JEA's

Available Transmission System Capability Implementation Document

I. Purpose

This document serves as JEA's Available Transfer Capability Implementation Document ("ATCID") and describes the methodology that JEA uses to assess Total Transfer Capability and Available Transfer Capability. This document is intended to comply with NERC Standard MOD-001-1a and MOD-028-1.

A. Type 1 Paths

JEA, along with other Florida Reliability Coordinating Council ("FRCC") members, use a TTC/ATC calculation software program that is provided and hosted by Open Access Technology International, Inc ("OATI"). This calculation software program along with OATI's webTrans product is collectively known as the "Engine". Members of the FRCC, including JEA, have formed the Florida Transmission Capability Determination Group ("FTCDG") in an effort to provide TTC and ATC values for the region.

B. Type 2 Paths

JEA, along with the following interface owners Florida Power and Light, Progress Energy – Florida and Tallahassee, determine coordinated TTC calculations across the Florida/Southern Interface. The TTC values are allocated to the interface owners and input into OATI's webTrans product to provide ATC calculations.

II. Definitions

Total Transfer Capability (TTC): The amount of electric power that can be moved or transferred reliably from one area to another area of the interconnected transmission systems by way of all transmission lines (or paths) between those areas under specified system conditions.

Available Transfer Capability (ATC): A measure of the transfer capability remaining in a physical transmission network for further commercial activity over and above already committed uses.

III. Calculation of TTC and ATC

JEA utilizes the Area Interchange Methodology as described in MOD-028 to calculate TTC and ATC. This methodology applies to all paths and all posted time periods.

A. Type 1 Paths

JEA's methodology and process details are contained in Appendix A.

B. Type 2 Paths

JEA's methodology and process details are contained in Appendix B.

C. ATC

JEA's methodology and process details are contained in Appendix C.

IV. Data for Calculating TTC and ATC

The Transmission Service Providers and Transmission Operators that participate in the exchange of data (receive and provide data) with JEA for calculating TTC/ATC is listed in Appendix D.

Appendix A

Total Transfer Capability for Type 1 Paths

I. Background

The transmission interfaces between JEA and its adjacent Balancing Areas is coordinated through agreements with FRCC and its members. In order to provide coordination of the TTC values for these interfaces, a group of FRCC members (First Contingency Transfer Determination Group or FCTDG) has developed processes and systems to share data and compute TTC's for the configured paths based on the methodology. The methodology and process is set up, such that, given the models and input data, the transfer capability can be verified.

II. Tools

A. OATI Engine

JEA utilizes a software program (Engine) that is provided and hosted by Open Access Technology International, Inc ("OATI") to perform its TTC and ATC calculations.

III. Input Data

A. Modeling Data and Topology

Base models are derived from the current FRCC Transmission Working Group ("TWG") seasonal models and represent the network topology for the entire FRCC region as well as the portion of the South East Reliability Council (SERC) region immediately adjacent to the FRCC. This ensures all relevant outages can be mapped in the base model. The remainder of the SERC is an equivalent representation in the models. These models contain generation and transmission facilities and their associated facility ratings as specified by the Generator and Transmission Owners, including planned additions. These models are provided to OATI for use in the Engine.

B. Interchange

Long-term firm and network interchange schedules are included in the calculation through a compiled FRCC list of transactions. The Source/Sink information provided for these transactions maps to Balancing Authorities in the model based on POR/POD.

C. Contractual Obligations

JEA limits its TTC to the lower of the physical limitations of the sum of its tie facility ratings with the other entities participating in the transfer or any contractual limitations including allocated shares.

D. Generation Merit Order

Generation merit order is provided by the individual FRCC participants.

E. Load Forecast

Hourly (168 hours) and daily (395 days) load forecast is provided by the individual FRCC participants.

F. Contingencies/Monitored Branches

Contingency Outages and Monitored Branches are established by the individual FRCC participants. JEA includes tie lines and all JEA owned 230KV and 138 KV facilities that are not radial in nature.

G. Generation and Transmission Outages

Generation and transmission outages are provided by the individual FRCC participants via FTMS.

1) Outages scheduled for a part of a day impact hourly calculations only for the hours during which they are scheduled. They impact daily calculations (Day 8-395) if they are scheduled to be out during the hour starting at 16:00 EPT for that particular day.
2) Outages scheduled for a part of a month impact monthly calculations by impacting the associated daily calculations. Each day of the month has its own calculation and will account for the outage if scheduled on that day. The monthly calculation is posted as the lowest daily number for each specific path.

H. TTC Paths

JEA has configured the following commercially viable paths between JEA adjacent balancing areas:

SSN to JEA, JEA to SSN
FPL to JEA, JEA to FPL
FPL to SSN
SOCO-FPL, FPL-SOCO
SOCO-SSN, SSN-SOCO

Where:

SSN – Seminole North
FPL – Florida Power and Light
SOCO – Southern Balancing Area

The TTC calculated for each path is based on an area to area transfer.

IV. Methodology

A. Setup

OATI creates flow models for each TTC calculation period by taking the input data in the proper time period to perform the calculations.

B. Compute FCITC

For each path and for each time period, generation is increased in the source area and decreased in the sink area, according to the merit order. The transfer capability increases until either a base or contingency System Operating Limit (SOL) violation occurs; otherwise the FCITC equals the value at which the maximum adjustment was applied.

C. Determine TTC

For each path and each time period, TTC is the lower of the sum of Facility Ratings of all ties comprising the ATC Path, contractual limitations for the path or the FCITC added to the "impacts of firm transmission services." The value for this "impact of firm transmission service" is based on the transmission services modeled in the study case.

V. TTC Path Allocation

JEA does not allocate TTC within a larger path. SOCO paths are allocated based on interface owner allocation tables. All of the JEA paths TTC's are allocated to JEA.

VI. Calculation Frequency and the Establishment of TTC

Calculations of TTC along with the subsequent ATC calculation for each individual path are performed at the following frequencies.

1) Hourly TTC values are calculated for Hours 1 – 72 with an hourly update frequency.
2) Hourly TTC values are calculated for Hours 73 – 168 with a daily update frequency.
3) Daily TTC values are calculated for Days 1 – 7 are determined by the most restrictive of the hourly values for that day.
4) Daily TTC values are calculated for Days 8 – 31 with a weekly update frequency.

5) Daily TTC values are calculated for Months 2 – 13 with a weekly update frequency. Monthly values are derived from these calculation based on the most restrictive day of the month.

Appendix B

Total Transfer Capability for Type 2 Paths

I. Background

The transmission interface between the FRCC region and Southeastern Sub region of SERC (Southern) is a multiple owner transmission interface that is coordinated through a reliability coordination arrangement between Southern and the FRCC as well as the transmission interface allocation arrangements among Florida Power and Light Company, Florida Power Corporation, JEA, and City of Tallahassee. On the Southern side, a joint ownership arrangement exists among the following owners; City of Dalton, Georgia Transmission Company, Municipal Electric Authority of Georgia, and Southern Company. In order to ensure coordination in the TTC values for this interface a procedure has been established between the Southern owners and the FRCC owners to share topology models, economic dispatch information and all data relevant to meeting the MOD-028 requirements.

The TTC for the FL/SO transmission interface is calculated as a simultaneous transfer to/from all the interface owners based on their respective allocations. This jointly determined TTC value is then allocated among the various owners according to their percentage ownership. For the FL/SO interface owners these individual allocations serve as a contractual obligation for each Transmission Provider when posting individual ATC paths involving the interface.

II. Tools

A. Power Flow

PTI PSS/E power flow software is utilized to perform TTC calculations.

III. Inputs

A. Modeling Data and Topology

Base models are derived from the current FRCC Transmission Working Group ("TWG") seasonal models and represent the network topology for the entire FRCC region as well as the portion of the South East Reliability Council (SERC) region immediately adjacent to the FRCC. The models are then merged with SERC models. This ensures all relevant

outages can be mapped in the base model. These models contain generation and transmission facilities and their associated facility ratings as specified by the Generator and Transmission Owners, including planned additions.

B. Interchange

Long-term firm and network interchange schedules are included in the calculation through a compiled FRCC list of transactions. The Source/Sink information provided for these transactions maps to Balancing Authorities in the model based on POR/POD.

C. Contractual Obligations

JEA limits its TTC to the lower of the physical limitations of the sum of its tie facility ratings with the other entities participating in the transfer or any contractual limitations including allocated shares.

D. Generation Commitment and Dispatch Order

Generation commitment and dispatch order is provided by the individual interface owners via EDCI files.

E. Load Forecast

Monthly and daily load forecast is provided by the individual interface owners.

F. Contingencies/Monitored Branches

Contingency Outages and Monitored Branches are established by the individual interface owners and represent a screening of potential contingencies that have potential impacts to the interface.

G. Generation and Transmission Outages

Generation and transmission outages are provided by the individual interface owners.

1) Outages scheduled for a part of a day impact hourly and daily calculations if they are scheduled to be out during the hour starting at 17:00 EPT for that particular day.
2) Outages scheduled for a part of a month impact monthly calculations if they are scheduled to be out any day of the month. A determination is made to determine which outage has the most limiting impact on TTC for the month.

H. TTC Paths

The interface owners calculate TTC for the interface between FRCC and the Southern Balancing Area. The TTC calculated for each path is based on an area to area transfer. The computed TTC is apportioned to the interface owners to map to the interface owner's individual paths.

IV. Methodology

A. Monthly Calculation

A rolling thirteen months of individual monthly TTC values are determined jointly by the Florida/Southern interface owners. All thirteen monthly TTC values are re-calculated and revised each month using updated load flow models shared through an FTP site. These shared models ensure that critical data i.e. topology, load forecasts, economic dispatch and transmission and generation outages are common to both parties. First Contingency Incremental Transfer Capability (FCITC) calculations are performed using a jointly established contingency and monitored element lists. All applicable SOL and IROL limits are observed and either a 5% OTDF for Florida facilities or a 3% OTDF for Southern facilities is applied to be consistent with intra-regional ATC calculations. In addition to the standard thermal and voltage limit violation checks, a Power/Voltage sensitivity analysis (P/V) is performed for those contingencies that have been identified as potential voltage stability issues. The TTC value is established as the sum of the FCITC and the existing firm commitments that were modeled. For planned outages that may not have been included in the original monthly studies the specific monthly model affected by the outage is modified and the TTCs recalculated. This planned outage would then be included in the next series of monthly studies if applicable.

B. Daily Calculation

At least once within the seven calendar days before they become effective the daily TTC will be re-calculated using the latest available information on loads and generation and transmission facility status. The same contingency and monitoring files used for the monthly TTC calculations are used to establish the daily TTCs. The study models used for the daily TTC value calculations are adjusted to reflect the forecasted loads and scheduled outages for the study period. The Area Interchange Methodology is used for these daily TTC calculations. In addition to the standard thermal and voltage limit violation checks, a Power/Voltage sensitivity analysis (P/V) is performed for those contingencies that have been identified as potential voltage stability issues.

C. P/V Sensitivity Study

The Transfers from the SERC Region into the FRCC Region may be limited by voltage stability concerns. The TTC values for daily and monthly transfers into the FRCC Region are studied with a P/V sensitivity technique for those contingencies that have been identified as having voltage security concerns. The most constraining contingency with respect to voltage stability is identified through a review of the P/V sensitivity results. The IROL and SOL limit for the FL/SO interface is set at maximum transfer for which BES post contingency voltages are above 90% of nominal for this most constraining contingency. A voltage security factor is applied to this IROL/SOL value to determine a TTC value with an adequate security margin. The TTC value for the FL/SO interface is set at the lower of the P/V sensitivity derived limit or the standard thermal and voltage limit violation limits.

D. Unexpected Outage of Transmission Facility

An unexpected outage of a 500 kV or higher transmission facility or a transformer with a low-side voltage of 200 kV or higher, provided such outage is expected to last 24 hours or longer, will be evaluated under the daily process for the next seven days. The monthly models for the applicable periods of the outage will be modified to remove the outaged facilities, the TTC values recalculated, and new TTC values developed within 24 hours.

V. TTC Path Allocation

The TTC is allocated to each individual owner based on allocation tables.

VI. Calculation Frequency and the Establishment of TTC

A calculation of TTC along with the subsequent ATC calculation for each individual path is performed at the following frequencies or better:

1) Hourly TTC values are calculated for Hours 1 – 48 once per week.
2) Daily TTC values are calculated for Days 1 – 31 once per week.
3) Monthly TTC values are calculated for Months 2 – 13 once per month.
4) Within 24 hours of an unplanned outage of a 500KV or higher BES facility, TTC will be recalculated if the outage is expected to last 24 hours or longer.

Appendix C

Available Transmission Capability

I. Background

JEA's ATC process is to utilize the path TTC's that are computed for the specific time period per the methodologies included in Appendices A and B. Once TTC's are computed they are automatically or manually transferred to the OATI WebTrans system for ATC calculations. Whenever TTC is changed or any component of ATC is changed, WebTrans will automatically compute the new path ATC's for paths computed by the OATI Engine. For non-OATI computed paths, ATC's are recalculated within one hour of the change.

II. Definitions

ETC: Committed uses of a Transmission Service Provider's Transmission system considered when determining ATC or AFC.

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

GF_F: The firm capacity set aside for Grandfathered Firm Transmission Service and contracts for energy and/or Transmission Service, where executed prior to the effective date of JEA's Open Access Transmission Tariff on ATC Paths that serve as interfaces with other Balancing Authorities.

PTP_F: The firm capacity reserved for confirmed Point-to-Point Transmission Service.

ROR_F: The capacity reserved for roll-over rights for Firm Transmission Service contracts granting Transmission Customer 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.

OS_F: The firm capacity reserved for any other service(s), contract(s), or agreement(s) not specified above using Firm Transmission Service, including any other firm adjustments to reflect impacts from other ATC Paths.

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

$GF_{NF:}$ The non-firm capacity set aside for Grandfathered Firm Transmission Service and contracts for energy and/or Transmission Service, where executed prior to the effective date of JEA's Open Access Transmission Tariff on ATC Paths that serve as interfaces with other Balancing Authorities.

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

$OS_{NF:}$ The non-firm capacity reserved for any other service(s), contract(s), or agreement(s) not specified above using Non-Firm Transmission Service, including any other firm adjustments to reflect impacts from other ATC Paths.

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 operation as system conditions change.

CBM: The amount of firm transmission transfer capability preserved by the transmission provider for Load-Serving Entities (LSEs), whose loads are located on that Transmission Service Provider's system, to enable access by the LSEs to generation from interconnected systems to meet generation reliability requirements. Preservation of CBM for an LSE allows that entity to reduce its installed generating capacity below that which may otherwise have been necessary without interconnections to meet it generation reliability requirements. The transmission transfer capability preserved as CBM is intended to be used by the LSE only in times of emergency generation deficiencies: the amount of transmission transfer capability necessary to provide reasonable assurance that the interconnected transmission network will be secure. CBM accounts for the inherent uncertainty in system conditions and the need for operating flexibility to ensure reliable system operation as system conditions change.

Postbacks: Positive adjustments to ATC as defined in Business Practices. Such Business Practices may include processing of redirects and unscheduled service.

Counterflows: The adjustments to ATC to reflect the impact of transactions on the inverse path.

III. Time Horizon

Within the calculation software, JEA defines the following time intervals.

Scheduling Interval – This is a moving window extending from the current hour through the next three hours.

Operating Interval – This is a moving and shrinking window that extends from the end of the Scheduling Interval to hour 24:00 of the current day.

Planning Interval – This window begins at the end of the Operating Interval and extends 13 months from the current date.

E. TTC Paths

JEA has configured the following commercially viable paths between JEA adjacent balancing areas:

SSN to JEA, JEA to SSN
FPL to JEA, JEA to FPL
SOCO to JEA, JEA to SOCO
SOCO to SSN, SSN to SOCO
SOCO to FPL, FPL to SOCO
FPL-SSN

Where:

SSN – Seminole North
FPL – Florida Power and Light
SOCO – Southern Balancing Area

The source used for TTC is obtained from the Point of Receipt (POR) field of the transmission reservation. The sink used for ATC calculations is obtained from the Point of Delivery (POD) field of the transmission reservation. Each POR/POD represents a balancing area. The TTC calculated for each path is based on an area to area transfer.

IV. ATC Methodology

JEA's ATC methodology is as follows:

A. Establish TTC's for each path for each time period per TTC Methodologies. Once TTC's are computed they are automatically or manually transferred to the OATI WebTrans system for ATC calculations.
B. Determine ATC Components for each path for each time period
    1) OASIS Transmission Reservation changes related to NITS and PTP
    2) Postbacks due to unscheduled transmission service
    3) Changes in counterflows schedule, currently JEA does not utilize counterflows
    4) Changes in GF, ROR, OS, CBM or TRM
C. Compute ATC's based on calculation algorithms
D. Re-compute ATC's if any component of ATC changes including TTC

V. ATC Calculations

JEA's ATC methodology is based on specific algorithm to calculate ATC based on the computation of TTC and the various components of ATC. The following calculation algorithms are executed whenever a component of ATC is changed:

A. Firm ATC

The following algorithm is used for firm ATC which is available as a daily, weekly and monthly product within the operating and planning horizons.

$$ATC_{firm} = TTC - ETC_{firm} - CBM - TRM + Postbacks_{firm} + Counterflows_{firm}$$

B. Non-Firm ATC

The following algorithm is used for non-firm ATC which is available as an hourly, daily, weekly and monthly product within the scheduling, operating and planning horizons.

$$ATC_{non\text{-}firm} = TTC - ETC_{firm} - ETC_{non\text{-}firm} - CBM_S - TRM_U + Postbacks_{non\text{-}firm} + Counterflows_{non\text{-}firm}$$

C. Existing Transmission Commitments (ETC)

The algorithm used for determining Firm ETC is the following:

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

The algorithm used for determining Non-Firm ETC is the following:

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

1) Network Integration Transmission Service (NITS)

JEA native and network customer loads are incorporated into the Transmission Model used to develop the FCITC; therefore, the transmission capacity set aside to serve this load is inherently present in the determination of FCITC but not explicitly counted as ETC.

Generation resources for JEA and other network customers located external to JEA's balancing area are included as either $NITS_F$ or $NITS_{NF}$ and are explicitly counted as ETC.

Non-OATT customers only have capacity set aside through ETC when there is a network service reservation or transmission service reservation on the JEA OASIS system.

2) Point-to-Point Transmission Service (PTP)

Point-to-Point Transmission service requests are accounted for in ETC through the use of reservations in OASIS.

3) Grandfathered Transmission Service (GF)

Grandfathered transmission service is counted as ETC through the use of Set Aside reservations.

4) Roll-over Rights (ROR)

Transmission service maintained until "roll-over" of a firm transmission service has expired or converted to service.

5) Other Transmission Services (OS)

To address the impact of non-firm reservations on network postings, JEA uses the OS component to post non-firm transmission as non-firm network on the Southern to JEA path.

6) Postbacks (Release of Unscheduled Capacity)

Firm capacity service through ETC that is not scheduled (tagged) is released within the Scheduling interval (i.e. posted back) by reducing the amount of ETC that is subtracted. This "postback" adds the released capacity only to non-firm ATC.

Non-firm capacity reserved through ETC that is not scheduled within the Scheduling interval is released as non-firm ATC through a "postback" as well.

D. Transmission Reliability Margin (TRM)

Scheduling Horizon - JEA does not use TRM for non-firm ATC

Operating and Planning Horizon – JEA utilizes TRM for non-firm ATC

The specifics of the JEA TRM methodology and associated databases can be found in JEA's Transmission Reliability Margin Implementation Document (TRMID).

E. Capacity Benefit Margin (CBM)

JEA only uses CBM on the Florida-Southern paths.

The specifics of the JEA CBM methodology can be found in JEA's Capacity Benefit Margin Implementation Document (CBMID).

F. Counterflows

Counterflows for long term firm transactions are inherently accounted for in determining FCITC by their inclusion within the study model. By nature these transactions' presents as interchange in the model impact the calculation of FCITC on the inverse path.

JEA does not use counterflows for other transactions due to the level of uncertainty associated with the scheduling of such reservations.

Appendix D

JEA receives and provides data from and to the following entities:

Florida Power & Light
Progress Energy Florida
City of Tallahassee
Tampa Electric

Seminole Electric Company
Orlando Utilities Commission Cooperative, Inc.
Gainesville Regional Utilities
Lakeland Electric
Florida Municipal Power Agency
Kissimmee Utility Authority
Southern Company