

# Available Transfer Capability (ATC) Methodologies for the Planning Time Period, Version 13

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## Table of Contents

1. Purpose .....	1
2. Definitions .....	1
3. Introduction .....	2
4. ATC Methodology for the External Interconnections, Interties and Network Paths.....	2
5. ATC Methodology for Network Flowgates .....	4
6. Modifications to ATC Methodologies.....	8
7. Management of ATC between Annual Planning Baseline Studies .....	8
8. Impacts of LTF Requests and Accepted NT Resource Forecasts .....	9

## 1. Purpose

The Available Transfer Capability (ATC) methodologies set forth in this document are Transmission Services’ methodologies for calculating ATC on the 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. Beyond month 14 on the network flowgates, the ATC 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 Deferral Request: Request to defer or apply for extension of the start of long-term firm (LTF) Transmission Service, per section 17.7 in the OATT.
- 2.2 Evaluated Point-of-Delivery (POD)/Point-of-Receipt (POR): The POD(s) and/or



POR(s) used to determine the impact of a LTF Request.

- 2.3 Original LTF Request: Initial request for reservation of LTF Transmission Service submitted on OASIS to Transmission Services.
- 2.4 Planning Time Period: The time horizon beyond 13 months.
- 2.5 PTDF (Power Transfer Distribution Factor) Calculation: An equation based on a POD, POR, and Transmission Demand used to determine the impacts to Network Flowgates (POR PTDF<sub>A</sub> - POD PTDF<sub>A</sub>) \* Transmission Demand = impact to Flowgate
- 2.6 Renewal Request: Request to renew an expiring LTF Transmission reservation for the long-term, per section 2.2 of the OATT.
- 2.7 Requested POD/POR: The Source/Sink provided in a LTF Request submitted on BPA's OASIS.

### 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 Interconnections<sup>1</sup>), Interties<sup>2</sup>, delivery Facilities, subgrid Facilities, and generation interconnection Facilities.

### 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:

$$ATC_{Firm} = TTC - ETC_{Firm} - TRM$$

#### 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. 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

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<sup>1</sup> 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.

<sup>2</sup> Southern Intertie (AC Intertie and DC Intertie) and Montana Intertie.

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<sub>Firm</sub>)

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:

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

##### 4.2.1 Network Integration Service (NITS)

Except for the following two netting adjustments, Transmission Services uses the full amount of its Network Integration Transmission (NT) load forecasts:

4.2.1.1 For West of Hatwai, must-run federal generation from the following eastside hydro resources: Dworshak, Hungry Horse, Libby, and Albeni Falls; is netted against Network Loads in that area to calculate ATC for West of Hatwai in the east to west direction.

4.2.1.2 For LaGrande, federal generation serving grandfathered and Network Loads in Southern Idaho is netted against peak loads in that area to calculate the ATC for LaGrande in the west-to-east direction.

##### 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.

#### 4.3 Transmission Reliability Margin (TRM)

Transmission Services sets aside transfer capability for TRM during the Planning Time Period only on the Northern Intertie.

## 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:

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

#### 5.1 Total Transfer Capability (TTC)

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 projected 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 At least once per calendar year, Transmission Services develops representative seasonal power flow cases for two years out and these representative seasons are used for the time period two to ten years out.

5.2.3 Normal peak (1 in 2 year) load forecasts are used for all seasons. The load growth rate used in the load forecasts aligns with regional studies.

5.2.4 Non-federal non-wind generators requiring transmission service on the Federal transmission system are set at either their contract demand or seasonal capability, whichever is lower.

5.2.5 Non-Federal resources that do not require Transmission Service from Transmission Services are set at levels obtained from such resource owners

as part of Transmission Services' standard process for power system planning studies.

- 5.2.6 Transmission Services sets initial federal generation levels using a multiple step process. The Columbia Generating Station (formerly known as WNP-2) is 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 sets generation levels at each of the Federal hydro projects<sup>3</sup> 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 the minimum levels seen by season during Calendar Year 2001<sup>4</sup>. See table below for such levels.

**Willamette Valley Projects 2001 Generation Seasonal Averages<sup>4</sup>**

	Winter	Spring	Summer	Fall
Big Cliff	8	15	3	3
Cougar	8	14	11	14
Detriot	40	44	48	41
Dexter	4	10	0	0
Foster	7	12	4	7
Green Peter	28	24	23	23
Hills Creek	8	8	10	7

<sup>3</sup> 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.

<sup>4</sup> Calendar Year 2001 was used because its averages were the lowest of the last 6 years. Winter: December - March; Spring: April - May; Summer: June - September; Fall: October - November.

Lookout Point	35	45	38	23
Lost Creek <sup>5</sup>	15	24	21	10
<b>Sum</b>	<b>153</b>	<b>196</b>	<b>158</b>	<b>118</b>

5.2.8 Transmission Services then models multiple generation 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 non-specific 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”.

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”.

5.2.8.4 The Flowgate impact of wind generators identified as Designated Network Resources in NT contracts or in the NT Resources<sup>6</sup> Memorandum of Agreement and that

<sup>5</sup> Most recent data for Lost Creek is 1996. Data between 1996 and 2001 for Hills Creek and Lookout Point followed a pattern that was applied to Lost Creek’s 1996 data to arrive at numbers used here. Hills Creek and Lookout Point were used as models due to their regional proximity to Lost Creek.

<sup>6</sup> Memorandum of Agreement, Management of Federal Power Sales for Network Integration Transmission Service, MOA No. 02TX-10925.

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 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 using the pro rata method, except for the stressed FCRPS zone, by the amount of excess generation to bring generation and Load into balance.

5.2.9 The lowest ETC amount resulting from the above described generation scenarios becomes the  $ETC_{Firm}$ .

5.3 Transmission Services holds an uncertainty margin that is the difference between the  $ETC_{Firm}$  and the highest ETC amounts resulting from the above described generation scenarios.

5.4 The Network Flowgates do not necessarily represent all Transmission lines across that particular constrained portion of the power system. In the planning power flow studies for determining Planning ETC and TTC for the Network Flowgates, Transmission Services accounts for power flow across Transmission Services' Facilities only. The flows on all Facilities for several constraints follow. The information contained in the following chart is not intended to establish a formal allocation between Transmission Services and other Transmission Owners.

Constraint	Case				
	MAY04M3 (MW)	JUN04M3 (MW)	A04M3 (MW)	J04M3 (MW)	J04EHM3 (MW)
From Substation- To Substation Voltage					
West of McNary	2598	2511	2310	1852	1788
<u>Coyote Springs-Slatt</u> 500kV	1801	1733	1578	1145	971
<u>McNary-Ross</u> 345kV	295	284	260	380	450
<u>McNary-Horse Heaven</u> 230kV	313	314	296	160	193
<u>McNary-Boardman Tap</u> 230kV	189	181	176	168	174
South of Allston	2479	2504	2478	766	208

Allston-Keeler 500kV	1369	1401	1420	122	-239
Lexington-Ross 230kV	292	257	250	165	91
Allston-St. Helens 115kV	75	78	76	42	35
Astoria-Seaside 115kV	-12	-8	-7	-27	-36
Trojan-St. Mary's 230kV	286	292	287	129	77
Trojan-Rivergate 230kV	229	240	236	83	59
Merwin- St. Johns 115kV	151	159	128	150	111
Clatsop-Lewis & Clark 115kV	89	85	88	102	110
<b>South of Napavine</b>	<b>1889</b>	<b>1908</b>	<b>1996</b>	<b>550</b>	<b>600</b>
Napavine-Allston #1 500kV	973	982	1025	325	349
Paul-Allston #2 500kV	916	926	971	225	251
Notes: (a) The "from" and "to" substations are listed in the direction of positive flow; (b) the underlined substation is where the flow is metered; and (c) numbers are rounded.					

## 6. Modifications to ATC Methodologies

- 6.1 When modifying the ATC 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):
- 6.1.1 The arithmetic formulas described in the ATC methodology (sections 4 and 5) above;
  - 6.1.2 The Load forecasts used in power flow base cases; and
  - 6.1.3 The generation dispatch levels of Federal hydro projects for NT Load service described in the section 5.

## 7. Management of ATC between Annual Planning Baseline Studies

- 7.1 Transmission Services will recompute the baseline ATC amounts for the Network Flowgates for the Planning Time Period at least once per year.
- 7.2 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 per the Impacts of Long-Term Firm Requests and Accepted NT Resource Forecasts section below.
- 7.3 A Long-Term Firm TSR will be granted if there is:
- 7.3.1 Sufficient ATC 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,

- 7.3.2 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
- 7.3.3 No subgrid or local area issue(s) are identified.
- 7.4 Where there is insufficient ATC 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.
- 7.5 When a new TSR is granted or a Network Integration Transmission Service (NT) resource forecast is accepted, the final ATC for each Flowgate (except those with *de minimis* impact) will be decremented by the new transaction's use of the Flowgate:  
 Final ATC = baseline ATC - sum of new transactions' use of the Flowgate
- 7.6 When the next baseline ATC amounts are calculated, any new Long-Term Firm arrangements, including those with *de minimis* impacts, will be included in the calculation of  $ETC_{Firm}$ , except in the following cases:
  - 7.6.1 Conditional Firm reservations are not included in the  $ETC_{Firm}$  values;
  - 7.6.2 Long-Term Firm arrangements whose service commencement date is later than the study time period; and
  - 7.6.2 NT resource forecasts for which BPA is encumbering ATC are not included in the  $ETC_{Firm}$  values.
  - 7.6.3 The above impacts will continue to be reflected in the sum of the new transactions as described in section 7.5.

## 8. Impacts of LTF Requests and Accepted NT Resource Forecasts

LTF Requests for Transmission Service impacting Network Flowgates are analyzed using the following methodology:

- 8.1 PTDF calculations are prepared for each LTF Request RECEIVED and for each LTF NT resource forecast accepted, to determine the impacts of the requested service on Network Flowgates, according to the following matrix:

	Request/Forecast Type	Evaluated POR	Evaluated POD
8.1.1	Original LTF PTP	Requested POR	Requested POD
8.1.2	NT (for service to New Network Load from a non-wind resource)	Requested POR	Requested POD
8.1.3	NT (for service to New Network Load from a wind resource) <sup>7</sup>	(A) Requested POR	(A) Requested POD
		(X) FCRPS	(X) Requested POD

	Request/Forecast Type		Evaluated POR	Evaluated POD
8.1.4	PTP Redirect <sup>8</sup>		(A) Requested POR	(A) Requested POD
			(B) Existing POR	(B) Existing POD
8.1.5a	NT (for service to existing Network Load from a non-wind resource)		Requested POR	Displaced Designated Network Resource <sup>9</sup> or FCRPS
8.1.5b	NT (for service to existing Network Load from an existing non-wind designated Network Resource through a new Transfer POD on BPA's		Existing POD	Requested POD
8.1.6	NT (for service to existing Network Load from a wind resource or an NT forecasted resource) <sup>10</sup>		(A) Requested POR	(A) Requested POD
			(B) Displaced Designated Network Resource <sup>9</sup> or FCRPS	(B) Requested POD
8.1.7	Deferral or Renewal Competition <sup>8</sup>		(A) Challenger's Requested POR <sup>11</sup>	(A) Challenger's Requested POD
			(B) Defender's Requested POR <sup>11</sup>	(B) Defender's Requested POD
Notes: <sup>7</sup> The impact to each Flowgate is deemed to be the larger of either the Path (A) or Path (X) impacts. <sup>8</sup> Impacts of Path (B) are subtracted from the impacts of Path (A) = (A-B). <sup>9</sup> If no Displaced Designated Network Resource is identified in the customer comment field of the TSR, Transmission Services will assume FCRPS generation is being displaced. <sup>10</sup> The incremental impact to each Flowgate is the larger of either the Path (A) or Path (B) impacts minus the impacts of Path (B) = (A or B) - B = (A-B) or 0 MW, whichever is larger. <sup>11</sup> If the POR is associated with a wind resource designated as a Network Resource, the impact to each Flowgate is determined by using either the Requested POR or FCRPS, whichever results in the largest impact.				

## 8.2 When a Request is CONFIRMED:

- 8.2.1 The non-*de minimis* positive PTDf calculation impacts will be decremented from posted ATC values;
- 8.2.2 Any negative PTDf calculation impacts will be dealt with as follows:
  - 8.2.2.1 The results of steps 8.1.1, 8.1.2, 8.1.3, and 8.1.6 will not be decremented to increase posted ATC values.
  - 8.2.2.2 The results of steps 8.1.4, 8.1.5, and 8.1.7 will be decremented to increase posted ATC values.

- 8.2.3 Transmission Services will review the ATC impacts for requests authorized based on the results of a Cluster Study or a System Impact Study and determine how those impacts should affect posted ATC values. In doing so, Transmission Services will model those impacts in a consistent and non-discriminatory manner and post a notice on the ATC Methodology webpage at [http://www.transmission.bpa.gov/business/atc\\_methodology/](http://www.transmission.bpa.gov/business/atc_methodology/) explaining how it is modeling those impacts between base cases. Transmission Services will incorporate the impacts into the next base case update.
- 8.3 When an NT resource forecast is accepted, the non-*de minimis* positive PTFDF calculation impacts will be decremented from posted ATC values.
- 8.4 NT Requests for Generation Behind the Meter
  - 8.4.1 Refer to the Generation Imbalance Service Business Practice for more information on generation behind the meter.
  - 8.4.2 For generation of which all of the energy produced is dedicated to serving the Load Serving Entity's Load on the Load side of BPAT's POD meter and a NT Request is not required, the generation behind the meter is deemed to have no Network Flowgate impacts.
  - 8.4.3 For generation of which only a portion of the energy produced is dedicated to serving the Load Serving Entity's Load on the Load side of BPAT's POD meter:
    - 8.4.3.1 The NT Request for the portion of the energy produced that is dedicated to serve the Load Serving Entity's Load on the Load side of BPAT's POD meter will be deemed to have no Network Flowgate impacts.
    - 8.4.3.2 The NT Request for the portion of the energy produced that is used for delivery outside of the Load Serving Entity's system and impacting Network Flowgates will be assessed using the relevant methodology in Step 8.1.
- 8.5 Evaluation of potential challengers for the demand capacity of Deferral and Renewal requests
  - 8.5.1 PTFDF calculations are prepared for each Deferral Request CONFIRMED and for each Renewal Request RECEIVED, to determine whether challengers for its demand capacity exist.
    - 8.5.1.1 The Deferral or Renewal Customer is hereafter referred to as the "Defender".
    - 8.5.1.2 The Customer that is determined to have a competing request is hereafter referred to as the "Challenger".
  - 8.5.2 There must be sufficient ATC to accommodate the impacts determined in the PTFDF calculations to conclude that the Challenger can be offered a Contingent Contract in a MW amount, including a partial offer that is at least equal to the amount of MWs that would be released by the Defender.

- 8.5.3 The Evaluated POD(s)/POR(s) used to prepare the PTDF calculation(s) will be determined based on Step 8.1.7.
- 8.5.4 If the LTF Renewal Request is CONFIRMED, there will be no change to posted ATC, as posted value reflects the assumption that roll-over rights will be exercised.
- 8.5.5 If the LTF Deferral Request remains CONFIRMED, there will be no change to posted ATC, except that ATC will be released for the period of the Deferral.
- 8.5.6 If the Challenger's Request is CONFIRMED, the positive PTDF calculation impacts will be decremented from ATC values; any negative impacts will also be decremented, to increase the posted values.