Available Transfer Capability

Implementation Document

(ATCID)

Reference: NERC Standard MOD-001a

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Denotes revision |

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1. Purpose

The purpose of BC Hydro's Available Transfer Capability Implementation Document (ATCID) is to address the requirements of the North American Electric Reliability Corporation (NERC) Mandatory Reliability Standard MOD-001 Available Transmission System Capacity adopted for British Columbia. This ATCID identifies the methodologies used by BC Hydro for determining the Total Transfer Capability (TTC) and calculating Available Transfer Capability (ATC) for each ATC Path in the BC Hydro System for a time horizon up to 13 months including the current month.

2. Effective Date

Effective date: **23 May 2019**

3. Definitions

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

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

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

CBM_s is the Capacity Benefit Margin for the ATC Path that has been scheduled during that period.

$Counterflows_F$ are adjustments to firm Available Transfer Capability as determined by the Transmission Service Provider and specified in their ATCID.

$Counterflows_{NF}$ are adjustments to non-firm Available Transfer Capability as determined by the Transmission Service Provider and specified in its ATCID.

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

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

GF_{NF} is the non-firm capacity set aside for grandfathered 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 tariff."

$NITS_F$ is the firm capacity reserved for Network Integration Transmission Service serving Load, to include losses, and Load growth, not otherwise included in Transmission Reliability Margin or Capacity Benefit Margin.

$NITS_{NF}$ is the non-firm capacity set aside for Network Integration Transmission Service serving Load (i.e., secondary service), to include losses, and load growth not otherwise included in Transmission Reliability Margin or Capacity Benefit Margin.

NL_F is the firm capacity set aside to serve peak Native Load forecast commitments for the time period being calculated, to include losses, and Native Load growth, not otherwise included in Transmission Reliability Margin or Capacity Benefit Margin.

OS_F is the firm capacity reserved for any other service(s), contract(s), or agreement(s) not specified above using Firm Transmission Service as specified in the ATCID.

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 as specified in the ATCID.

$Postbacks_{F}$ are changes to firm Available Transfer Capability due to a change in the use of Transmission Service for that period, as defined in Business Practices.

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

PTP_{F} is the firm capacity reserved for confirmed Point-to-Point Transmission Service.

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

ROR_{F} is the firm capacity reserved for Roll-over rights for 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.

System Operating Limit (SOL) is the value (such as MW, MVar, Amperes, Frequency or Volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria.

TRM is the Transmission Reliability Margin for the ATC Path 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.

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

4. TTC Methodology

The TTC methodology selected for each ATC Path is as shown in Table 1 below.

Table 1

ATC Path Name	Methodology	TTC (MW)	Comment
BCHA – BPAT	MOD-029 Rated System Path	3150	A WECC Rated Path (Path 3) with an Accepted Rating of 3150 MW.
BPAT – BCHA	MOD-029 Rated System Path	3000	A WECC Rated Path (Path 3) with an Accepted Rating of 3000 MW.
BCHA – AESO	MOD-029 Rated System Path	1200	A WECC Rated Path (Path 1) with an Existing Rating of 1200 MW.
AESO – BCHA	MOD-029 Rated System Path	1000	A WECC Rated Path (Path 1) with an Existing Rating of 1000 MW.
FBC – BCHA	MOD-029 Rated System Path	811	Kootenay 230 kV System Development Project.
BCHA – FBC	MOD-029 Rated System Path	811	Kootenay 230 kV System Development Project. The flow on this ATC Path is in a direction counter to the prevailing flow of the FBC – BCHA Path. Its TTC is set based on MOD-029 R2.2.

BC Hydro will use the TTC value for each ATC Path shown in Table 1 to calculate ATC for that Path unless BC Hydro has determined that the System Operating Limit (SOL) for the respective ATC Path is lower than its TTC value, in which case BC Hydro will use the SOL as TTC.

BC Hydro also performs on-going SOL and TTC evaluations (forecasts) and for time periods (hourly, daily, weekly and monthly) when there are changes to the transmission system topology either due to planned or unplanned outages, and load/generation forecast including generation outages. In addition, BC Hydro coordinates with AESO and BPA to ensure TTC for the inter-ties are set at the levels that take into account its neighbouring systems' capabilities on a day-ahead and hour-ahead basis.

When calculating TTC, BC Hydro uses assumptions no more limiting than those used in the planning of operations for the corresponding time period studied, provided that such planning of operations has been performed for that period.

5. ATC Calculations

BC Hydro calculates ATC values for each ATC Path as described below:

- At least once per hour: hourly values for at least the next 48 hours
- At least once per day: daily values for at least the next 31 calendar days
- At least once per week: monthly values for at least the next 12 months

The ATC values are calculated using the following algorithms:

5.1. ATC Algorithms

5.1.1. Generic ATC Algorithms

$ATC_F = TTC – ETC_F – CBM – TRM + Postback_F + Counterflow_F$

$ATC_{NF} = TTC – ETC_F – ETC_{NF} – CBMs – TRM_U + Postback_{NF} + Counterflow_{NF}$

Where:

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

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

5.1.2. Capacity Benefit Margin (CBM)

BC Hydro does not set aside CBM at this time.

5.1.3. Transmission Reliability Margin (TRM)

BC Hydro sets aside TRM and TRM_U for each ATC Path as shown in Table 2 and documented in the published TRMID. The TRMID can be found at:

http://www.bchydro.com/energy-in-bc/operations/transmission/transmission-system/atc-methodology.html

Table 2

ATC Path Name	TRM (MW)	Minimum TRM_U Value (MW)
BCHA – BPAT	Higher of (TTC – 2350, 50)	50
BPAT – BCHA	Higher of (TTC – 1950, 50)	50
BCHA – AESO	Higher of (TTC – 480, 65)	65
AESO – BCHA	Higher of (TTC – 535, 65)	65
FBC – BCHA	0	0
BCHA – FBC	0	0

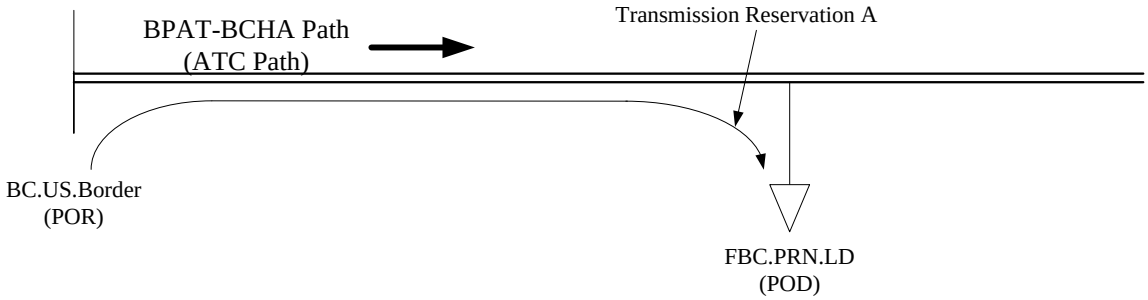
5.1.4. Postbacks and Counterflows

For calculating Firm ATC, BC Hydro does not include counterflows. BC Hydro does include counterflows when calculating pre-schedule Non-firm ATC to allow more transactions to flow and for congestion management on the prevailing flow direction. BC Hydro also includes unused ETC_F, as $Postbacks_{NF}$, and counterflows when calculating real-time Non-firm ATC to allow more transactions to flow and for congestion management on the prevailing flow direction.

5.2. Transfer Capability Allocation Process

Currently, BC Hydro defines six ATC Paths (see Table 1), for which on-going SOL/TTC and ATC are calculated. Within the BC Hydro System, there are PORs created to represent the bulk system, regional systems or generators, and PODs created to present system load or individual loads connected to the transmission system. These PORs and PODs have been created to facilitate the ease of scheduling and settlement for internal transactions. Transfer capability from these PORs or PODs to the system have been planned and constructed under normal planning process or Interconnection Processes to sufficiently accommodate the specific generator or load. Power transfers between these PORs and PODs are part of generation resource and load forecast assumptions used in the base cases for calculating SOL/TTC.

For example:



Transfer capability for the radial line connecting FBC.PRN.LD and the system has been planned and constructed to meet the peak load. Transmission Reservation A from BC.US.Border to FBC.PRN.LD impacts ATC on the BPAT-BCHA Path, and is counted as ETC when calculating ATC for this ATC Path. Such and similar transmission reservations are tracked, and used for calculating ATC by BC Hydro MODS, an OATI hosted system.

6. Information Sharing

BC Hydro uses WECC base cases that represent Western Interconnection's generation and transmission for calculating TTC. BC Hydro also performs on-going SOL and ATC calculations using data provided by Alberta Electric System Operator (AESO), Bonneville Power Administrator (BPA) and FortisBC. In reciprocity, BC Hydro provides similar data to AESO and BPA for their use in calculating transfer or Flowgate capability.

BC Hydro will provide a copy of this ATCID and revisions before they take effect, to the following entities:

- Each Planning Coordinator associated with the BC Electric System, Alberta Electric System, and BPA System
- Reliability Coordinator associated with the BC Electric System, Alberta Electric System, and BPA System
- Transmission Operators in the BC Electric System, Alberta Electric System, and BPA System

In addition, BC Hydro will provide, within 30 calendar days of receiving a request by any Transmission Service Provider, Planning Coordinator, Reliability Coordinator, or Transmission Operator, with transmission and generation data used by BC Hydro for calculating TTC and ATC, for up to 13 months into the future, and other available data in a format maintained by BC Hydro; subject to confidentiality and security requirements, BC Hydro will make such data available on a schedule specified by the requestor but no more frequently than once per hour.

Document Change History

Issue	Reviewer	Reason for Issue	Date
0		Initial Implementation.	21 November 2011
1		Correcting an omission	30 November 2011
2		Change in TRM amount required for transmission system topology uncertainty	25 June 2012
3		Change in Section 4, Table 1, for BPAT-BCHA TTC. Updated for WECC Path Rating limit as the maximum (TTC).	31 January 2016
4		Table 1 – revised typo in one of the ATC path names Section 4 – revised for TTC reductions less than table values for other operating needs. Section 5.1.3 Added hyperlink to the published TRMID. Revised values in Table 2 to match the published TRMID. Section 6 – revised BC Control Area to BC Electric System.	23 May 2019