reached on any other adjacent system in the Transmission model that is not on the study path and the distribution factor is 5% or greater¹.

R6.2. If the limit in step R6.1 can not be reached by adjusting any combination of load or generation, then set the incremental Transfer Capability by the results of the case where the maximum adjustments were applied.

R6.3. Use (as the TTC) the lesser of:

- The sum of the incremental Transfer Capability and the impacts of Firm Transmission Services, as specified in the Transmission Service Provider's ATCID, that were included in the study model, or
- The sum of Facility Ratings of all ties comprising the ATC Path.

R6.4. For ATC Paths whose capacity uses jointly-owned or allocated Facilities, limit TTC for each Transmission ~~Operator~~ Service Provider so the TTC does not exceed ~~that Transmission Operator's~~ each Transmission Service Provider's contractual rights.

¹ The Transmission operator may honor distribution factors less than 5% if desired.

- R7.** The Transmission Operator shall provide the Transmission Service Provider of that ATC Path with the most current value for TTC for that ATC Path no more than:
[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]
- R7.1.** One calendar day after its determination for TTCs used in hourly and daily ATC calculations.
- R7.2.** Seven calendar days after its determination for TTCs used in monthly ATC calculations.
- R8.** When calculating Existing Transmission Commitments (ETCs) for firm commitments (ETC_F) for all time periods for an ATC Path the Transmission Service Provider shall use the following algorithm: *[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]*

$$ETC_F = NITS_F + GF_F + PTP_F + ROR_F + OS_F$$

Where:

$NITS_F$ is the firm capacity set aside for Network Integration Transmission Service (including the capacity used to serve bundled load within the Transmission Service Provider’s area with external sources) on ATC Paths that serve as interfaces with other Balancing Authorities.

GF_F is the firm capacity set aside for Grandfathered Firm Transmission Service and contracts for energy and/or Transmission Service, where executed prior to the effective date of a Transmission Service Provider’s Open Access Transmission Tariff or “~~Safe Harbor harbor Tariff~~” accepted by FERC on ATC Paths that serve as interfaces with other Balancing Authorities.

PTP_F is the firm capacity reserved for confirmed Point-to-Point Transmission Service.

ROR_F is the capacity reserved for roll-over rights for Firm Transmission Service contracts granting Transmission Customers the right of first refusal to take or continue to take Transmission Service when the Transmission Customer’s Transmission Service contract expires or is eligible for renewal.

OS_F is the firm capacity reserved for any other service(s), contract(s), or agreement(s) not specified above using Firm Transmission Service, including any other firm adjustments to reflect impacts from other ATC Paths of the Transmission Service Provider as specified in the ATCID.

- R9.** When calculating ETC for non-firm commitments (ETC_{NF}) for all time periods for an ATC Path the Transmission Service Provider shall use the following algorithm:
[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]

$$ETC_{NF} = NITS_{NF} + GF_{NF} + PTP_{NF} + OS_{NF}$$

Where:

$NITS_{NF}$ is the non-firm capacity set aside for Network Integration Transmission Service (i.e., secondary service, including the capacity used to serve bundled load within the Transmission Service Provider’s area with external sources)

reserved on ATC Paths that serve as interfaces with other Balancing Authorities.

GF_{NF} is the non-firm capacity reserved for Grandfathered Non-Firm Transmission Service and contracts for energy and/or Transmission Service, where executed prior to the effective date of a Transmission Service Provider's Open Access Transmission Tariff or "~~s~~Safe Harbor harbor Tariff/tariff" accepted by FERC on ATC Paths that serve as interfaces with other Balancing Authorities.

PTP_{NF} is non-firm capacity reserved for confirmed Point-to-Point Transmission Service.

OS_{NF} is the non-firm capacity reserved for any other service(s), contract(s), or agreement(s) not specified above using Non-Firm Transmission Service, including any other firm adjustments to reflect impacts from other ATC Paths of the Transmission Service Provider as specified in the ATCID.

- R10.** When calculating firm ATC for an ATC Path for a specified period, the Transmission Service Provider shall utilize the following algorithm: [*Violation Risk Factor: Lower*] [*Time Horizon: Operations Planning*]

$$ATC_F = TTC - ETC_F - CBM - TRM + Postbacks_F + counterflows_F$$

Where:

ATC_F is the firm Available Transfer Capability for the ATC Path for that period.

TTC is the Total Transfer Capability of the ATC Path for that period.

ETC_F is the sum of existing firm Transmission commitments for the ATC Path during that period.

CBM is the Capacity Benefit Margin for the ATC Path during that period.

TRM is the Transmission Reliability Margin for the ATC Path during that period.

Postbacks_F are changes to firm ATC due to a change in the use of Transmission Service for that period, as defined in Business Practices.

counterflows_F are adjustments to firm ATC as determined by the Transmission Service Provider and specified in the ATCID.

- R11.** When calculating non-firm ATC for a ATC Path for a specified period, the Transmission Service Provider shall use the following algorithm: [*Violation Risk Factor: Lower*] [*Time Horizon: Operations Planning*]

$$ATC_{NF} = TTC - ETC_F - ETC_{NF} - CBM_S - TRM_U + Postbacks_{SNF} + counterflows_{SNF}$$

Where:

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

TTC is the Total Transfer Capability of the ATC Path for that period.

ETC_F is the sum of existing firm Transmission commitments for the ATC Path during that period.

ETC_{NF} is the sum of existing non-firm Transmission commitments for the ATC Path during that period.

CBM_S is the Capacity Benefit Margin for the ATC Path that has been scheduled without a separate reservation during that period.

TRM_U is the Transmission Reliability Margin for the ATC Path that has not been released for sale (unreleased) as non-firm capacity by the Transmission Service Provider during that period.

Postbacks_{NF} are changes to non-firm ATC due to a change in the use of Transmission Service for that period, as defined in Business Practices.

counterflows_{NF} are adjustments to non-firm ATC as determined by the Transmission Service Provider and specified in the ATCID.

C. Measures

- M1.** Each Transmission Service Provider shall provide its current ATCID that has the information described in R1 to show compliance with R1. (R1)
- M2.** Each Transmission Operator shall provide evidence including the model used to calculate TTC as well as other evidence (such as Facility Ratings provided by facility owners, written documentation, logs, and data) to show that the modeling requirements in R2 were met. (R2)
- M3.** Each Transmission Operator shall provide evidence, including scheduled outages, facility additions and retirements, (such as written documentation, logs, and data) that the data described in R3 and R4 were included in the determination of TTC as specified in the ATCID. (R3)
- M4.** Each Transmission Operator shall provide the contingencies used in determining TTC and ~~its~~ the ATCID as evidence to show that the contingencies described in the ATCID were included in the determination of TTC. (R4)
- M5.** Each Transmission Operator shall provide copies of contracts that contain requirements to allocate TTCs and TTC values to show that any contractual allocations of TTC were respected as required in R4.2. (R4)
- M6.** Each Transmission Operator shall provide evidence (such as copies of coordination agreements, reservations, interchange transactions, or other documentation) to show that firm reservations were used to estimate scheduled interchange, the modeling of scheduled interchange was based on the rules described in R4.3, and that estimated scheduled interchange was included in the determination of TTC. (R4)
- M7.** Each Transmission Operator shall provide evidence (such as logs and data and dated copies of requests from the Transmission Service Provider to establish TTCs at specific intervals) that TTCs have been established at least once in the calendar week prior to the specified period for TTCs used in hourly and daily ATC calculations, at least once per calendar month for TTCs used in monthly ATC calculations, and within 24 hours of the unexpected outage of a 500 kV or higher transmission Facility or an autotransformer with a low-side voltage of 200 kV or higher for TTCs in effect during the anticipated

duration of the outage; provided such outage is expected to last 24 hours or longer in duration per the specifications in R5.(R5)

M8. Each Transmission Operator shall provide evidence (such as written documentation) that TTCs have been calculated using the process described in R6. (R6)

M9. Each Transmission Operator shall have evidence including a copy of the latest calculated TTC values along with a dated copy of email notices or other equivalent evidence to show that it provided its Transmission Service Provider with the most current values for TTC in accordance with R7. (R7)

M10. ~~The Transmission Service Provider must be capable of demonstrating~~ shall demonstrate compliance with R8 by that for any calculation of firm ETC made in the previous sixty days, the Transmission Service Provider can recalculate the individual value of the firm ETC for recalculating firm ETC for any specific time period as described in (MOD-001 R2), using the algorithm defined in R8 and with data used to calculate ~~this the~~ specified value for the designated ~~hourtime period~~. The data used must meet the requirements specified in ~~the standard~~ MOD-028-1 and the ATCID. To account for differences that may occur when recalculating the value (due to mixing automated and manual processes), any recalculated, and the audited value must that is ~~be~~ within +/- 15% or 15 MW, whichever is greater, of the ~~demonstrated result~~ originally calculated value, is evidence that the Transmission Service Provider used the algorithm in R8 to calculate its firm ETC. (R8)

~~M10.~~ (R8)

M11. ~~The Transmission Service Provider must be capable of demonstrating~~ shall demonstrate compliance with R9 by that for any calculation of non-firm ETC made in the previous sixty days, the Transmission Service Provider can recalculateing the individual value of the non-firm ETC for any specific time period as described in (MOD-001 R2), using the algorithm defined in R9 and with data used to calculate ~~this the~~ specified value for the designated ~~hourtime period~~. The data used must meet the requirements specified in ~~the standard~~ MOD-028-1 and the ATCID. To account for differences that may occur when recalculating the value (due to mixing automated and manual processes), any recalculated value that is, and the audited value must be within +/- 15% or 15 MW, whichever is greater, of the originally calculated value, is evidence that the Transmission Service Provider used the algorithm in R8 to calculate its non-firm ETC ~~demonstrated result~~. (R9)

M12. Each Transmission Service Provider shall produce the supporting documentation for the processes used to implement the algorithm that calculates firm ATCs, as required in R10. Such documentation must show that only the variables allowed in R10 were used to calculate firm ATCs, and that the processes use the current values for the variables as determined in the requirements or definitions. Note that any variable may legitimately be zero if the value is not applicable or calculated to be zero (such as counterflows, TRM, CBM, etc...). The supporting documentation may be provided in the same form and format as stored by the Transmission Service Provider. (R10)

M13. Each Transmission Service Provider shall produce the supporting documentation for the processes used to implement the algorithm that calculates non-firm ATCs, as

required in R11. Such documentation must show that only the variables allowed in R11 were used to calculate non-firm ATCs, and that the processes use the current values for the variables as determined in the requirements or definitions. Note that any variable may legitimately be zero if the value is not applicable or calculated to be zero (such as counterflows, TRM, CBM, etc...). The supporting documentation may be provided in the same form and format as stored by the Transmission Service Provider. (R11)

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

Regional Entity.

1.2. Compliance Monitoring Period and Reset

Not applicable.

1.3. Data Retention

The Transmission Operator and Transmission Service Provider shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

- 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.
- The Transmission Operator shall retain evidence to show compliance with R3 for the most recent 12 months or until the model used to calculate TTC is updated, whichever is longer.
- The Transmission Operator shall retain evidence to show compliance with R4, R5, R6 and R7 for the most recent 12 months.
- The Transmission Service Provider shall retain evidence to show compliance in calculating hourly values required in with R8 and R9 for the most recent ~~sixty-14~~ days; evidence to show compliance in calculating daily values required in R8 and R9 for the most recent 30 days; and evidence to show compliance in calculating monthly values required in R8 and R9 for the most recent 60 days.
- The Transmission Service Provider shall retain evidence to show compliance with R10 and R11 for the most recent 12 months.
- 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

R #	Lower VSL	Moderate <u>VSL</u>	High VSL	Severe VSL
R1.	<p><u>The Transmission Service Provider has an ATCID but it is missing one of the following:</u></p> <ul style="list-style-type: none"> ▪ <u>R1.1</u> ▪ <u>R1.2</u> ▪ <u>R1.3</u> ▪ <u>R1.4</u> ▪ <u>R1.5 (any one or more of its sub-subrequirements)</u> <p>The Transmission Service Provider has an ATCID that meets the intent of Requirement 1 but the ATCID is missing some minor information.</p>	<p><u>The Transmission Service Provider has an ATCID but it is missing two of the following:</u></p> <ul style="list-style-type: none"> ▪ <u>R1.1</u> ▪ <u>R1.2</u> ▪ <u>R1.3</u> ▪ <u>R1.4</u> ▪ <u>R1.5 (any one or more of its sub-subrequirements)</u> <p>The Transmission Service Provider has an ATCID but it is missing one of the four required elements in R1.</p>	<p><u>The Transmission Service Provider has an ATCID but it is missing three of the following:</u></p> <ul style="list-style-type: none"> ▪ <u>R1.1</u> ▪ <u>R1.2</u> ▪ <u>R1.3</u> ▪ <u>R1.4</u> ▪ <u>R1.5 (any one or more of its sub-subrequirements)</u> <p>The Transmission Service Provider has an ATCID but it is missing two of the four required elements in R1.</p>	<p><u>The Transmission Service Provider has an ATCID but it is missing more than three of the following:</u></p> <ul style="list-style-type: none"> ▪ <u>R1.1</u> ▪ <u>R1.2</u> ▪ <u>R1.3</u> ▪ <u>R1.4</u> ▪ <u>R1.5 (any one or more of its sub-subrequirements)</u> <p>The Transmission Service Provider has an ATCID but it is missing three or more of the four required elements in R1.</p>
R2.	<p>The Transmission Operator utilized<u>used</u> one to ten Facility Ratings that were different from those specified by a Transmission or Generator Owner in their Transmission model.</p> <p>Note: A modeling error (a violation of the criteria in R2) is a single violation, regardless how many times that error has been modeled.<u>used.</u></p>	<p>The Transmission Operator utilized<u>used</u> eleven to twenty Facility Ratings that were different from those specified by a Transmission or Generator Owner in their Transmission model.</p> <p>Note: A modeling error (a violation of the criteria in R2) is a single violation, regardless how many times that error has been modeled.<u>used.</u></p>	<p><u>One or both of the following:</u></p> <ul style="list-style-type: none"> • <u>The Transmission Operator utilized<u>used</u> twenty-one to thirty Facility Ratings that were different from those specified by a Transmission or Generator Owner in their Transmission model.</u> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • <u>The Transmission Operator did not use a Transmission model that includes modeling data and topology (or equivalent representation)</u> 	<p><u>One or more of the following:</u></p> <ul style="list-style-type: none"> • <u>The Transmission Operator utilized<u>used</u> more than thirty Facility Ratings that were different from those specified by a Transmission or Generator Owner in their Transmission model.</u> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • <u>The Transmission Operator's model includes equivalent representation of non-radial facilities greater than 161 kV for its own Reliability</u>

R #	Lower VSL	Moderate <u>VSL</u>	High VSL	Severe VSL
			<p>for one adjacent Reliability Coordinator areaArea.</p> <p>Note: A modeling error (a violation of the criteria in R2) is a single violation, regardless how many times that error has been modeled used.</p>	<p>Coordinator areaArea.</p> <p>OR</p> <ul style="list-style-type: none"> The Transmission Operator did not use a Transmission model that includes modeling data and topology (or equivalent representation) for two or more adjacent Reliability Coordinator areasAreas. <p>Note: A modeling error (a violation of the criteria in R2) is a single violation, regardless how many times that error has been modeled used.</p>
R3.	<p>The Transmission Operator did not include in the TTC process one to ten expected generation and Transmission outages, additions or retirements as specified in the ATCID.</p>	<p>The Transmission Operator did not include in the TTC process eleven to twenty-five expected generation and Transmission outages, additions or retirements as specified in the ATCID.</p>	<p>The Transmission Operator did not include in the TTC process twenty-six to fifty expected generation and Transmission outages, additions or retirements as specified in the ATCID.</p>	<p><u>One or more violations below constitutes a single violation of R3 of the following.:</u></p> <ul style="list-style-type: none"> The Transmission Operator did not include in the TTC process more than fifty expected generation and Transmission outages, additions or retirements as specified in the ATCID. <p>OR</p> <ul style="list-style-type: none"> The Transmission Operator did not include the Load forecast or unit commitment in its TTC calculation as described in R3.

R #	Lower VSL	Moderate <u>VSL</u>	High VSL	Severe VSL
R4.	<p>The Transmission Service ProviderOperator did not model reservations' sources or sinks as described in R5.3 for more than zero reservations, but not more than 5% of all reservations; or 1 reservation, whichever is greater.</p>	<p>The Transmission Service ProviderOperator did not model reservations' sources or sinks as described in R5.3 for more than 5%, but not more than 10% of all reservations; or 2 reservations, whichever is greater.</p>	<p>The Transmission Service ProviderOperator did not model reservations' sources or sinks as described in R5.3 for more than 10%, but not more than 15% of all reservations; or 3 reservations, whichever is greater.</p>	<p><u>One or more of the following:</u></p> <ul style="list-style-type: none"> • <u>The Transmission Operator did not include in the TTC calculation the contingencies that met the criteria described in the ATCID.</u> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • <u>The Transmission Operator did not respect contractual allocations of TTC.</u> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • <u>The Transmission Service ProviderOperator did not model reservations' sources or sinks as described in R5.3 for more than 15% of all reservations; or more than 3 reservations, whichever is greater.</u> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • <u>The Transmission Operator did not use firm reservations to estimate interchange or did not utilize that estimate in the TTC calculation as described in R4.3.</u>
R5.	<p><u>One or more of the following:</u></p> <ul style="list-style-type: none"> • <u>The Transmission Operator did not establish TTCs for use in hourly or daily ATCs within 7 calendar days but did establish the values within 10 calendar days</u> 	<p><u>One or more of the following:</u></p> <ul style="list-style-type: none"> • <u>The Transmission Operator did not establish TTCs for use in hourly or daily ATCs in 10 calendar days but did establish the values within 13 calendar days</u> 	<p><u>One or more of the following:</u></p> <ul style="list-style-type: none"> • <u>The Transmission Operator did not establish TTCs for used in hourly or daily ATCs in 13 calendar days but did establish the values within 16 calendar days</u> 	<p><u>One or more of the following:</u></p> <ul style="list-style-type: none"> • <u>The Transmission Operator did not establish TTCs for used in hourly or daily ATCs in 16 calendar days</u> • <u>The Transmission Operator did not establish TTCs for</u>

Standard MOD-028-1 — Area Interchange Methodology

R #	Lower VSL	Moderate <u>VSL</u>	High VSL	Severe VSL
	<ul style="list-style-type: none"> The Transmission Operator did not establish TTCs for use in monthly ATCs during a calendar month but did establish the values within the next consecutive calendar month <p>N/A</p>	<ul style="list-style-type: none"> The Transmission Operator did not establish TTCs for use in monthly ATCs during a two consecutive calendar month period but did establish the values within the third consecutive calendar month N/A 	<ul style="list-style-type: none"> The Transmission Operator did not establish TTCs for use in monthly ATCs during a three consecutive calendar month period but did establish the values within the fourth consecutive calendar month <p>N/A</p>	<p>use in monthly ATCs during a four or more consecutive calendar month period</p> <ul style="list-style-type: none"> The Transmission Operator did not establish TTCs within 24 hrs of the triggers defined in R5.3 <p>The Transmission Operator did not establish TTCs within the minimum time frames specified in R5.</p>
R6.	N/A	N/A	N/A	The Transmission Operator did not calculate TTCs per the process specified in R6.
R7.	<p>One or more of the following:</p> <ul style="list-style-type: none"> The Transmission Operator provided its Transmission Service Provider with its ATC Path TTCs used in hourly or daily ATC calculations more than one calendar day after their determination, but not been more than two calendar days after their determination. <p>OR</p> <ul style="list-style-type: none"> The Transmission Operator has not provided its Transmission Service Provider with its ATC Path TTCs used in monthly ATC calculations more than seven calendar days after their determination, but not more 	<p>One or more of the following:</p> <ul style="list-style-type: none"> The Transmission Operator provided its Transmission Service Provider with its ATC Path TTCs used in hourly or daily ATC calculations more than two calendar days after their determination, but not been more than three calendar days after their determination. <p>OR</p> <ul style="list-style-type: none"> The Transmission Operator has not provided its Transmission Service Provider with its ATC Path TTCs used in monthly ATC calculations more than 14 calendar days after their determination, but not been 	<p>One or more of the following:</p> <ul style="list-style-type: none"> The Transmission Operator provided its Transmission Service Provider with its ATC Path TTCs used in hourly or daily ATC calculations more than three calendar days after their determination, but not been more than four calendar days after their determination. <p>OR</p> <ul style="list-style-type: none"> The Transmission Operator has not provided its Transmission Service Provider with its ATC Path TTCs used in monthly ATC calculations more than 21 calendar days after their determination, but not been 	<p>One or more of the following:</p> <ul style="list-style-type: none"> The Transmission Operator provided its Transmission Service Provider with its ATC Path TTCs used in hourly or daily ATC calculations more than four calendar days after their determination. <p>OR</p> <ul style="list-style-type: none"> The Transmission Operator did not provide its Transmission Service Provider with its ATC Path TTCs used in hourly or daily ATC calculations. <p>OR</p> <ul style="list-style-type: none"> The Transmission Operator provided its Transmission Service Provider with its ATC

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R #	Lower VSL	Moderate <u>VSL</u>	High VSL	Severe VSL
	than 14 calendar days since their determination.	more than 21 calendar days after their determination.	more than 28 calendar days after their determination.	<p>Path TTCs used in monthly ATC calculations <u>more calculations</u> more than 28 calendar days after their determination.</p> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • The Transmission Operator did not provide its Transmission Service Provider with its ATC Path TTCs used in monthly ATC calculations.
R8.	For a specified period, the Transmission Service Provider calculated a firm ETC with an absolute value different than that calculated in <u>M9-M10</u> for the same period, and the absolute value difference was more than 15% of the value calculated in the measure or 15MW, whichever is greater, but not more than 25% of the value calculated in the measure or 25MW, whichever is greater.	For a specified period, the Transmission Service Provider calculated a firm ETC with an absolute value different than that calculated in <u>M9-M10</u> for the same period, and the absolute value difference was more than 25% of the value calculated in the measure or 25MW, whichever is greater, but not more than 35% of the value calculated in the measure or 35MW, whichever is greater.	For a specified period, the Transmission Service Provider calculated a firm ETC with an absolute value different than that calculated in <u>M9-M10</u> for the same period, and the absolute value difference was more than 35% of the value calculated in the measure or 35MW, whichever is greater, but not more than 45% of the value calculated in the measure or 45MW, whichever is greater.	For a specified period, the Transmission Service Provider calculated a firm ETC with an absolute value different than that calculated in <u>M9-M10</u> for the same period, and the absolute value difference was more than 45% of the value calculated in the measure or 45MW, whichever is greater.
R9.	For a specified period, the Transmission Service Provider calculated a non-firm ETC with an absolute value different than that calculated in <u>M10-M11</u> for the same period, and the absolute value difference was more than 15% of the value calculated in the measure or 15MW, whichever is greater,	For a specified period, the Transmission Service Provider calculated a non-firm ETC with an absolute value different than that calculated in <u>M10-M11</u> for the same period, and the absolute value difference was more than 25% of the value calculated in the measure or 25MW, whichever is greater,	For a specified period, the Transmission Service Provider calculated a non-firm ETC with an absolute value different than that calculated in <u>M10-M11</u> for the same period, and the absolute value difference was more than 35% of the value calculated in the measure or 35MW, whichever is greater,	For a specified period, the Transmission Service Provider calculated a non-firm ETC with an absolute value different than that calculated in <u>M10-M11</u> for the same period, and the absolute value difference was more than 45% of the value calculated in the measure or 45MW, whichever is greater.

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R #	Lower VSL	Moderate <u>VSL</u>	High VSL	Severe VSL
	but not more than 25% of the value calculated in the measure or 25MW, whichever is greater.	but not more than 35% of the value calculated in the measure or 35MW, whichever is greater...	but not more than 45% of the value calculated in the measure or 45MW, whichever is greater.	
R10.	The Transmission Service Provider did not use all the elements defined in R10 when determining firm ATC, or used additional elements, for more than zero ATC Paths, but not more than 5% of all ATC Paths or 1 ATC Path (whichever is greater).	The Transmission Service Provider did not use all the elements defined in R10 when determining firm ATC, or used additional elements, for more than 5% of all ATC Paths or 1 ATC Path (whichever is greater), but not more than 10% of all ATC Paths or 2 ATC Paths (whichever is greater).	The Transmission Service Provider did not use all the elements defined in R10 when determining firm ATC, or used additional elements, for more than 10% of all ATC Paths or 2 ATC Paths (whichever is greater), but not more than 15% of all ATC Paths or 3 ATC Paths (whichever is greater).	The Transmission Service Provider did not use all the elements defined in R10 when determining firm ATC, or used additional elements, for more than 15% of all ATC Paths or more than 3 ATC Paths (whichever is greater).
R11.	The Transmission Service Provider did not use all the elements defined in R11 when determining non-firm ATC, or used additional elements, for more than zero ATC Paths, but not more than 5% of all ATC Paths or 1 ATC Path (whichever is greater).	The Transmission Service Provider did not use all the elements defined in R11 when determining non-firm ATC, or used additional elements, for more than 5% of all ATC Paths or 1 ATC Path (whichever is greater), but not more than 10% of all ATC Paths or 2 ATC Paths (whichever is greater).	The Transmission Service Provider did not use all the elements defined in R11 when determining non-firm ATC, or used additional elements, for more than 10% of all ATC Paths or 2 ATC Paths (whichever is greater), but not more than 15% of all ATC Paths or 3 ATC Paths (whichever is greater).	The Transmission Service Provider did not use all the elements defined in R11 when determining non-firm ATC, or used additional elements, for more than 15% of all ATC Paths or more than 3 ATC Paths (whichever is greater).