

Available Transfer Capability (ATC) Methodologies for the Planning Time Period, Version 18

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1. Purpose

The Available Transfer Capability (ATC) methodologies set forth in this document are Transmission Services' methodologies for calculating ATC on the Long-Term BPA Constraints -- comprised of External Interconnections, Interties, Paths internal to BPA's Network (Network Paths) and Flowgates internal to BPA's Network (Network Flowgates) -- for the Planning Time Period (beyond 13 months). BPA's ATC 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 Month 14 for the Network Flowgates is considered a transitional month between the 0 to 13 month time horizon and the Planning Time Period; therefore the methodology used to determine ATC for month 14 is the same methodology used for months 0 to 13.

2. Definitions

Unless otherwise defined herein, capitalized terms are defined in BPA's Open Access Transmission Tariff (OATT), Transmission & Ancillary Service 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.

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), Interties², delivery Facilities, subgrid Facilities, and generation interconnection Facilities.

¹ Northern Intertie, Reno-Alturas Transmission System, West of Garrison and LaGrande Paths.

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

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

The algorithm Transmission Services uses for its firm ATC determinations for Interties, External Interconnections, and Network Paths during the Planning Time Period is listed below, along with descriptions of each of the elements in the algorithm:

$$ATC_{\text{Firm}} = TTC - ETC_{\text{Firm}}$$

4.1 Total Transfer Capability (TTC)

Transmission Services calculates reliability-based TTCs for all Interties, External Interconnections, and Network Paths using powerflow and transient stability studies to establish a reliability limit. The TTC for each Intertie, External Interconnection, and Network Path represents the transfer capability of the BPA owned Transmission lines and associated Facilities comprising such Intertie, External Interconnection, or Network Path. Transmission Services uses the WECC base cases to develop the seed cases that are used to simulate scenarios in order to determine a TTC that ensures all transmission elements do not exceed their continuous rating as well as satisfying all planning criteria contingencies. Topology changes from new or retired facilities as well as updated load forecast assumptions are incorporated into the TTC studies. Outages are considered in setting the TTC; although, Long-Term sales are made using the all lines in service TTC, unless it has been determined that TTC has been significantly reduced for specific months to accommodate long-term outages or upgrades.

4.2 Firm Existing Transmission Commitments (ETC_{Firm})

The algorithm Transmission Services uses for its firm ETC determinations for Interties, External Interconnections, and Network Paths during the Planning Time Period is listed below, along with descriptions of each of the elements in the algorithm:

$$ETC_{\text{Firm}} = \text{NITS} + \text{PTP} + \text{ROFR} + \text{GF} + \text{OS}$$

4.2.1 Network Integration Service (NITS)

Transmission Services uses the full amount of its Network Integration Transmission (NT) load forecasts except for the calculation of ATC on LaGrande in the west-to-east direction, in which federal generation serving grandfathered and Network Loads in Southern Idaho is netted against peak loads in that area.

4.2.2 Point-to-Point Service (PTP)

Transmission Services uses the full amount of Point-to-Point Service amounts.

4.2.3 Right of First Refusal (ROFR)

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.

4.2.4 Grandfathered Contracts (GF)

Transmission Services includes amounts from the following grandfathered contracts: Integration of Resources (IR) and Formula Power Transmission Service (FPT).

4.2.5 Other Services (OS)

Transmission Services includes amounts from other firm service contracts including, but not limited to, the following: agreements where Transmission Services provides Transmission Service to Investor-Owned Utility Loads located in Transmission Services' Balancing Authority Area, obligations to the United States Bureau of Reclamation (USBR) to serve its irrigation pumping load, and the return of power under the Columbia River Treaty.

4.2.6 BPA does not include counterflows in the determination of ATC for External Interconnections, Interties and Network Paths.

5. ATC Methodology for Network Flowgates

The algorithm Transmission Services uses for its firm ATC determinations for Network Flowgates during the Planning Time Period is listed below, along with descriptions of each of the elements in the algorithm:

$$ATC_{\text{Firm}} = TTC - ETC_{\text{Firm}}$$

5.1 Total Transfer Capability (TTC)

Transmission Services calculates reliability-based TTCs for all Network Flowgates using powerflow and transient stability studies to establish a reliability limit. The TTC for each Network Flowgate represents the flowgate capability of the BPA owned Transmission lines and associated Facilities comprising such Network Flowgate. Transmission Services uses the WECC base cases to develop the seed cases that are used to simulate scenarios in order to determine a TTC that ensures all transmission elements do not exceed their continuous rating as well as satisfying all planning criteria contingencies. Topology changes from new or retired facilities as well as updated load forecast assumptions are incorporated into the TTC studies. Outages are considered in setting the TTC for the Planning Time Period beyond 14 months although Long-Term sales are made using the all lines in service TTC, unless Planning has determined that TTC has been significantly reduced for specific months to accommodate long term outages or upgrades.

5.2 For Existing Transmission Commitments (ETC) calculations, Transmission Services models power flows representing various system conditions. Transmission Services uses subsequent power flow analysis to reflect new or changed system conditions.

5.2.1 The power flow model is a mathematical representation of the actual lines, transformers, loads, and generators that comprise the Federal Columbia River Transmission System. A key output of this model is a computation of how much power will flow over each element in the power system for the assumed load and generation levels.

5.2.2 Power flow analysis inherently includes counterflows, so the determination of ETC_{Firm} in the predominately constrained direction for each Network Flowgate is decreased by flows in the opposite direction.

5.2.3 At least once per calendar year, Transmission Services develops representative seasonal power flow cases for five and ten years out. This

process is referred to as the ATC Base Case Update and produces the baseline ATC referenced below.

- 5.2.4 Loads are reflected in the model as follows:
 - 5.2.4.1 Normal peak (1 in 2 year) non-coincidental load forecasts are used for all seasons in peak scenarios; and
 - 5.2.4.2 Off peak loads are used for all seasons in light-load scenarios.
- 5.2.5 Non-Federal generation levels are initially set at:
 - 5.2.5.1 The lower of contract demand or seasonal capability in peak scenarios; and
 - 5.2.5.2 Historic levels in light-load scenarios.
- 5.2.6 The Columbia Generating Station (formerly known as WNP-2) is initially assumed to be on-line at full load in the power flow cases in all seasons. Transmission Services deems the portion of the plant's output that is not covered under federal Point-to-Point (PTP) contract demand to serve all contracts that call out non-specific Federal projects as Points of Receipt (PORs).
- 5.2.7 Transmission Services then sets initial generation levels at each of the Federal hydro projects³ by first determining the nameplate for each project and then adjusting such nameplates by outages forecasted for the particular plants. Next in the month of August, the Lower Snake plants (Lower Granite, Lower Monumental, Little Goose, and Ice Harbor) are capped at the observed project outflow over the past ten Augusts, including spill amounts. Generation levels at the Libby, Hungry Horse, Dworshak, and Albeni Falls projects, however, are set based on the requirements set forth in the 2000 Biological Opinion. In addition, the generation levels at the Willamette Valley projects are set at low historical levels for each season.
- 5.2.8 Transmission Services then models multiple scenarios.
 - 5.2.8.1 Each of three different "zones" of Federal hydro resources is stressed to the generation levels described above and scales the generation at the remaining Federal hydro projects to match the sum of the demands for all contracts that call out nonspecific Federal hydroelectric projects as PORs after adjusting these demands for the portion served by Columbia Generating Station, Libby, Hungry Horse, Dworshak, Albeni Falls, and the Willamette Valley projects. The Federal PTP demands at each project are then added to this result to obtain the final assumed generation level for each Federal hydro project. The overall method for modeling the federal resources is referred to as the "Nameplate Adjusted Method".

³ Federal hydro projects include: Grand Coulee, Chief Joseph, Dworshak, Albeni Falls, Libby, Hungry Horse, Lower Granite, Lower Monumental, Little Goose, Ice Harbor, McNary, John Day, The Dalles, Bonneville, Willamette Valley Projects.

- 5.2.8.2 The three “zones” that are stressed individually in the scenarios are made up of the following projects:
- (i) Upper Columbia zone: Grand Coulee and Chief Joseph;
 - (ii) Lower Snake zone: Lower Monumental, Lower Granite, Little Goose, and Ice Harbor; and
 - (iii) Lower Columbia zone: McNary, John Day, Dalles, and Bonneville.
- 5.2.8.3 Wind generators identified as PORs in PTP contracts and that require transmission service on the Federal transmission system are set at the greater of the following:
- (i) Modeled on at 100 percent of the contract demand for the wind generator; or
 - (ii) Modeled off and replaced by the “Balancing Logic Method” described in 5.2.8.6 below.
- 5.2.8.4 The Flowgate impact of wind generators identified as Designated Network Resources in NT contracts or in the NT Resources⁴ Memorandum of Agreement and that require Transmission Service on the Federal Transmission System are determined on a Flowgate by Flowgate basis, and set at the greater of the following:
- (i) Modeled on at 100 percent of the designated MW level for the wind generator; or
 - (ii) Modeled off and replaced, at 100 percent of the designated MW level for the wind generator, by “Nameplate Adjusted Method” Federal generators.
- 5.2.8.5 Return of power under the Columbia River Treaty is modeled at 100 percent of the treaty obligation and off.
- 5.2.8.6 If there is more generation than load in the power flow case after all exports and after all generation is modeled as described above, Transmission Services scales down the assumed generation levels to bring generation and Load into balance as follows:
- (i) In peak scenarios all generators are reduced *pro rata*, except for the stressed FCRPS zone, by the amount of excess generation; and
 - (ii) In off-peak scenarios, generation is reduced to reflect a merit-order dispatch, except for the stressed FCRPS zone⁵, which is modeled at forecasted light load hour outflow, including spill amounts.
- 5.2.9 A table documenting modeled generation levels is posted at the time of each ATC Base Case Update.

⁴ Memorandum of Agreement, Management of Federal Power Sales for Network Integration Transmission Service, MOA.

⁵ The off-peak scenarios do not stress the Upper Columbia zone.

- 5.2.10 The lowest ETC amount for each season, resulting from the modeled scenarios, becomes the base ETC. These representative seasonal values are linearly interpolated to determine the ATC values for the time period two to ten years out.
- 5.2.11 Transmission Services then calculates an uncertainty margin that is the difference between the lowest ETC amount and the highest ETC amount resulting from the above described generation scenarios. This uncertainty margin is added to the base ETC to determine the ETC_{Firm}.

6. Management of ATC between Annual Planning Baseline Studies

- 6.1 When a new TSR is granted or a Network Integration Transmission Service (NT) forecast is accepted, the final ATC for each Long-Term BPA Constraint Flowgate (except those with *de minimis* impact) will be decremented by the new transaction's impact on the constraint.
 - 6.1.1 Final ATC = baseline ATC - sum of new transactions' impact on the constraint.
 - 6.1.2 Impacts of new transactions are determined per the Transmission Service Requests Evaluation business practice.
- 6.2 When the next baseline ATC amounts are calculated, the impacts of any new transactions will be included in the calculation of ETC_{Firm}, except in the following cases, in which the impacts will continue to be reflected in the sum of the new transactions as described above:
 - 6.2.1 Conditional Firm reservations; and
 - 6.2.2 NT forecasts for which BPA is encumbering ATC using PTFDs.