



Transmission Services

Available Transfer Capability (ATC) and Available Flowgate Capability (AFC) Methodologies for the Planning Time Period, Version 8

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1. Purpose

The Available Transfer Capability (ATC) and Available Flowgate Capability (AFC) methodologies set forth in this document are Transmission Services' methodologies for calculating ATC on the External Interconnections, Interties and some Paths internal to BPA's Network (Network Paths) and calculating AFC on the Flowgate internal to BPA's Network (Network Flowgates) for the Planning Time Period (beyond 13 months). BPA's ATC and AFC Methodologies for the time horizon beginning with the current hour and extending through month 13 is provided in the ATC Implementation Document posted on Transmission Services' ATC Methodology website. Beyond month 13, the ATC methodology is determined in accordance to this document, except that for the network flowgates, month 14 is considered a transitional month between the 0 to 13 month time horizon and the Planning Time Period; therefore the methodology used to determine AFC for month 14 is the same methodology used for months 0 to 13. Beyond month 14 on the network flowgates, the AFC methodology is determined in accordance with this document.

2. Definitions

Unless otherwise defined herein, capitalized terms are defined in BPA's Open Access Transmission Tariff (OATT), 2012 Transmission & Ancillary Service Rate Schedules or successor rate schedules (Rate Schedules), the Business Practices, Federal Energy Regulatory Commission (FERC) Standards and Communication Protocols for OASIS, and/or the North American Electric Reliability Corporation (NERC) Glossary of Terms.

- 2.1 ATC Methodology Margin (AMM): The margin accounting for the portion of differences between Contract Accounting and Planning methodologies for calculating Existing Transmission Commitments (ETC) to address uncertainties between these two methodologies in the Planning Time Period (beyond 13 months).
- 2.2 Planning Time Period: The time horizon beyond 13 months.

3. Introduction

- 3.1 BPA owns the Federal Columbia River Transmission System (FCRTS). Transmission Services provides Transmission Service over the FCRTS under its OATT and other grandfathered contracts.
- 3.2 The FCRTS is used to deliver power between resources and Loads within the Pacific Northwest, and to transmit power between and among the Pacific Northwest region, western Canada and the Pacific Southwest.
- 3.3 The FCRTS is comprised of BPA's main grid network Facilities (Network), including constrained Paths interconnecting with other Transmission Systems (External

Interconnections¹); Interties;² delivery Facilities; subgrid Facilities, and generation interconnection Facilities.

- 3.4 BPA calculates ATC for the External Interconnections, Interties, and some paths internal to the BPA Network (referred to as Network Paths). See the ATC Implementation Document posted on Transmission Services' ATC Methodology website for a map and description of these Paths.
- 3.5 BPA calculates AFC for the Network Flowgates. See the ATC Implementation Document posted on Transmission Services' ATC Methodology website for a map and description of these Network Flowgates.

4. ATC Methodology for the External Interconnections, Interties and Network Paths

- 4.1 Transmission Services uses the Contract Accounting Methodology, which is posted on Transmission Services' ATC Methodology website, for firm ATC determinations for Interties, External Interconnections³, and Network Paths during the Planning Time Period using the following algorithm:

$$\text{Firm ATC} = \text{TTC} - \text{ETC}_{\text{Firm}} - \text{TRM} - \text{CBM} + \text{Postbacks} + \text{Counterflows}$$

The following is a step-by-step explanation of how Transmission Services uses the Contract Accounting Methodology to calculate ATC for each Intertie, External Interconnection, and some Network Paths for the Planning Time Period:

- 4.2.1 Total Transfer Capability (TTC)

Transmission Services calculates reliability-based TTCs for all Interties, External Interconnections, and some Network Paths using powerflow and transient stability studies to establish a reliability limit. Transmission Services adjusts generation and load levels within power-flow base cases to determine the TTC that can be simulated for the paths, while at the same time satisfying all planning criteria contingencies. Transmission Services ensures that all transmission elements in its calculations remain at or below 100 percent of their continuous Rating; the TTC for the path is then, the pre-contingency flow on that path that would result in a facility being loaded to 100 percent of its continuous rating following any planning criteria outage.

Transmission Services uses the WECC base cases to develop the seed cases that are used to run its various base cases.

¹ Northern Intertie, Reno-Alturas Transmission System, West of Hatwai, West of Garrison and LaGrande Paths. West of Hatwai is treated as an External Interconnection because its operating characteristics are similar to an External Interconnection and this Flowgate has historically been treated as such.

² Southern Intertie (AC Intertie and DC Intertie) and Montana Intertie.

³ Northern Intertie, AC Intertie, DC Intertie, West of Garrison, Reno-Alturas Transmission System, West of Hatwai, LaGrande, and Montana Intertie

The differences between the TTC methodology for the Planning Time Period and the TTC methodology described in the ATCID are as follows: 1) Topology changes resulting from new or retired facilities that occurred after the current year's TTC studies for Planning Time Period are incorporated into the following year's TTC studies for the Planning Time Period; 2) Changes to the load forecast assumptions that occurred after the current year's TTC studies for the Planning Time Period are incorporated into the following year's TTC studies for the Planning Time Period; and 3) Outages are not considered in the TTC studies for the Planning Time Period, but are considered in the TTC studies for day 0 to day 14, as described in the ATCID.

4.2.2 Firm Existing Transmission Commitments (ETC_{Firm})

Transmission Services determines firm ETC for its transmission service obligations in accordance with the Contract Accounting Methodology, which is posted on Transmission Service's ATC Methodology website. The transmission service obligations are listed in Appendix D of the ATC Implementation Document posted on Transmission Services' ATC methodology website.

Transmission Services assumes that a transmission customer with a transmission service contract containing the right of first refusal will take or continue to take transmission service when that contract expires or is eligible for renewal, unless otherwise notified by the transmission customer.

4.2.3 Transmission Reliability Margin (TRM)

Transmission Services does not set aside transfer capability for TRM during the Planning Time Period.

4.2.4 Capacity Benefit Margin (CBM)

Transmission Services does not set aside transfer capability for CBM during the Planning Time Period

4.2.5 Postbacks

Postbacks are changes to ATC due to a change in the use of transmission service. Transmission Services does not include Postbacks during the Planning Time Period.

4.2.6 Counterflows

Counterflows are adjustments to ATC. Transmission Services does not include Counterflows during the Planning Time Period.

4.2 The ATC Methodology for the period beginning with the current hour and extending to month 13 is described in the ATC Implementation Document, which is posted on Transmission Services' ATC Methodology website.

5. AFC Methodology for Network Flowgates

5.1 Transmission Services uses a Combined Planning/Accounting Methodology for the constrained Flowgates internal to the Network (Network Flowgates) for the

Planning Time Period. The Combined Planning/Accounting Methodology combines a Planning Methodology, referred to as the Power Flow Base Case Methodology, which measures physical power flows on BPA's Network Flowgates with a Contract Accounting Methodology that reflects contractual obligations for Long-Term Firm Transmission Services in the Planning Time Period. Transmission Services uses the following algorithm to calculate AFC during the Planning Time Period:

$$\text{Firm AFC} = \text{TFC} - \text{ETC}_{\text{Firm}} - \text{TRM} - \text{CBM} + \text{Postbacks} + \text{Counterflows}.$$

- 5.2 Transmission Services developed its Combined Planning/Accounting Methodology to establish a method that Transmission Services will use to determine baseline AFC values for each Network Flowgate for the Planning Time Period for such needs as System Planning and Transmission marketing.⁴
- 5.3 The following is a step-by-step explanation of how Transmission Services uses the Combined Planning/Accounting Methodology to calculate the baseline AFC for each Network Flowgate for the Planning Time Period:

5.3.1 TFC

The TFC for each Network Flowgate represents the flowgate capability of the BPA-owned Transmission lines and associated Facilities comprising such Network Flowgate. Transmission Services calculates reliability based TFCs for all Flowgates by establishing a reliability limit using power flow and transient stability studies.⁵ Transmission Services adjusts generation and load levels within power flow base cases to determine the TFC that can be simulated for the Flowgates, while satisfying all planning criteria contingencies. Transmission Services ensures that all transmission elements in its calculations remain at or below 100 percent of their continuous Rating. Therefore, the TFC for a flowgate is set at the pre-contingency flow that would result in a facility being loaded to 100% of its continuous rating following any planning criteria outage.

Transmission Services uses the WECC base cases to develop the seed cases that are used to run its various base cases.

The differences between the TFC methodology for the Planning Time Period and the TFC methodology described in the ATCID are as follows: 1) Topology changes resulting from new or retired facilities that occurred after the current year's TFC studies for Planning Time Period are incorporated into the following year's TFC studies for the Planning Time Period; 2) Changes to the load forecast assumptions that occurred after the current year's TFC studies for the Planning Time Period are incorporated into the following year's TFC studies for the Planning Time Period; and 3) Outages are not considered in the TFC studies for the

⁴ Development of the initial ATC Methodology included a series of open customer meetings held in 2003. Revisions to the methodology are developed in accordance with BPA Transmission Services' business practice process, involving customer meetings and review and comment period.

⁵ For the Monroe-Echo Lake flowgate, Transmission Services uses a flow level that corresponds to the System Operating Limit (SOL) determined through SOL studies for the Northern Intertie.

Planning Time Period, but are considered in the TFC studies for day 0 to day 14, as described in the ATCID.

5.3.2 ETC_{Firm}:

Transmission Services determines ETC_{Firm} using a multi-step process.

1. Compute the Contract Accounting ETC

The Contract Accounting Methodology evaluates the long-term firm committed uses of Transmission Services' transmission system. The transmission service obligations are listed in Appendix D of the ATC Implementation Document posted on Transmission Services' ATC Methodology website. BPA maps these transmission service obligations to each of the Network Flowgates for the Planning Time Period using Power Transfer Distribution Factors (PTDFs). Transmission Services' Contract Accounting Methodology for the Planning Time Period and PTDFs are posted on Transmission Services' ATC Methodology website.

Transmission Services assumes that a transmission customer with a transmission service contract containing the right of first refusal will take or continue to take transmission service when that contract expires or is eligible for renewal, unless otherwise notified by the transmission customer.

2. Compute the Planning ETC

Transmission Services computes planning power flows for the months of January, May, June, and August using base case assumptions during its annual planning baseline studies. Transmission Services' Power Flow Base Case Methodology and assumptions are described in the Power Flow Base Case for the Planning Time Period posted on Transmission Services' ATC Methodology website.

3. Compute the Delta between Contract Accounting ETC and Planning ETC

$\text{Delta} = \text{Contract Accounting ETC} - \text{Planning ETC}$

The Planning ETC for January, May, June, and August is subtracted from the Contract Accounting ETC for the same months to compute the Delta for those months. The Delta, which may be a positive or negative value for each of those months, is used as the delta value for the other months in the corresponding season⁶. Transmission Services uses the Delta to calculate AMM.

4. Determine the AMM

⁶ January Delta applies to November - February; May delta applies to April - May; June Delta applies to June only; August Delta applies to July - August. March Delta is the average of the January and May Deltas. October Delta is the average of the August and January Deltas. September Delta is the weighted average of the August and January Deltas, where the weighting is as follows: (0.75 x August Delta); and (0.25 x January Delta).

AMM is the margin inserted into the final AFC calculation to account for uncertainties in the Planning Time Period. Transmission Services' determination of AMM for each Network Flowgate is posted on the ATC Methodology page of Transmission Services' website.

5.3.3 TRM

Transmission Services does not set aside flowgate capability for TRM during the Planning Time Period.

5.3.4 CBM

Transmission Services does not set aside flowgate capability for CBM during the Planning Time Period.

5.3.5 Postbacks

Postbacks are changes to AFC due to a change in the use of transmission service. Transmission Services does not include Postbacks during the Planning Time Period.

5.3.6 Counterflows

Counterflows are adjustments to AFC for power flows in the opposite direction of constraints within BPA's area. Transmission Services does not separately add capacity to the calculation of firm ATC for counterflows, except that counterflow assumptions are included in the ETC calculation. The Planning ETC power flow study, which studies how power will flow on the transmission system, inherently includes all flows and counterflows. The Contract Accounting Methodology uses limited netting assumptions, which are described in the Contract Accounting Methodology for the Planning Time Period.

- 5.4 The AFC Methodology for the period beginning with the current hour and extending to month 13 is described in the ATC Implementation Document, which is posted on Transmission Services' ATC Methodology website.

6. Management of AFC between Annual Planning Baseline Studies

- 6.1 Transmission Services will perform planning power flow studies to update final AFC baseline amounts for the Network Flowgates for the Planning Time Period at least once per year.
- 6.2 In the interim, Long-Term Firm Transmission Service Requests (TSRs) for new Transmission Service will be evaluated by determining the impact the new request has on each Network Flowgate using the Impacts of Long-Term Firm Requests posted on Transmission Services' ATC Methodology website.
- 6.3 A Long-Term Firm TSR will be granted if there is:
- 6.3.1 Sufficient AFC at each Network Flowgate and sufficient ATC on all Paths for all time periods, including the Planning Time Period as adjusted for higher queued TSRs,

- 6.3.2 Sufficient *de minimis* capacity on Network Flowgates if the TSR qualifies as having a *de minimis* impact on the Flowgate (See *De Minimis* on Transmission Services' ATC Methodology website for further details), and
- 6.3.3 No subgrid or local area issue(s) are identified.
- 6.4 Where there is insufficient AFC to grant a Long-Term Firm TSR or there are subgrid or local area issues identified, System Impact or other Studies, as specified by the OATT, would be required.
- 6.5 When a new TSR is granted, the baseline final AFC for each Flowgate (except those with *de minimis* impact) will be decremented by the new transaction's use of the Flowgate.
- 6.6 When the next Long-Term Firm AFC baseline amounts are calculated, any new Long-Term Firm arrangements, including those with *de minimis* impacts, will be included in the planning power flow studies and contract accounting analysis, and incorporated into the final AFC results for each Flowgate.

7. Modifications to ATC and AFC Methodologies

- 7.1 When modifying the ATC and AFC Methodologies for the Planning Time Period, Transmission Services will provide a notice and comment period for changes to the following items (items not expressly identified, will not be subject to such notice and comment):
 - 7.1.1 The arithmetic formulas described in Steps 5.3.1 through 5.3.6 above used to calculate AFC using the Combined Planning/Accounting Methodology described in this AFC Methodology;
 - 7.1.2 The methodology for determining Load forecasts as described in the Power Flow Base Case for the Planning Time Period;
 - 7.1.3 The generation dispatch levels of Federal hydro projects for NT Load service described in the Contract Accounting Methodology for the Planning Time Period and Power Flow Base Case for the Planning Time Period;
 - 7.1.4 The netting assumptions described in the Contract Accounting Methodology for the Planning Time Period.
- 7.2 The ATC and AFC Methodology documents described above are posted on Transmission Services' ATC Methodology web page.

8. Related Business Practices

Transmission Services Business Practices are available on its web site at http://transmission.bpa.gov/ts_business_practices/.

ATC and AFC Supporting Information and Related Information/Documents are available on Transmission Services' web page at http://transmission.bpa.gov/business/atc_methodology/