Phase I/II HVDC-TF

TTC, CBM, TRM and ATC METHODOLOGY

Version 1.1

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Table of Contents

1.0 INTRODUCTION

1.1 Transmission Providers Include

This document applies to the calculation of the Phase I/II HVDC Transmission Facilities (Phase I/II HVDC-TF) transfer capability by the Transmission Providers listed below. This list of Transmission Providers (who are also known as Schedule 20A Service Providers) represents those Interconnection Rights Holders that offer its portion of the Phase I/II HVDC-TF transmission rights for sale pursuant to Schedule 20A - Point-to-Point Service over the Phase I/II HVDC Transmission Facilities (Schedule 20A) to Section II of the ISO Tariff. Such transmission service is offered on the respective Transmission Provider Page (http://oasis.iso-ne.com/documents/Phase-I-II-percentages.htm) as part of the ISO Open Access Same-Time Information Service (OASIS) Node.

Schedule 20A Service Providers:

- Bangor Hydro-Electric Company (BHE)
- Boston Edison Company (BECO)
- Cambridge Electric Light Company (CELC)
- Central Maine Power Company (CMP)
- Central Vermont Public Service Corporation (CVPS)
- Commonwealth Electric Company (COM)
- Green Mountain Power Corporation (GMP)
- New England Power Company (NEP)
- Northeast Utilities Companies (NU)
- The United Illuminating Company (UICO)
- Vermont Electric Cooperative, Inc. (VECT)

1.2 Scope of Document

This document addresses the following items with respect to the Phase I/II HVDC-TF between Hydro-Quebec and ISO New England for the Schedule 20A Service Providers:

- Total Transmission Capability (TTC) methodology
- Available Transmission Capability (ATC) methodology
- Use of Transmission Reliability Margin (TRM)
- Use of Capacity Benefit Market (CBM)

1.3 Overview of Phase I/II HVDC-TF

The Phase I/II HVDC-TF is a 2,000 MW HVDC tie line in New England that interconnects with the Hydro-Québec Control Area in the Province of Québec. This HVDC line has one termination point in New England (with paired operation with complementary facilities in Québec). The specific facilities in New England are the Sandy Pond HVDC Terminal, which interconnects Central Massachusetts and the Nicolet and/or Radisson HVDC terminals of Hydro-Québec

Additional information on the Phase I/II HVDC-TF can be found at: **http://oasis.iso-ne.com/documents/hq.htm**

1.4 Definitions

Balancing Authority (BA): The responsible entity that integrates resource plans ahead of time, maintains load-interchange-generation balance within a Balancing Authority Area, and supports Interconnection frequency in real time.

Balancing Authority Area: The collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The Balancing Authority maintains load-resource balance within this area.

Export: ISO New England to Hydro-Quebec

Import: Hydro-Quebec to ISO New England

Operating Horizon (OH): For the purposes of this document,

- CVPS resets the OH at 16:00 eastern prevailing time each day. At that time the OH spans from 16:00 through midnight two days out for a total of 56 hours. As time progresses the total hours remaining in the OH decreases until 16:00 the following day when the OH is once again reset to 56 hours.

- All SSPs (except CVPS) individually reset their OHs at noon eastern prevailing time each day. At that time the OH spans from noon through midnight of the next day for a total of 36 hours. As time progresses the total hours remaining in the OH decreases until noon the following day when the OH is once again reset to 36 hours.

Planning Horizon (PH): For the purposes of this document, PH for all SSPs is any period outside of the OH.

2.0 PHASE I/II HVDC-TF TOTAL TRANSFER CAPABILITY (TTC)

The Total Transfer Capability (TTC) for the Phase I/II HVDC-TF is calculated by ISO New England and posted on the ISO New England OASIS Node. Therefore, all requirements associated with the documentation of TTC methodology are addressed in Sections 1 and 3 of the ISO New England document which can be viewed at the following link: (http://www.iso-ne.com/trans/ops/limits/iso_ne_ttc_atc_method.doc).

3.0 PHASE I/II HVDC-TF AVAILABLE TRANSFER CAPABILITY (ATC)

3.1 General

NERC standard MOD-001 defines the required items to be identified when describing a Transmission Provider's ATC methodology. However, several of those items are not applicable to the Phase I/II HVDC-TF due to the fact that it is a DC facility and sinks into a region where advance transmission service is not required. Because of this arrangement, loop flow is not an issue; and since associated regional transmission service is not sold in advance of real-time flow within ISO New England, the flow on the Phase I/II HVDC-TF do not typically impact the calculation of any other transmission capability. As such, partial path reservations over the Phase I/II HVDC-TF and the ultimate source/sink of a reservation are not a concern. In addition, the Phase I/II HVDC-TF ATC calculations are not dependent on the level or location of customer demands.

Each Schedule 20A Service Provider based on its Planning and Operating Horizon timing guidelines will calculate Firm and Non-Firm Phase I/II HVDC-TF ATC separately.

3.2 Phase I/II HVDC-TF Capacity Benefit Market (CBM)

The use of Capacity Benefit Margin (CBM) on Phase I/II HVDC-TF is governed by the overall ISO New England approach to capacity planning requirements. Load Serving Entities (LSEs) operating in the New England Balancing Authority Area are required to arrange their Installed Capability requirements prior to the beginning of any given month in accordance with New England Wholesale market rules. As such, CBM on Phase I/II HVDC-TF for use in ATC calculations is zero and will not be included in the calculations of ATC. As long as this market design is in place in New England the CBM is set to zero.

3.3 Phase I/II HVDC-TF Transmission Reliability Margin (TRM)

The Transmission Reliability Margin (TRM) is the portion of TTC that cannot be used for reservation of Firm Transmission Service because of uncertainties in system operation. These calculated TRM values shall not be applied to non-firm transmission service.

The Phase I/II HVDC-TF interface is the largest contingency in the NYISO, PJM and New England control areas. As such, the Import TRM on the Phase I/II HVDC-TF is directly related to these operational limits which can be enforced at any time. The Import TRM is established such that Firm transmission service is not sold above this operational limit.

Phase I/II Import TRM = TTC – 1200 MW

Export TRM is established based on the methodology to account for operational uncertainties as described above

Phase I/II Export TRM = TTC – 500 MW

4.0 CALCULATION OF PHASE I/II HVDC-TF ATC

4.1 Calculation of Phase I/II HVDC-TF Firm ATC in the Planning Horizon

Firm Available Transfer Capability (Firm ATC) for an interface is the capability for Firm transmission reservations that remain after allowing for CBM and Firm Existing Transmission Commitments (ETC). As discussed above, Phase I/II HVDC-TF CBM is zero. Firm Transmission Service over the Phase I/II HVDC-TF that is available in the Planning Horizon (PH) includes: Yearly, Monthly, Weekly, and Daily.

Firm ETCs considered in the Firm ATC calculation are those Phase I/II HVDC-TF Firm transmission reservations with a status of Confirmed. Phase I/II HVDC-TF transmission reservations with any other status are not included in this Firm ATC calculation. Netting of Phase I/II HVDC-TF transmission reservations is not considered in the ATC calculation.

Mathematically, Firm ATC in the PH is calculated using the equation:

Firm ATC over Phase I/II HVDC-TF

$$Firm\ ATC = TTC - CBM - Firm\ ETC$$

4.1.1 Calculation of Phase I/II HVDC-TF Firm ATC in the Operating Horizon

Because Firm Phase I/II HVDC-TF transmission service is not offered in the Operating Horizon (OH); Phase I/II HVDC-TF Firm ATC in the OH is zero.

4.2 Calculation of Phase I/II HVDC-TF Non-Firm ATC

4.2.1 Calculation of Phase I/II HVDC-TF Non-Firm ATC in the Planning Horizon

Non-Firm ATC in the PH for an interface is the capability for N-n-Firm transmission reservations that remain after allowing for CBM, TRM and Firm and Non-Firm ETCs. As discussed above, the CBM for Phase I/II HVDC-TF is zero. Non-Firm ATC over the Phase I/II HVDC-TF that is available in the PH includes: Monthly, Weekly, Daily and Hourly.

Firm and Non-Firm Phase I/II HVDC-TF ETCs are only those Firm and Non-Firm transmission reservations with a status of Confirmed. Phase I/II HVDC-TF transmission reservations with any other status are not included in this Non-Firm ATC calculation. Netting Phase I/II HVDC-TF transmission reservations is not considered in this calculation.

Mathematically, Non-Firm ATC in the PH is calculated using the equation:

Non-Firm ATC = TTC – CBM – TRM – Firm and Non-Firm ETCs

4.2.2 Calculation of Phase I/II HVDC-TF Non-Firm ATC in the Operating Horizon

Non-Firm ATC in the OH is determined based on the remaining transmission capacity after deducting the scheduled amount of the confirmed Firm transmission reservation and any already confirmed Non-Firm transmission reservations. Non-Firm Transmission Services available in the OH include: Daily and Hourly.

Firm and Non-Firm ETCs considered in this ATC calculation are only those Firm and Non-Firm transmission reservations with a status of Confirmed. Transmission reservations with any other status are not included in this Non-Firm ATC calculation. Netting Phase I/II HVDC-TF transmission reservations is not considered in this calculation.

Calculation of Non-Firm ATC by CVPS: Any Phase I/II HVDC-TF transmission capacity that is not allocated to an implemented interchange transaction (i.e., e-Tag) for the associated time period will be released at the start of the CVPS OH and offered as Non-Firm capacity in the applicable OH.

Calculation of Non-Firm ATC by all other Schedule 20A Service Providers: Any Phase I/II HVDC-TF transmission capacity that is not allocated to an implemented interchange transaction (i.e., e-Tag) for the associated time period will be released at the start of the OH and offered as Non-Firm capacity in the applicable OH.

Mathematically, Non-Firm ATC in the OH is calculated using the equation:

Non-Firm ATC = TTC –CBM + unused CBM – TRM – Firm and Non-Firm ETCs + unscheduled Firm ETCs. ***Note: Since CBM is zero both of the CBM variables in the equation above are zero.***

4.3 Phase I/II HVDC-TF Negative ATC

Due to the calculation methods defined above, typically there should not be negative Phase I/II HVDC-TF ATC values posted.

5.0 POSTING OF PHASE I/II HVDC-TF ATC

5.1 Location Of Phase I/II HVDC-TF ATC Posting

Phase I/II HVDC-TF ATC values are posted separately on the Phase I/II HVDC-TF Transmission Provider's Page for those Schedule 20A Service Providers listed in Section 1 above. In addition, a summary of the level of service available from the Schedule 20A Service Providers is available on the New England OASIS web page (http://nepool.jtsin.com/OASIS/NODE) under the "IRH" button.

5.2 Updates To Phase I/II HVDC-TF ATC

When any of the variables in the Phase I/II HVDC-TF ATC equations change, the Phase I/II HVDC-TF ATC values are recalculated and immediately posted.

6.0 REFERENCES

- "NPCC CO-13 Whitepaper on Regional Methodology and Guidelines for Forecasting TTC and ATC", December 2005 working draft.
- ISO New England Inc. Transmission, Markets and Services Tariff, Section II - ISO New England Open Access Transmission Tariff, Attachment C.
- North American Electric Reliability Council Standard MOD-001, "Documentation of TTC and ATC Calculation Methodologies", undated working draft.
- "ISO New England Calculation of TTC for External Interfaces and ATC for PTF interfaces, Version 1.0", July 2007.