

ATTACHMENT C

Available Transfer Capability Calculation Methodology

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Figure I – ATC Calculation Flow Process Diagram

I. Introduction

Tucson Electric Power Company's (TEP) transmission system has many interconnections with neighboring utilities. Some of those interconnections have a Western Electricity Coordinating Council (WECC)-approved path rating. The methodology for achieving path rating approval is stated in the WECC "Overview of Policies / Procedures for Regional Planning Project Review" document, located at the following link:

http://www.wecc.biz/documents/library/procedures/planning/Overview_Policies_Procedures_RegionalPlanning_ProjectReview_ProjectRating_ProgressReports_07-05.pdf

The rating for those paths without a WECC approved path is based on power flow analysis and thermal capability.

II. ATC---General Methodology

TEP calculates firm and non-firm Available Transmission Capability (ATC) using the Contract Path ATC methodology that is based, in part, on the WECC-approved methodology detailed in "Determination of Available Transfer Capability within the Western Interconnection" and by applying the Open Access Transmission Inc. (OATI) ATC Formula parameters.

<http://www.wecc.biz/documents/library/procedures/ATC-apprdec01.pdf>

Determination of ATC consists of three steps:

1. The determination of path Total Transfer Capability (TTC),
2. The allocation of TTC among Transmission Providers
3. The determination of each Transmission Providers' Existing Transmission Commitments (ETC)

A Transmission Provider's ATC is then determined by subtracting ETC from the allocated TTC.

$$\text{ATC} = \text{TTC (allocated)} - \text{TRM} - \text{CBM} - \text{ETC}$$

(a) Determination of Total Transfer Capability (TTC)

(i) Definition

From the WECC ATC document, "Determination of Available Transfer Capability Within the Western Interconnection", TTC represents the reliability limit of a transmission path at any specified point in time.

TTC may also be defined as the amount of electric power that can be transferred over the specified interface of the interconnected transmission network in a reliable manner while meeting all of a specific set of defined pre- and post-contingency system conditions.

As described below, the TTC is also dependent on transmission rights TEP may have on a transmission path.

(ii) Calculation Methodology

1. For transmission facilities that will affect the Western Interconnection, the determination of TTC is accomplished through the WECC Path Rating Process.
2. TTC is determined either prior to a new transmission component being brought into service or when a modification to a transmission component would affect the TTC.
3. Once the TTC determination is made, it remains fixed and changes only if there is a physical or operational change to the transmission system or a transmission component which requires a change to TTC.
4. When transmission facilities are jointly owned, the capacity is allocated between the owners based on the joint ownership or participation agreement;

therefore, the TTC of TEP's share of any jointly owned facilities will be based upon TEP's allocated capacity .

5. If a WECC defined path must be separated into components to properly allow for the commercial use of the path and its components, the components' TTCs will be based on the same studies used to determine the path Operating Transfer Capability (OTC) or the thermal rating of the components. The sum of the components' TTCs will not exceed the path OTC.
6. Narratives explaining changes to monthly and/or yearly TTC are posted on TEP's OASIS in the Order 890 Folder.

(iii) Databases Used in TTC Assessments

System base cases developed by the WECC members are used by TEP in its TTC assessments.

(iv) Assumptions Used in TTC Assessments

To ensure reliability is maintained within the Western Interconnection, many variations in load and generation levels, and single contingency situations, are studied to determine the TTC of any path.

(b) Existing Transmission Commitments (ETC)

(i) Definition

ETC: Committed uses of the transmission system including 1.) Native Load commitments (including Network Integrated Transmission Service), 2.) Ancillary Services not otherwise included in CBM or TRM, 3) rollover rights, 4.) grandfathered transmission service agreements and bundled contracts for energy and transmission, 5.) confirmed reservations, 6.) post-backs of redirected services, parallel flows, and counterflows not otherwise accounted for in the ATC calculation.

(ii) Calculation Methodology To Determine Transmission Capacity Set Aside for Native Load And Network Load:

Native load and network service type contracts are modeled using the megawatt quantity and other terms which are determined consistent with the OATT and the transmission customer's (TC) loads and resources forecasts.

(iii) Incorporation of Point-To-Point Transmission Service Requests (TSRs)

For existing, confirmed TSRs and to properly account for potential roll-over requests, point-to-point type contracts are modeled using the specified megawatt quantity, point of receipt, and point of delivery.

(iv) Accounting for Rollover Rights

TEP assumes that a TC will rollover its existing long term TSR. To account for this, transmission in the amount of the confirmed TSR is set aside. If a TC does not exercise its rollover right, that amount may be removed from the ETC, unless that capacity is reserved by another TC.

(v) Process For Ensuring that Non-Firm Capacity is Released Properly

Transmission reservations that are not scheduled will be made available and posted on OASIS as available Non-Firm Capacity.

(c) **Transmission Reliability Margin (TRM)**

(i) Definition

TRM is the amount of transmission transfer capability necessary to provide a reasonable level of assurance that the interconnected transmission network will be secure under a broad range of uncertainties in system conditions. TRM accounts for the inherent uncertainty in system conditions and system modeling, and the need for operating flexibility to ensure reliable system operation as system conditions change.

(ii) Calculation Methodology

Not applicable to TEP

(iii) Databases Used in TRM Assessments

Not applicable to TEP

(iv) Conditions Under Which TEP Uses TRM

TEP utilizes TRM for the following:

1. Reserve Sharing

Transmission may be set aside to meet TEP's reserve sharing obligations. Because the full capacity of the reserve sharing may be needed at anytime

during any hour for reliability purposes, the capacity is not released for non-firm use.

2. Operating Reserves and Contingency Reserves

TEP is a member of the Southwestern Reserve Sharing Group (SRSG). The reserve sharing group exists to allow member Balancing Authorities to reduce the contingency reserves they may carry and allow access to other reserves to meet the requirements of the NERC Disturbance Control Standard (DCS) detailed in BAL-002-0.

(d) Capacity Benefit Margin (CBM)

(i) Definition

CBM is the amount of firm transmission transfer capability reserved by Load Serving Entities (LSEs) on the host transmission system where their load and generation resources are located, to enable access to generation from interconnected systems to meet generation reliability requirements. CBM is a uni-directional quantity with identifiable beneficiaries, and its use is intended only for the time of emergency generation deficiencies.

(ii) Capacity Benefit Margin (CBM) Practice and Procedures

It is TEP's practice to not set aside transfer capability for CBM; therefore TEP does not have procedures in place allowing for use of CBM. Should TEP determine that it is necessary to use an amount other than zero for CBM, TEP will post the required information on its OASIS including any required reasons and or methodology used in determining the CBM and location.

III. ATC Calculation for the Three Operating Horizons

Acronyms Used in Equations

ATC = Available Transfer Capability

CBM = Capacity Benefit Margin

ETC = Existing Transmission Commitments

TRM = Transmission Reliability Margin

TSR = Transmission Service Reservation

TTC = Total Transfer Capability

To determine firm and non-firm Available Transfer Capability (ATC), TEP uses the following algorithms for the various horizons:

(a) Scheduling Horizon

The Scheduling Horizon is defined as the real-time period (current hour plus the next two hours).

In the Scheduling Horizon, Non-Firm ATC is calculated by subtracting TRM, CBM, Implemented Firm Tags and Implemented Non-Firm Tags; and adding the appropriate counter-schedules which increase ATC. Subtracting the Implemented Firm Tags accomplishes two things: since a Firm Tag must have an accompanying Firm TSR, this properly accounts for Firm TSRs, and it will release non-Tagged Firm TSRs for use as Non-Firm.

$$(a) \text{ Firm ATC} = \text{TTC} - \text{TRM} - \text{CBM} - \text{Reserved Firm ETC}$$

$$(b) \text{ Non-Firm ATC} = \text{TTC} - \text{TRM} - \text{CBM} - \text{Tagged Firm/Non-Firm ETC} + \text{Counterflow Schedules}$$

(b) Operating Horizon

The Operating Horizon is defined as the day-ahead or preschedule period (begins at the end of the Scheduling Horizon and extends through the end of the next preschedule day(s)).

In the Scheduling Horizon, Non-Firm ATC is calculated by subtracting TRM, CBM, Implemented Firm Tags and Implemented Non-Firm Tags. Subtracting the Implemented Firm Tags accomplishes two things: since a Firm Tag must have an accompanying Firm TSR, this properly accounts for Firm TSRs, and it will release non-Tagged Firm TSRs for use as Non-Firm.

$$(c) \text{ Firm ATC} = \text{TTC} - \text{TRM} - \text{CBM} - \text{Reserved Firm ETC}$$

$$(d) \text{ Non-Firm ATC} = \text{TTC} - \text{TRM} - \text{CBM} - \text{Tagged Firm/Non-Firm ETC}$$

(c) Planning Horizon

The Planning Horizon is defined as the period beyond the Operating Horizon.

Firm ATC is calculated using TRM, CBM, long range load forecasts filed by the Network/Native Load Customer, existing transmission contracts, and confirmed Long Term or Short Term Firm Point-to-Point Transmission Service Requests. Non-Firm ATC is then calculated by deducting from Firm ATC any reserved Short Term Non-Firm Point-to-Point Transmission Service Requests.

(e) Firm ATC = TTC - TRM - CBM – Reserved Firm ETC

(f) Non-Firm ATC = TTC - TRM - CBM – Reserved Firm ETC – Reserved Non-Firm ETC

(d) Frequency of ATC Calculations

An initialization run of the webTrans ATC calculation model is performed each day at 1100 MST for all posted paths for the hours of 1200 MST of the current day through the end of the current day.

A second initialization run is performed each day at 1600 MST for all posted paths. The second initialization extends the OASIS “Operating” time frame.

An hourly initialization run is performed at 30 minutes past the hour extending one hour or sliding out on hour at a time during real time.

Additionally, ATC is recalculated on a path-specific basis each time a new TSR is granted, an e-tag is submitted, or the TTC on a path has changed.

Figure I – Process Flow Diagram Illustrating Various Steps Through Which ATC is Calculated

