1 Purpose

MOD-001-1a R3.1

MISO has elected to utilize a flow-based approach to evaluate transmission service requests ("TSRs"). The Available Flowgate Capacity Methodology used requires the calculation of AFC in accordance with the requirements of NERC Reliability Standard MOD-030. This document describes the implementation of the Flowgate methodology such that the AFC calculations performed by MISO may be validated as required by NERC Reliability Standard MOD-001. Specifically, the document also provides the following:

The terms and definitions associated with Available Flowgate Capability ("AFC") calculations.

MOD-001-1a R1

- The Flowgate Methodology, as described in NERC Reliability Standard MOD-030-02, is used for calculating AFC for each Available Transfer Capability ("ATC") path.
- The criteria used to identify sets of Transmission Facilities as Flowgates that are to be considered in AFC calculations.
- How Source and Sink for Transmission Service are accounted for in AFC calculations.
- The Flowgate allocation calculations used in the TSR approval process per the Congestion Management Process ("CMP") outlined in the various seams agreements between MISO and its adjacent Transmission Service Providers ("TSPs").
- AFC coordination procedures with adjacent TSPs.

2 Scope

The scope of the Available Transfer Capability Implementation Document covers the processes used for calculating the Available Flowgate Capability (AFC).

3 Definitions

Capitalized terms herein shall have the meaning provided in the MISO Tariff, the NERC Reliability Standards ("NERC Standards"), the NERC Glossary of Terms Used in Reliability Standards ("NERC Glossary"), or as defined by this document.

3.1 Flowgates

Flowgates are a predetermined set of constraints on the transmission system that are expected to experience loading in real-time. In the flow based process, these constraints are used to measure the commitments on the transmission system.

Flowgates are classified as two types, Power Transfer Distribution Factor ("PTDF") and Outage Transfer Distribution Factor ("OTDF"). A PTDF Flowgate is a Flowgate that monitors the flow on single or multiple transmission elements without a contingency. An

OTDF Flowgate is a Flowgate that monitors flow on single or multiple transmission elements for the loss of other transmission elements. A transmission element is a transformer, a transmission line segment, or a generator. Typically, elements rated above 100 kV are included in the transmission system model.

3.2 Available Flowgate Capability (AFC)

The AFC on a Flowgate refers to the amount of MW transfer capacity on a Flowgate that remains available for additional transmission service above and beyond existing uses of the transmission system. Existing uses of the transmission system include the generation to load impacts on the Flowgates and transmission service that has already been sold. AFC values are time and service type dependent. MISO calculates Firm and Non-Firm AFC values for 36 months into the future from the next hour.

3.3 Distribution Factors

The distribution factor quantifies the incremental impact of a power transfer on a Flowgate for a particular transmission path and is expressed as a percentage. Distribution factors are dependent on the system topology and change with changing transmission outages.

3.4 AFC Zone

An AFC Zone is the smallest granular area that is modeled in MISO AFC calculations. All included transmission service reservations are mapped to these AFC Zones for modeling impacts and evaluation. In general, the AFC zones are the balancing authority areas ("BAAs") modeled in the Eastern Interconnection Reliability Assessment Group ("ERAG") Multiregional Modeling Working Group ("MMWG") models.

3.5 AFC Path

MOD-030 R1.2

An AFC path is defined by a unique source and sink that are modeled as AFC Zones. Since the MISO OASIS uses a list of sources and sinks that may be different than the granularity in the AFC calculation, an electrical equivalent table is used to map the source and sink combinations to AFC Zones. The electrical equivalent table can also be used to map the source and sink to a study zone that is a combination of multiple AFC Zones to evaluate TSRs more accurately. See Appendix B for more details.

3.6 Capacity Benefit Margin ("CBM")

The amount of firm transmission transfer capability preserved by MISO for Load Serving Entities ("LSEs") within a BAA to enable access by the LSEs to generation from the interconnected systems to meet generation reliability requirements. The CBM is applied as a Total Flowgate Capability ("TFC") reduction to the limiting element(s) of the associated Flowgate.

3.7 Transmission Reliability Margin ("TRM")

The amount of transmission transfer capability necessary to provide reasonable assurance that the interconnected transmission network will be secure. TRM accounts for the inherent uncertainty in system conditions and the need for operating flexibility to ensure reliable system operations as system conditions change.

3.8 Total Flowgate Capability (TFC)

MOD-030 R2.4

The maximum amount of power that can flow across the Flowgate without overloading (either on an actual or contingency basis) any element of the Flowgate. A MW proxy can substitute to ensure sufficient margin against adverse voltage or stability conditions. Flowgate TFCs represent the Interconnection Reliability Operating Limit ("IROL") or System Operating Limit ("SOL") of the defined Flowgates per NERC Reliability Standard MOD-030, R2.4.

3.9 Share of Total Flowgate Capability ("STFC")

This term stands for the share of the TFC that a particular entity is allocated and that is determined using the various rules laid out in the CMP under the various seams agreements. It is used to limit the firm transmission service in future time periods.

3.10 Available Share of Total Flowgate Capability ("ASTFC")

This term stands for the available share of the TFC for an entity that is available on a Flowgate for use as a Firm transmission service. It is calculated as the share of the TFC minus the existing firm commitments that the entity has on the Flowgate.

3.11 Local Balancing Authority ("LBA")

LBA is an operational entity or a Joint Registration Organization which is (i) responsible for compliance to NERC for the subset of NERC Balancing Authority Reliability Standards defined in the Balancing Authority Agreement for their local area within the MISO Balancing Authority Area, (ii) a Party to Balancing Authority Agreement, excluding MISO, and (iii) shown in Appendix A to the Balancing Authority Agreement.

3.12 Effective ATC

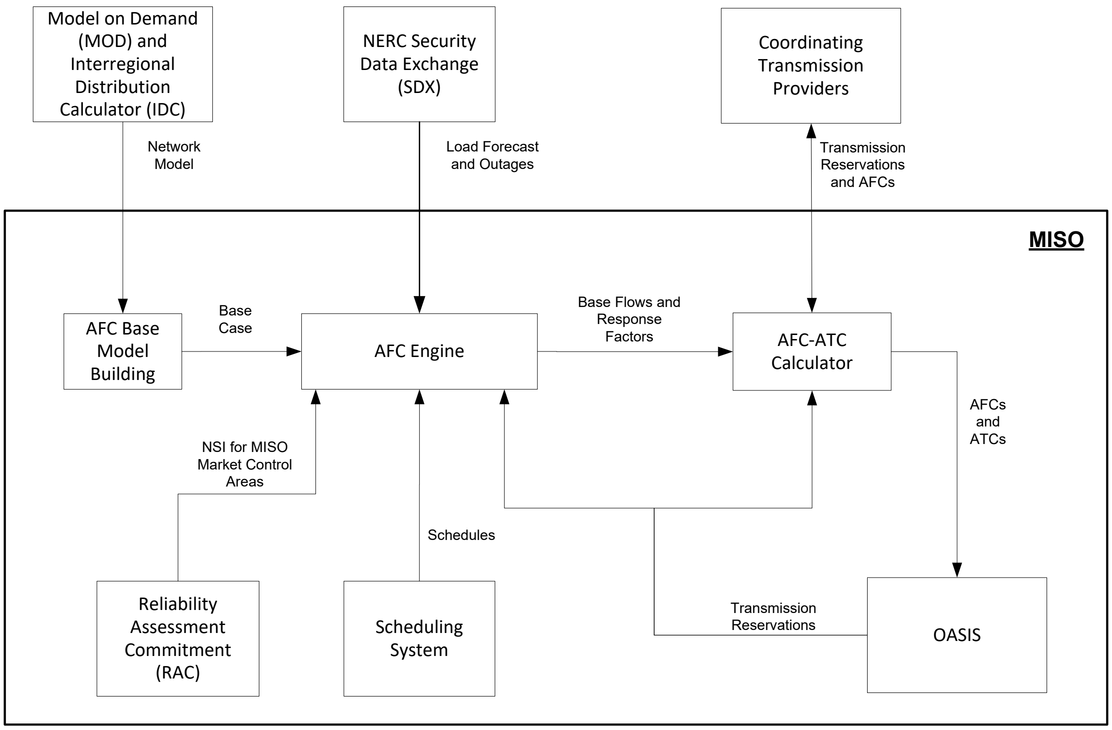
Effective ATC is the available capacity on a specific Path (or POR/POD combination) as determined by the AFC on the most limiting Flowgate.

4 Roles and Responsibilities

MISO Seams Administration Engineers - Are responsible for calculating Available Flowgate Capability ("AFC") and Available Share of Total Flowgate Capability ("ASTFC") values using the methodology described in this document.

MISO Tariff Administration Analysts - Are responsible for evaluating the transmission service requests ("TSRs") using the results of Available Flowgate Capability ("AFC") and Available Share of Total Flowgate Capability ("ASTFC") calculations.

5 Process Flowchart



MISO AFC Process Diagram

6 Flowgates in AFC Calculations

6.1 Flowgate Selection Criteria

MOD-030 R1.1

MISO and its Transmission Owners utilize an "N-1" criteria to determine additions, deletions, or modifications to the list of Flowgates. MISO uses the following criteria to determine if a Flowgate should be included in its AFC process:

MOD-030 R2.1.1 and R2.1.2

- Once per year, MISO completes a first contingency transfer analysis to identify Flowgates. This first contingency transfer analysis is performed for ATC Paths internal to MISO's market footprint up to 10,000 MW, which is beyond the maximum capability of any path to be studied and, further, is performed such that the first three limiting elements and their worst associated contingency combinations with an OTDF of at least 5% and within MISO's market footprint are included as Flowgates. MISO also includes the results from all adjacent Balancing Authority ("BA") source and sink combinations for such analysis. The results of this analysis will be reviewed by the operations planning personnel of MISO to ensure the first contingency criteria used are consistent with those that are used in the planning of operations, including the use of Remedial Action Schemes.
  Furthermore, if any limiting element is kept within its limit for its associated worst contingency by operating within the limits of another Flowgate, then no new Flowgate needs to be established for such limiting elements or contingencies. Likewise, only the most limiting element in a series configuration needs to be included as a Flowgate.
- MISO includes any limiting element/contingency combination within its Transmission model that has been requested to be included by any other TSP using the Flowgate methodology. The requested Flowgate will be included in the MISO AFC process if it has at least 5% PTDF or OTDF impact from any generator within MISO's market footprint, or at least 5% PTDF or OTDF impact from any BAA within MISO's market footprint to an adjacent BAA.

MOD-030 R2.1.3

- MISO also includes any Flowgate within its Reliability Coordinator's area that has been subjected to an Interconnection-wide congestion management procedure within the last 12 months unless it was created to address temporary operating conditions. If a Flowgate has not been subjected to an Interconnection-wide congestion management procedure within the last 24 months, MISO can remove the Flowgate from its AFC process.

MOD-030 R2.1.4

- MISO also includes any limiting element/contingency combination within its market footprint that has been requested to be included by MISO real-time operations personnel to manage congestion. The requested Flowgate will be included in the MISO AFC process if it has at least 5% PTDF or OTDF impact from any generator within MISO's market footprint, or at least 5% PTDF or OTDF impact from any BAA within MISO's market footprint to an adjacent BAA.

6.2 Flowgate Definitions

MOD-030 R2.2, 2.3,2.4, 2.5, 2.5.1, 2.6

MISO uses the Facility ratings provided by Transmission Owners/Operators to establish Flowgate TFCs per the MISO SOL/IROL Methodology document. Flowgate definitions and TFC provided by the Transmission Owners/Operators (SOL Flowgates), or the MISO Reliability Coordinator (IROL Flowgates), that are determined based upon the summer and winter peak ambient conditions and by the Flowgate selection criteria described above. These Flowgate TFCs represent the IROL or SOL of the defined Flowgates.

Furthermore, MISO conducts a quarterly review of TFC for each Flowgate and reestablishes the TFC at least once per quarter based on the inputs from its Transmission Owners/Operators. Outside of the quarterly review, it is up to the Transmission Owners/Operators to notify MISO of any changes that would affect the TFC of a Flowgate used in the AFC process. If the change is related to temporary system conditions, the Transmission Owners/Operators need to specify the length of time for the temporary TFC change. MISO will implement TFC changes within seven calendar days of the notification.

MOD-001-1a R6

Additionally, MISO uses assumptions no more limiting than those used in the planning of operations for the corresponding time period. More specifically, MISO performs studies and provides daily reports for the next day operating condition. Any IROL and SOL changes from these daily reports that are related to existing Flowgates in the MISO AFC process are then implemented into the AFC process. Short-term, weather-adjusted facility rating updates are not included in the AFC process.

7 AFC Methodology

7.1 Transmission Service Request Submission

MOD-030 R1.2.1, R1.2.

MISO hosts an OASIS site for customers to submit TSRs. The Source and Sink fields of a TSR are used as the Source and Sink for paths to evaluate TSRs and to calculate AFC. Appendix B of this document illustrates how Source(s) and Sink(s) available on the OASIS map to the AFC model.

7.2 Calculation of Available Flowgate Capability (AFC)

MISO uses a flow-based approach to determine the transfer capability for evaluating requests for transmission service. For each transmission path defined by a source and sink, the flow based approach identifies a set of Most Limiting Flowgates that impact this path. The incremental impact of a transaction on a Flowgate is quantified by a distribution factor expressed by a percentage. For a TSR to be granted on a path, the incremental effect of the MW amount of the request must be smaller than the AFC on all Most Limiting Flowgates impacted by this path.

For example, consider a TSR for Non–Firm, Daily service for one day from ALTW to WAUE for 100 MW. Table 1 below lists Flowgates that have been identified as constraints on this path, their Non-Firm AFC, and their distribution factor for energy transfer from ALTW to WAUE.

Table 1: Constraining Flowgates

Constraint	*Distribution Factor*	*Pre Non-Firm AFC*	*Partial ATC (MW)*	*Impact of 100 MW Transfer*	*Post Non-Firm AFC*
Flowgate 1	*5 %*	*100*	*2000*	*5*	*95*
Flowgate 2	*10%*	*5*	*50*	*10*	*-5*
Flowgate 3	*15%*	*20*	*133.33*	*15*	*5*
Flowgate 4	*10%*	*200*	*2000*	*10*	*190*

In the above example, the minimum Partial ATC is 50 MW because of Flowgate 2. This indicates that the Path ATC is 50 MW, which is less than the 100 MW capacity requested. Therefore, this TSR would not be accepted by MISO as requested.

7.2.1 Timing and Frequency of AFC Calculations

MISO builds a power flow model for each time interval per service increment. The base flows from these models are used to compute AFC values for Firm and Non-Firm transmission services.

AFC Run Horizons
MISO computes AFC values based on the calculation cycle, referred to as a horizon. Table 2 below describes the various horizons with their time range, increments and frequencies:

MOD-001-1a R2.1, R8.1

MOD-001-1a R2.2, R8.2

Table 2: Horizons in MISO AFC Calculations

Horizon	Time Range	Increment	Frequency
Operating	0-48	Hourly	Hourly
Planning	49-168	Hourly	Daily
Planning	2-33	Daily	Daily
Study	2-36	Monthly	Weekly

MOD-030 R10, R10.1, R10.2, R10.3, R3.2, R3.3

* When an increment overlaps for the same time point, the more granular increment is used.

AFC resynchronizations occur via webTrans on the above-referenced frequency utilizing inputs to the AFC equation as described below. These AFC resynchronizations occur on the schedule described above to ensure that webTrans remains updated with the most current model-related data and information. These resynchronizations may occur more frequently if necessary. More specifically, MISO will attempt to resynchronize the Planning horizon for hours 49-168 every six hours and the Study horizon daily.

AFC is recalculated when TSRs are submitted or their status is modified such that their impact upon AFC must be removed or recalculated. Accordingly, recalculations of AFC values via webTrans occur frequently via its algebraic functionality. More specifically, when a TSR is updated, webTrans algebraically updates the impacted AFC values. These updated AFC values are then available for use in evaluating subsequent TSRs. Because this algebraic process occurs when a TSR is updated, MISO's AFC values remain current throughout the day. Completion of an algebraic update of AFC values by webTrans will be considered a successful recalculation and update of AFC. To the extent that a scheduled resynchronization by webTrans as described above is not completed, the last valid AFC calculation by webTrans is used to evaluate TSRs.

During resynchronization, new TSRs are modeled in the Flowgate Methodology through two phases, power flow model building and webTrans, as described in more detail below.

7.2.2 Power Flow Model Building

MOD-030 R6.1.1

The power flow case is built from a base network topology model, load forecast, generation and transmission outages, and net interchange for each of MISO areas and first tier areas. For each of the MISO LBAs, the individual loads are scaled to match with the load forecast value (include Native Load and Network Service Load) for that time point. The generation and transmission outages are applied using a topology processor. The generation dispatch order for the MISO LBAs is determined based on the MISO market history.

If available, individual loads for external control areas are scaled to match with the load forecast value for the applicable time period under study (see Table 2). The generation and transmission outages are applied using a topology processor. The net interchange for each area is determined from existing transmission commitments. Outages may be applied to the extent they are available to MISO via NERC Security Data Exchange (“SDX”) and within the scope of the AFC model.

A power flow is performed on the base case by enforcing net interchange. The power flow solution provides base flows on each of the Flowgates. The distribution factors are computed from the solved case as well. Distribution factors represent the percent of a transaction from a specified source to a specified sink that appears on a Flowgate. The distribution factors are topology dependent and can change due to system conditions. The Transmission Provider uses the thresholds defined below to decide whether a transaction has a significant impact on a Flowgate. If the Transmission Provider has a PTDF Flowgate, a five (5) percent threshold is used to indicate a significant impact. If the Transmission Provider has an OTDF Flowgate, a three (3) percent threshold is used to indicate a significant impact.

In order to produce credible constrained facility AFCs, the Transmission Provider must consider the effects of system conditions and transmission service that has been sold by other transmission providers.

MOD-030 R5.3

MISO will exchange AFC values with other TSPs as required by NERC Reliability Standard MOD-030 and as required by its seams agreements. Each TSP, including MISO, will have the most detail for its own system. Consequently, it is in the best position to calculate its AFC values and to exchange this information for use by other TSPs. The other TSPs use the exchanged AFC values along with their own calculated AFC to sell Transmission Service. This guarantees that all TSPs are using the same

AFC values for each TSP to sell transmission service (the TSP with responsibility for a Flowgate will always calculate its AFC).

7.2.2.1 Topology Modeling for Power Flow Case

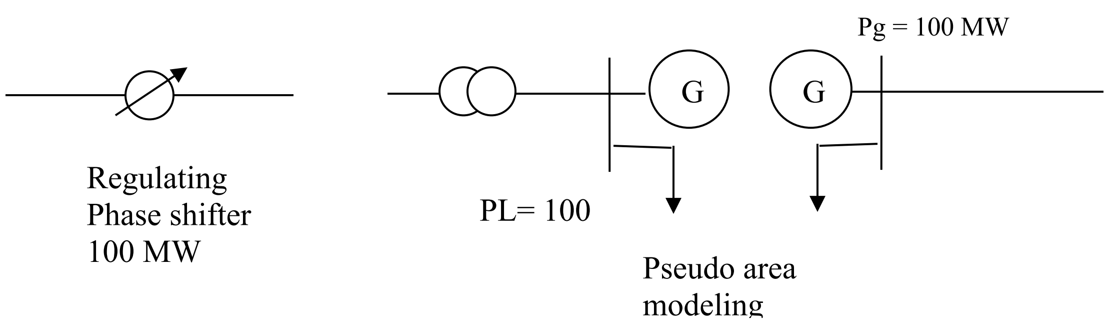
MOD-030 R5.1, R3.1, R3.4, R3.5.

MOD-030 R5.2

MISO utilizes a bus branch representation of the power system for all horizons. The bus branch models for each season are derived from the Model on Demand (“MOD”) system for the Study horizon and the NERC Interchange Distribution Calculator (“IDC”) seasonal model for the Operating, and Planning horizons. MISO Transmission Owners provide MISO with any modeling changes, including, but not limited to facility ratings, modeling data, and system topology for their Facilities. The NERC IDC models are used where there are no recent updates in the MOD software so that it contains modeling data and system topology for the remainder of MISO’s Reliability Coordinator footprint and immediately adjacent to and beyond the MISO footprint.

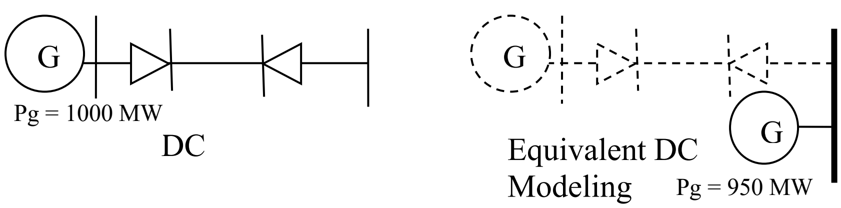
Special treatment for DC lines and phase shifters, which regulate MW flows through them, is necessary to facilitate accurate calculation of AFCs and distribution factors.

Phase Shifters – Phase shifters used to regulate interface power exchanges that have a significant impact on the AFC calculations are modeled by separating the network using pseudo areas. These pseudo areas are then used to enforce the MW injection and MW withdrawal to represent the flow through the phase shifter. The diagram below represents the modeling. Consider a phase shifter regulating the MW flow through it to 100 MW. In the pseudo area modeling, the phase shifter is unregulated and moved to one end in the network, and two pseudo areas are modeled using a generator and load combination. The source end pseudo area is modeled to withdraw 100 MW using the load, and the sink end pseudo area is modeled to inject 100 MW using the generator. Both a load and a generator are modeled in each pseudo area to accommodate flow reversal for phase shifters that can be operated to regulate flow in either direction. The unregulated phase shifter is retained as a regular transformer.

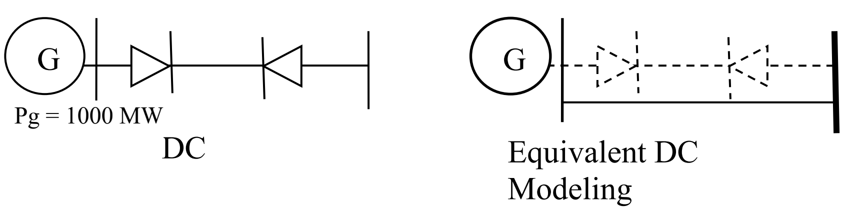


Currently, the Manitoba Hydro to Ontario phase shifters, Minnesota Power to Ontario phase shifters, and the Saskatchewan Power Company to the Western Area Power Administration - Upper Great Plains East (WAUE) are modeled using the above approach. Based on this modeling, Flowgates with these phase shifters as the monitored elements should have a response factor of 1.0 for the power transfers across the regulated interface. For example, for the Manitoba to Ontario power transfer across the MH-ONT interface, a Flowgate with the two parallel phase shifters will have a response factor of 1.0.

Modeling of DC Lines – DC Lines transfer power using a rectifier-inverter combination. Since the power is regulated across these DC lines, distribution factors cannot be calculated across these interfaces. Typically, DC Lines are built close to large generators to efficiently transfer power across them. For the purposes of AFC calculations, the DC lines are turned off, and equivalent generators are modeled at the receiving end of the DC Lines. The diagram below represents the modeling. Consider a 1000 MW generator connected through a DC Line to the network. The DC Line is turned off, and the actual generator is removed. An equivalent generator is modeled at the receiving end of the DC Line with 950 MW (1000 MW minus the 50 MW losses across DC) and is connected to the AC system. This modeling technique is used where all generations at the source end of the DC Line are normally scheduled to flow on the DC Line.



Another modeling approach is to model DC Lines where the DC Line is turned off and a short impedance AC Line is used to connect both ends of the DC Line.



Currently, AFC calculations use both of these approaches to model the Manitoba DC lines, Great River Energy ("GRE") DC Line, Minnesota Power DC Line, and the WAUE DC ties to the west.

MOD-001-1a R3.6

7.2.2.2 Outage Information

MISO hosts a web based application known as the “Outage Scheduler” to allow members to submit generation and transmission outages. The Outage Scheduler has an interface with the NERC SDX through which outages in the MISO footprint are reported to the SDX and outages for the external footprint are downloaded.

MOD-001-1a R3.6.1, R3.6.2, R3.6.3

Each hour, generation and transmission outages are downloaded from the NERC SDX. The outages are applied to the power flow models according to the following criteria:

- For the hourly modeling increment, outages are applied if they occur within the hour itself
- For the daily modeling increment, outages are applied if the duration of the outage is greater than 50% of the time period 12:00 – 16:00 on the day being modeled.
- For the monthly modeling increment, outages are applied if the duration of the outage is greater than 50% of the time period 12:00 – 16:00 on the 3rd Wednesday of the month.

Note that all times are expressed as prevailing system time for the Transmission Provider.

MOD-030 R5.2

Generation and Transmission Outages from the NERC SDX are consistent with the NERC IDC Model. Outages from MISO’s area, all of its adjacent TSPs, and any TSPs with coordination agreements with MISO will be included. Unmapped outages are checked on a weekly basis. Unmapped outages outside the scope of the model will be evaluated for modeling significance and dealt with on a case-by-case basis.

MOD-030 R1.2.4

MOD-030 R6.1.2

7.2.2.3 Generation Dispatch Order

Generation dispatch order is used to dispatch generation in the AFC models to meet the load and net interchange requirements for each AFC Zone. Generators within each control area are grouped together into sub groups called generation blocks. Upon reaching the last block that would meet the load plus net interchange for a control area, all units within the block are dispatched *pro rata*. MISO reviews its generation dispatch merit order at least once per year. This grouping is based on input from the Transmission Operator, generation dispatch history from the MISO Energy and Operating Reserves market, and generators who have requested to be mothballed or retired within the next 18 months. A generator may be excluded from MISO’s dispatch order file or placed in the last merit order block if its mothballed or retirement date is such that it would be expected to be online less than 50% of the 18 month period after the generation dispatch order review is completed and effective. Each generation block is then ranked in the order in which it should be dispatched for the power flow solution. This represents, statistically, how generators are expected to be committed and dispatched (designated network resources in the market do not have an obligation to run in real-time).

MOD-030 R4

All generators within each control area, except for the nuclear, wind, and seldom dispatched generators (with average output less than 1% of Pmax), are grouped together when simulating the transfer analysis for each time interval to establish distribution factors.

7.2.2.4 Net Interchange

Net interchange represents the MW amount of power that is either exported from an AFC Zone or imported to an AFC Zone. This value determines the amount of generation needed to be dispatched in the AFC Zone. Net interchange values are expressed in MW and are signed numbers typically rounded to the first decimal. A positive number indicates that the AFC Zone is exporting power and a negative number indicates that the AFC Zone is importing power.

For the planning and study horizons, “Confirmed” Firm Network TSRs are used to compute the Net Interchange for each AFC Zone. However, the operating horizon uses TSRs or schedules depending on the time of day. If the time is before 5:00 PM of the current day, schedules and a constrained economic dispatch are used to calculate Net Interchange during the scheduling horizon until midnight, and then reservations are used to calculate Net Interchange for the remainder of the operating horizon. If the time is after 5:00 PM, schedules and a constrained economic dispatch are used for the remainder of the day and the next day, and then Reservations are used to calculate Net Interchange for the remainder of the operating horizon. MISO assumes 100% counterflow when establishing Net Interchange because the “Confirmed” Firm Network Reservations and schedules utilized are expected to flow in real-time in order to serve load.

Net interchange for the AFC Zones external to MISO is computed using the same methodology described above for AFC Zones internal to the MISO footprint.

7.2.2.5 Transmission Service Requests and Reservations in AFC Calculations

MOD-030 R1.2, R1.2.1, R1.2.2, R1.2.3

TSRs are used to develop area interchange values beyond the scheduling horizon. These values are obtained from MISO and MISO neighboring transmission providers’ OASIS, for which MISO has executed a seams agreement. MISO downloads the TSR information from neighboring transmission providers via FTP sites every hour. Grandfathered Agreements are included in AFC calculations in the same manner as all other TSRs. These TSRs are incorporated into the hourly AFC calculations. Once downloaded, the TSRs are run through a reservation scrubber that filters out non-qualifying reservations. Reservations already modeled in the base case and Reservations starting after the horizon of a calculation are two examples of reservation

MOD-030 R4

types that would be filtered out from the power flow model for a particular horizon. The source and sink used for AFC calculations are obtained from the Source and Sink fields of the TSRs. MISO maintains a mapping table that maps all Sources and Sinks in its OASIS to specific Balancing Authorities in its power flow model. This mapping table is updated when a new source or sink is created in OASIS. MISO periodically checks for mapping errors and makes changes to the table as necessary.

7.2.2.6 Additional Considerations for Development of Distribution Factors

MISO operates an Energy and Operating Reserves market that dispatches generation to meet market load, losses, and interchange for the entire Balancing Authority Area. As such, any generator within the MISO BAA may be the marginal unit required to respond to a change in net scheduled interchange as a result of a Drive-In or Drive-Out transmission service request. To account for this, MISO defines specific internal subsystems that estimate the power flows that would result from an import or export transaction to/from an external BAA. An internal subsystem is established to model an import and one to model an export transaction between the external BAA and MISO. The participation factors assigned to each MISO's LBA are used as weighting factors to calculate the final Distribution Factor.

For example, for a Drive-Out reservation to TVA, MISO's Power Flow Model Building software calculates a weighted Distribution Factor to TVA. It is calculated as the distribution factor calculated for each MISO's LBA to TVA, weighted by the participation factor of each MISO's LBA for a Drive-Out transaction.

To determine the internal export participation factors of MISO's subsystem, MISO uses the most recent exporting Marginal Zone participation factor available.

To determine the internal import participation factors of MISO's subsystem, MISO uses the most recent importing Marginal Zone participation factor available.

The participation factors calculation for TSR evaluation is the same as the Marginal Zone participation factors calculation. For more detailed information about participation factors calculation, please refer to the posted document on MISO OASIS under ATC Information: MISO Marginal Zone Methodology.

7.2.3 webTrans Simulation

The solved power flow process generates a set of base flows and distribution factors for every Flowgate in the AFC process from the AFC Flowgate List for each time increment in each horizon run. MISO uses OATI webTrans to apply all remaining Existing Transmission Commitments ("ETCs") not included in the Power Flow Model Building process and decrement Flowgate CBM and TRM to simulate the final flows for Flowgates for each time increment for each horizon.

Historically, the Transmission Provider has observed some Flowgates located on its Transmission System that experience more congestion in the real-time operating environment more often than other Flowgates located on its Transmission System. To facilitate the calculation of more accurate AFC values for Flowgates, the Transmission Provider considers counter flow and positive direction flow differently for each Flowgate using webTrans. The webTrans process allows the Transmission Provider to calculate the most accurate flows that are expected to occur for each time increment by considering the impact of a TSR and applying specific positive flow and counter flow rules to each Flowgate. The webTrans simulation multiplies the capacity of a TSR by the Distribution Factor and the appropriate positive or counter flow adjustment factor for all Flowgates to establish the impact or amount of energy from the Reservation expected to flow across the Flowgate. Additional details regarding the webTrans process are described below.

7.2.3.1 Positive Impact (PIRULE) and Counter Flow Impact (CIRULE) Rules

MOD-001-1a R3.2 R3.2.1 R3.2.2

In Sec. 7.2.2.4, MISO assumes 100% counterflow for “Confirmed” Firm Network Reservations because those Reservations are expected to be scheduled in order to serve load. MISO does not assume that other Reservation types, Firm and Non-Firm Point-to-Point and Non-Firm Network Reservations, are expected to be scheduled for its full MW amount in real-time because it is not expected to serve load. An example would be where a yearly reservation is scheduled during various seasons with a smaller MW amount than the original reservation MW amount or situations where an hourly or daily reservation could not be scheduled.

Similarly, while selling transmission service on a path, it is assumed that these Reservations in the counterflow direction that impact the Flowgates on the requested path are not flowing at the same time. In reality, some of these counter flow Reservations will be scheduled and flowing at the same time.

To address these types of issues, MISO developed a mechanism to include a portion of the impacts from the positive flow and counter flow reservations described above on Flowgates to improve the accuracy of AFC calculations. The mechanism involves the use of a Positive Impact Rule (“PIRULE”) factor and a Counter Impact Rule (“CIRULE”) factor for each Flowgate.

Positive Impact Rule Factor – Indicates the percentage of transactions that have a positive impact on the Flowgate that are assumed to be scheduled. The percentage can range from 0% to 100% for Firm and Non-Firm AFC calculations.

MOD-001-1a R3.2.1

Counter Impact Rule Factor – Indicates the percentage of transactions that have a negative impact on the Flowgate that are assumed to be scheduled. The percentage can range from 0% to 100% for Firm and Non-Firm AFC calculations.

MOD-001-1a R3.2.2

Review of PIRULE and CIRULE – MISO reviews the impact rules for its Flowgates at least once per calendar year. Factors may change either direction based on real-time congestion history.

7.2.3.2 Must Include and Exclude Reservations

MISO maintains a Must Include reservations list and an Exclude Reservations list. The TSRs in these lists must have a status of "Confirmed" or "Study."

Must Include Reservations – A list of reservations that need to be included in the AFC process but are not available to the AFC process via OASIS or AFC coordination process.

Must Exclude Reservations – A list of reservations that must be excluded from the AFC process. This list was designed to accommodate situations such as duplicate TSRs on multiple provider pages.

7.2.3.3 Profiling Reservations

The profiling of reservations refers to a technique where one or more original TSRs are excluded from the AFC calculation, and one or more TSRs are substituted or included in the AFC calculation that corresponds to the originally excluded reservations. The TSRs in the Must Include Reservations list can differ from the original Reservation in the Exclude list by MW amount and/or start and stop times. Profiling is useful because a multiple monthly or annual TSR, typically for serving network load, is evaluated and Confirmed for a peak MW amount, but the actual MW amount can vary monthly or seasonally.

An example would be where a customer has a Reservation for 100 MW for one year. However, due to the lower rating limit for some equipment, the customer can only transfer 75 MW during the summer season. During the summer, the original yearly TSR would be placed in the Must Exclude Reservations list, and a new monthly reservation for 75 MW would be created for the summer months and inserted into the Include list.

7.2.3.4 Treatment of Yearly Requests Pending System Impact Study

MOD-030 R6.7

Yearly TSRs are subject to a System Impact Study according to Attachment D of the MISO tariff. A TSR in Study mode could still be pending a System Impact Study while the start date of the TSR may be close to the current date. In this situation, if the study results show that the TSR can be accepted, MISO accepts the request, which the customer can then use for scheduling energy from the time of its confirmation. However, while the System Impact Study is pending, the impact of the TSR is reflected in the AFC values on the limiting Flowgates and can cause a denial of shorter term TSRs.

MISO has developed a process to accommodate the shorter term TSRs. MISO will query its OASIS for all TSRs in Study status with yearly service increments that are included in the AFC process. If the request has a start date within 60 days of the current day, the original TSR will be excluded via the Must Exclude Reservations List and a new monthly horizon TSR will be included via the Must Include Reservations List with the start date moved to a later date according to the input received from project managers of the System Impact Studies. This process takes place monthly and is limited to TSRs on the MISO OASIS only.

If the status changes from the study, the TSRs will be removed from the Must Exclude and Must Include Reservation Lists.

7.2.3.5 Suspect Flowgate List

AFC calculations and real-time flow reports are monitored for suspect Flowgates. A suspect Flowgate is a Flowgate whose AFC calculations may be questionable and where a Flowgate is constantly a constraint. MISO reviews the limiting Flowgates that cause TSR refusals, real-time operations binding constraints, and Transmission Loading Relief ("TLR") data for each Flowgate.

All this information is compiled and reviewed monthly by the ROWG and is used to identify suspect Flowgates. In these situations, the Flowgate AFC calculations are discussed with the Transmission Operator of the Flowgate, and upon agreement, a resolution can be implemented. A resolution could be in the form of a TFC change, or the Flowgate could be ignored for the sale of transmission service until the AFC calculation for this Flowgate can be resolved.

7.2.4 MATHEMATICAL ALGORITHM FOR FIRM AND NON-FIRM AFC CALCULATION

7.2.4.1 Firm AFC Algorithm

The Transmission Provider uses the following formula to determine firm AFC in the Operating Horizon, Planning Horizon, and Study Horizon:

MOD-030 R8

$$AFC_F = TFC - ETC_{Fi} - CBM_i - TRM_i + Postbacks_{Fi} + counterflows_{Fi} \quad \textbf{(6.2)}$$

Where:

AFC_F is the firm Available Flowgate Capability for the Flowgate for that period.

TFC is the Total Flowgate Capability of the Flowgate.

MOD-030 R6, R6.3 - R6.7

ETC_{Fi} is the sum of the impacts of the $(\text{Base Flow})_{FIRM}$, and the sum of the impacts of other firm Transmission Services not included in the $(\text{Base Flow})_{FIRM}$.

$(\text{Base Flow})_{FIRM}$ is the flow from a solved power flow case which is built using Load Forecast (including Native Load and Network Service load), unit commitment and dispatch orders, the impact of any firm Network Integration Transmission Service, and impact of Grandfathered firm obligations for MISO's area, adjacent TSPs to MISO, and any other TSPs with which coordination agreements have been executed with MISO.

Other firm Transmission Service is the impact of any confirmed firm Point-to-Point Transmission Service expected to be scheduled (including Grandfathered firm obligations with Point-to-Point Transmission Services), filtered to eliminate duplicate impacts from transactions using Transmission Service from multiple Transaction Service Providers, including roll-over rights for Firm Transmission Service contracts, and for MISO's area, adjacent TSPs to MISO, and any other TSPs with which coordination agreements have been executed with MISO. It also includes counterflows described in *Section 7.2.3.1*. Certain queued but not yet confirmed (ACCEPTED, STUDY, and COUNTEROFFER) TSRs on the MISO OASIS are also included for AFC calculations.

CBM_i is the impact of the Capacity Benefit Margin on the Flowgate during that period.

$counterflows_{Fi}$ is zero because it has already been included in ETC_{Fi}

$Postbacks_{Fi}$ is zero because it has already been included in *ETC_{Fi}* as MISO uses the latest data to calculate AFC values.

TRM_i is the impact of the Transmission Reliability Margin on the Flowgate during that period.

7.2.4.2 Non-Firm AFC Algorithm

MOD-030 R9

MISO uses the following formula to determine non-firm AFC when using reservations in the Operating Horizon, Planning horizon, and Study horizon:

$$AFC_{NF} = TFC - ETC_{Fi} - ETC_{NFi} - CBM_{Si} - TRM_{Ui} + Postbacks_{NFi} + counterflows \quad (6.3)$$

Where:

AFC_{NF} is the non-firm Available Flowgate Capability for the Flowgate for that period.

TFC is the Total Flowgate Capability of the Flowgate.

MOD-030 R7, R7.1 - R7.7

ETC_F is the same as in Formula 6.2.

ETC_{NFi} is the sum of the impacts of any Grandfathered non-firm obligations, the sum of impacts of non-firm Network Integration Transmission Service (secondary service), and the sum of the impacts of all confirmed non-firm Point-to-Point Transmission Service expected to be scheduled, filtered to eliminate duplicate impacts from transactions using Transmission service from multiple TSPs, for MISO's area, adjacent TSPs to MISO, and any other TSPs with which coordination agreements have been executed with MISO. It also includes counterflows described in *Section 7.2.3.1*.

CBM_{Si} is the impact of any schedules during that period using Capacity Benefit Margin. It is zero in planning and study horizons because the use of CBM only takes place under emergencies - Energy Emergency Alert Level 2 (See CBMID for details).

TRM_{Ui} is the impact on the Flowgate of the Transmission Reliability Margin that has not been released (unreleased) for sale as non-firm capacity by the TSP during that period. It is determined by using (*TRM Factor A)* and *TRM_i* ($TRM_{Ui} = TRM\ Factor\ A \times TRM_i$)

TRM Factor A determines the amount of TRM that has not been released (unreleased) for sale to be used in non-firm AFC calculations. Its value ranges from 0 to 1 and is applied as a multiplier to the TRM value.

$Postbacks_{NFi}$ is zero because it has already been taken into consideration when calculating ETC_{NFi} as MISO uses the latest data to calculate AFC values.

counterflows are zero because it has already been taken into consideration when calculating ETC_{NFi}

Non-firm AFC is computed differently in the operating horizon than in the planning horizon. Before 5:00 PM (EST), the operating horizon uses schedules for the current day and uses reservations for the next day. After 5:00 PM (EST), the operating horizon exclusively uses schedules for the remainder of the current day and the entire next day. While using schedules in the operating horizon, the ETC_{Fi} and ETC_{NFi} components are derived from the flow expectations associated with schedules.

MISO uses the following formula to determine Non-Firm AFC in the operating horizon when using schedules:

$$\boldsymbol{AFC_{NF\ Schedules} = TFC - ETC_{Fi} - ETC_{NFi} - CBM_{Si} - TRM_{Ui} + Postbacks_{NFi} + counterflows} \quad (\mathbf{6.4})$$

Where:

$AFC_{NF\ Schedules}$ is the non-firm Available Flowgate Capability for the Flowgate for this period.

(ETC_{Fi} + ETC_{NFi}) includes the same commitments as Formulas 6.2 & 6.3, but they are not calculated separately. The total number is represented by the flow expectations associated with schedules.

CBM_{Si} is zero for all MISO Flowgates because such schedules, if any, are included in ***ETC_{Fi}***.

TRM_{Ui} is the impact on the Flowgate of the Transmission Reliability Margin that has not been released (unreleased) for sale as non-firm capacity by the TSP during this period. It is determined by using (*TRM Factor B)* and TRM_i ($\boldsymbol{TRM_{Ui} = TRM\ Factor\ B \times TRM_i}$)

TRM Factor B determines the amount of TRM that has not been released (unreleased) for sale to be used in non-firm AFC calculation during the operating horizon. Its value ranges from 0 to 1 and is applied as a multiplier to the TRM value. Usually, it is determined in such a way so that only the Automatic Reserve Sharing ("ARS") component is preserved (See TRMID for details).

Postbacks$_{NFi}$ is zero because it has already been taken into consideration when calculating ETC_{NFi} as MISO uses the latest data to calculate AFC values.

counterflows are zero because it has already been taken into consideration when calculating ETC_{NFi}

7.2.5 MATHEMATICAL ALGORITHM FOR CONVERSION OF AFC TO ATC

MOD-030 R11

When converting Flowgate AFCs to ATCs for ATC paths, MISO uses the following algorithm:

$$ATC = min(P) \quad \textbf{(6.1)}$$

$$P = \{PATC_1,\ PATC_2, \ldots, PATC_n\}$$

$$PATC_n = \frac{AFC_n}{DF_{np}}$$

Where:

ATC is the Available Transfer Capability.

P is the set of partial Available Transfer Capabilities for all "impacted" Flowgates honored by MISO.

PATC$_n$ is the partial Available Transfer Capability for a path relative to a Flowgate *n.*

AFC$_n$ is the Available Flowgate Capability of a Flowgate *n*.

DF$_{np}$ is the distribution factor for Flowgate *n* relative to path *p*.

7.3 Calculation of Share of Total Flowgate Capability (STFC)

MOD-001-1a R3.5

When one or more external entities that have a seams agreement between them have significant impacts or loop flow on one entity's Flowgate, the Flowgate is defined as reciprocal Flowgates between the entities. The STFC of each entity on the Flowgate is calculated, which represents each reciprocal TSP's Allocation of Flowgate capability, and used to limit the entity's firm transmission services. According to the baseline CMP, the Allocation of the STFC is calculated as forward directional firm transmission right, based on the historical generation and firm point-to-point reservation impacts upon the freeze date defined in the CMP. The rules of calculating historical impacts and

Allocation are defined in section 6.6 (Forward Coordination Processes) of the baseline CMP.

Different run types of Allocation of STFC are calculated based on the schedule listed in Table 3 to reflect the allocation results based on the latest system information. Monthly and daily allocation values are calculated to be used for the evaluation of firm transmission services.

Table 3: Allocation Calculations by Run Type

Allocation Run Type	Allocation Process Start	Range Allocated	Allocation Process Complete
April Seasonal Firm	Every April 1 at 8:00 EST	Twelve monthly values from October 1 of the current year through September 30 of the next year	April 1 at 12:00 EST
October Seasonal Firm	Every October 1 at 8:00 EST	Twelve monthly values from April 1 of next year through March 31 of the following year	October 1 at 12:00 EST
Monthly Firm	Every month on the second day of the month at 8:00 EST	Six monthly values for the next six successive months	2nd of the month at 12:00 EST
Weekly Firm	Every Monday at 8:00 EST	Seven daily values for the next Monday through Sunday	Monday at 12:00 EST
Two-Day Ahead Firm	Every Day at 17:00 EST	One daily value for the day after tomorrow	Current Day at 18:00 EST
Day Ahead Non-Firm	Every Day at 8:00 EST	Twenty-four hourly values for the next 24-hour period (Next Day HE1-HE24 EST)	Current Day at 9:00 EST

Allocations are further used to determine the ASTFC, which is then used to determine how much Flowgate capability remains available on that Flowgate for use as Transmission Service. ASTFC is calculated as follows:

ASTFC = STFC –Entity's firm commitments – CBM

Entity's firm commitments =
Entity Generation to Load Impacts + Entity Firm Confirmed reservation positive Impact +Entity Firm Confirmed reservation negative Impact

CBM is subtracted only when calculating ASTFC for the entity that owns the Flowgates.

Reciprocal entities of the Flowgate shall post unused Allocation (unused STFC) for other deficient reciprocal entities (with negative ASTFC on the constraint flowgate) to request for sharing or transferring for selling transmission services. The unused Allocation is calculated by including requests that are in the pending status (e.g., study status) and queued before the request of sharing and transferring of the Allocation and is calculated as follows:

> *Unused Allocation = ASTFC – Entity Firm Study Reservation Positive Impact – Entity Firm Study Reservation Negative Impact*

The sharing and transfer process is explained in detail in section 6.7 (Sharing or Transferring Unused Allocations) in the baseline CMP. Figure 3 shows the process flow of the STFC and ASTFC processes.

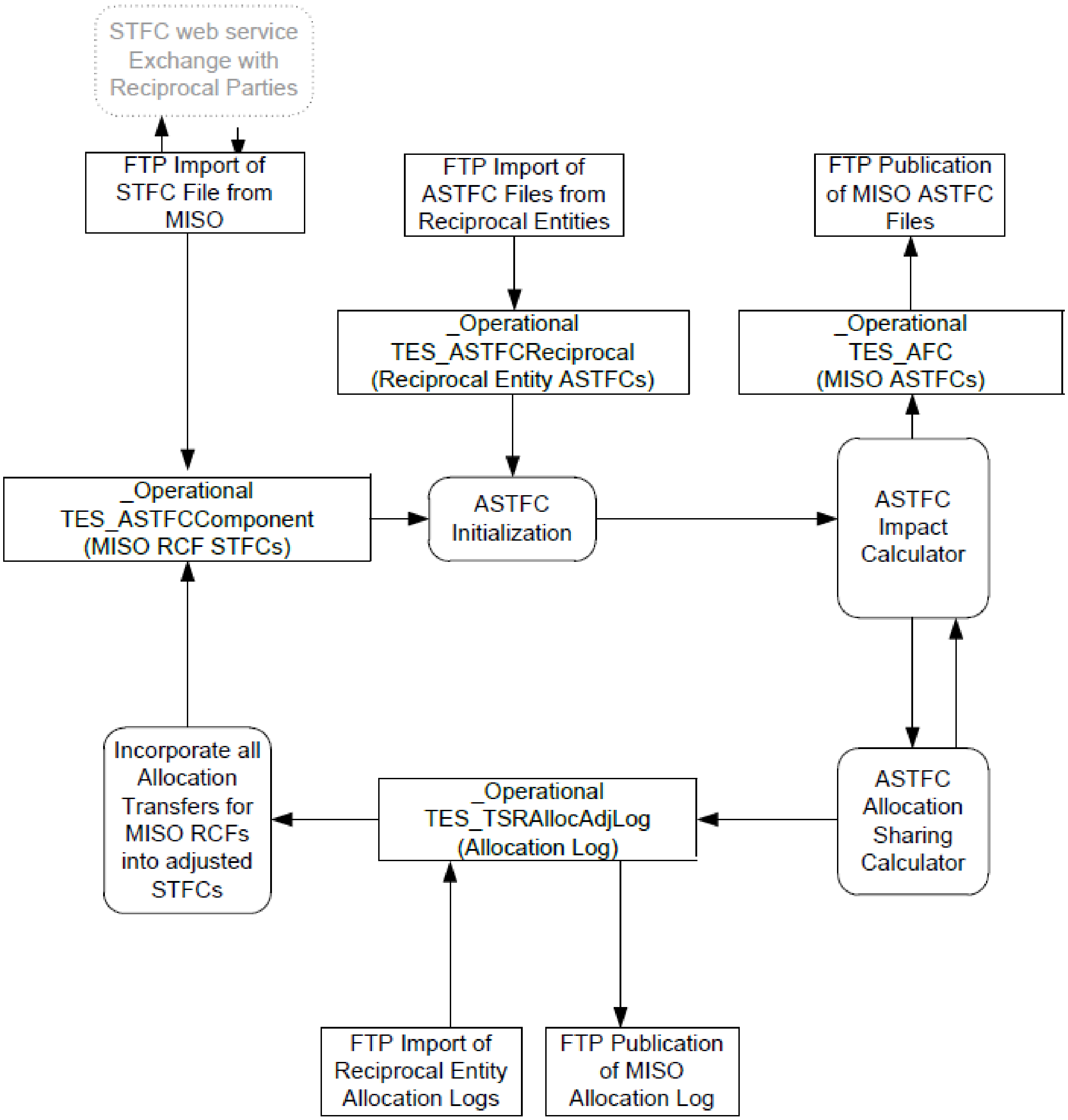


Figure 3: STFC and ASTFC Process Flow Diagram

8 Overview of Transmission Service Request Approval Process

MISO hosts an OASIS site for customers to submit TSRs. Requests received via the OASIS are evaluated by MISO Tariff Administration, and the evaluation results are posted to the OASIS for the customer. A digital certificate is necessary to access the OASIS site. The sections herein describe the attributes of a TSR and the accompanying evaluation process.

8.1 Transmission Service Request (TSR)

A transmission service request is defined by a Point of Receipt (“POR”), Point of Delivery (“POD”), source, and sink that identify the transmission path for the service requested by the customer. The valid list of PORs and PODs includes all MISO LBAs and non-MISO first-tier BAs. The valid list of sources and sinks includes all entities and commercial nodes (generator and load areas) within MISO BA and non-MISO BAs. If the TSR is for sources or sinks beyond the non-MISO first-tier BAs, the source or sink will be the BA where the actual source or sink is located, and the POR or POD will be a non-MISO first-tier BA.

Each TSR has a start time and stop time to specify the duration of the service. Other attributes of a TSR include:

Service Increment – Describes the time increment of the request. The service increment can be hourly, daily, weekly, monthly, or yearly.

Service Class – Describes the class of service (firm or non-firm) that can be requested.

Service Type – Describes the type of service (network or point to point service) that can be specified.

Request Status – TSRs are classified by status. These include, but are not limited to: “STUDY,” “ACCEPTED,” “REFUSED,” and “CONFIRMED.” Once a TSR is received, and under evaluation by MISO, the TSR is considered to be in the STUDY status phase. If the TA team evaluates the request and determines that the request can be granted, the request then achieves ACCEPTED status. If the request cannot be granted, the request is evaluated to determine the availability of partial service. If no partial service is available, the TSR is REFUSED. If the request achieves the ACCEPTED status and the customer wishes to take the service, the customer CONFIRMS the request.[1]

[1] Refer to the OATT Module B Business Practice Manual posted on OASIS for further details.

A TSR can also have path-related attributes with respect to the MISO footprint. The following are path-related attributes of a TSR:

Drive In TSR – If the TSR has a source that is outside the MISO footprint and the sink is within the MISO footprint, the TSR is referred to as a Drive In Reservation.

Drive Out TSR – If the TSR has a source that is within the MISO footprint and the sink is outside the MISO footprint, the TSR is referred to as a Drive Out reservation.

Wheel (Drive Through) TSR – If the TSR has a source and sink that are both outside the MISO foot print, the TSR is referred to as a Wheel or Drive Through Reservation.

Drive Within TSR – If the TSR has a source and sink that are both within the MISO footprint, the TSR is referred to as a Drive Within Reservation.

8.2 Firm Transmission Service Evaluation Process

Each firm TSR goes through an AFC check and ASTFC check. If a firm TSR is constrained on one reciprocal Flowgate and the AFC value is lower than the ASTFC value, the AFC value should be utilized for the purpose of approving/denying service. In this case, while the Allocation process might indicate that the entity has rights to a particular Flowgate through the Allocation process, current conditions on that Flowgate indicate that selling those rights would result in reliability problems due to insufficient AFC.

If the AFC value is higher than the ASTFC value, the ASTFC value should be utilized for the purpose of approving/denying service. In this case, while the AFC process might indicate that the entity can sell more service than the Allocation might indicate, the entity must honor their Allocation.

If a Reciprocal Entity uses all of its firm Allocation and desires to obtain additional capacity from another Reciprocal Entity who has the remaining capacity, that additional capacity may be obtained through a request to share or transfer unused Allocation. Figure 4 provides a flowchart of the firm TSR evaluation process, including the sharing and transfer process.

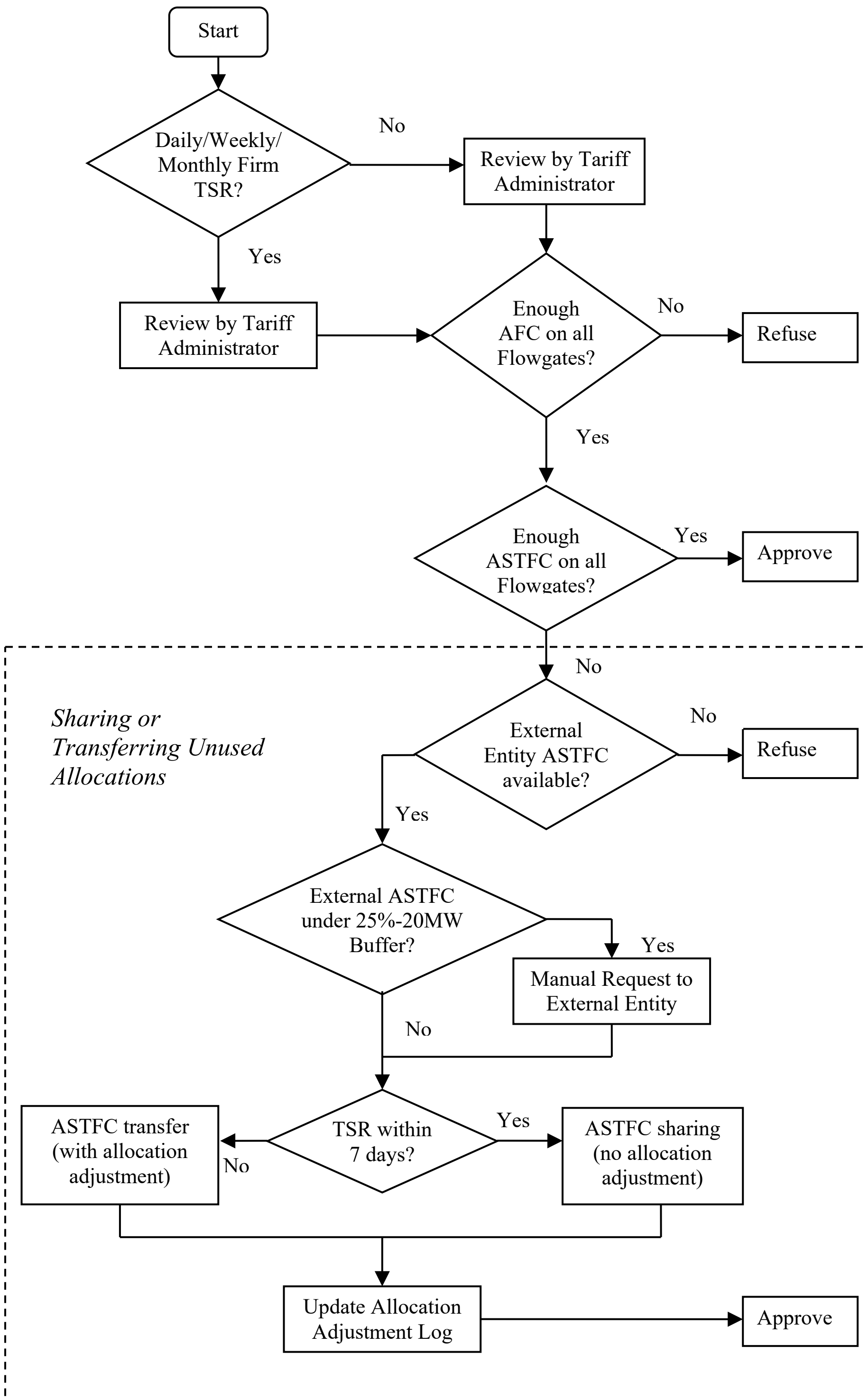


Figure 4: Firm TSR Evaluation Process

8.2.1 Evaluation process (On the Path - Off the Path)

The TSRs received are evaluated separately by the class of service. If the request is for Non-Firm service, it is evaluated against the Non-Firm AFC on the limiting Flowgates for the requested service. If the request is for Firm service, it is evaluated against the Firm AFC on the limiting Flowgates for the requested service and the ASTFC on the limiting Flowgates for the requested service.

The On the Path – Off the Path evaluation technique can be summarized by Flowgates on the transmission service path outside the MISO footprint are ignored, and Flowgates off the transmission service path are honored if the TSR sources and sinks within the MISO footprint, both MISO and non-MISO Flowgates are honored. If the request sources in the MISO footprint and sinks outside the MISO footprint, Flowgates owned by the sink/POD are ignored because it is assumed that the customer will have to submit a request on the sink/POD entity's OASIS, and that entity will be responsible for evaluation on Flowgates owned by it. Flowgates that are not owned by MISO or the sink/POD entity are honored as third-party limits since a TSR will not be submitted on that entity's OASIS. Similar logic is used when a TSR sources outside the MISO footprint and sinks inside the MISO footprint. The On the path - Off the path logic is honored for AFC only. For ASTFC, all Flowgates are honored irrespective of whether the Flowgate is On the path or Off the path.

For example, consider a TSR from ALTW to CE. ALTW is a MISO source, and CE is a non-MISO sink under PJM Tariff. In this case, Flowgates under the PJM Tariff are ignored while evaluating this request since the customer will have to submit a request on the PJM OASIS to complete the transmission service path. However, Flowgates owned by SPP are honored as third-party limits for this TSR since the customer is not required to submit a TSR on the SPP OASIS. However, in the above example, if both PJM and SPP Flowgates show up as constraints for ASTFC, they are honored.

8.2.2 Additional Considerations for TSR Evaluation

8.2.2.1 Interface Limits

In addition to AFC and ASTFC limits, there can be interface limits for selling transmission services to or from certain interfaces. Any such interface limits are posted on the MISO OASIS. Such a limit can be for 1) exporting to a specific POD or importing from a specific POR; 2) firm or non-firm transmission service 3) exporting to a group of PODs or importing from a group of PORs. For example, the firm limit for POD of MI-ONT is 1200 MW as of 10/21/2010. If the total confirmed transmission services on the MISO OASIS with a POD of MI-ONT equals 1100 MW for a specific period, only an additional 100 MW of new firm services for that period can be sold into MI-ONT, even if there are enough AFC and ASTFC available for the requests. Counterflow is not considered during an interface limit evaluation.

8.3 AFC Coordination Procedures

MOD-001-1a R3.3, R3.4, R9

MISO coordinates AFC values with neighboring entities with the intent that all entities should be using the most accurate, up-to-date models available. Currently, AFC values are coordinated with adjacent TSPs, including those for which coordination agreements have been executed. The AFC coordination process is described below. Appendix A identifies the Transmission Operators and TSPs from which the TSP provides and receives data for use in calculating ATC or AFC.

MOD-030 R6.2.1

Load Forecast – MISO reports hourly, daily, and monthly load forecast values, including Native Load and Network Service Load to the NERC SDX. MISO downloads hourly, daily, and monthly load forecast values for the AFC Zones that are in the footprints of adjacent TSPs with which coordination agreements have been executed and use them to model external generation to load impacts in AFC calculations for MISO Flowgates.

MOD-030 R6.2.2

Generation Dispatch Order – MISO exchanges its generation dispatch order information with adjacent TSPs with which coordination agreements have been executed. This exchange includes ranking and grouping of generation blocks. This generation dispatch information is used in MISO AFC calculations to include all designated network resources and other resources that are committed or have the legal obligation to run as specified by their TSPs.

Transmission Reservations – MISO shares all TSRs (including, but not limited to, Secondary Service, Firm and Non-Firm, Grandfathered Obligations, Firm roll-over rights, etc.) with adjacent TSPs which have coordination agreements ave been executed. MISO posts TSRs on an FTP site for the other entities to access each hour. MISO also scans the FTP sites of adjacent TSPs with which coordination agreements have been executed to download their respective TSRs. These TSRs are filtered to avoid duplication, and the basic filtering rules are as follows:

- All Reservations from an external entity that has a MISO-owned AFC Zone as a source or sink are excluded.
- While processing an entity's Reservation list, the source end reservation is always kept, except when the sink is in a MISO AFC Zone.

MOD-030 R5.3

List of Flowgates Attributes TFC and AFC Values – MISO posts the Flowgate TFC and AFC for all calculated time periods on an FTP site every hour for other entities to download. MISO also downloads the TFC and AFC values for the external Flowgates in the MISO process from adjacent TSPs, with which coordination agreements have been executed every hour for use in the sale of Transmission Service. MISO also posts a list of Flowgates along with their facility ratings, CBM, and TRM on its OASIS website as described in section 8.4of this document.

Generator and Transmission Outages – MISO uploads its generation and transmission outages to the NERC SDX every hour for other entities to use in their AFC calculations and also downloads the generation and transmission outages every hour for the non-MISO AFC Zones and uses them in the AFC calculations.

MOD-001-1a R9.1, R9.2

Data Requests – MISO will make the following data available, if it is maintained by MISO and requested, to any TSP, Planning Coordinator, Reliability Coordinator, or Transmission Operator solely for use in the requestor's ATC or AFC calculations within thirty calendar days of receiving a request or on the schedule as specified by the requestor (but no more frequently than once per hour, unless mutually agreed to by the requester and the provider).

- Expected Generation and Transmission outages, additions, and retirements.
- Load Forecasts.
- Unit commitments and order of dispatch, to include all designated network resources and other resources that are committed or have the legal obligation to run, as they are expected to run, in one of the following formats chosen.
    - Dispatch Order
    - Participation Factors
    - Block Dispatch
- Aggregated firm capacity set-aside for Network Integration Transmission Service and aggregated non-firm capacity set aside for Network Integration Transmission Service (i.e., Secondary Service).
- Firm and non-firm Transmission reservations.
- Aggregated capacity set-aside for Grandfathered obligations
- Firm roll-over rights.
- Any firm and non-firm adjustments applied by the TSP to reflect parallel path impacts.
- Power flow models and underlying assumptions.
- Contingencies, provided in one or more of the following formats:
    - A list of Elements
    - A list of Flowgates
    - A set of selection criteria that can be applied to the Transmission model used by the Transmission Operator and/or TSP
- Facility Ratings.
- Any other services that impact Existing Transmission Commitments (ETCs).
- Values of Capacity Benefit Margin (CBM) and Transmission Reliability Margin (TRM) for all ATC Paths or Flowgates.

  - Values of Total Flowgate Capability (TFC) and AFC for any Flowgates considered by the TSP receiving the request when selling Transmission service.
  - Values of TTC and ATC for all ATC Paths for those TSPs receiving the request that does not consider Flowgates when selling Transmission Service.
- Source and sink identification and mapping to the model.

8.4 Public Postings

8.4.1 List of Flowgates in AFC Process

A spreadsheet is posted on the MISO OASIS that lists all the Flowgates used in the Transmission Service approval process for AFC evaluation. It includes the TFCs, TRM, and CBM values for the summer and winter season as well as the CIRULE and PIRULE factors.

8.4.2 List of Flowgates in the CMP Process

A spreadsheet is posted on the MISO OASIS that lists all the Flowgates used in the Transmission Service approval process for ASTFC evaluation. It includes MISO coordinated Flowgates and reciprocal Flowgates with the neighboring entities for which a seams agreement has been executed.

8.4.3 STFC and ASTFC Values

Flowgate reports are posted on the MISO OASIS that lists the share of all TFC and ASTFC values for MISO reciprocal Flowgates used in the selling of the firm Transmission Service.

8.4.4 ATCID Postings

MOD-001-1a R4, R5

This document ("ATCID") is posted on the MISO OASIS website under the ATC Information Link. MISO will notify Planning Coordinators, Transmission Operators, and Reliability Coordinators within its footprint and adjacent Planning Coordinators, Reliability Coordinators, and TSPs of any updates to this document prior to implementing them.

The stakeholders have access to this document and are encouraged to review and understand this procedure so that they are familiar with how AFC values for their Flowgates are calculated. Stakeholders are encouraged to engage in discussions with MISO about this document via the various Stakeholder meetings held each month.

9 References

- EMT, Attachment C
- EMT, Module B
- NAESB WEQ-001, WEQ-013
- NERC MOD-001, MOD-030
- TP-PL-002 Transmission Reliability Margin Implementation Document
- TP-PL-003 Capacity Benefit Margin Implementation Document

10 Disclaimer

This document is prepared for informational purposes only to support the application of the provisions of the Tariff and the services provided thereunder. MISO may revise or terminate this document at any time at its discretion without notice. While every effort will be made by MISO to update this document and inform its users of changes as soon as practicable, it is the responsibility of the user to ensure the use of the most recent version of this document in conjunction with the Tariff and other applicable documents, including, but not limited to, the applicable NERC Standards. Nothing in this document shall be interpreted to contradict, amend, or supersede the Tariff. MISO is not responsible for any reliance on this document by others or for any errors or omissions or misleading information contained herein. In the event of a conflict between this document, including any definitions, and either the Tariff, NERC Standards, or NERC Glossary, the Tariff, NERC Standards, or NERC Glossary shall prevail. In the event of a conflict between the Tariff and the NERC Standards, or NERC Glossary, the Tariff shall prevail until or unless the Federal Energy Regulatory Commission ("FERC") orders otherwise. Any perceived conflicts or questions should be directed to the Legal Department.

11 Revision History

Doc Number	Description	Revised by:	Effective Date
TP-OP-005-r25	• Improved the figures in Section 7.2.2.1 for the modeling of Phase Shifters and DC lines to better illustrate the methodology • Updated Section 7.2.4.1 and 7.2.4.2 for the correct reference to counterflow in section 7.2.3.1 • Annual Review Completed	S.Guo	MAR-14-2021
TP-OP-005-r24	• Added GridLiance (GLH and GLHB) to the mapping table in Appendix B according to the LBA changes	S.Guo	MAR-14-2020
TP-OP-005-r23	• Updated the IDC acronyms. • Annual Review Completed	S.Guo	NOV-11-2019
TP-OP-005-r22	• Added HMPL to the mapping table in Appendix B according to the new LBA addition	S.Guo	MAR-01-2019

TP-OP-005-r21	• Annual Review Completed	S. Guo /K.Thomas	NOV-11-2018
TP-OP-005-r20	• Annual Review Completed	K. Thomas	NOV-11-2017
TP-OP-005-r19	• Revised ATCID to reflect the new MOD-030-3. Section 6.1 Changed the reference term “Special Protection Systems” to “Remedial Action Schemes.” Changed “MOD-030-2“ to “MOD-030.”	K. Thomas	FEB-01-2017
TP-OP-005-r18	• Added EMBA to mapping table in Appendix B • Annual review completed	K. Thomas/ T. Nguyen	OCT-29-2016
TP-OP-005-r17	• Updated section 8.4.3 STFC and ASTFC Values • Updated MOD references in document for the following: MOD-030-02 R1.1 & R1.2, MOD-001-1 R1 & R3.5 • Removed MAPP from Appendix A • Annual review completed	K. Thomas/ T. Nguyen	OCT-01-2015
TP-OP-005-r16	• Added MIUP to mapping table in Appendix B. Annual Review completed.	K. Thomas	DEC-01-2014
TP-OP-005-r15	• Revised Section 7.2.2.6 with update description on participation factors calculation • ‘Annual Review completed’ verbiage was erroneously left off -r14.	T. Nguyen	AUG-08-2014
TP-OP-005-r14	• 6.2, Removed language about how MISO’s Flowgate WebTool manages Flowgates • 3.12 Added definition for Effective ATC	K. Thomas/ C. Risley	JUL-26-2014
TP-OP-005-r13	• Revised Appendix A, updated structure, and add clarity to process	T. Nguyen	APR-15-2014
TP-OP-005-r12	• Sec. 5, updated AFC process diagram • Sec 7.2, changed the word affect to effect (grammatical error) • Sec. 7.2.1, updated Table and added clarifying language • Sec. 7.2.2, changed the word Interval to Power Flow • Sec. 7.2.2.2, updated how outages are included • Sec. 7.2.2.3, removed Attachment Y reference • Sec. 7.2.2.6, changed the word Interval to Power Flow • Sec. 7.2.3, changed the word Interval to Power Flow • Sec 8.3, Removed on a daily basis to align with Generation Dispatch Order process, was incorrectly added, changed incorrect reference of 6.12 to 8.4 • Appendix A, added on behalf of their member companies to SOCO	T. Nguyen	DEC-26-2013

TP-OP-005-r11	• Revised 7.2.2.1 to add clarity of process. • Revised Section 7.2.2.6 with update description on participation factors calculation. • Revised Section 7.2.3 with clarification language • Revised Section 7.2.3.1 with corrected reference to Section 7.2.2.4 • Revised Section 8.4 to remove redundancy of Flowgate list • Added SOCO to Appendix A • Updated mappings in Appendix B • Due to manual error Revision number 2 was not used, 'a' and 'b' were added to distinguish versions of revision 5 and added missing information in Revision History.	T. Nguyen / J. Li	DEC-19-2013
TP-OP-005-r10	Revised Appendix B of ATCID with updated Source Sink mapping table to reflect MISO South region integration into MISO.	K. Shenoy / T. Nguyen	NOV-19-2013
TP-OP-005-r9	Annual review completed. Added additional details for outage information in section 7.2.2.2 and corrected equation 6.1 ($\boldsymbol{PATC_3\ to\ PATC_n}$) in section 7.2.5. Due to manual error in revision numbering the original revision numbering was not used.	T. Nguyen J. Li	JUL-26-2013
TP-OP-005-r8	Revised ATCID for OATI webTrans Implementation: 1) Revised Section 5.2 regarding Limiting Flowgates 2) Revised Section 5.2.1, 5.2.2.2. Peak for the daily increment is changed 3) Revised Section 5.2.3.Replaced PAAC with webTrans 4) Revised Section 5.2.3.3 regarding Profiling Reservations 5) Updated Figure 3 in Section 5.3. 6) Removed Figure 1 in Section 6.1.1 7) Updated APPENDIX B	T. Nguyen/ P. Gogineni	APR-15-2013
TP-OP-005-r7	Complete Annual Review. Added additional details for counterflow, corrected typo regarding IDC model.	J. Harmon	JUL-27-2012
TP-OP-005-r6	Revised Generator dispatch order process, corrected typo in Appendix B, and added section describing calculation of Distribution Factors. Made non-technical changes to conform with MISO Controlled Documents policy.	J. Harmon	NOV-30-2011
TP-OP-005-r5b	MISO Rebranding Changes JUL-12-2011	G. Krebsbach	JUN-02-2011
TP-OP-005-r5a	Revised Appendix B to map FE control area to FE (due to FE exit) and new SPRM control area mapped to EDE.	J. Harmon	JUN-02-2011

TP-OP-005-r4	Revised AFC Procedure to ATCID and added references to MOD-030-02 and MOD-001-1	T. Nguyen / J. Harmon	APR-01-2011
TP-OP-005-r3	1) Revised examples related to MEC since MEC has become internal to MISO 2) Removed MAPP from the entities that have seams agreement with MISO 3) Merged the definition of rating and TFC 4) Added reference to MOD-030-2, R2.4 5) Make consistent use of constraint and Flowgate 6) Clean up the ASTFC calculation section to remove duplicate paragraphs comparing to the baseline Congestion Management Process document	K. Zhu	APR-01-2010
TP-OP-005-r1	Clarifications added regarding Flowgate definitions	K. Zhu	MAY-20-2009
TP-OP-005	Original Document	J. Harmon	JUL-10-2008

APPENDIX A

MISO primarily receives data for use in calculating AFC from its Transmission Owners and Operators via the NERC SDX. An illustrative list of entities whose data MISO would receive via the MISO's SDX file can be found at: https://www.misoenergy.org/StakeholderCenter/Members/Pages/MembershipList.aspx

MISO also receives data from the following entities via the NERC SDX:

- Manitoba Hydro (MHEB)
- Ontario IESO (ONT)
- PJM Interconnection, LLC (PJM) on behalf of their member companies
- Southern Company (SOCO) on behalf of their member companies
- Southwest Power Pool (SPP) on behalf of their member companies
- Tennessee Valley Authority (TVA) on behalf of their member companies
  - Associated Electric Cooperative, Inc. (AECI)
  - LG&E and KU (LGEE)
- VACAR South (VACS) on behalf of their member companies

Additionally, MISO receives data from the following entities via FTP:

- PJM Interconnection, LLC (PJM) on behalf of their member companies
- Southern Company (SOCO) on behalf of their member companies
- Southwest Power Pool (SPP) on behalf of their member companies
- Tennessee Valley Authority (TVA) on behalf of their member companies
  - Associated Electric Cooperative, Inc. (AECI)
  - LG&E and KU (LGEE)

MISO reports its data for adjacent entities' use in calculating ATC or AFC to the NERC SDX. It also provides data for use in calculating ATC or AFC to the following entities via FTP:

- Manitoba Hydro (MHEB)
- PJM Interconnection, LLC (PJM) on behalf of their member companies
- Southern Company (SOCO) on behalf of their member companies
- Southwest Power Pool (SPP) on behalf of their member companies
- Tennessee Valley Authority (TVA) on behalf of their member companies
  - Associated Electric Cooperative, Inc. (AECI)
  - LG&E and KU (LGEE)

APPENDIX B

The mapping table below illustrates how specific Source and Sink points on the MISO OASIS are mapped to the model used to calculate AFC.

In general, specific generators and load points are mapped to their respective Control Areas. For example, a reservation with a Source of AMIL.COFFEEN1 would be modeled as a reservation with a Source of AMIL. The table below illustrates this concept with ".XXXXX" after MISO LBAs to signify this mapping.

OASIS Source/Sink	AFC Model Mapping
AEC	AEC
AECI	AECI
AEP	AEP
ALTE.XXXXX	ALTE
ALTW.XXXXX	ALTW
AMIL.XXXXX	AMIL
AMMO.XXXXX	AMMO
AP	AEP
BREC.XXXXX	BREC
CE	CE
CIN.XXXXX	CIN
CLEC.XXXXX	CLEC
CONS.XXXXX	CONS
CPLE	CPLE
CPLW	CPLW
CSWS	CSWS
CWLD.XXXXX	CWLD
CWLP.XXXXX	CWLP
DECO.XXXXX	DECO
DEOK	DEOK
DEWO	AEP
DLCO	DLCO
DPC.XXXXX	DPC

OASIS Source/Sink	AFC Model Mapping
MHEB	MHEB
MOWR	AECI
MP.HVDCE	MPDCE
MP.HVDCW	MPDCW
MP.XXXXX	MP
MPS	MPS
MPW.XXXXX	MPW
NIPS.XXXXX	NIPS
NPPD	NPPD
NSB	SOCO
NSP.XXXXX	NSP
OKGE	OKGE
ONT	ONT
ONT.DECO.PSOUT	ONT
ONT_W	MP_ONT
OPPD	OPPD
OTP.XXXXX	OTP
OVEC	OVEC
PJMC	PJM
RC	SOCO
SC	SC
SCEG	SCEG
SEC	SOCO

OASIS Source/Sink	AFC Model Mapping
DPL	DPL
DUK	DUK
EDE	EDE
EEI	EEI
EES	EES
EKPC	EKPC
EMBA.XXXX	EMBA
ERCO	CSWS
FE	FE
FMPP	SOCO
FPC	SOCO
FPL	SOCO
GRDA	GRDA
GRE.XXXXX	GRE
GVL	SOCO
HE.XXXXX	HE
HQT	PJM
HST	SOCO
INDN	INDN
IPL.XXXXX	IPL
IPRV	AEP
ISNE	PJM
JEA	SOCO
KACY	KACY
KCPL	KCPL
LAFA.XXXXX	LAFA
LAGN.XXXXX	LAGN
LEPA.XXXXX	LEPA
LES	LES
LGEE	LGEE
LWU	SOCO
MDU.XXXXX	MDU

OASIS Source/Sink	AFC Model Mapping
SECI	SECI
SEHA	SEHA
SERU	SERU
SIGE.XXXXX	SIGE
SIPC.XXXXX	SIPC
SME.XXXXX	SME
SMP.XXXXX	SMP
SOCO	SOCO
SPA	SPA
SPC	SPC
SPS	SPS
TAL	SOCO
TEC	SOCO
TVA	TVA
UPPC.XXXXX	UPPC
VAP	VAP
WAUE	WAUE
WEC.XXXXX	WEC
WFEC	WFEC
WPS.XXXXX	WPS
WR	WR
YAD	YAD
EAI.XXXXX	EAI
PSEC	AEC
CISO	SPS
EDDY	PJM
MIDW	SECI
NYISO	NYISO
PECO	PJM
PNM	SPS
PSCO	SPS
PSEG	PJM

OASIS Source/Sink	AFC Model Mapping
MEC.XXXXX	MEC
MGE.XXXXX	MGE
MIUP.XXXXX	MIUP
HMPL.XXXXX	HMPL
GLH.XXXXX	GLH
GLHB.XXXXX	GLHB

OASIS Source/Sink	AFC Model Mapping