Manitoba Hydro

Available Transfer Capability Implementation Document

(ATCID)

Version/Review Control

Version	Date	Signing Authority	Brief Description of Change/Review
1.0	April 1, 2011	M.D. Rheault, L.A. St Hilaire	Documentation of current practices.
2.0	May 16, 2011	M.D. Rheault, L.A. St Hilaire	Added reference to Seams Operating Agreement to section 6.4 and posting on OASIS of ATCID in section 7. Minor typographical corrections.
2.1	Jan 12, 2012	M.D. Rheault, L.A. St Hilaire	Updated Saskatchewan practice as per agreed upon terms for the Winter 2011-12 studies. Changed additional wording to add clarity.
3.0	July 23, 2014	M.D. Rheault	Reviewed complete document and updated to document new process.
4.0	December 23, 2014	M.D. Rheault	Added new Manitoba – Saskatchewan northern ATC path and added clarity throughout the document.
4.1	June 3, 2015	M.D. Rheault	Reference to TRMID is removed.

Table of Contents

1. Introduction

Manitoba Hydro has elected to use the Area Interchange Methodology as described in MOD-028-1 to calculate Available Transfer Capability (ATC) for each of the ATC paths described in this document.

This document, referred to as the ATCID (Available Transfer Capability Implementation Document) is presented as evidence of compliance with NERC Standards MOD-001-1 and MOD-028-1.

2. Manitoba Hydro ATC Paths

Manitoba Hydro has four ATC Paths that are used to offer transmission services:

- Manitoba – USA ATC Path
- Manitoba – Ontario ATC Path
- Manitoba – Saskatchewan Southern ATC Path
- Manitoba – Saskatchewan Northern ATC Path

This document describes Manitoba Hydro's current methodology used to calculate Total Transfer Capability (TTC) and Available Transfer Capability (ATC) on these ATC Paths.

2.1. Manitoba – USA ATC Path

The Manitoba – USA ATC path consists of four tie lines, namely:

- D602F - 500kV line from Dorsey Station to Forbes Station (Minnesota)
- L20D - 230 kV line from Letellier Station to Drayton Station (North Dakota)
- R50M - 230 kV line from Richer South Station to Moranville Station (Minnesota)
- G82R - 230 kV line from Glenboro South Station to Rugby Station (North Dakota)

The Manitoba – USA ATC Path is modeled with flow in either north or south directions: MHEX_N (flow into Manitoba) or MHEX_S (flow into USA).

2.2. Manitoba – Ontario ATC Path

The Manitoba – Ontario ATC Path consists of two transmission lines:

- K21W – 230 kV line from Whiteshell Station to Kenora Station (Ontario)
- K22W – 230 kV line from Whiteshell Station to Kenora Station (Ontario)

Each of these lines has a phase shifter that controls the flow within a ± 25 MW bandwidth. The Manitoba – Ontario ATC Path is modeled with flow in either direction: MH-ONT-E (flow into Ontario) and MH-ONT-W (flow into Manitoba).

2.3. Manitoba – Saskatchewan Southern ATC Path

The Manitoba – Saskatchewan Southern ATC path is made up of three transmission lines:

- R7B – 230 kV line from Reston Station to Boundary Dam Station (Saskatchewan)
- R25Y – 230 kV line from Roblin South Station to Yorkton Station (Saskatchewan)
- P52E – 230 kV line from The Pas Ralls Island Station to E.B. Campbell Station (Saskatchewan)

The Manitoba – Saskatchewan Southern ATC Path is modeled with flow in either direction: MH-SPC-E (flow into Manitoba) and MH-SPC-W (flow into Saskatchewan).

2.4. Manitoba – Saskatchewan Northern ATC Path

The Manitoba – Saskatchewan Northern ATC Path is made up of two transmission lines:

- I1F – 115 kV line from Border Station to Island Fall Station (Saskatchewan)
- I2F – 115 kV line from Border Station to Island Fall Station (Saskatchewan)

The Manitoba – Saskatchewan Northern ATC Path is modeled with flow in either direction: MH-SPC-IF-E (flow into Manitoba) and MH-SPC-IF-W (flow into Saskatchewan).

2.5. Other Interconnection Line

In addition to the four aforementioned ATC Paths, Manitoba Hydro and Hydro One jointly own the interconnected 115 kV line SK1, which connects Manitoba at Seven Sisters Station to Ontario at Clearwater Bay Station. Since this line cannot be used as a market facility in the Ontario energy market, SK1 is not recognized as an ATC Path. Manitoba Hydro can neither export nor import energy into or out of Ontario using this line. Normally open at the provincial boundary between Manitoba and Ontario, this interconnected line is only used to serve isolated load in either province during forced or planned outages on either side of the provincial boundary.

2.6. Manitoba Hydro ATC Calculation Schedule

Every hour of the day, Manitoba Hydro calculates ATC values for each ATC Path according to the schedule outlined in the table below.

Horizon	Time Range	Increment
Operating *	0 – 48	Hourly
Planning I	49 – 168	Hourly
Planning II	8 – 31	Daily
Study	2 - 36	Monthly

* Operating horizon includes current day and next day information (scheduling horizon and beyond).

In addition to these hourly calculations, ATC is recalculated when Transmission Service Requests (TSR) are submitted or their status is modified such that their impact upon ATC must be removed or recalculated. As a result, ATC values may be updated more frequently than the schedule identified in the table above. Any updated ATC values are then available for use in evaluating subsequent TSRs.

2.7. Source and Sink Information

Manitoba Hydro lists the following Source and Sink points on the Manitoba Hydro OASIS:

Source	Sink	Description
ALTE	ALTE	Alliant Energy East
ALTW	ALTW	Alliant Energy West
AMIL	AMIL	Ameren – Illinois
AMMO	AMMO	Ameren – Missouri
BREC	BREC	Big Rivers Electric Corp
CIN	CIN	Cinergy Corporation
CONS	CONS	Consumers Energy
CWLD	CWLD	Columbia Water & Light
CWLP	CWLP	City Water, Light & Power
DECO	DECO	ITC Transmission
DPC	DPC	Dairyland Power Cooperative
GRE	GRE	Great River Energy
HE	HE	Hoosier Energy
IPL	IPL	Indianapolis Power & Light

Source	Sink	Description
MDU	MDU	Montana – Dakota Utilities Co.
MEC	MEC	MidAmerican Energy Co.
MGE	MGE	Madison Gas and Electric
MHEB	MHEB	Manitoba Hydro
MISO	MISO	Midcontinent Independent System Operator
MP	MP	Minnesota Power
MPC	MPC	Minnkota Power Cooperative
MPW	MPW	Muscatine Power and Water
NIPS	NIPS	Northern Indiana Public Service Company
NSP	NSP	Xcel Energy
OTP	OTP	Otter Tail Power
IESO	IESO	Independent Electricity System Operator
SIGE	SIGE	Southern Indiana Gas & Electric Company
SIPC	SIPC	Southern Illinois Power Cooperative
SMP	SMP	Southern Minnesota Municipal Power Agency
SPC	SPC	SaskPower
SPCN	SPCN	SaskPower – Island Falls
UPPC	UPPC	Upper Peninsula Power Co.
WEC	WEC	Wisconsin Electric Power Company
WPS	WPS	Wisconsin Public Service Corporation
MIUP	MIUP	Michigan Upper Peninsula

2.8. POR and POD Information

When making a transmission service reservation on the Manitoba Hydro OASIS, the following POR/PODs are used:

POR/POD Name	POR/POD Type	Model Mapping
MHEB	POR/POD	Manitoba Hydro
MHEB.IMO	POR/POD	The Manitoba – Ontario Border
MHEB.MAPP	POR/POD	The Manitoba – USA Border for Minnkota transactions
MHEB.MISO	POR/POD	The Manitoba – USA Border for MISO transactions
SPC	POR/POD	The Manitoba-Saskatchewan Border for the Saskatchewan Southern ATC path.
MHEB.IF	POR/POD	The Manitoba-Saskatchewan Border for the Saskatchewan Northern ATC path.

3. Establishing Total Transfer Capability (TTC) and Transmission Reliability Margin (TRM)

3.1. Modeling data

Manitoba Hydro is a member of the MRO (Midwest Reliability Organization) Model Building Subcommittee. As a member of the MRO, Manitoba Hydro is responsible to submit model building data for their transmission system in conformance with the MRO's annual data request. The modeling data includes, but is not limited to, system topology, forecasted peak load for the period, facility ratings for generation and transmission assets, long term planned outages, new facilities installed on the system during individual time horizons, facilities retired from the system, and expected power transfers with neighboring areas. Once the MRO receives the modeling data from all members in the region, the MRO prepares a powerflow model and distributes this model to its members. This powerflow model is referred to as the "MRO Model". The MRO Model contains modeling data and topology for the entire Midcontinent Independent System Operator (MISO) footprint and the transmission systems immediately adjacent to and beyond the MISO footprint, including Manitoba Hydro.

The MRO's model building process aggregates all the expected Transmission Service Reservations and maps them to the transmission model in order to establish appropriate transfer levels between Transmission Operators. Generators in each of the Transmission Service Provider areas is then dispatched considering unit commitment and dispatch order to satisfy the firm transmission commitments and forecasted load for that period.

Manitoba Hydro uses the MRO Model with some local changes to determine TTC and TRM for each time horizon in the ATC calculation schedule.

3.2. Calculation of Transmission Reliability Margin

Manitoba Hydro performs winter and summer seasonal operating studies to determine TRM (Transmission Reliability Margin) for the four ATC paths described earlier, taking into consideration system intact and numerous prior outage conditions.

3.3. Calculation of Total Transfer Capability

Manitoba Hydro owns all the transmission facilities and the resulting transfer capability within Manitoba and is the sole transmission service provider for the ATC Paths defined in this document. As a result, Manitoba Hydro calculates the TTC (Total Transfer Capability) in Manitoba for all ATC Paths that cross international or provincial borders. Furthermore, a process to allocate transfer capability among multiple lines, between Transmission Service Providers, or among multiple transmission owners is not required. Manitoba Hydro does not have any contractual obligations to allocate TTC.

Manitoba Hydro performs winter and summer seasonal operating studies to establish TTC for all of its ATC Paths considering system intact and a numerous prior outage conditions. To calculate TTC for each system configuration, Manitoba Hydro adjusts Manitoba Hydro's HVdc system with load or generation of the corresponding entity until the System Operating Limit (SOL) is reached or the maximum possible generation/load adjustments are applied to the study model. Manitoba Hydro identifies the TTC as the lesser of either the sum of incremental transfer capability and the impacts of Firm Transmission Service across the ATC Path or the sum of the facility ratings of all ties comprising the ATC path.

Manitoba Hydro uses the TTC and TRM established by seasonal operating studies to calculate ATC for the entire ATC calculation schedule. If Manitoba Hydro expects multiple outage conditions not considered in the seasonal study, a special study is performed to establish a temporary TTC and TRM. Seasonal studies assume peak load conditions unless a special study is performed to assess anticipated outage conditions, at which time load forecast adjustments are made for current conditions. The results of these special studies are integrated into the ATC calculation process.

Since Manitoba Hydro uses the MRO Model to determine TTC, Manitoba Hydro has the ability to directly model all the outages external to Manitoba that impact the transfer calculation within Manitoba. There are no outages from other Transmission Service Providers that cannot be mapped to the transmission model. It is not necessary to group the generation.

As a vertically integrated utility, Manitoba Hydro performs the role of both Transmission Operator as well as Transmission Service Provider. As a result, the exchange of data between Transmission Operator function and Transmission Service Provider function is integrated in the tools used by Manitoba Hydro to establish TTC and calculate ATC. As a result, the most current TTC values are always available for the next hour ATC calculations.

3.3.1. Manitoba – USA ATC Path

Manitoba Hydro performs its transfer calculation based on guidelines developed collaboratively with the following entities:

- Minnesota Power
- Minnkota Power Corporation
- Otter tail Power
- Xcel Energy
- MISO

These guidelines describe the study methodology and establish the parameters used in the studies to determine transfer capability. The study parameters address many different aspects of system operations, including:

- Base area load level
- Interface flow levels
- Monitoring elements
- Source and sink adjustment used when adjusting the interface transfer level

The contingency list for the Manitoba – USA transfer analysis is derived from previous study experience and in consultation with the stakeholders identified above.

The Manitoba – USA transfer is facilitated by adjusting the power order on the Manitoba Hydro HVdc system and adjusting pre-defined loads and generators in North Dakota, South Dakota, Minnesota, and Wisconsin. Manitoba Hydro accounts for the following flow dependencies in the calculation of TTC for the Manitoba – USA ATC path:

- Flow from North Dakota to surrounding regions (NDEX)
- Flow from Saskatchewan to the USA across the Boundary Dam phase shifting transformer (B10T)
- Flow from Ontario to the USA across the International Falls transformer (F3M)
- Flow from Manitoba to Ontario
- Flow from Minnesota to Wisconsin (MWEX)

Except for the NDEX interface, all flows across these interfaces are set at pre-determined values in the powerflow. The pre-determined values of B10T and F3M as well as Manitoba – Ontario flows reflect maximum Interchange Schedules. The other flow dependencies do not have Interchange Schedules associated with them. Manitoba – USA TTC is then calculated as a function of NDEX, which is the most important sensitivity to the Manitoba – USA transfer calculation.

Manitoba Hydro performs steady state, post contingency, transient stability, and voltage stability analysis (for North Flow conditions only) to calculate TTC. The following criteria are used to determine transfer capability for the USA ATC path:

- Steady state, post contingency, and dynamic voltage limits
- Steady state and post contingency thermal overload limits
- Steady state, post contingency, and transient out-of-step relay margins
- Reactive reserve margin at Dorsey
- Voltage stability limits
- Dynamic damping

The optimum transfer level that satisfies the aforementioned parameters determines the Total Transfer Capability (TTC).

3.3.2. Manitoba – Ontario ATC Path

The Manitoba-Ontario-Minnesota (MOM) Interconnection Working Group has developed and maintains a guideline document that defines the criteria used to assess the Manitoba – Ontario and the Minnesota – Ontario ATC path. Manitoba Hydro participates in this working group and respects these guidelines in its study process.

Manitoba Hydro performs seasonal studies to determine transfer capability for the Ontario ATC Path. The Manitoba – Ontario transfer is calculated by adjusting the power order on Manitoba Hydro's HVdc system and the power order on the phase shifting transformers located at Whiteshell Station. Counteracting changes are made by adjusting generation within northwestern Ontario. The Ontario transfer analysis is calculated for various levels of Winnipeg River Generation (hydraulic). Any Interchange Schedules included in the MRO model is used for the calculation of the TTC for the Manitoba-Ontario ATC Path.

Transfer limits are determined by performing steady state and post contingency analysis. The contingency list for the Manitoba – Ontario transfer analysis consists of all the BES elements between Dorsey and the Ontario border.

The following criteria are used to determine transfer capability for Ontario ATC path:

- Steady state and post contingency voltage limits.
- Steady state and post contingency thermal overload limits

The optimum transfer level that satisfies the aforementioned parameters determines the Total Transfer Capability (TTC).

3.3.3. Manitoba – Saskatchewan Southern ATC Path

Manitoba Hydro performs joint winter and summer operating studies with the Saskatchewan Power Corperation (SPC) to calculate TTC for the Manitoba – Saskatchewan southern ATC

path. Transfer calculations are performed by adjusting the power order of the Manitoba Hydro HVdc system and pre-defined loads and generators in Saskatchewan.

For the Manitoba – Saskatchewan transfer analysis, the Saskatchewan to USA Interchange Schedule across the Boundary Dam phase shifting transformer (B10T) is set to a value mutually agreed to with SPC. This value represents the maximum transfers that SPC will post on B10T for the present season. All the other interface values are left unchanged from the MRO base model.

The contingency list for the Manitoba – Saskatchewan transfer analysis is derived from previous study experience and in consultation with SaskPower study engineers.

Transfer limits are determined by performing steady state and post contingency analysis.

The following criteria are used to determine transfer capability for the Manitoba – Saskatchewan ATC path:

- Steady state and post contingency voltage limits
- Steady state and post contingency thermal overload limits
- Pre-contingency reactive power margin at certain generation stations

The optimum transfer level that satisfy the aforementioned parameters determine the Total Transfer Capability (TTC).

3.3.4. Manitoba – Saskatchewan Northern ATC Path

Manitoba Hydro performs joint winter and summer operating studies with the Saskatchewan Power Corperation (SPC) to calculate the TTC for the Manitoba – Saskatchewan northern ATC path. Transfer calculations are performed by adjusting the power order of the Manitoba Hydro HVdc system and pre-defined loads and generators in Saskatchewan.

For the Manitoba – Saskatchewan transfer analysis, the Saskatchewan to USA Interchange Schedule across the Boundary Dam phase shifting transformer (B10T) is set to a value mutually

agreed to with SPC. This value represents the maximum transfers that SPC will post on B10T for the present season. All the other interface values are left unchanged from the MRO base model.

The contingency list for the Manitoba – Saskatchewan transfer analysis is selected in consultation with SaskPower study engineers.

Transfer limits are determined by performing steady state and post contingency analysis.

The following criteria are used to determine transfer capability for the Manitoba – Saskatchewan ATC path:

- Steady state and post contingency voltage limits
- Steady state and post contingency thermal overload limits
- Pre-contingency reactive power margin at certain generation stations

The optimum transfer level that satisfy the aforementioned parameters determine the Total Transfer Capability (TTC).

3.4. Establishing TTC for ATC Calculation

Manitoba Hydro updates its normal operating procedures for ATC Path operations prior to the start of each season based on the results of the seasonal studies. These procedures include tabulated TTC and TRM values for system intact and various prior outage conditions. These tables are generally referred to as “TLAP Tables” and shared with Manitoba Hydro’s Network Resource Management group and also implemented in Manitoba Hydro Energy Management System (EMS). In the EMS, this program is called the “TLAP Program”.

Manitoba Hydro’s Network Resource Management group is responsible for approving outages on the Manitoba Hydro bulk electric system, coordinating outages with neighbouring utilities, and issuing Temporary Operating Instructions (TOIs) for planned outage conditions. For outage coordination, Manitoba Hydro exchanges outage information with MISO, IESO and SaskPower. The Network Resources Management group uses the TLAP tables to find the appropriate TTC, TRM values for planned outage conditions and issues a corresponding TOI. When a TLAP table

does not have TTC and TRM value for a particular planned outage condition involving multiple elements, a new study is performed to determine TTC and TRM and a TOI is issued.

All the Manitoba Hydro planned and real time outages are entered into the Manitoba Hydro outage management program called "Consolidated Outage and Operational Data and Logging Application" (COLA). COLA transfers the outage data that impacts transfer levels into the TLAP program. The TLAP program uses this information to identify the correct TTC and TRM for the ATC calculation schedule. Each hour, the TLAP program sends TTC, TRM and TRM coefficient values to MISO for the entire calculation schedule to use in the ATC calculation. In real time, the TLAP program uses current system conditions to determine the appropriate TTC and TRM for use in the ATC calculations.

The data tabulated in the TLAP program reflects the following assumptions:

- TTC and TRM values for each ATC Path are established for pre-determined outage conditions.
- When an outage affects a portion of the day:
    - TTC in the hourly calculation schedule is only reduced for the outage period,
    - TTC in the daily calculation schedule is reduced for the entire day.
- When an outage affects a portion of the month:
    - TTC in the daily posting horizon is only reduced for the days (either complete or partial) in which the outage takes place,
    - TTC in the monthly posting horizon is reduced for the entire month.
- Previous year TTC and TRM values are used for posting monthly ATC values beyond the current season until a new study is performed.

The TLAP program also contains conservative default TTC and TRM values that will ensure secure system operations in the event of multiple simultaneous outages where the TLAP program does not have pre-determined TTC and TRM values for the specific system conditions. The TLAP program uses these default values until a study is completed and new TTC and TRM values are established for the specific multiple outage condition. Once the study is complete and a Temporary Operating Instruction is issued to the control room, operators temporarily overwrite

the default values in the TLAP program with the new TTC and TRM values for the duration of the outages.

As explained above, TTC values calculated in the operations planning horizon are submitted to MISO for ATC calculation and subsequently used for real-time operations. As a result, Manitoba Hydro does not use assumptions in the operating horizon than are more limiting than those used in the operations planning horizon.

4. Existing Transmission Commitments (ETCs)

The firm ETC (ETC_F) for Manitoba Hydro is defined by the following formula:

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

Where:

$NITS_F$ is the firm capacity set aside for Network Integration Transmission Service (i.e. including the capacity used to serve bundled load within the Transmission Service Provider's area with external sources) on ATC Paths that serve as interfaces with other Balancing Authorities.

GF_F is the firm capacity set aside for Grandfathered and other Pre-Tariff Firm 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 on ATC Paths that serve as interfaces with other Balancing Authorities.

PTP_F is the firm capacity reserved for confirmed Point-to-Point Transmission Service.

ROR_F is the capacity reserved for roll-over rights for Firm Transmission Service 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.

Manitoba Hydro does not have other firm capacity reserved for any other services, contracts or agreements not specified above that must be accounted for in calculating firm existing transmission commitments.

The non-firm ETC (ETC_{NF})for Manitoba Hydro is defined by the following formula:

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

Where:

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

$NITS_{NF}$ is the non-firm capacity set aside for Network Integration Transmission Service (i.e. secondary service, including the capacity used to serve bundled load within the Transmission Service Provider's area with external sources) on ATC Paths that serve as interfaces with other Balancing Authorities.

Manitoba Hydro does not have any non-firm capacity set aside for Grandfathered and other Pre-Tariff Firm 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 on ATC Paths that serve as interfaces with other Balancing Authorities.

Manitoba Hydro does not have other non-firm capacity reserved for any other services, contracts or agreements not specified above that must be accounted for in calculating non-firm existing transmission commitments.

5. ATC Calculation

5.1. Use of Capacity Benefit Margin, Postback and Counterflow in ATC Calculations

The transfer capability for all the ATC Paths defined in this document is calculated at the Manitoba provincial boundary. Since Manitoba Hydro does not serve load outside of its footprint, it is not necessary to allocate a portion of the firm transfer capability as Capacity Benefit Margin.

Manitoba Hydro assumes that its transmission customers will use their Transmission Service Reservations for the entire period. Therefore, Manitoba Hydro includes the full use of the Transmission Service Reservations for the given period in its ATC calculations. In other words, no Postbacks are included in the ATC calculation.

Manitoba Hydro does not increase the ATC value on an ATC Path to account for flows in the opposite direction due to the increased risk to reliability of the Bulk Electric System in Manitoba. Therefore, Manitoba Hydro does not use Counterflow in ATC calculations.

5.2. ATC Calculation Procedure

According to the Manitoba Hydro – MISO Coordination Agreement, MISO will perform ATC calculations and posting on behalf of Manitoba Hydro. As mentioned above, Manitoba Hydro's EMS TLAP program will generate TTC, TRM and TRM coefficient values every hour and send the results to MISO. The TRM coefficient indicates the availability of TRM that can be released for non-firm service, its value ranging between zero and one. A TRM coefficient of one inhibits any release of TRM while a TRM coefficient less than one enables the release of up to TRM x (1-TRM coefficient) on a recallable basis.

MISO downloads Manitoba Hydro transmission service reservations from the Manitoba Hydro OASIS and Manitoba Hydro schedules from webTrans. The ATC Calculator uses POR to obtain

the Source and POD to obtain the Sink for the reservation. The impacts of the POR-POD pair on the ATC paths are modeled in the ATC calculator. Manitoba Hydro does not use the Source or Sink information to calculate ATC. During the scheduling horizon, the reservations are replaced by the schedules from the MISO physical scheduling system for each ATC path. The reservations along with the TTC and TRM Coefficient values are used by the ATC calculator as described below to determine the available transfer capability for each ATC path. The reservations recognize any redirects that may have taken place. The Firm ATC and Non-Firm ATC are determined as follows for each of the ATC path.

5.2.1. Definitions

- All times use the 24-hour format (i.e. 00:00-23:00)
- "Now" is defined as the present time (EST)
- Day 1 is from Now until the end of the present day
- Day 2 is hour 0 through 23 of the day after Day 1
- Capacity (MW) is always measured in absolute values.

5.2.2. Firm ATC

Manitoba Hydro uses the following formula to calculate firm ATC (ATC_F) for all horizons in the calculation schedule:

$$ATC_F = TTC - TRM - ETC_F$$

5.2.3. Non-Firm ATC

In calculating non-firm ATC (ATC_{NF}), Manitoba Hydro use reservations or schedules depending on the time of the day and posting horizon to account for existing non-firm transmission commitments (ETC_{NF}). The following table defines the calculation formulas for non-firm ATC based on current time and posting horizon.

Current Time	Posting Horizon	Formula for non-firm ATC (ATC_{NF})
<1500	Day 1	TTC – (TRM* TRM coefficient) – sum of all firm schedules (associated with firm reservations) at the current time – sum of non-firm reservations (use scheduled MW if available otherwise use non-firm reservation MW)
	Day 2	TTC – (TRM*TRM coefficient) – sum of firm reservations (use scheduled MW if available otherwise use firm reservation MW) – sum of non-firm reservations (use scheduled MW if available otherwise use non-firm reservation MW)
	Day 3 & beyond	TTC – (TRM*TRM coefficient) – sum of firm reservations – sum of non-firm reservations
>=1500	Day1	TTC – (TRM*TRM coefficient) – sum of all firm schedules (associated with firm reservations) at the current time – sum of non-firm reservations (use scheduled MW if available otherwise use non-firm reservation MW)
	Day 2	TTC – (TRM*TRM coefficient) – sum of schedule capacity for time point if schedule refers to firm reservations – sum of non-firm reservations (use scheduled MW if available otherwise use non-firm reservation MW)
	Day 3 & beyond	TTC – (TRM*TRM coefficient) – sum of firm reservations – sum of nonfarm reservations

5.3. Data Exchange for ATC Calculation

Manitoba Hydro uses the MRO Model to determine TTC values for each ATC Path. Since all MRO members contribute to the development of this model, the model building process is the mechanism to exchange information between Transmission Operators and Transmission Service Providers.

Manitoba Hydro also exchanges outage information with IESO, MISO and SaskPower via MISO's CROW outage scheduling tool. Manitoba Hydro uses this outage information to determine the TTC value that is used to calculate ATC. IESO, MISO and SaskPower may also use Manitoba Hydro outage information for the same purpose.

6. Distribution of ATCID

This ATCID document, which describes existing practices at Manitoba Hydro, is posted on Manitoba Hydro's OASIS webpage:

http://www.oasis.oati.com/MHEB/index.html

A notification email is sent to those entities specified in R4 of NERC Standard MOD-001-1 whenever revisions are made to this ATCID document.