Principles, Practices and Methods
for the Determination of

Available Transfer Capacity
for
El Paso Electric Company (EPE)

(Version 1.7.06)

(Available Transfer Capability Implementation Document (ATCID))
(TRM Implementation Document (TRMID))

System Planning Department

El Paso Electric Company
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I. <u>INTRODUCTION</u>

In the Federal Energy Regulatory Commission (FERC) Order No. 890, the acronym ATC was changed from defining Available Transmission Capacity as described in the FERC Order No. 888 and Order No. 889 to Available Transfer Capacity to be consistent with the North American Reliability Council (NERC) definition. In the May 2, 2007 NERC Glossary of Terms Used in Reliability Standards, Available Transfer Capacity is defined as:

Available Transfer Capacity (ATC): A measure of the transfer capability remaining in the physical transmission network for further commercial activity over and above already committed uses. It is defined as Total Transfer Capability (TTC) less existing transmission commitments (including retail customer service), less a Capacity Benefit Margin, less a Transmission Reliability Margin.

In this definition of ATC, NERC developed several important principles upon which ATC calculations must be measured. The first of these is that ATC calculations must produce commercially viable results. This means that ATC determined by the various transmission owners must give a reasonable and dependable determination of actual transfer capabilities available to the electric power market. This principle also incorporates the concept that ATC calculations must accommodate reasonable uncertainties in system conditions and provide for operating flexibility to ensure the safe and reliable operation of the system. Therefore, included in ATC calculations, the transmission owners are allowed to incorporate and reserve certain components, such as a transmission margin and account for certain contingencies. The second of these principles is that ATC must recognize time-variant power flow conditions and the effects of simultaneous transfers and parallel path flow from a reliability viewpoint. For the EPE system, this principle means that where applicable, the effects of nomogram operation for the southern New Mexico transmission system must be included in all applicable ATC calculations. These effects will be primarily seen at the EPE interconnections with the WECC interconnected grid. The final important principle that must be incorporated in ATC calculations is that those calculations will depend on the points of electric power injection, the directions of transfers across the network and the points of extraction. To implement this principle on the EPE transmission system, due to the large number of possible transmission paths, EPE has determined the TTC and ATC for various transmission segments. These segments, when combined, form transmission paths into, through, and out of the EPE transmission system.

EPE does not require data or information from other Transmission Service Providers or Transmission Operators to determine the TTC and/or ATC on EPE's posted transmission segments.

The TTC and ATC values which are posted on the wesTTrans webOASIS are values for the EPE transmission system with all transmission lines in-service. During forced outages or during times when transmission lines are out-of-service for maintenance, these values will change. The amount of curtailments for EPE's major transmission system outages are given on EPE's OASIS. To obtain the times and amounts of curtailments of TTC and ATC for EPE's transmission paths, look in the "Transmission" section of EPE's Internet Home Page at the address: http://www.epelectric.com and on the OASIS in the Outage Manager and Notices pages.

The TTC values outlined in this document where determined using the processes and procedures as delineated in the NERC Standard MOD-29.

The way in which EPE calculates its TTC, as set forth in this document, is also the methodology by which EPE performs an annual assessment of Transfer Capability for purposes of compliance with Reliability Standard FAC-013, and/or seasonal studies requested by the Regional Entity. As a component of the assessments/studies, EPE reviews operating limits so as not to adversely affect, as well as to respect, known Systems Operating Limits (SOLs). To be clear, EPE's assessments/studies respects known SOLs, and the assumptions and criteria used to perform the assessments/studies are consistent with EPE's planning practices. Additionally, EPE maintains this updated transfer capability methodology on its website at http://www.epelectric.com/transmission/documents.

For an identification of the criteria for the selection of the transfers to be assessed, please see Section IX of this document. Additional information regarding this criterion is located in EPE's FERC Form 715. Please call the Director of System Planning for questions regarding EPE's FERC Form 715.

For a description of how each of the following assumptions and criteria used in performing the assessment are addressed, please see Section IX of this document, as well as the Availability Transfer Capability Implementation Document (ATCID). Additional information regarding these assumptions and criteria are located in EPE's FERC Form 715. Please call the Director of System Planning for questions regarding EPE's FERC Form 715.

1. Generation dispatch, including but not limited to long term planned outages, additions and retirements.
2. Transmission system topology, including but not limited to long term planned Transmission outages, additions, and retirements.
3. System demand.
4. Current approved and projected Transmission uses.
5. Parallel path (loop flow) adjustments.
6. Contingencies
7. Monitored Facilities.

For a description of how simulations of transfers are performed through the adjustment of generation, load or both, please see (ATCID). Additional information regarding this description is located in EPE'S FERC Form 715. Please call the Director of System Planning for questions regarding EPE's FERC Form 715.

Please note that this document is a "living" document meant to give transparency to EPE's TTC and ATC process and values. This document will be updated and corrected as changes occur on the system and in the FERC/NERC requirements. This document, along with Availability Transfer Capability Implementation Document (also posted on the EPE website at http://www.epelectric.com/transmission/documents), complies with FAC-013.

II. DEFINITIONS

NERC defines Total Transfer Capacity (TTC) as the following:

Total Transfer Capacity (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.

Transfer capacity must be determined and posted on the OASIS between two points, defined by the FERC as the "Point of Receipt" and the "Point of Delivery":

Point of Receipt (POR): The point of interconnection on the Transmission Provider's transmission system where capacity and/or energy transmitted will be made available to the Transmission Provider by the Delivering Party. This is used along with Point of Delivery to define a Path and direction of flow on that path.

Point of Delivery (POD): The point of interconnection on the Transmission Provider's transmission system where capacity and/or energy transmitted by the Transmission Provider will be made available to the Receiving Party. This is used along with Point of Receipt to define a Path and direction of flow on that path.

Before beginning the discussion of determination of ATC for the EPE system, the definitions of the terms and quantities used in the determination must be made. Towards this end, the NERC has developed a white paper titled "*Available Transfer Capability Definitions and Determination"* and WECC a document titled "*Determination of Available Transfer Capability within the Western Interconnection"* (June 2001) which sets forth concepts, methods and defined terms. In the NERC paper, the NERC states that some traditional industry terms may have different meanings in different parts of the country. Therefore, to develop a standardized set of terms which would apply across the board, the NERC established the following definitions, which have been used to determine the EPE TTC and ATC components.

Total Transfer Capacity (TTC): The maximum amount of power that can be transferred from one point on the system to another point on the system in a *reliable* manner while meeting *all* of a specific set of defined pre-and post-contingency system conditions. This capability is defined by the worst contingency for the defined point-to-point path and the thermal, voltage and/or stability limits of that path. The TTC calculation for all transmission paths is required to conform to NERC's "*Reliability Standards for the Bulk Electric Systems of North America*", the NERC Standards (MOD-29) and WECC's Planning and Operating Standards.

Following the determination of TTC, the Transmission Provider can reserve part of the TTC for Committed Uses as outlined in the WECC "*Determination of Available Transfer Capability within the Western Interconnection"*:

Native Load Customers (CU1): That amount of transfer capacity required to serve native load customers. Native load customers are defined in FERC Order No. 888 as "[t]he wholesale and retail power customers of the Transmission Provider on whose behalf the Transmission Provider, by statute, franchise, regulatory requirement, or contract, has undertaken an obligation to construct and operate the Transmission Provider's system to meet the reliable electric needs of such customers." Included in this reservation, are the following:

- transfer capability reserved for native load growth reasonably forecasted within the utility's current planning horizon. This transfer capability must be made available for use by others until the time that it is actually needed;
- transfer capability reserved for those ancillary services required to serve native load. These ancillary services include load regulation and frequency response services, reactive supply and voltage control service, and energy imbalance services.

Existing Commitments (CU3 and CU4): These uses are existing commitments at the time of the ATC determination. These uses may be grandfathered or pre-existing contracts and energy transactions that can be reasonably expected to be consummated, such as expected hydro conditions.

Other Pending Uses (CU5): These include "good faith requests" for transmission service received by EPE in accordance with the applicable FERC policy.

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 operation as system conditions change. These reservations may include the following:

- load forecast and load distribution error,
- variations in facility loadings,
- uncertainty in transmission system topology,
- loop flow impact,
- variations in generation dispatch,
- automatic sharing of reserves, and
- other uncertainties as identified through the NERC reliability standards development process.

TRM does not include reservations for planned outages and other known transmission conditions which have been included in the calculation of TTC.

Capacity Benefit Margin (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 its 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. EPE does not presently reserve CBM on its system.

In accordance with the terms and conditions of EPE's tariff, reservations for CBM and TRM may be sold on a non-firm basis.

In defining both ATC and the commercial components of the transfer capacity, two terms are used. These are:

Non-Firm: Defined as the right of a transmission provider to interrupt all or part of a transmission service for any reason, including economic, that is consistent with the FERC's policy and the transmission provider's transmission service tariffs or contract provisions.

Firm: Defined as that transmission service that can only be interrupted in cases where system reliability is threatened or an emergency exists.

Transmission service must adhere to a standard set of priorities to avoid confusion. These priorities are:

- Firm service has priority over non-firm service;
- Pre-Confirmed Firm service has priority over non Pre-Confirmed firm service;
- Non-firm transfers, both reserved or scheduled, may be recalled for firm transfer requests.

III. PATH POSTING SCHEDULES

The FERC defines two classes of posted paths: "constrained" and "unconstrained". The constrained path is one in which ATC has been less than or equal to 25 percent of the TTC for that path for at least one of the last 168 hours (7 days) or is calculated to be 25 percent or less of its posted TTC during the next 7 days. For constrained paths, the ATC and TTC for firm and non-firm service must be posted on the OASIS for the next 168 hours and, thereafter, daily to the end of a 31 day period. In addition, ATC and TTC for constrained paths for firm and non-firm service must be posted on the OASIS for the current month and the next twelve months. However, the monthly posting for non-firm service for constrained paths must be posted only if requested by a customer. Additionally, since EPE charges separately for on-peak and off-peak periods in its tariff, the ATC and TTC is posted on the OASIS daily for each period. The posting for constrained paths must be updated when transmission service on the path is reserved or service ends or when the TTC for that path changes by more than 10 percent.

An unconstrained path is defined as any path posted on the OASIS that is not a constrained path. For unconstrained paths that are posted on the OASIS, the ATC and TTC for firm transmission service and non-firm transmission service are posted for the next 7 days and for the current month and the next 12 months. Again, if EPE has separate charges for on-peak and off-peak periods in its tariff, the unconstrained path ATC and TTC must be posted for the current day and the next 6 days following each period. The posting for unconstrained paths must be updated when ATC changes by more than 20 percent of the paths TTC.

FERC does not require that ATC and/or TTC be posted for any path more than 13 months in advance except if planning and specifically requested transmission studies for that path have been performed. In that case, capability must be posted for the year following the current year and for each year following to the end of the planning horizon, but not to exceed 10 years.

In summary, the following are the transmission path posting requirements for the OASIS:

<u>Constrained Paths:</u>

Service	Total Transfer Capacity	Available Transfer Capacity
Firm	each hour for next 7 days each day for next 31 days each month for next 12 months	each hour for next 7 days each day for next 31 days each month for next 12 months
Non-firm	see above	each hour for next 7 days each day for next 31 days each month for next 12 months

Unconstrained Paths:

Service	Total Transfer Capability	Available Transfer Capability
Firm	each day for next 7 days each month for next 12 months	each day for next 7 days each month for next 12 months
Non-firm	see above	each day for next 7 days each month for next 12 months

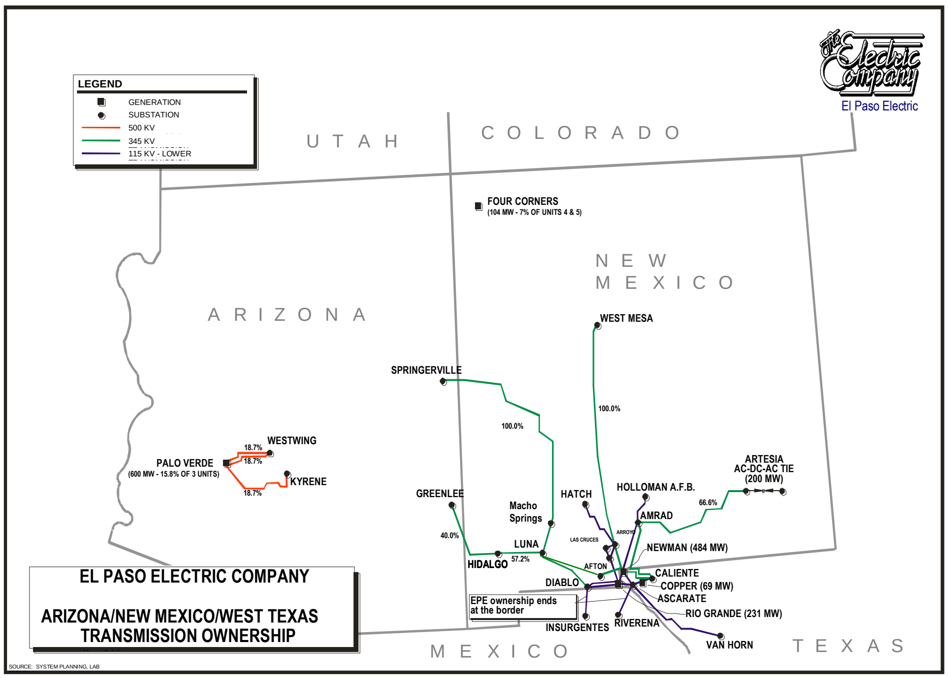
The TTC and ATC values which are posted on EPE's OASIS site are values for the EPE transmission system with all transmission lines in-service. Additionally, EPE does not utilize counter flows in determining TTC and/or ATC nor does EPE require data or information from any other Transmission Service Provider or Transmission Operator to determine a segment TTC or ATC. During contingencies or during times when transmission lines are out-of-service for maintenance, these values will change. The amount of curtailments for EPE's major transmission system outages are given on EPE OASIS. To obtain the times and amounts of curtailments of TTC and ATC for EPE's transmission paths, look in the "Transmission" section of EPE's Internet Home Page at the address: http://www.epelectric.com and on the OASIS in the Outage Manager and Notices pages.

IV. POSTED TRANSFER PATHS FOR EPE

FERC states three conditions for which a transfer path will be required to be posted on the OASIS. These paths are called “posted paths” and follow these simple posting rules:

- Any path (segment) between two control areas;
- Any path for which transmission service has been denied, curtailed or subject to interruption during any hour or part of an hour for a total of 24 hours in the last 12 months. In counting up to 24 hours, any part of an hour counts for a whole hour;
- Any path on which a customer requests that ATC and TTC be posted. Customer requested postings can be dropped if no customer has taken service on the path in the last 180 days.

Additionally, FERC states that transmission owning entities must only post those paths in which they "own, operate or control". Therefore, those paths in which EPE only has transmission rights or wheeling rights are not posted. For the EPE transmission system, due to the multitude of possible transmission paths, “posted paths” on the OASIS will consist of transmission segments. These transmission segments, when combined together, will form the posted paths. EPE’s transmission segments will fall into three categories. The 345 kV and 500 kV transmission segments for the EPE system are shown in the map above.



El Paso Electric Transmission Rights and Ownership

The first of these transmission segment categories will be those busses which are on the boundaries of the EPE control area and which interconnect the EPE control area to another control area. It must be noted, however, that in some instances, EPE has no transmission ownership or delivery rights across the control area boundary. In that case, the transmission segments that interconnect those control areas will not be posted as EPE has zero TTC across the boundary. Additionally, EPE will not post just those boundary transmission segments as paths but will incorporate those segments in more extensive paths. The second transmission segment category will be those transmission segments, external to the EPE control area, in which EPE has ownership. The third category of transmission segments will be the transmission segments which make up the transmission paths internal to the EPE control area.

The calculated TTC and ATC for the posted transmission paths will be determined by the TTC and ATC of the transmission segments which make up the path. The transmission segment which has been determined to have the least TTC and/or ATC of the transmission path will be the governing values for the transmission path TTC and/or ATC. EPE does not utilize counter flows in determining TTC and/or ATC.

For path posting requirements, EPE will post as part of the requisite transmission path the interconnections between the EPE control area and other control areas. These interconnection points, and the interconnecting control areas, are:

	Point of Interface	Connecting Control Area
POR/POD Between Control Areas:	Springerville 345 kV	TEP
	Greenlee 345 kV	TEP
	WestMesa 345 kV	PNM
	Eddy 230 kV	SPS
	Luna 345 kV	PNM
	Hidalgo 345 kV	PNM
	Las Cruces 115 kV Bus	PNM (TSGT)
	Amrad 115 kV Bus	PNM
	Afton 345 kV Bus	PNM

Note: TSGT is a sub-control area of the PNM control area.

The second set of transmission paths for which EPE has posted paths is the transmission external to the EPE control area in which EPE has ownership. This ownership is between two points on the transmission system, therefore each has a Point of Delivery and a Point of Receipt. Where indicated, the transmission rights of EPE are either in uni-directional (U) or bi-directional (B).

	Point of Delivery	Point of Receipt	Control Area	Direction
Paths EPE has Ownership:	Palo Verde 500 kV	Westwing 500 kV	APS	B
	Palo Verde 500 kV	Jojoba 500 kV	APS	B
	Jojoba 500 kV	Kyrene 500 kV	APS	B

The third category of the transmission paths which comprise the posted paths will be between points internal to the EPE control area. These paths will primarily utilize the EPE 345 kV transmission system as the Points of Delivery and Point of Receipt. These paths will also be bi-directional. Rather than list each path individually, the list below gives the EPE control area 345 kV substations which will be either the Point of Delivery or Point of Receipt of a transmission segment, depending upon the requested path direction:

Point of Receipt (or Delivery) name:	Afton 345 kV bus Arroyo 345 kV bus Newman 345 kV bus Diablo 345 kV bus Caliente 345 kV bus Amrad 345 kV bus Hidalgo 345 kV bus Luna 345 kV bus

One additional point in the EPE system will be used as a Point of Receipt only. This will be the generalized point for "EPE Local Generation" and will be used to inject EPE's local generation resources at Newman, Rio Grande and Copper into the transmission system. Three additional points in the EPE system will be used as Points of Delivery only. These will be the generalized point for "Resident Load" and will be used as the transmission path to sell into the EPE native load underlying system, the point RGC.DC.LF115 will be used as a delivery point to the Rio Grande Cooperative loads at Dell City and Lobo Flats, and the point JUAREZ will be used for deliveries to CFE in Juarez, Mexico.

Additional transmission paths will be made up of transmission segments which are both internal and external to the EPE control area. An example of a transmission path of this type is "Eddy 230 to Greenlee 345". This path will consist of the following transmission segments:

Eddy 230 - Eddy 345
Eddy 345 - Amrad 345
Amrad 345 - Caliente 345
Caliente 345 - Newman 345
Newman 345 – Afton 345
Afton 345 - Luna 345
Luna 345 - Hidalgo 345
Hidalgo 345 – Greenlee 345

The TTC and ATC values which are posted on EPE's OASIS site are values for the EPE transmission system with all transmission lines in-service. However, during contingencies or during times when transmission lines are out-of-service for maintenance, these values will change. The amount of curtailments for EPE's major transmission system outages are given in on EPE's OASIS. To obtain the times and amounts of curtailments of TTC and ATC for EPE's transmission paths, look in the "Transmission" section of EPE's Internet Home Page at the address: http://www.epelectric.com or on the OASIS at the Outage Manager or Notices page.

V. NAMING CONVENTIONS FOR EPE'S POSTED PATHS

The transmission paths posted on EPE's OASIS will be composed of transmission segments both external and internal to the EPE control area. Therefore, any transmission path can be constructed using these segments. The following names will be used to define the POR/POD:

Actual Bus Name	OASIS Abbreviated Name
Afton 345 kV Bus	AFTON345
Amrad 115 kV Bus	AMRAD115
Amrad 345 kV Bus	AMRAD345
Arroyo 345 kV Bus	ARROYO345
Caliente 345 kV Bus	CALIENTE345
Diablo 345 kV Bus	DIABLO345
Eddy 345 kV Bus	EDDY345
Eddy 230 kV Bus	EDDY230
EPE Local Generation	EPE.LOCALGEN
EPE Resident Load	EPE.RESLOAD
EPE 345/115 kV transformers	EPE.SYSSHEL
Greenlee 345 kV Bus	GREENLEE345
Hidalgo 345 kV Bus	HIDALGO345
Holloman 115 kV Bus	HOLLOMAN115
Juarez Delivery Point	JUAREZ
Jojoba 500 kV Bus	JOJOBA500
Kyrene 500 kV Bus	KYRENE500
Las Cruces 115 kV Bus	LASCRCS115
Luna 345 kV Bus	LUNA345
Luna Energy Facility (non-EPE owned)	LUNALEF
Macho Springs 345 kV Bus	MACHOSPRG345
Newman 345 kV Bus	NEWMAN 345
Palo Verde 500 kV Bus	PALOVERDE500
Picacho 115 kV Bus	PICACHO115
Picante 345 kV Bus	PICANTE345
RGEC Dell City/Lobo Flats Delivery Points	RGC.DC.LF115
Springerville 345 kV Bus	SPRINGER345
West Mesa 345 kV Bus	WM345
Westwing 500 kV Bus	WESTWING500

These names will define the POR and POD of all the transmission segments, and therefore all of the transmission paths, offered by EPE on the OASIS at the current time. With additional construction in the EPE system, or if EPE obtains ownership in more external transmission, this list will be expanded. Also, since the list is not inclusive of all points in the EPE system, if a request in made for a transmission path not included in this list, additional PORs and PODs and additional names can be added to this list.

VI. EPE'S TRANSMISSION SEGMENTS

Using the names and conventions as delineated in Section V, the transmission segments which make up the EPE's posted paths are given below.

Interconnecting Points between the EPE Control Area and Another Control Area:

Control Area Interconnection Point	Adjacent Control Area
WM345	PNM
SPRINGER345	TEP
GREENLEE345	TEP
MACHOSPRG345	TEP
LUNA345	PNM
HIDALGO345	PNM
AMRAD115	PNM
LASCRCS115	PNM
EDDY230	SPS
AFTON345	PNM
LUNALEF	PNM

Segments Interconnecting Two Substations (External to EPE Control Area):

Point of Receipt	Point of Delivery	Path Description
PALOVERDE500 WESTWING500	WESTWING500 PALOVERDE500	Two line segment in which EPE has an 18.7% ownership interest
PALOVERDE500 JOJOBA500	JOJOBA500 PALOVERDE500	One line segment in which EPE has an 18.7% ownership interest
JOJOBA500 KYRENE500	KYRENE500 JOJOBA500	One line segment in which EPE has an 18.7% ownership interest

Segments Interconnecting Two Substations (Internal to EPE Control Area):

There are many potential transfer paths internal to EPE's control area, i.e., to and from each 345 kV transmission bus. These transfer paths are comprised of transmission segments, i.e., the transmission line between two internal EPE substations.

Point of Receipt	Point of Delivery	Path Description
AMRAD115 AMRAD345	AMRAD345 AMRAD115	Segment over Amrad 345/115 XFMR - 1/2 capacity owned by EPE
GREENLEE345 HIDALGO345	HIDALGO345 GREENLEE345	Segment of SWNMT Line of which EPE has 40% ownership

Point of Receipt	Point of Delivery	Path Description
HIDALGO345 LUNA345	LUNA345 HIDALGO345	Segment of SWNMT Line of which EPE has 57.2% ownership
LUNA345 DIABLO345	DIABLO345 LUNA345	Segment wholly-owned by EPE limited by Auto-Transformer
LUNA345 AFTON345	AFTON345 LUNA345	Segment wholly-owned by EPE
AFTON345 NEWMAN345	NEWMAN345 AFTON345	Segment wholly-owned by EPE
WM345 ARROYO345	ARROYO345 WM345	Segment wholly-owned by EPE - limited by Phase Shifter/Auto-Transformer
ARROYO345 NEWMAN345	NEWMAN345 ARROYO345	Segment wholly-owned by EPE
CALIENTE345 PICANTE345	PICANTE345 CALIENTE345	Segment wholly-owned by EPE
NEWMAN345 PICANTE345	PICANTE345 NEWMAN345	Segment wholly-owned by EPE
AMRAD345 CALIENTE 345	CALIENTE345 AMRAD 345	Segment wholly-owned by EPE
EDDY345 AMRAD345	AMRAD345 EDDY345	Segment which EPE has 66.67% ownership
EDDY230 EDDY345	EDDY345 EDDY230	HVDC Terminal: 2/3 owned by EPE - SPP is 230 kV and EPE is 345 kV
LUNA345 MACHOSPRG345	MACHOSPRG345 LUNA345	Segment wholly-owned by EPE
MACHOSPRG345 SPRINGER345	SPRINGER345 MACHOSPRG345	Segment wholly-owned by EPE
ARROYO345	LASCRCS115	Segment using under-lying EPE system
LASCRCS115	AMRAD345	Segment using under-lying EPE system

For transfers to Las Cruces 115 kV bus and from EPE Local Generation at Newman, Rio Grande and Copper, and to the Rio Grande Coop loads and Juarez, the path used is the EPE internal transmission network. Therefore, on the OASIS, these Points of Receipt have no defined transmission segment
associated with them to any other point in the system. The "fictitious" segments which are associated with these points are:

Power From (POR)	Power Delivered To (POD)
ARROYO345	LASCRCS115
LASCRUCS115	AMRAD345
EPE.LOCALGEN	RGC.DC.LF115
EPE.LOCALGEN	JUAREZ

Please note that the "EPE Local Generation" is a Point of Receipt *only.*

Another Point of receipt only on the EPE system is "LUNALEF". This point is located at Luna 345 kV substation and is the interconnection point between the Luna Energy Facility (a 570 MW generating planted jointly owned by PNM, Phelps Dodge and TEP) and the EPE control area at LUNA345. This point was put on the OASIS for scheduling and e-tagging purposes.

Another Point of Delivery in the EPE system is "EPE Resident Load". This point simulates the underlying EPE system and the EPE native load. The segment connecting this POD to the remainder of the system is the EPE 345/115 kV transformers simulated as the segment point "EPE Shell". These segments are:

345 kV Bus	Intermediate Point	Point of Delivery
ARROYO		
NEWMAN		
DIABLO	EPE.SYSSHEL	EPE.RESLOAD
CALIENTE		
AMRAD		
PICANTE		

The final Point of Delivery in the EPE system is Holloman 115 kV bus. This is part of the delivery of CRSP allocated power to Holloman by Western Area Power Administration (WAPA) and uses the "EPE.SYSSHEL" interface.

The method and determination of the TTC and ATC for each of the above transmission segments are given in:

- Section XI for the segments interconnecting the EPE control area with another control area;
- Section XII for the segments external to the EPE control area;
- Section XIII for the segments internal to the EPE control area.

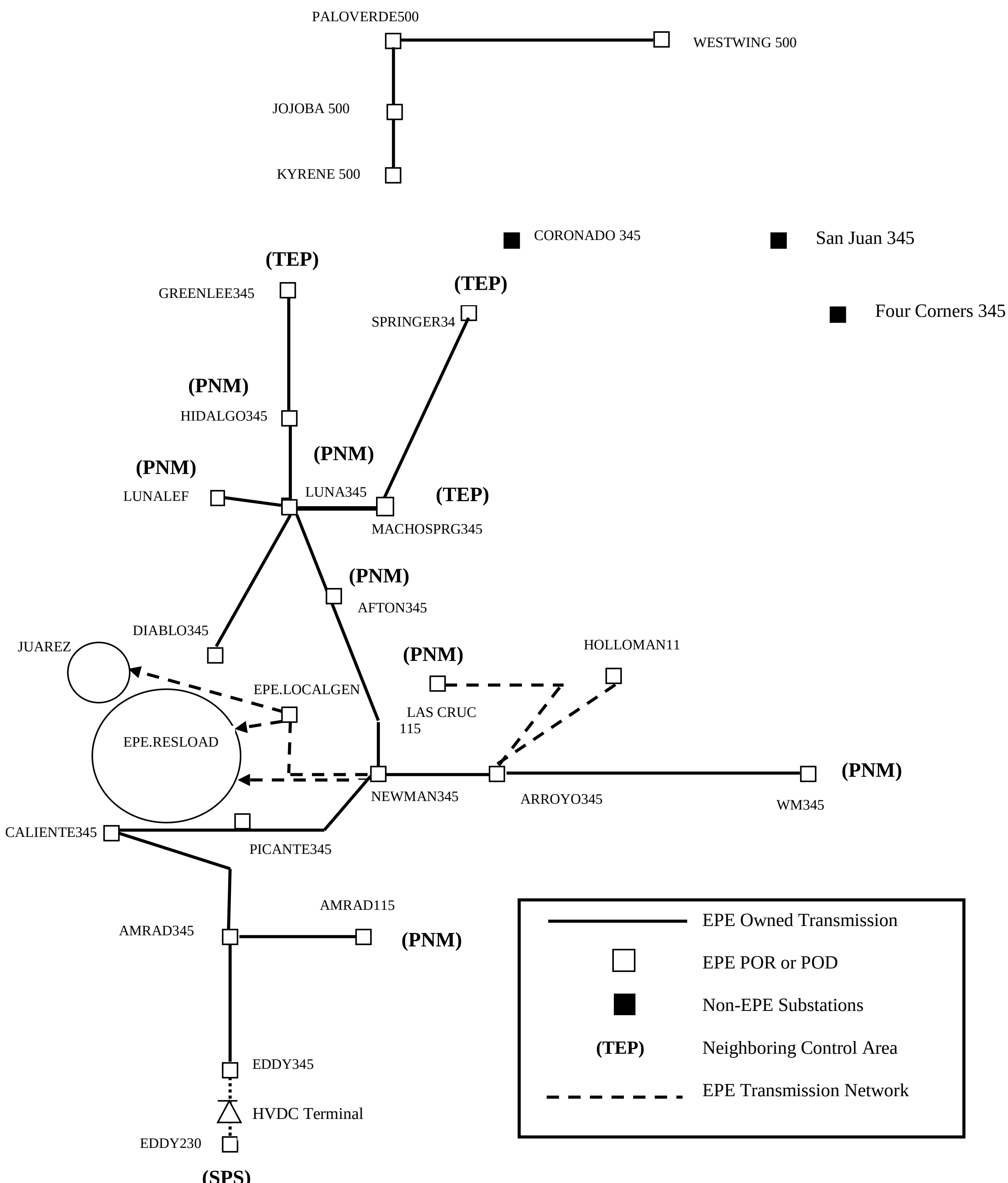
VII. EPE'S POSTED PATHS

For the EPE system, the transmission paths on which transactions can take place are shown in the one-line graphic below. These paths, for the most part, are bi-directional. Therefore, either end of the path can be a Point of Receipt (POR) or a Point of Delivery (POD), with the path segments the same in each direction. These paths can be wholly internal to the EPE control area, wholly external to the EPE control area or both internal and external to the EPE control area.

The Path Code indicates the control is at or on the POR or POD bus boundary.

Path POR	Path POD	Path Code
AFTON345	GREENLEE345	PNM-TEP
AFTON345	HIDALGO345	PNM-EPE
AFTON345	LUNA345	PNM-EPE
AFTON345	SPRINGER345	PNM-TEP
AFTON345	WM345	PNM-PNM
AFTON345	EPE.RESLOAD	PNM-EPE
AMRAD115	AMRAD345	PNM-EPE
AMRAD345	AMRAD115	EPE-PNM
AMRAD345	GREENLEE345	EPE-TEP
AMRAD345	EDDY230	EPE-SPS
AMRAD345	SPRINGER345	EPE-TEP
EDDY230	EDDY345	SPS-EPE
EDDY230	AMRAD115	SPS-PNM
EDDY230	GREENLEE345	SPS-TEP
EDDY230	HIDALGO345	SPS-EPE
EDDY230	LUNA345	SPS-EPE
EDDY230	SPRINGER345	SPS-TEP
EDDY230	WM345	SPS-PNM
EDDY345	EDDY230	EPE-SPS
EDDY345	GREENLEE345	EPE-TEP
EDDY345	SPRINGER345	EPE-TEP
EDDY345	WM345	EPE-PNM
GREENLEE345	EDDY230	TEP-SPS
GREENLEE345	WM345	TEP-PNM
HIDALGO345	AFTON345	EPE-PNM
HIDALGO345	EPE.RESLOAD	EPE-EPE
HIDALGO345	GREENLEE345	EPE-TEP
HIDALGO345	LUNA345	EPE-EPE
HIDALGO345	SPRINGER345	EPE-TEP

Path POR	Path POD	Path Code
HIDALGO345	WM345	EPE-PNM
JOJOBA500	KYRENE500	SRP-SRP
JOJOBA500	PALOVERDE500	SRP-SRP
JOJOBA500	WESTWING500	SRP-SRP
KYRENE500	JOJOBA500	SRP-SRP
KYRENE500	PALOVERDE500	SRP-SRP
EPE.LOCALGEN	AFTON 345	EPE-PNM
EPE.LOCALGEN	EDDY230	EPE-SPS
EPE.LOCALGEN	GREENLEE345	EPE-TEP
EPE.LOCALGEN	HIDALGO345	EPE-EPE
EPE.LOCALGEN	JUAREZ	EPE-EPE
EPE.LOCALGEN	LUNA345	EPE-EPE
EPE.LOCALGEN	RGC.DC.LF115	EPE-EPE
EPE.LOCALGEN	SPRINGER345	EPE-TEP
EPE.LOCALGEN	WM345	EPE-PNM
LASCRCS115	AMRAD345	EPE-PNM
LASCRCS115	EDDY230	EPE-SPS
LUNA345	AFTON345	EPE-EPE
LUNA345	SPRINGER345	EPE-TEP
LUNA345	WM345	EPE-PNM
LUNA345	GREENLEE345	EPE-TEP
LUNA345	EPE.RESLOAD	EPE-EPE
LUNA345	AMRAD345	EPE-EPE
LUNALEF	LUNA345	PNM-EPE
PALOVERDE500	JOJOBA500	SRP-SRP
PALOVERDE500	KYRENE500	SRP-SRP
PALOVERDE500	WESTWING500	SRP-APS
SPRINGER345	EDDY230	TEP-SPS
SPRINGER345	WM345	TEP-PNM
WM345	AMRAD115	PNM-PNM
WM345	AMRAD345	PNM-EPE
WM345	EDDY230	PNM-SPS
WM345	HOLLOMAN115	PNM-EPE
WM345	LASCRCS115	PNM-PNM
WESTWING500	PALOVERDE500	APS-SRP



Segments Which Comprise the EPE Transmission System

The TTC and ATC values for the above transmission paths which are posted on EPE’s OASIS site are values for the EPE transmission system with all transmission lines in-service. During contingencies or during times when transmission lines are out-of-service for maintenance, these values will change. The amount of curtailments for EPE’s major transmission system outages are given on EPE’s OASIS. To obtain the times, paths out and amounts of curtailments of TTC and ATC for EPE’s transmission paths, look in the “Transmission Information” section of EPE’s Internet Home Page at the address: http://www.epelectric.com or the OASIS at the Outage Manager or Notices pages.

Please note that the above paths are not all of the possible paths on the EPE transmission system. Additional paths will be posted on EPE’s OASIS if a request for that path is made as per FERC policy.

VIII. SOUTHERN NEW MEXICO IMPORT CAPABILITY (SNMIC)

Southern New Mexico Import Capability (SNMIC)

Before the TTC and ATC for the primary 345 kV paths which connect the EPE control area to external control areas (PNM and TEP) can be determined, the southern New Mexico import capability (SNMIC) must first be defined. The individual lines into the EPE control area, the WestMesa 345 kV transfer path between EPE and PNM and the Springerville 345 kV and Greenlee 345 kV transfer paths between EPE and TEP, are collectively referred to as WECC Path 47 or the southern New Mexico Transmission System (SNMTS). This is a WECC Accepted Path with a rating that is less than the sum of the capabilities of the individual lines. The path rating is defined by dynamic nomograms and, as a result, the ratings of the individual lines (paths) that make up Path 47 must be adjusted. For example, if the sum of the individual transmission path TTCs total 1000 MW, but the Path 47 TTC is 500 MW, the individual transmission path TTCs must be reduced accordingly.

The SNMIC is determined through nomogram equations which incorporate the state and configuration of the system at any instant of time and by the use of dynamic adjustments which reflect changes in that system state. These dynamic adjustments reflect the following system variables:

- Number of EPE Newman generators “on” and total output of plant;
- Number of EPE Rio Grande generators “on” and total output of plant;
- Power factor of EPE under-lying system as measured at the 345/115 kV transformers;
- Number and configuration of 345 kV reactors “on” in the SNMTS;
- Northern New Mexico impacts as measured by MW and MVAR flow on WestMesa-Arroyo 345 kV line;
- Amount and direction of real power flow over EPE’s phase shifting transformer at Arroyo Substation;
- Amount and direction of real power flow over the Eddy County HVDC Terminal;
- Afton generator “on” and total output of plant.

The maximum amount of *firm* import capability into the SNMTS over the 345 kV interconnections defined above (plus the capacity of the Tri-State Belen-Bernardo 115 kV line), pursuant to the “*New Mexico Transmission System Operating Procedures”* (agreed to between EPE, PNM, TNMP and Tri-State), is 940 MW. The allocation of this firm capability among the owners of the SNMTS is:

El Paso Electric Company	645 MW
Public Service Company of New Mexico	185 MW
Tri-State Gen. & Transmission Association	110 MW
Texas-New Mexico Power Company	-- MW (now PNM)

Also, pursuant to the “*New Mexico Transmission System Operating Procedures”*, if the SNMIC decreases below the maximum firm capacity value due to a change in the status of the EPE owned variables incorporated in the nomogram dynamic adjustments listed above, with the exception of the reactor on the Greenlee-Hidalgo 345 kV line, EPE is obligated to decrease its portion of SNMIC. Therefore, the amount of TTC, and thus the amount of ATC available at each of these interconnections, is dependent not only upon the schedules on the interconnections but the state of the SNMTS. This inter-relationship is such that the sum of the EPE scheduled power at Greenlee, Springerville and WestMesa cannot exceed 645 MW on a firm basis but, due to system conditions, can be less.

Southern New Mexico Total Transfer Capacity Nomograms

The total transfer capacity from the interconnected WECC system into the SNMTS on Path 47 is determined by a set of equations defined as nomograms. These nomograms define the safe and reliable operating limit of the sum of the real power (MW) flows on the following transmission lines:

West Mesa-Arroyo 345 kV line as measured at West Mesa;
Belen-Bernardo 115 kV line as measured at Belen;
Springerville-Macho Springs-Luna 345 kV line as measured at Springerville;
Greenlee-Hidalgo 345 kV as measured at Greenlee.

The nomograms allow safe operation of the SNMTS under N-1 conditions, i.e., for the loss of the single worst transmission element. This is in accordance with the Western Electricity Coordinating Council (WECC) and NERC criteria, standards and guidelines.

The nomograms begin by defining a set of "base" import levels, with all control variables listed above in the SNMTS set at a base level. Then a set of Dynamic Adjustments are applied to these base nomograms, which adjust the import level according to the state of the control variables. These control variables are listed below, and defined in the nomogram equations with the following variable names:

PST - Arroyo Phase Shifting Transformer flow in MW
PF - Power Factor of the EPE underlying (115 kV and 69 kV) system
Nx - Equivalent impedance of the EPE's Newman generator step-up impedances
Nmw - Sum of EPE's Newman 1-4 generators real power (MW) output
RGCoeff - EPE's Rio Grande generator adjustment coefficient
WM - MVAR flow on the West Mesa-Arroyo 345 kV line as measured at West Mesa
ARR - MVAR flow on the West Mesa-Arroyo 345 kV line as measured at Arroyo
Amw - Real power (MW) flow through the Eddy County HVDC Terminal
AFTmw - Real Power (MW) output of Afton Generator

Each of these control variables generates Dynamic Adjusts to the base nomogram. If the adjustment equation given below has a "BNom-|" in front, the adjustment is subtracted from the base nomogram value. If, however, the adjustment equation has a "BNom+|" in front, the adjustment is <u>added</u> to the base nomogram value.

<u>Base Nomogram Equations and Nomogram Error Adjustments:</u>

The base nomograms are defined by the number and configuration of the 345 kV line reactors in the SNMTS. These reactors are:

- Arroyo 50 MVAR reactor on the West Mesa-Arroyo 345 kV line at Arroyo
- Caliente 54 MVAR reactor on the Caliente-Amrad 345 kV line at Caliente
- Newman 65 MVAR reactor on the Newman-Luna 345 kV line at Newman
- Luna 54 MVAR reactor on the Luna-Diablo 345 kV line at Luna
- Luna 50 MVAR reactor on the Luna-Hidalgo 345 kV line at Luna
- Luna 54 MVAR reactor (#1) on the Luna-Macho Springs 345 kV line at Luna
- Luna 54 MVAR reactor (#2) on the Luna-Macho Springs 345 kV line at Luna

Several other reactors on the tertiary winding of some 345/115 kV auto-transformers in the SNMTS have been shown to have no effect on the SNMTS TTC. These tertiary reactors are:

- Diablo 25 MVAR reactor on the Diablo 345/115 kV auto-transformer
- Newman 2-17 MVAR reactors on the Newman 345/115 kV auto-transformer

Several additional reactors in the SNMTS are assumed to remain always in the "on" state. These reactors are:

- Amrad 80 MVAR reactor on the Amrad-Eddy 345 kV line at Amrad
- Macho Springs 54 MVAR reactor on the Macho Springs-Luna 345 kV line at Macho Springs
- Hidalgo 59 MVAR reactor on the Greenlee-Hidalgo 345 kV line at Hidalgo (SNMIC is reduced by 55 MW when this reactor is off)

The above reactors can be grouped into two distinct sets, the 345 kV reactors at Luna/Macho Springs and the 345 kV reactors at Caliente, Newman and Arroyo. In the table below, the Base Nomogram equations and the Nomogram Error Adjustment equations, the first number in the "Reactor" column represents the number of reactors on at Luna/Macho Springs:

- Macho Springs 54 MVAR reactor on the Macho Springs-Springerville 345 kV line at Macho Springs (always "on" state)
- Luna 54 MVAR reactor on the Luna-Diablo 345 kV line at Luna
- Luna 50 MVAR reactor on the Hidalgo-Luna 345 kV line at Luna
- Luna 54 MVAR reactor (#1) on the Springerville-Luna 345 kV line at Luna
- Luna 54 MVAR reactor (#2) on the Springerville-Luna 345 kV line at Luna

As seen in Nomograms 17-20, when the first number in the "Reactor" column equals five (5) (i.e., all reactors at Luna and Macho Springs are on), 35 MW is subtracted from the Base

Nomogram.

The second number in the "Reactor" column represents the number of reactors on at Caliente, Newman and Arroyo substations. With these reactors, all necessary TTC values can be calculated.

Nomogram	Reactor	Base Nomogram Equation	Nomogram Error Equation
Nom #1	(1+0)	967.767 + 0.611032 * **PST** - 0.000714236 * **PST**^{2} - 0.322496 * Log[**PST**]	BNom-| 1.5 - (480 - **Nmw**) / 40 - (**Nx** - 0.019) * (135 * **PF** - 123.7) / 0.04
Nom #2	(1+1)	946.518 + 0.605519 * **PST** - 0.000744117 * **PST**^{2} - 0.30412 * Log[**PST**]	BNom-| 1.1 - (480 - **Nmw**) / 60
Nom #3	(2+0)	937.613 + 0.604027 * **PST** - 0.000726528 * **PST**^{2} - 0.390296 * Log[**PST**]	BNom-| (**Nmw** – 480) / 60 - (**Nx** - 0.019) * 175
Nom #4	(1+2)	928.099 + 0.584877 * **PST** - 0.000700476 * **PST**^{2} - 0.261722 * Log[**PST**]	BNom-| 2.8 - (480 - **Nmw**) / 45 + (**Nx** - 0.019) * (3437.5 * **PF**^{2} - 7156.25 * **PF** + 3717.9) / 0.04
Nom #5	(2+1)	912.72 + 0.610009 * **PST** - 0.000740785 * **PST**^{2} - 0.476248 * Log[**PST**]	BNom-| 2
Nom #6	(1+3)	907.868 + 0.595145 * **PST** - 0.000768725 * **PST**^{2} - 0.120655 * Log[**PST**]	BNom-| 3 + (**Nmw** - 480) / 50 + (**Nx** - 0.019) * (354-350 * **PF**) / 0.04
Nom #7	(3+0)	900.664 + 0.625888 * **PST** - 0.000776544 * **PST**^{2} - 0.426214 * Log[**PST**]	BNom-| 3.3 + (**PF** - 1) * 67 + (**Nmw** - 480) / 50 - (**Nx** - 0.019) * (133 * **PF** - 123) / 0.04
Nom #8	(2+2)	892.683 + 0.567826 * **PST** - 0.000685675 * **PST**^{2} + 0.0557823 * Log[**PST**]	BNom-| 2 + (**Nmw** - 480) / 45 + (**Nx** - 0.019) * (315 - 317 * **PF**) / 0.04
Nom #9	(3+1)	871.854 + 0.616668 * **PST** - 0.000767704 * **PST**^{2} - 0.16522 * Log[**PST**]	BNom-| 1.5 - (480 - **Nmw**)/45 + 75 * (**Nx** - 0.019)
Nom #10	(2+3)	871.505 + 0.581836 * **PST** - 0.000720906 * **PST**^{2} - 0.0284626 * Log[**PST**]	BNom-| 3 + (**Nmw** - 480) / 60 + (**Nx** - 0.019) * (289.2 – 282.5 * **PF**) / 0.04
Nom #11	(4+0)	859.662 + 0.638146 * **PST** - 0.00080029 * **PST**^{2} - 0.454661 * Log[**PST**]	BNom-| 2 + (**Nmw** - 480) / 50 - (1 - **PF**) * 50 +(**Nx** - 0.019) * (94.4 - 103.3 * **PF**) / 0.04

Nom #12	(3+2)	847.776 + 0.617256 * **PST** – 0.000775626 * **PST**^{2} – 0.177116 * Log[**PST**]	Bnom-| 2.4 – (480 – **Nmw**) / 50 + (**Nx** – 0.019) * (1250 * **PF**^{2} – 2665 * **PF** + 1419.8) / 0.04

Nomogram	**Reactor**	**Base Nomogram Equation**	**Nomogram Error Equation**
Nom #13	(4+1)	835.084 + 0.621782 * **PST** - 0.00077072 * **PST**^{2} - 0.175766 * Log[**PST**]	BNom-| 2.9 + (**Nmw** - 480) / 55 - (1 - **PF**) * 33 + (**Nx** - 0.019) * (168.7 - 171.7 * **PF**) / 0.04
Nom #14	(3+3)	829.238 + 0.6044 * **PST** - 0.00074846 * **PST**^{2} - 0.311507 * Log[**PST**]	BNom-| 3 + (**Nmw** - 480) / 55 + (**Nx** - 0.019) * (350.3 – 341 * **PF**) / 0.04
Nom #15	(4+2)	804.459 + 0.628235 * **PST** - 0.000786044 * **PST**^{2} - 0.222787 * Log[**PST**]	BNom-| 2 - (480 - **Nmw**) / 50 + (**Nx** - 0.019) * (937.5 * **PF**^{2} - 2024.25 * **PF** + 1092.1) / 0.04
Nom #16	(4+3)	790.689 + 0.594575 * **PST** - 0.000697801 * **PST**^{2} - 0.190091 * Log[**PST**]	BNom-| 3.3 - (480 - **Nmw**) / 60 + (**Nx** - 0.019) * (1482.25 * **PF** - 937.5 * **PF**^{2} - 530) / 0.04
Nom #17	(5+0)	(859.662 + 0.638146 * **PST** - 0.00080029 * **PST**^{2} - 0.454661 * Log[**PST**]) - 35	BNom-| 2 + (**Nmw** - 480) / 50 - (1 - **PF**) * 50 +(**Nx** - 0.019) * (94.4 - 103.3 * **PF**) / 0.04
Nom #18	(5+1)	(835.084 + 0.621782 * **PST** - 0.00077072 * **PST**^{2} - 0.175766 * Log[**PST**]) - 35	BNom-| 2.9 + (**Nmw** - 480) / 55 - (1 - **PF**) * 33 + (**Nx** - 0.019) * (168.7 - 171.7 * **PF**) / 0.04
Nom #19	(5+2)	(804.459 + 0.628235 * **PST** - 0.000786044 * **PST**^{2} - 0.222787 * Log[**PST**]) - 35	BNom-| 2 - (480 - **Nmw**) / 50 + (**Nx** - 0.019) * (937.5 * **PF**^{2} - 2024.25 * **PF** + 1092.1) / 0.04
Nom #20	(5+3)	(790.689 + 0.594575 * **PST** - 0.000697801 * **PST**^{2} - 0.190091 * Log[**PST**]) - 35	BNom-| 3.3 - (480 - **Nmw**) / 60 + (**Nx** - 0.019) * (1482.25 * **PF** - 937.5 * **PF**^{2} - 530) / 0.04

<u>Rio Grande Generation Adjustment:</u>

The Dynamic Adjustment for EPE's Rio Grande generators is dependent upon the status of the generators, i.e., on or off, the amount of real power (MW) generation each is supplying to the system, the PST flow and the EPE underlying system power factor. This system power factor is measured as the real power (MW) and reactive power (MVAR) flow on the following auto-transformers and lines (direction of flow is in the direction given):

(-)	Amrad 115	Amrad 345
(-)	Arroyo 115	Arroyo 345
(+)	Caliente 345	Caliente 115
(+)	Diablo 345	Diablo 115

(-)	Newman 115	Newman 345
(+)	Picacho 115	Picacho 24.9
(+)	Picante 345	Picante 115
(-)	Las Cruces 115	Dona Ana 115

and the following generators (summed for MVAR only):

(+)	Newman #1 13.8	Newman 115
(+)	Newman #2 13.8	Newman 115
(+)	Newman #3 13.8	Newman 115
(+)	Newman #4 GT1 13.8	Newman 115
(+)	Newman #4 GT2 13.8	Newman 115
(+)	Newman #4 ST1 13.8	Newman 115
(+)	Newman #5 GT3 13.8	Newman 115
(+)	Newman #5 GT4 13.8	Newman 115
(+)	Newman #5 ST2 13.8	Newman 115
(+)	Rio Grande #6 13.8	Rio Grande 69
(+)	Rio Grande #7 13.8	Rio Grande 69
(+)	Rio Grande #8 17.5	Rio Grande 115
(+)	Rio Grande #9 13.8	Rio Grande 115
(+)	Copper G1 13.8	Copper 115

The power factor is then calculated as a per unit value using the following formula:

$$PF = MW / \sqrt{}(MW^2 + MVAR^2)$$

The Rio Grande Adjustment is given by the following formula:

BNom-| ((0.81 - **RGCoeff**) * ((22342 * **PF** - 11875 * $\mathbf{PF}^{\mathbf{2}}$ - 10398) - (150 - **PST**) * (0.54 - 0.5 * **PF**)))

The value of the Rio Grande Adjustment Coefficient (RGCoeff) used in this formula is given in the following table:

Configuration #	RGD #6	RGD #7	RGD #8	Rio Grande Adjustment Coefficient
0	0	0	0	0
1	18 - 28	0	0	0.26
2	29 - 40	0	0	0.24
3	41 - 50	0	0	0.23
4	0	18 - 28	0	0.26
5	0	29 - 40	0	0.24
6	0	41 - 50	0	0.23
7	36 - 56 *		0	0.43
8	57 - 80 *		0	0.42
9	81 - 100 *		0	0.41
10	0	0	30 – 70	0.81
11	0	0	71 - 95	(0.81 - (0.81 – (64.875 * **PF** - 31.25 * **PF**^{2} - 32.773 - 0.0005 * (**PST** - 150))) / 3)
12	0	0	96 - 115	(0.81 - 2 * (0.81 – (64.875 * **PF** - 31.25 * **PF**^{2} - 32.773 - 0.0005 * (**PST** - 150))) / 3)

* Rio Grande #6 and Rio Grande #7 are both on with this summed MW output

Configuration #	RGD #6	RGD #7	RGD #8	Rio Grande Adjustment Coefficient
13	0	0	116 - 160	(64.875 * **PF** - 31.25 * **PF**^{2} - 32.773 - 0.0005 * (**PST** - 150))
14	18 - 50 **		30 – 75	0.92
15	18 - 50 **		76 - 124	0.91
16	18 - 50 **		125 - 160	0.90
17	36 - 100 *		30 – 90	1.0
18	36 - 100 *		91 - 160	(25.45 * **PF** - 11.95 - 12.5 * **PF**^{2} + 0.75 * (1 - **PF**) - **PST** * (1 - **PF**) / 200)

* Rio Grande #6 and Rio Grande #7 are both on with this summed output
** Either Rio Grande #6 or Rio Grande #7 is on with this output

Adjustment to SNMIC from Rio Grande #9 ("RG9") generation unit:
The adjustment to SNMIC from RG9 when RG9 is On and RG8 is Off, is what would be the

adjustment to SNMIC from RG8 had RG8 been On. The rationale for this is that both RG8 and RG9 are connected to the same 115 kV bus, and because of the reactive power capability of RG9 being capable of at least providing the reactive power that RG8 can generate. The way that this is handled by the EMS SNMIC calculation, is that the MW and MVAR output of RG9 is assigned as the MW and MVAR output of RG8, so that all equations that consider RG8, are satisfied.
The adjustment to SNMIC from RG9 is a constant 87 MW (i.e., when RG9 are RG8 are both On, the SNMIC is increased by 87 MW).

RG9 is considered On when it is generating at least 25 MW.

Newman Generation Adjustment:

The Dynamic Adjustment for EPE's Newman generators depends upon both the number of generators running (as utilized in the impedance of the Newman generator step-up transformers given on page 30) and the real power MW output of the generators. Additionally, the PST flow, EPE system power factor as measured in the Rio Grande Adjustment section, and the Rio Grande Coefficient play a role in this adjustment. This Dynamic Adjustment is given by the following formula:

BNom-| $(235 + (10577 * \mathbf{PF} - 5625 * \mathbf{PF}^2 - 4893 + 1.35 * 10^{-16} * \mathbf{PST} + 0.0003 * \mathbf{PST}^2 + 36 + 0.09 * (\mathbf{PST} -150) - \mathbf{RGCoeff} * (39 + 0.3 * (\mathbf{PST} - 150)) + \mathbf{RGCoeff}^2 * (0.21 * (\mathbf{PST} - 150) - 4) + (1 - (\mathbf{Nmw} / 480)) * (14.5 - 5.25 * \mathbf{RGCoeff}) - 65) * (3.67 + 0.934 * \mathrm{Log}[\mathbf{Nx}]) + 59.7 * \mathrm{Log}[\mathbf{Nx}])$

Nmw does not include the MW output of Newman 5 generation, as this generation was not on-line when the equations were originally developed.

EPE Area Power Factor Adjustment:

The capability limitation of Path 47 is due to a voltage and reactive margin limitation. This means that following the critical contingency, the critical element is the voltage and/or reactive power at points on the 345 kV system. Due to this, a major impact on the SNMTS TTC is the power factor in the underlying EPE system as given by the calculated value detailed in the Rio Grande Adjustment. The Dynamic Adjustment equation for this system control variable is:

BNom-| $((270152.7 - (733860.6 * \mathbf{PF}) + (531783 * \mathbf{PF}^2) + (61098.3 * \mathbf{PF}^3) - (129173.2 * \mathbf{PF}^4)) * (0.900385 + (.0006641 * \mathbf{PST})))$

Northern New Mexico Transmission System (NNMTS) Adjustment:

The northern and southern New Mexico transmission systems are interconnected through the West Mesa-Arroyo 345 kV line and the West Mesa-Belen 115 kV line. The interaction between these two systems is greatly reduced due to the insertion of a phase shifting transformer (PST) on the West Mesa-Arroyo 345 kV line at Arroyo. This PST limits the real power flow between the two systems. There remains a small interaction, however, primarily due to the MVAR flow on the West Mesa 345 kV line. This is taken into account with the following adjustment equation:

BNom+| $((0.59 + 0.0012 * (\mathbf{PST} - 150) + 3*10^{-6} * (\mathbf{PST} - 150)^{2} - (0.001 * \mathbf{Nom}^{3} - 0.0225 * \mathbf{Nom}^{2} + 0.1668 * \mathbf{Nom} - 0.1) * ((2*10^{-6}) * \mathbf{PST}^{2} - 0.0002 * \mathbf{PST} + 0.16)) - \mathbf{WM} / (\mathbf{WM} + \mathbf{ARR})) * 132$

The control variables in this adjustment are:

- WM - MVAR flow on the WestMesa-Arroyo 345 kV line (+ for flows into WestMesa, - for flows out of WestMesa)
- ARR - MVAR flow on the WestMesa-Arroyo 345 kV line (+ for flows into Arroyo, - for flows out of Arroyo)
- Nom - Base Nomogram number as determined by the reactor configuration as given in the Base Nomogram table in section "*Base Nomogram Equations and Nomogram Error Adjustments*"

Eddy County HVDC Terminal Adjustment:

The Eddy County HVDC Terminal has a minimum transfer capability of 35 MW in either direction. If a value is inputted for the variable **Amw** below this amount, the terminal is assumed off (i.e., **Amw** = 0).

The Dynamic Adjustment for the Eddy County HVDC Terminal primarily involves the status of the capacitors and reactor at the terminal. This adjustment is given by the following equations:

BNom+| $(8.17203 * 10^{-9} * (\mathbf{Amw}^{4})) - (7.61796 * 10^{-7} * (\mathbf{Amw}^{3})) - (0.00189405 * (\mathbf{Amw}^{2})) + (0.0404956 * \mathbf{Amw}) + 60.69 - ((411.75 * \mathbf{PF} - 220.83 * \mathbf{PF}^{2} - 190.92) * (0.000092 * (\mathbf{Amw}^{2}) - 0.0979 * \mathbf{Amw} - 22.15))$

This equation assumes that both of the 30 MVAR capacitors on the Eddy County HVDC (filter capacitors) are on and the 54 MVAR reactor is off. For additional adjustments due to variations in this assumption, the following equations are used, additive to the above equation:

Eddy capacitor adjustment, to be applied for each of the 30 MVAR Eddy County HVDC Terminal capacitors off:

BNom-| $15.2 - (\mathbf{Amw} + 193) * 0.0087$

Please note that due to harmonics in the HVDC Terminal, at least one 30 MVAR filter capacitor is always on when the Terminal is in operation.

Eddy reactor adjustment, to be applied when the 54 MVAR Eddy County HVDC Terminal reactor, is on:

BNom-| $40.8 - (\mathbf{Amw} + 193) * 0.024$

The control variable Amw is the flow over the Eddy County HVDC terminal as measured at the Eddy 345 kV bus. The sign convention for this flow in the above equations is:

Amw is **+** for West (EPE) to East (SPS) flow and
- for East (SPS) to West (EPE) flow.

Voltage Stability Adjustment:

As was stated above, Path 47 is voltage limited. The primary voltage criteria used in the development of these nomograms is a maximum of 7% voltage drop, following a contingency, at the Luna 345 kV or Hidalgo 345 kV buses. Additionally, a maximum of 5% voltage drop following a contingency is utilized on the Tucson Electric Power Company (TEP) Greenlee 345 kV bus. This adheres to WECC criteria. However, under certain circumstances, primarily with low EPE system power factors and little generation on in the El Paso area, this voltage criterion could not be maintained with a stable system. Therefore, under these conditions, the voltage drop criteria was modified (made more restrictive) to ensure the safe and reliable operation of the system under N-1 conditions. The change in voltage criteria for the various system conditions is given below, along with the resulting nomogram adjustment.

Newman Step-Up Transf. Impedance (Nx)	Permissible Voltage Drop Value					
	RGD #8 **off** RGD #6 **&** #7 **off**	RGD #8 **off** RGD #6 **or** #7 **on**	RGD #8 **off** RGD #6 **&** #7 **on**	RGD #8 **on** RGD #6 **&** #7 **off**	RGD #8 **on** RGD #6 **or**#7 **on**	RGD #8 **on** RGD #6 **&** #7 **on**
	EPE System Power Factor **0.96 or above**					
> 0.08	**3**	**4**	**4**	**5**	**6**	**6**
0.07 - 0.08	**4**	**4**	**4**	**5**	**7**	**7**
0.06 - 0.069	**4**	**5**	**5**	**5**	**7**	**7**
0.05 - 0.059	**4**	**5**	**5**	**6**	**7**	**7**
0.04 - 0.049	**5**	**5**	**5**	**6**	**7**	**7**
0.03 - 0.039	**5**	**6**	**6**	**7**	**7**	**7**
< 0.03	**6**	**7**	**7**	**7**	**7**	**7**

Newman Step-Up Transf. Impedance (Nx)	Permissible Voltage Drop Value					
	RGD #8 **off** RGD #6 **&** #7 **off**	RGD #8 **off** RGD #6 **or** #7 **on**	RGD #8 **off** RGD #6 **&** #7 **on**	RGD #8 **on** RGD #6 **&** #7 **off**	RGD #8 **on** RGD #6 **or** #7 **on**	RGD #8 **on** RGD #6 **&** #7 **on**
	EPE System Power Factor **Below 0.96**					
> 0.08	**3**	**4**	**4**	**5**	**5**	**5**
0.07 - 0.08	**3**	**4**	**4**	**5**	**5**	**6**
0.06 - 0.069	**4**	**5**	**5**	**5**	**6**	**6**
0.05 - 0.059	**4**	**5**	**5**	**6**	**6**	**6**
0.04 - 0.049	**4**	**5**	**5**	**6**	**6**	**7**
0.03 - 0.039	**5**	**5**	**5**	**6**	**6**	**7**
< 0.03	**6**	**6**	**6**	**7**	**7**	**7**

Using the above tables, the Dynamic Adjustment for the system sensitivity to the voltage drop criteria is given as:

BNom-|	0 MW	if voltage drop equals **7**
BNom-|	35 MW	if voltage drop equals **6**
BNom-|	65 MW	if voltage drop equals **5**
BNom-|	95 MW	if voltage drop equals **4**
BNom-|	125 MW	if voltage drop equals **3**

<u>Afton Generator Adjustment:</u>

The Dynamic Adjustment for the impact of Afton Generator on the Path 47 nomogram depends on the real power (MW) output of the unit. This MW output then determines the available reactive capability of the unit based on the generator manufacturers Reactive Capability Curves.

The equation for this adjustment when only the gas turbine (GT) is on and its generation output is at least at its minimum, is:

BNom+| 75 – **AFTmw** * 0.3, where **AFTmw** = GTmw

The equation for this adjustment when both the GT and steam turbine (ST) are on and their generation output is at least at their minimum, is:

BNom+| 115 – **AFTmw** * 0.3, where **AFTmw** = GTmw + STmw

The use of these equations in the nomograms assumes that the Afton generator's gas turbine and steam turbine minimum outputs are 75 MW and 46 MW, respectively. Thus, for output less than these amounts, i.e., generator ramp-up or ramp-down, the nomogram adjustment is defaulted to zero.

Luna Energy Facility (LEF) Generator Adjustment:

The Dynamic Adjustment for the impact of the Luna Energy Facility 2 x 1 Combined Cycle plant on the Path 47 nomogram depends on the number of units on-line and with the ability to produce reactive power. The adjustment for this plant is:

BNom+| 60 MW for each unit on-line

A unit is considered to be on-line if its generation output is above its minimum, which is 58 MW for each of the two gas turbines, and 48 MW for the steam turbine. If there are no units on-line, the nomogram adjustment is defaulted to zero.

Error Detection in Dynamic Adjustments:

The equations given for the Nomogram Dynamic Adjustments assume that exact and correct values are inputted into the equations. However, under certain values, errors could occur in the equations and result in erroneous Path 47 TTC values. These errors are concerned with the values of EPE generation and the flow over the Eddy County HVDC Terminal. To correct this, the following convention is used:

When the value for real power output of each EPE generator is below that generator's minimum allowed output, the nomogram TTC calculation will assume that the generator is off-line. This covers the period when the generator has been switched on and is ramping up. Likewise, when the value inputted is greater than that generator's maximum value, the nomogram TTC calculation will assume the generator is at its maximum allowed output. The minimum and maximum generation, in MW, for each EPE generator and the parallel impedance values for the Newman generators utilized in the control variable Nx are:

Generator	Minimum Generation	Maximum Generation (*)	Step-up Transformer Impedance (****)
Newman #1	25	77	0.11635
Newman #2	28	80	0.12871
Newman #3	30	101	0.07912
Newman #4 GT1	4**	73 ***	0.16498
Newman #4 GT2	4**	74 ***	0.16164
Newman #4 ST1	25	75 ***	0.08555
Newman #5 GT3	45	70	0.12700
Newman #5 GT4	45	70	0.12700
Newman #5 ST2	45	148	0.08700
Rio Grande #6	18	48	

Rio Grande #7	18	45
Rio Grande #8	30	150
Rio Grande #9	25	87
Copper G1	4	69

(*) Maximum generation does not include de-rations for environmental standards, equipment failure or amount required for station service.

(**) Minimum stable generation for each of EPE's Newman 4 or 5 gas turbines is 4 MW in a dry condition. If operated wet, minimum stable generation is 20 MW on each unit.

(***) With Afterburners on GT's

(****) Step-up Transformer Impedances are Per-Unitized on a 100 MVA base, and with the exception of Newman 5 generators, they are the values used in the development of the original equations, therefore these should not change even if the step-up transformers are replaced. The addition of Newman 5 generators, which came after the equations were developed, to the control variable Nx does not significantly change the Nomogram Error Equation, Newman Generation, and Voltage Drop adjustments, as Nx decreases to its least value when all Newman generation is on, but also considers the presence of Newman 5 generation when any other Newman generator is off.

IX. <u>GUIDELINES FOR THE DETERMINATION OF TTC AND ATC FOR EPE POSTED TRANSMISSION PATHS</u>

Determination of TTC on the EPE Transmission System

EPE utilizes the NERC and WECC contract path or rated path methodology to determine Total Transfer Capacity (TTC) on its transmission system. The determination of the TTC for paths on the EPE system is segment dependent. However, the tools used to determine TTC is the same for all segment, i.e., the GE PSLF powerflow and stability programs using system modeling data obtained through WECC.

EPE conducts two primary TTC evaluations, the first being on the nomogram defined Path 47 transmission path. This evaluation is performed, using powerflows as this system is voltage constrained, by modeling variations in the primary variables defined in Section VIII and determining the total path transfer capacities. These capacities, along with the variable states, are collapsed into equations which are then utilized in the EPE Energy Management System (EMS) to determine the real-time Path 47 capacity. These nomograms, the components used and the specific equations, are defined in Section VIII. The procedure and methodology for this evaluation follows the NERC Standard MOD-29 methodology.

The second TTC determination, again using the GE PSLF powerflow and stability programs along with WECC derived data, determines the TTC for the line segments internal to the EPE system. The determination of TTC for these segments, however, also must take into account the contracts for those segments. The methodology for this determination also follows and is delineated in the NERC Standard MOD-29.

Determination of TTC on the Palo Verde East Transmission System

EPE is an owner in the 500 kV transmission system from the Palo Verde Nuclear Generating Station to the Westwing and Kyrene Switchyards, known as the Palo Verde East Transmission System. The Palo Verde East transmission system is also owned by Salt River Project (SRP), Arizona Public Service Company (APS) and Public Service Company of New Mexico (PNM) and is operated by SRP. The TTC for this system is determined by SRP with approval of the other owners.

Capacity Reservations That Impact ATC on the EPE Transmission System

The procedures and methodology detailed in the NERC paper "*Available Transfer Capability Definitions and Determination*" and the WECC paper "*Determination of Available Transfer Capability in the Western Interconnection*" has given the Transmission Provider (EPE) several options in the final determination of ATC. The first of these options is to reserve a part of the TTC for a Transmission Reliability Margin (TRM). This margin is used, as stated in Section II, to reserve capability for simultaneous limitations with parallel paths, unscheduled flow impacts and unplanned transmission outages which were not taken into account in the original determination of that paths total transfer capacity. Historically, EPE has incorporated the TRM as related to contingencies as part of its calculations for a paths total capacity in determining the nomograms utilized for the southern New Mexico transmission system. This is incorporated in the voltage, VAR and other criteria, as well as the contingencies taken in calculating these values.

The second option is the use of a Capacity Benefit Margin (CBM). This value, as defined in Section II, is used to reserve a part of the transmission system for generation reserves and the changes in the system usage due to changing generation patterns, generation contingencies and system load growth. This part of the ATC can only be sold as non-firm transmission service. EPE does not utilize CBM in its ATC calculations.

The CBM and TRM needs of EPE are determined and calculated by EPE's reliability function. EPE's wholesale merchant function is not involved in any way in the process for determination of ATC or the amount of CBM/TRM to incorporate into EPE's system reliability plans. EPE strictly follows its Standards of Conduct regarding all transmission service requests, as well as the determination of the appropriate level of CBM/TRM for EPE's system reliability purposes.

A third reservation of transmission EPE can make under FERC rules is Committed Uses (CU), as defined in Section II above. This reservation includes transmission reserved for native load use and pre-existing commitments. These pre-existing commitments are pre-FERC Order No. 888 contracts. On the OASIS, EPE reserves this transmission capacity under CU (Committed Uses) and Miscellaneous Impacts (MI).

Definition of Capacity Benefit Margin and Transmission Reliability Margin

Capacity Benefit Margin (CBM) is defined by the NERC in the document *Glossary of Terms Used in Reliability Standards* (May 2, 2007) as the following:

> Capacity Benefit Margin (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 its 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.

Transmission Reliability Margin (TRM) is also defined in that NERC document as the following:

> 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 operation as system conditions change.

TRM is further defined as capacity set aside for (1) Load forecast and load distribution error, (2) variations in facility loadings, (3) uncertainty in transmission system topology, (4) loop flow impact, (5) variations in generation dispatch, (6) automatic sharing of reserves, and (7) other uncertainties as identified through the NERC reliability standards development process.

Transmission Interconnections on which EPE Reserves CBM and TRM

EPE does not utilize reservations for CBM on its transmission segments.

EPE does not utilize reservations for TRM on its transmission segments.

Who Performs the Assessment of CBM and TRM Requirements?

The assessment of CBM and TRM for EPE is performed by the System Planning Department, i.e., the reliability (transmission) function. For questions concerning EPE's TRM and CBM requirements and calculations, the following persons can be contacted:

Dennis H. Malone, Director, System Planning
Phone: 915-543-5757 e-mail: dennis.malone@epelectric.com
Ernesto Martinez, Director, System Operations
Phone: 915-543-2062 e-mail: ernesto.martinez@epelectric.com

Determination and Use of CBM on the EPE System

EPE does not reserve CBM on the EPE transmission system.

Determination and Use of TRM on the EPE System

EPE does not reserve TRM on the EPE transmission system.

Availability of CBM and TRM

EPE makes the transmission capability preserved as CBM (none) and TRM (none) available on the OASIS to market entities on a non-discriminatory non-firm basis under its Open Access Transmission Tariff (OATT) which is located on EPE's website. The transmission capability preserved as CBM (none) and TRM (none) and sold on a non-firm basis is curtailed (for reliability reasons) as per the curtailment procedures for non-firm transmission in EPE's OATT.

Native Load Reservations

EPE reserves capacity on its transmission system to serve its native load requirements using the OASIS SetASide (SAS) function on paths that are scheduled through e-tags. This is done by creating an AREF for capacity on the desired transmission segment. EPE has created SetAsides on its transmission from Palo Verde (PaloVerde to Westwing, Palo Verde to Jojoba and Jojoba to

Kyrene segments) and on the Path 47 transmission segments (WestMesa to Arroyo, Springerville to Luna and Greenlee to Hidalgo). In addition to the reservations made by SetASides, EPE reserves capacity on the transmission segments internal to the EPE system, i.e., not scheduled, for native load use. This capacity is reserved using the OASIS CU variable or the OASIS variable MI. The CU variable removes both the firm and non-firm ATC and the MI variable removes only the firm, leaving the non-firm ATC available to the market.

X. DETERMINATION OF ATC FOR EPE POSTED TRANSMISSION PATHS

Methodology for Determining ATC

FERC requires that Transmission Providers post the TTC and ATC for all transmission paths that are interconnections between two control areas, regardless of the voltage level of the interconnections. Additionally, EPE posts all paths in which it has ownership, even if that path is external to the EPE control area, i.e., EPE's Palo Verde paths, for which transmission requests have been made. Finally, transmission paths internal to the EPE control area, initially only over the 345 kV paths, are posted. Additional transmission paths will be posted as required when EPE receives requests for those paths.

EPE uses the Contract Path or Rated Path methodology that is common to the Western Interconnection in the determination of TTC and ATC in its system. The technical methodology for determining the TTC and ATC for EPE's transmission paths is through first determining the TTC and ATC of the transmission segments which make up the path. For example, the transmission path "Eddy 230 to Greenlee 345" will consist of the following transmission segments:

Eddy 230 - Eddy 345	Newman 345 – Afton 345
Eddy 345 - Amrad 345	Afton 345 - Luna 345
Amrad 345 - Caliente 345	Luna 345 - Hidalgo 345
Caliente 345 - Newman 345	Hidalgo 345 - Greenlee 345

Each of these transmission segments will have a TTC and ATC associated with them. To determine the TTC and ATC of the entire path, those values must be looked at for each segment and the minimum value of the segments will be the TTC and ATC for that path. It must also be kept in mind that in determining the ATC for a path, the ATC for another path which utilizes common segments must be evaluated. For example, for the path given above, Newman - Afton 345 segment is contained in that path. This segment, however, is also contained in the "Eddy 230 to Springer 345" transmission path. Therefore, when the ATC is determined for each segment, the transactions over all of the paths using common segments will be evaluated.

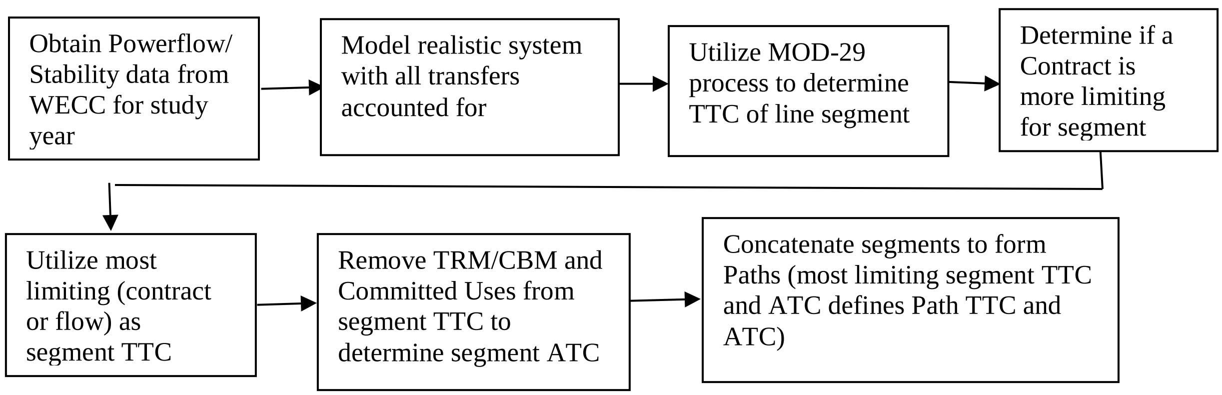
Path 47 is treated, for purposes of determining ATC, as three separate transmission lines: the West Mesa to Arroyo 345 kV line, the Springerville to Luna 345 kV line and the Greenlee to Hidalgo 345 kV line. However, in determining the actual path capacity under the WECC process and in the nomograms, these lines are treated as a single path. The maximum firm capacity of this path, for EPE, is 645 MW. Therefore, the maximum sum of the firm use of each individual transmission line in this path cannot exceed that firm value. Also note that the sum of the TTC for the lines comprising Path 47 is greater than the TTC for Path 47.

EPE has reserved for native load use (SetASide) an amount of firm ATC over each of EPE's interconnections, WestMesa 345, Springerville 345, Greenlee 345 and Eddy 230. In conjunction with these reservations, a reservation over the line segments connecting these interconnections with the EPE native system is also made. These line segment reservations are automatic and are dependent upon the amount being reserved at the interconnection points. For each of these line segments, the amount of native load reservation is:

Line Segment	TTC Reserved
WestMesa 345-Arroyo 345	124 MW capacity as Native Load Reservation (SetASide)
Springer 345-Macho Sp-Luna 345	453 MW capacity as Native Load Reservation (SetASide)
Springer 345-Macho Sp-Luna 345	4 MW capacity as Network Customer RGEC (SetASide)
Greenlee 345-Hidalgo 345	107 MW capacity as Native Load Reservation (SetASide)
Hidalgo 345-Luna 345	179 MW capacity as Native Load Reservation (MI)
Hidalgo 345-Luna 345	107 MW capacity as Native Load Reservation (SetASide)
Luna 345-Afton 345	490 MW capacity as Native Load Reservation (CUFirm)
Luna 345-Afton 345	125 MW capacity as Native Load Reservation (SetASide)
Afton 345-Newman 345	376 MW capacity as Native Load Reservation (CUFirm)
Afton 345-Newman 345	125 MW capacity as Native Load Reservation (SetASide)
Luna 345-Diablo 345	400 MW capacity as Native Load Reservation (CUFirm)
Eddy 230-Eddy 345	133 MW capacity as Native Load Reservation (SetASide)
Eddy 345-Amrad 345	133 MW capacity as Native Load Reservation (SetASide)
Amrad 345-Amrad 115	85 MW capacity as Native Load Reservation (CUFirm)
Amrad 345-Caliente 345	133 MW capacity as Native Load Reservation (SetASide)
Caliente 345-Amrad 345	300 MW capacity as Native Load Reservation (MI)
Caliente 345–Newman 345	300 MW capacity as Native Load Reservation (MI)
Newman 345-Arroyo 345	400 MW capacity as Native Load Reservation (MI)
Newman 345-Caliente 345	200 MW capacity as Native Load Reservation (MI)
Arroyo 345-Newman 345	124 MW capacity as Native Load Reservation (MI)
Luna 345-EPE.Shell	564 MW capacity as Native Load Reservation + RGEC Reservation (SetASide)
EPE.Shell-EPE.ResLoad	947 MW capacity as Native Load Reservation (SetASide) Note: Capacity SetASide on this segment is sum of connecting SetASides.

Note that these reservations are only made in the direction given in the line segment name above. In the following Sections, the TTC and ATC for all of EPE's transmission segments are evaluated. The first set of transmission segments are those which interconnect EPE to other control areas, the second are those external segments in which EPE has ownership, and the third set are those transmission segments internal to the EPE control area.

The steps EPE utilizes to determine TTC and ATC on the EPE transmission system follow the methodology given in NERC Standard MOD-29 which are given in the following flow chart:



In the determination of TTC for the transmission paths in the EPE area, EPE utilizes the WECC and NERC standards and criteria for transmission element loading, reactive capability margins and stability margins.

ATC on EPE's OATI OASIS

As a means to post and sell ATC on the EPE transmission system, EPE utilizes the Open Access Technologies International, Inc. (OATI) wesTTran OASIS. As part of this OASIS, EPE, along with all other participants, has allowed OATI to regulate the methodology by which ATC is determined.
In its simplest form, the calculation for ATC is as follows:

$$ATC = TTC - TRM - CBM - \sum Transmission\ Impacts$$

Each value specified in the equation must be defined in order for the ATC calculation to function properly.

Transmission Impacts include the impact of reservations (TSRs and TSNs), tags, Committed Use (CU) values, Miscellaneous Impact (MI) values. Committed Uses are reservations on line segments for some pre-FERC Order 888 contracts and other uses that remove both the firm and non-firm ATC from that segment. Miscellaneous Impacts are uses not defined by Committed Uses that only remove the firm ATC from the line segment. All CU and MI are applied to line segments. EPE does not use counter flows in determining TTC and/or ATC.

ATC computations are controlled by setting Parameters for each time horizon to define the ATC Formula used in the computations. Each computation is configured with a separate set of ATC Parameters which determine which reservations, schedules, or external input data are to be used when performing the following calculations:

ATC Computation	Description
<horizon> Committed Initialize	Computes the committed, firm ATC for designated time horizon during the ATC initialize process based on the

Firm	ATC Parameters specified for this computation.
<horizon> Committed Initialize Non Firm	Computes the committed, non-firm ATC for designated time horizon during the ATC Initialize process based on the ATC Parameters specified for this computation.
<horizon> Pending Initialize Firm	Computes the pending, firm ATC for designated time horizon during the ATC initialize process based on the ATC Parameters specified for this computation.
<horizon> Pending Initialize Non Firm	Computes the pending, non-firm ATC for designated time horizon during the ATC initialize process based on the ATC Parameters specified for this computation.
<horizon> Committed Firm	Computes the committed, firm ATC for designated time horizon as part of the ATC Decrement process based on the ATC Parameters specified for this computation.
<horizon> Committed Non Firm	Computes the committed, non-firm ATC for designated time horizon as part of the ATC Decrement process based on the ATC Parameters specified for this computation.
<horizon> Pending Firm	Computes the pending, firm ATC for designated time horizon as part of the ATC Decrement process based on the ATC Parameters specified for this computation.
<horizon> Pending Non Firm	Computes the pending, non-firm ATC for designated time horizon as part of the ATC Decrement process based on the ATC Parameters specified for this computation.

<horizon> = Scheduling, Operating, or Planning

The ATC algorithm is developed and maintained by OATI under agreement with EPE. EPE is responsible for inputting the component values used in the ATC algorithm, but the structure of the formula can only be changed by OATI.

ATC Components

A detailed definition of each component used in the ATC formula is given below:

ATC Impact Category	**Description**
ComResFirm	Firm reservations that are in a *Committed State*. The ATC on all segments of a path will be reduced by the TSR amount.
ComResFirm_CS	Firm reservations that are in a *Committed State*, on a path for which a counter-segment has been defined. The ATC on all counter-segments will be increased by the TSR amount. For example, if the reservation is on path ABC/DEF the ATC for DEF/ABC will be increased. The amount of the counter flow in the reverse direction is determined by the CS_Factor defined on the counter segment for each time horizon.
ComResNonFirm	Non-Firm reservations that are in a *Committed State*. The ATC on all segments of a path will be reduced by the TSR amount.
ComResNonFirm_CS	Non-Firm reservations that are in a *Committed State* on a path for which a counter-segment has been defined. The ATC on all counter-segments will be increased by the TSR amount. For example, if the reservation is on path ABC/DEF the ATC for DEF/ABC will be increased. The amount of the counter flow in the reverse direction is determined by the CS_Factor defined on the counter segment for each time horizon.
ComTagFirm	All tags (IMPLEMENTED and PENDING) containing firm reservations that are in a *Committed State*. The tagged energy MW values are used to impact the ATC calculation. This impact category would typically be used for Non-Firm ATC when the TP is releasing unscheduled firm capacity for sale as non-firm. If both the TSR on the tag and the tag itself are included in the ATC impact, the ATC calculation will credit the TSR MW capacity, by the amount of the tag, and use the tag MW capacity in the ATC calculation. For example, if a path has firm reservations of 100MW and the tags using these reservations are only 75mw, the non-firm ATC will be reduced by the 75mw and the remaining 25mw will not impact the non-firm ATC.
ComTagFirm_CS	All tags (IMPLEMENTED and PENDING) containing firm reservations that are in a *Committed State*, on a path for which a counter-segment has been defined. The tagged energy MW values are used to impact the ATC calculation. This impact category would typically be used for Non-Firm ATC when the TP is releasing unscheduled firm capacity for sale as non-firm. If both the TSR on the tag and the tag itself are included in the ATC impact, the ATC calculation will credit the TSR MW capacity, by the amount of the tag, and use the tag MW capacity in the ATC calculation.
ComTagNonFirm	All tags (IMPLEMENTED and PENDING) containing non-firm reservations that are in a *Committed State*. The tagged energy MW values are used to impact the ATC calculation. This impact category would typically be used for Non-Firm ATC when the TP is releasing unscheduled firm capacity for sale as non-firm. If both the TSR on the tag and the tag itself are included in the ATC impact, the ATC calculation will credit the TSR MW capacity, by the amount of

ATC Impact Category	Description
	the tag, and use the tag MW capacity in the ATC calculation.
ComTagNonFirm_CS	All tags (IMPLEMENTED and PENDING) containing non-firm reservations that are in a *Committed State*, on a path for which a counter-segment has been defined. The tagged energy MW values are used to impact the ATC calculation. This impact category would typically be used for Non-Firm ATC when the TP is releasing unscheduled firm capacity for sale as non-firm. If both the TSR on the tag and the tag itself are included in the ATC impact, the ATC calculation will credit the TSR MW capacity, by the amount of the tag, and use the tag MW capacity in the ATC calculation.
CUFirm	Firm Committed Use value provided by the transmission provider in the Committed Use Summary display *(webTrans → OASIS → TTC Components → CU/MI Summary)*. The TP Parameter, ATC_CU_SIGN, controls whether the uploaded value is added to or subtracted from the ATC formula.
CUNonFirm	Non-Firm Committed Use value provided by the transmission provider in the Committed Use Summary display *(webTrans → OASIS → TTC Components → CU/MI Summary)*. The TP Parameter, ATC_CU_SIGN, controls whether the uploaded value is added to or subtracted from the ATC formula.
MiscFirm	Miscellaneous Firm Impact value provided by the transmission provider in the Misc Impact Summary display *(webTrans → OASIS → TTC Components → CU/MI Summary)*. The TP Parameter, ATC_MISC_SIGN, controls whether the uploaded value is added to or subtracted from the ATC formula.
MiscNonFirm	Miscellaneous Non-Firm Impact value provided by the transmission provider in the Misc Impact Summary display *(webTrans → OASIS → TTC Components → CU/MI Summary)*. The TP Parameter, ATC_MISC_SIGN, controls whether the uploaded value is added to or subtracted from the ATC formula.
NewComResFirm	Firm reservations that are in a *Committed State* submitted since the last automated daily initialization. At the time of the next daily initialization, the reservations that were included in the NewComResFirm category will be included in the ComResFirm category.
NewComResNonFirm	Non-Firm reservations that are in a *Committed State* submitted since the last automated daily initialization. At the time of the next daily initialization, the reservations that were included in the NewComResNonFirm category will be included in the ComResNonFirm category.
NewPendResFirm	Firm reservations that are in a *Pending State* submitted since the last automated daily initialization. This is used for TSR validation and is kept separate from the posted ATC. If the pending reservation plus the confirmed TSR make the ATC negative, the validation will fail.
NewPendResNonFirm	Non-Firm reservations that are in a *Pending State* submitted since the last automated daily initialization. This is used for TSR validation and is kept separate from the posted ATC. If the pending reservation plus the confirmed TSR make the ATC negative, the validation will fail.

ATC Impact Category	Description
OffsetFirm	Firm Offset value provided by the transmission provider in the Flow Gate Offset display *(webTrans → OASIS → TTC Components → Flow Gate Offset)*.
OffSetNonFirm	Non-Firm Offset value provided by the transmission provider in the Flow Gate Offset display *(webTrans → OASIS → TTC Components → Flow Gate Offset)*.
PendResFirm	Firm reservations that are in a *Pending State*.
PendResFirm_CS	Firm reservations that are in a *Pending State*, on a path for which a counter-segment has been defined. The ATC on all counter-segments will be increased by the TSR amount.
PendResNonFirm	Non-Firm reservations that are in a *Pending State*.
PendResNonFirm_CS	Non-Firm reservations that are in a *Pending State*, on a path for which a counter-segment has been defined. The ATC on all counter-segments will be increased by the TSR amount.
ScheduleFirm	Firm scheduled value provided by the transmission provider in the Schedule Summary display *(webTrans → OASIS → TTC Components → Schedule Summary)*. This is used by TPs that want to use the scheduled MW value instead of the tagged MW value for impacting ATC. Schedule adjustments are included during the initialization calculation.
ScheduleFirm_CS	Firm scheduled value impact provided by the transmission provider in the Schedule Summary display *(webTrans → OASIS → TTC Components → Schedule Summary)*, on a path for which a counter-segment has been defined. This is used by TPs that want to use the scheduled MW value instead of the tagged MW value for impacting ATC. Schedule adjustments are included during the initialization calculation.
ScheduleNonFirm	Non-Firm scheduled value provided by the transmission provider in the Schedule Summary display *(webTrans → OASIS → TTC Components → Schedule Summary)*. This is used by TPs that want to use the scheduled MW value instead of the tagged MW value for impacting ATC. Schedule adjustments are included during the initialization calculation.
ScheduleNonFirm_CS	Non-Firm scheduled value impact provided by the transmission provider in the Schedule Summary display *(webTrans → OASIS → TTC Components → Schedule Summary)*, on a path for which a counter-segment has been defined. This is used by TPs that want to use the scheduled MW value instead of the tagged MW value for impacting ATC. Schedule adjustments are included during the initialization calculation.
SetsideFirm	Firm TSN entries in webTrans with a type SAS.
SetasideNonFirm	Non-Firm TSN entries in webTrans with a type SAS.

ATC Algorithms

Using the components listed above, the specific EPE ATC algorithms for the Scheduling, Operating and Planning Horizons are given below.

Scheduling Horizon ATC Algorithm:

Scheduling Committed Initialize Firm = TTC – TRM – CBM - CUFirm – CUNonFirm – ComResFirm – MiscFirm – NewComResFirm – SetasideFirm

Scheduling Committed Initialize NonFirm = TTC – CUFirm – CUNonFirm – ComTagFirm – ComTagFirm_CS – ComTagNonFirm – MiscNonFirm - NewComResFirm – NewComResNonFirm

Scheduling Pending Initialize Firm = TTC – TRM – CBM - CUFirm – CUNonFirm – ComResFirm – MiscFirm – NewComResFirm – NewPendResFirm – PendResFirm - SetasideFirm

Scheduling Pending Initialize NonFirm = TTC – CUFirm – CUNonFirm – ComTagFirm – ComTagNonFirm – MiscNonFirm - NewComResFirm – NewComResNonFirm – NewPendResFirm – NewPendResNonFirm - PendResFirm - PendResNonFirm

Scheduling Committed Firm = TTC – TRM – CBM - CUFirm – CUNonFirm – ComResFirm – MiscFirm – NewComResFirm – SetasideFirm

Scheduling Committed NonFirm = TTC - CUFirm – CUNonFirm – ComTagFirm – ComTagFirm_CS – ComTagNonFirm –MiscNonFirm – NewComResFirm – NewComResNonFirm

Scheduling Pending Firm = TTC – TRM – CBM - CUFirm – CUNonFirm – ComResFirm – MiscFirm – NewComResFirm – NewPendResFirm – PendResFirm – SetasideFirm

Scheduling Pending NonFirm = TTC – CUFirm – CUNonFirm – ComTagFirm – ComTagNonFirm – MiscNonFirm – NewComResFirm – NewComResNonFirm – NewPendResFirm – NewPendResNonFirm – PendResFirm - PendResNonFirm

Operating Horizon ATC Algorithm:

Operating Committed Initialize Firm = TTC – TRM – CBM - CUFirm – ComResFirm – MiscFirm – NewComResFirm – SetasideFirm

Operating Committed Initialize NonFirm = TTC – CUFirm – ComTagFirm – ComTagFirm_CS – ComTagNonFirm – MiscNonFirm - NewComResFirm – NewComResNonFirm

Operating Pending Initialize Firm = TTC – TRM – CBM - CUFirm – ComResFirm – MiscFirm – NewComResFirm – NewPendResFirm – PendResFirm - SetasideFirm

Operating Pending Initialize NonFirm = TTC – CUFirm – ComTagFirm –ComTagNonFirm – MiscNonFirm - NewComResFirm – NewComResNonFirm – NewPendResFirm – NewPendResNonFirm - PendResFirm – PendResNonFirm

Operating Committed Firm = TTC – TRM – CBM - CUFirm – ComResFirm – MiscFirm – NewComResFirm – SetasideFirm

Operating Committed NonFirm = TTC - CUFirm – ComTagFirm – ComTagFirm_CS – ComTagNonFirm –MiscNonFirm – NewComResFirm – NewComResNonFirm

Operating Pending Firm = TTC – TRM – CBM - CUFirm – ComResFirm – MiscFirm – NewComResFirm – NewPendResFirm – PendResFirm – SetasideFirm

Operating Pending NonFirm = TTC –CUFirm – ComTagFirm – ComTagNonFirm – MiscNonFirm – NewComResFirm – NewComResNonFirm – NewPendResFirm – NewPendResNonFirm – PendResFirm - PendResNonFirm

<u>Planning Horizon ATC Algorithm:</u>

Planning Committed Initialize Firm = TTC – TRM – CBM - CUFirm – ComResFirm – MiscFirm – NewComResFirm – SetasideFirm

Planning Committed Initialize NonFirm = TTC – CUFirm – ComResFirm – ComResNonFirm - MiscNonFirm - NewComResFirm – NewComResNonFirm

Planning Pending Initialize Firm = TTC – TRM – CBM - CUFirm – ComResFirm – MiscFirm – NewComResFirm – NewPendResFirm – PendResFirm – SetasideFirm

Planning Pending Initialize NonFirm = TTC – CUFirm – ComResFirm –ComResNonFirm – MiscNonFirm - NewComResFirm – NewComResNonFirm – NewPendResFirm – NewPendResNonFirm - PendResFirm - PendResNonFirm

Planning Committed Firm = TTC – TRM – CBM - CUFirm – ComResFirm – MiscFirm – NewComResFirm – SetasideFirm

Planning Committed NonFirm = TTC - CUFirm – ComResFirm – ComResNonFirm – MiscNonFirm – NewComResFirm – NewComResNonFirm

Planning Pending Firm = TTC – TRM – CBM - CUFirm – ComResFirm – MiscFirm – NewComResFirm – NewPendResFirm – PendResFirm – SetasideFirm

Planning Pending NonFirm = TTC – CUFirm – ComResFirm - ComResNonFirm – MiscNonFirm – NewComResFirm – NewComResNonFirm – NewPendResFirm – NewPendResNonFirm – PendResFirm - PendResNonFirm

The TTC and ATC values which are posted on EPE's OASIS site are values for the EPE transmission system with all transmission lines in-service. However, during contingencies or during times when transmission lines are out-of-service for maintenance, these values will change. The amount of curtailments for EPE's major transmission system outages are given on EPE's OASIS. To obtain the times and amounts of curtailments of TTC and ATC for EPE's transmission paths, look in the "Transmission" section of EPE's Internet Home Page at the address: http://www.epelectric.com and on the OASIS on the Outage Manager or Notices page.

XI. TTC/ATC FOR EPE CONTROL AREA INTERCONNECTION POINTS

The TTC and ATC for the interconnection points between the EPE control area and neighboring control areas are defined below as the transmission lines between the various control areas. The TTC and ATC for these lines, which also define the control area boundary points, are the amount of power that can be reliably transferred over the specific line defining the interconnection point. From these interconnection lines, the power is then transferred on paths (segments) internal to the EPE transmission system. To determine the TTC and ATC for a transmission path utilizing one or more of EPE's interconnection lines (points), the TTC and ATC for each intervening segment must be evaluated. The segment with the least TTC and ATC will be the governing segment, defining the TTC and ATC for that path.

The primary interconnection boundary for the EPE control area is the WECC rated Path 47. This path is defined by the following lines at interconnection points:

Interconnection Point	Line Name	OASIS Name
WestMesa 345:	WestMesa 345 to Arroyo 345	WM345 – ARROYO345
Springerville 345:	Springerville 345 to MachoSp 345	SPRINGER345–MACHOSPGR345
Greenlee 345:	Greenlee 345 to Hidalgo 345	GREENLEE345–HIDALGO345

The amount of firm capacity owned by EPE on this Path is 645 MW. However, since the OASIS posts the capacities of each individual line segment, the capacity of Path 47 is listed as the capacity for each line. <u>The sum of the individual line capacities is greater than the Path 47 capacity.</u> Therefore, the amount of ATC used on each line segment list above for Path 47 cannot sum to an amount greater than the TTC of Path 47, or 645 MW

EPE has reserved on Path 47, as well as several internal line segments, sufficient transmission capability to import its remotely owned generation at Palo Verde and Four Corners for its native load use. For each of these interconnection segments, the following maximum amount of ATC has been reserved for Native Load use. Previously these Native Load reservations were implemented on the OASIS as a Committed Use (CU) or (MI). However, they are currently reserved by use of an "AREF SetAside" for E-Tag purposes. This use of an "AREF SetAside" allows the Firm ATC to be reserved for native load use but Non-Firm capacity to be posted and sold when the full amount is not utilized.

in from WestMesa 345:	124 MW
in from Springerville 345:	457 MW
in from Greenlee 345:	107 MW

However, as stated above, regardless of the amount of native load reservation made on each individual interconnection point of Path 47, under EPE's contracts and nomograms, the maximum amount of firm ATC on those points is 645 MW.

In addition to the native load reservations on Path 47, EPE has made a reservation on the interface between the 345 kV system and EPE's underlying network. On the OASIS, this interface is referred to as "EPE.SYSSHEL", which is the 345/115 kV auto-transformers surrounding the EPE load area, called "EPE.RESLOAD". EPE has also made a native load reservation, shown as a Committed Use, from a designated Network Resource at Luna Substation to EPE.RESLOAD of 125 MW.

The TTC and ATC values which are posted on the OASIS are values for the EPE transmission system with all transmission lines in-service. However, during contingencies or during times when transmission lines are out-of-service for maintenance, these values will change. The amount of curtailments for EPE's major transmission system outages are given on EPE's OASIS. To obtain the times and amounts of curtailments of TTC and ATC for EPE's transmission paths, look in the "Transmission Information" section of EPE's Internet Home Page at the address: http://www.epelectric.com and on the OASIS at the Outage Manager or Notice page.

WestMesa 345 kV Control Area Interconnection Point:

PNM Control Area to EPE Control Area:
OASIS Name: WM345 – ARROYO345 Segment

The WestMesa to Arroyo 345 kV line segment (WestMesa Interconnection Point) interconnects the EPE and PNM control areas. The TTC and ATC for this line are limited by several constraints: i) the angular and thermal capability of EPE's phase shifting transformer (300 MW) at Arroyo; ii) the capacity of EPE's Arroyo 345/115 kV auto-transformers during and following contingencies; iii) EPE's and other Party's transmission rights through the PNM northern New Mexico transmission system; and iv) EPE's and other party committed uses over the phase shifting transformer (PST). All ATC sold on this path must have a corresponding purchase of transmission through the northern New Mexico system. Therefore, third party use of this path cannot be accommodated without concurrence of PNM. For each MW of flow on the WM345-ARRORO345 segment, a MW of transmission must be purchased from PNM. Therefore, the ATC on this segment can only be increased under a very limited condition specified in the "*2005 New Mexico Transmission System Operating Procedures"*. The mechanism to increase the PST Base Setting and firm SNMIC is given in the "*2005 New Mexico Transmission Operating Procedures"*:

> "9.5 A Party, or third party, may purchase from PNM, in accordance with PNM's OATT, firm transmission in the NNMTS for delivery to the SNMTS and, from EPE in accordance with EPE's OATT, firm transmission in the SNMTS. For the duration of that purchase the PST Base Setting as delineated in Section 1.3 and SNMIC as delineated in Sections 1.6 and 1.7 will be increased by 1 MW for each 1 MW of increase above the original PST Base Setting."

At the present time, the PST Base Setting, as defined in the "*2005 New Mexico Transmission System Operating Procedures"*, reflects the maximum firm rights that can be delivered into the southern New Mexico system through the northern New Mexico system with a delivery point at WestMesa 345 kV. This amount is currently 201 MW. This Base Setting is broken down into the following:

Non-EPE firm schedules:

PNM (purchase under EPE OATT):	25 MW
Tri-State (1994 Long Term Transmission Service Agreement):	50 MW

EPE firm schedules (CU AREF for Native Load):

Purchase of Four Corners to WestMesa path under PNM OATT:	104 MW
Service Schedule I (SSI):	20 MW

Firm purchase by WAPA for:

Wheeling of WAPA CRSP power to Holloman Air Force Base:	2 MW

Of this Base Setting, EPE has committed 124 MW for Native Load use (AREF, FirmSetAside), 2 MW for a firm purchase by WAPA and an additional 50 MW for Existing Contracts (CU), for a total of 176 MW.

As stated above, the limiting factor for this line segment is the phase shifting transformer (PST). Specifically, the PST normal thermal limitation of the PST is XXX MVA (a new PST is being ordered). However, during contingencies, the short time rating based on the angle present on the PST during a contingency. This thermal limitation is:

Powerflow from Load to Source:

Tap Positions 1 – 17 (0^0 – 17^0)	477 MVA
Tap Positions 18 – 33 (18^0 – 34^0)	339 MVA

Powerflow from Source to Load:

Tap Position 1 (0^0)	339 MVA
Tap Position 2 (2^0)	357 MVA
Tap Position 3 (3^0)	363 MVA
Tap Position 4 (4^0)	373 MVA
Tap Position 5 (5^0)	382 MVA
Tap Position 6 (6^0)	394 MVA
Tap Position 7 (7^0)	410 MVA
Tap Position 8 (8^0)	425 MVA
Tap Position 9 (9^0)	444 MVA
Tap Position 10(10^0)	471 MVA
Tap Positions 11 – 33 (11^0 – 34^0)	477 MVA

During a contingency, the natural angles in the system change and more power is placed on the PST. The amount of this additional power depends on the pre-contingency angle setting. If firm schedules are above the PST Base Setting, the PST could overload. Therefore, due to this and the requirement to purchase ATC from PNM, all TTC on this segment above the PST Base Setting (201 MW). The remainder is posted as non-firm such that it can be sold on a non-firm basis with the agreement of PNM as per Section 9.4 of the "*New Mexico Transmission System Operating Procedures":*

> "9.4 EPE may request and PNM may agree, if available and at PNM's sole discretion, to increase the PST schedules above the PST Base Setting on a non-firm basis. As a result, the SNM import level will change on a non-firm basis pursuant to Section 7."

Note that if a purchase of firm ATC is made on the PNM system to WestMesa, and with the agreement of PNM, the non-firm ATC posted for the WestMesa 345 to Arroyo 345 transmission segment will be re-designated as firm for the duration of the PNM purchase. Therefore, EPE's TTC and ATC for this control area interconnection path is as follows:

TTC = **lesser** of: 300 MW **or**
SNMIC (as defined by the nomogram) – 295 MW (PNM/Tri-State SNMIC) – EPE Schedule @ Springerville - EPE Schedule @ Greenlee

ATC = TTC – Committed Uses @ WestMesa 345 – FirmSetAside @ WestMesa 345

It must be reiterated that the actual transfer capacity of this interconnection point (and transfer path) is dynamic based on the use of the Springerville and Greenlee interconnection points, all of which cannot exceed 645 MW on a firm basis, and the nomograms and dynamic variables as described in Section VIII.

EPE Control Area to PNM Control Area:
OASIS Name: ARROYO345 – WM345 Segment

The natural direction of the flow of power on the Arroyo to WestMesa 345 kV line (WestMesa interconnection point is from north to south, i.e., from PNM to EPE. Therefore, the TTC of the path and the WestMesa 345 kV (defined as WM345 on the OASIS) control area interconnection point from EPE to PNM is dependent upon the maximum angle that can result in a north to south flow on the phase shifting transformer at Arroyo (angle range is $+34^0$ to -34^0). With the phase shifting transformer in a full "buck" tap position of -34^0 and under various system load conditions, the maximum power that can be reliably transferred under WECC methodology and criteria from south to north is 30 MW. This value, therefore, is the TTC for the Arroyo 345 to WestMesa 345 kV line:

TTC = 30 MW

There are no Committed Uses (CU/MI) on this path, therefore:

ATC = TTC

<u>Springerville 345 kV Control Area Interconnection Point:</u>

TEP Control Area to EPE Control Area:
OASIS Name: SPRINGER345 – MACHOSPRG345 Segment

The Springerville to Macho Springs 345 kV line (Springerville 345 kV Interconnection Point) is one of the ties EPE has with TEP. The other Interconnection Point is at Greenlee discussed below. The natural flow of power over the control area interconnection points between TEP and EPE at Springerville and Greenlee is into the EPE control area. The amount of power that can be scheduled over these two points into the EPE control area is dependent upon the SNMIC as defined above, and the schedule between PNM and EPE over the WestMesa 345 kV control area interconnection point. The amount of power, therefore, that can be scheduled on the Springerville segment alone depends upon the schedules at Greenlee and WestMesa.

The maximum firm EPE TTC into the SNMTS is 645 MW, i.e., 940 MW less the transmission rights of the other SNMTS owners: PNM (185 MW) and Tri-State (110 MW), for a total of 295 MW. For this 645 MW SNMIC, EPE can utilize three transmission paths, the interconnection path at West Mesa with PNM, this interconnection path and the interconnection path with TEP at Greenlee. Currently, EPE has 124 MW of firm rights from PNM to EPE at the WestMesa 345 kV interconnection point. Additionally, 2 MW of firm rights are purchased by WAPA through EPE's phase shifting transformer for delivery of WAPA CRSP allocated power to Holloman Air Force Base. Therefore, EPE has a total of 126 MW of rights to transfer power from PNM to EPE at WestMesa. This is reflected in the PST Base Setting detailed above. Therefore, if required, EPE can transfer the remaining SNMIC on the Springerville and Greenlee interconnection points.

This interconnection point is part of a defined transfer path, Path 47. The transfers on this line segment, when summed with the transfers on the other Path 47 components, cannot exceed 645 MW on a firm basis. Given that constraint, the capability of this line segment was determined using the methodology as delineated in the NERC Standard MOD-29.

On this interconnection point, as part of Path 47, EPE reserves 454 MW for native load and 4 MW for RGEC service (AREF, FirmSetAside on the OASIS). This reservation is to import EPE's remote generation at Palo Verde and Four Corners into the EPE load area. Also, under the 1982 "*Tucson-El Paso Power Exchange and Transmission Agreement*", EPE has assigned TEP 200 MW of firm transmission rights from Springerville to Luna to Hidalgo to Greenlee. This is treated on the OASIS as an existing contract (MI). Therefore, EPE has reserved on this segment a total of 658 MW.

It must be reiterated that the actual transfer capacity of this interconnection point (and transfer path) is dynamic based on the use of the WestMesa and Greenlee interconnection points, all of which cannot exceed 645 MW on a firm basis, and the nomograms and dynamic variables as described in Section VIII. Therefore the TTC and ATC for this interconnection point are:

TTC = **lesser** of: 658 MW **or**

645 MW (EPE SNMIC) - EPE Schedule @ WestMesa - EPE Schedule @ Greenlee
or
SNMIC (as defined by the nomogram) – 295 MW (PNM/Tri-State SNMIC) – EPE Schedule @ WestMesa - EPE Schedule @ Greenlee

ATC = TTC - Committed Uses @ Springerville 345

Note: Sum of schedules (flows) into southern New Mexico at WestMesa, Springerville and Greenlee cannot exceed 645 MW or EPE's firm SNMIC.

EPE Control Area to TEP Control Area:
OASIS Name: MACHOSPRG345 - SPRINGER345 Segment

The natural flow of power over the control area interconnection points between TEP and EPE at Springerville and Greenlee is into the EPE control area. Due to this, the rating of the path from Macho Springs to Springerville, utilizes the "prevailing flow" standard in MOD-29. This is because there is insufficient generation in southern New Mexico/El Paso to actually cause power to flow from EPE to WECC on this path. Therefore, the TTC for the Macho Springs to Springerville path is to be:

TTC = 658 MW

Since there are no Committed Uses in the east (EPE) to west (TEP) direction on this path, the ATC is:

ATC = TTC - Schedules @ Springerville 345 kV Bus.

<u>Greenlee 345 kV Control Area Interconnection Point:</u>

TEP Control Area to EPE Control Area:
OASIS Name: GREENLEE345 – HIDALGO345 Segment

The Greenlee to Hidalgo 345 kV line (Greenlee 345 kV Interconnection Point) is one of the ties EPE has with TEP. The other Interconnection Point is at Springerville discussed above. The natural flow of power over these control area interconnection points between TEP and EPE at Springerville and Greenlee is into the EPE control area. The amount of power that can be scheduled over these two points into the EPE control area is dependent upon the SNMIC as defined above, and the schedule between PNM and EPE over the WestMesa 345 kV control area interconnection point. The amount of power, therefore, that can be scheduled on the Greenlee path alone depends upon the schedules at Springerville and WestMesa.

The maximum firm EPE TTC into the SNMTS is 645 MW, i.e., 940 MW less the transmission rights of the other SNMTS owners: PNM (185 MW) and Tri-State (110 MW), for a total of 295 MW. For this 645 MW SNMIC, EPE can utilize three transmission segments, the interconnection segment at West Mesa with PNM, this interconnection segment and the interconnection segment with TEP at Springerville. Currently, EPE has 124 MW of firm rights from PNM to EPE at the WestMesa 345 kV interconnection point. Additionally, 2 MW of firm rights were purchased by WAPA through EPE's phase shifting transformer for delivery of WAPA CRSP allocated power to Holloman Air Force Base. Therefore, EPE has a total of 126 MW of rights to transfer power from PNM to EPE at WestMesa. This is reflected in the PST Base Setting detailed above. Therefore, if required, EPE can transfer the remaining SNMIC on the Springerville and Greenlee interconnection points.

Although this interconnection point is part of a defined transfer path (WECC Path 47), the transfer capability of this point alone has been determined through technical studies utilizing MOD-29 methodology. The transfer capability of this line segment is greater than the contractual limit of the segment. Therefore, EPE utilizes a TTC value relating to the contractual obligations EPE has at this interconnection point. Under the EPE-TEP Interconnection Agreement, EPE has agreed to schedule no more than 200 MW at Greenlee. Superseding this, in the 1990 "*Final Order*" of the EPE/PNM Arbitration, the EPE and TNMP maximum firm capacity at the Greenlee interconnection point is defined as 118 MW. Further, EPE's Greenlee interconnection capacity (by allocating EPE's rights on the Greenlee-Hidalgo 345 kV line) was allocated as 107 MW in the *1977 Southwest New Mexico Transmission Project Participation Agreement, Amendment #*5 (1995). A final limitation to EPE's capacity on the Greenlee-Hidalgo 345 kV line segment is the transfer capacity of Path 47 as per the dynamic nomograms defined in Section VIII and the use of the WestMesa and Greenlee interconnection points, the sum on all three of which cannot exceed 645 MW on a firm basis.

As part of the path in which EPE delivers its remote resources at Palo Verde and Four Corners to the EPE load area, EPE reserves the entire capability at this interconnection point, or 107 MW, for native load use (AREF, FirmSetAside on the OASIS). Therefore the TTC and ATC for this interconnection point (and line segment) are:

TTC = **lesser** of: 107 MW **or**
SNMIC (as defined by the nomogram) - 295 MW - EPE Schedule @ WestMesa - EPE Schedule @ Springerville
or
645 MW (EPE SNMIC) - EPE Committed Uses @ WestMesa & Springerville - EPE Schedule @ WestMesa - EPE Schedule @ Springerville

ATC = TTC - Committed Uses @ Greenlee 345

Note: Sum of schedules (flows) into southern New Mexico at WestMesa, Springerville and Greenlee cannot exceed 645 MW or EPE's firm SNMIC.

EPE Control Area to TEP Control Area:
OASIS Name: HIDALGO345 - GREENLEE345 Segment

The natural flow of power over the control area interconnection points between TEP and EPE at

Springerville and Greenlee is into the EPE control area. This is because there is insufficient generation in southern New Mexico/El Paso to actually cause power to flow from EPE to WECC on this segment. Due to this, the rating of the segment from Hidalgo to Greenlee utilizes the “prevailing flow” standard in MOD-29. The prevailing flow on this segment in the Greenlee to Hidalgo direction allows for a TTC of 543 MW. However, this segment is part of the Southwest New Mexico Transmission Project owned by EPE and PNM. Under the *1977 Southwest New Mexico Transmission Project Participation Agreement*, this line segment is contractually rated at 500 MW, of which EPE has a 40% ownership share. Therefore, the TTC for the Hidalgo to Greenlee segment is determined to be:

TTC = 200 MW.

Under the 1982 *Tucson-El Paso Power Exchange and Transmission Agreement*, EPE has assigned TEP 200 MW of firm transmission rights between Springerville to Luna to Hidalgo to Greenlee, which will be applied to this line segment. Therefore, the ATC for this segment is:

ATC = TTC – Existing Contracts (MI).

<u>Eddy HVDC Terminal Interconnection Point:</u>

SPS Control Area to EPE Control Area:
OASIS Name: EDDY 230 – EDDY 345 Segment

The High Voltage Direct Current (HVDC) Terminal interconnecting the EPE control area with the Southwestern Public Service Company (SPS) control area at Eddy is rated at 200 MW. Of this, EPE has ownership rights to two-thirds (2/3) of the capability, or 133 MW. Since the HVDC Terminal is directly controlled, i.e., the amount of power flowing over it can be precisely regulated, and this power transfer is not included in the determination of SNMIC, all of this capability can be used, even under most Lines Initially Out of Service (IOS) conditions.

The transmission utilizing the Eddy County HVDC Terminal is available on a non-firm basis only. The number and duration of outages at the Terminal prevents EPE from offering firm transmission at that location until further notice.

The TTC and ATC for this control area interconnection segment are:

TTC = 133 MW (non-firm only)

ATC = TTC - Committed Uses @ Eddy

In addition, there is one other limitation in scheduling and using the Eddy HVDC Terminal. Due to physical limitations of the converter, the minimum flow through the terminal in either direction is 35 MW. Therefore any single schedule(s) or net schedule(s) which cause the flow through the terminal to be less than 35 MW cannot be accommodated.

EPE Control Area to SPS Control Area:

OASIS Name: EDDY345 - EDDY 230 Segment

EPE's ownership rights in the Eddy HVDC Terminal are both in the SPS to EPE direction and the EPE to SPS direction. The TTC and ATC for the Eddy HVDC Terminal control area interconnection segment in that direction are estimated to be:

TTC = 133 MW (non-firm only)

ATC = TTC - Schedules @ Eddy (EPE to SPS)

T transmission utilizing the Eddy County HVDC Terminal is available on a non-firm basis only. The number and duration of outages at the Terminal prevents EPE from offering firm transmission at that location until further notice.

There is one additional limitation in scheduling and using the Eddy HVDC Terminal. Due to physical limitations of the converter, the minimum flow through the terminal in either direction is 35 MW. Therefore any single schedule(s) or net schedule(s) which cause the flow through the terminal to be less than 35 MW cannot be accommodated.

Las Cruces 115 kV Interconnection Point:

EPE Control Area to PNM Control Area:
OASIS Name: LASCRCS115 Segment

The EPE control area and the PNM control area (Tri-State sub-control area) interconnect at the Las Cruces 115 kV bus. Utilizing the NERC Standard MOD-29 methodology, the TTC for this interconnection is flow rated. Therefore, using the waiver granted of MOD-29-1a R2.1 in the NERC letter dated March 4, 2011, the capacity of this control area interconnection point is governed by the conductor size of the Las Cruces-Dona Anna 115 kV line. This conductor size is 477 MCM ACSR with a normal thermal rating of 402 amperes. This rating equates to:

402 Amps x 115 kV x $\sqrt{3}$ = 80 MVA

Assuming a unity power factor, this rating is estimated as 80 MW. Under the "*EPE/Tri-State Long Term Wheeling Agreement"* (see WestMesa 345 kV Interconnection Point), Tri-State has 50 MW of firm scheduling rights over this control area interconnection point. This use is posted on the OASIS as a Committed Use. Therefore, the TTC and ATC for the Las Cruces 115 kV control area interconnection point in the EPE control area to PNM control area direction are:

TTC = 80 MW

ATC = TTC - Committed Uses.

Because of lack of capacity requests, the maximum firm transmission capacity from EPE to PNM on this interconnection point has not been rigorously studied. Therefore, the amount of

TTC given for this interconnection point is estimated based on the size of the conductor. If a firm transmission service request is submitted to EPE for this interconnection point such that the uses of this interconnection point approach the TTC, EPE will re-evaluate the TTC for this interconnection point through studies.

PNM Control Area to EPE Control Area:
OASIS Name: LASCRCS115 Segment

Utilizing the NERC Standard MOD-29 methodology, the TTC for this interconnection is flow rated. Therefore, using the waiver granted of MOD-29-1a R2.1 in the NERC letter dated March 4, 2011, the capacity of this control area interconnection point is governed by the conductor size of the Las Cruces-Dona Anna 115 kV line. This conductor size is 477 MCM ACSR with a normal thermal rating of 402 amperes. This rating equates to:

$$402 \text{ Amps} \times 115 \text{ kV} \times \sqrt{3} = 80 \text{ MVA}$$

Assuming a unity power factor, this rating can be stated as 80 MW. Currently, there are no firm schedules over this interconnection point in this direction. However, powerflow studies have shown that approximately 40 MW flows into this interconnection for EPE native load service. Therefore, this amount of capacity has been reserves as a Committed Use for native load. Therefore, the TTC and ATC for the Las Cruces 115 kV control area interconnection point in the PNM control area to EPE control area direction are estimated to be:

TTC = 80 MW

ATC = TTC - Committed Use

Because of lack of capacity requests, the maximum firm transmission capacity from PNM to EPE on this interconnection point has not been rigorously studied. Therefore, the amount of TTC given for this interconnection point is estimated based on the size of the conductor. If a firm transmission service request is submitted to EPE for this interconnection point such that the uses of this interconnection point approach the TTC, EPE will re-evaluate the TTC for this interconnection point through studies.

Luna 345 kV:

The EPE control area is interconnected to the PNM 115 kV control area at the Luna 345 kV bus, with the control area metering at Luna 345 kV. EPE has no transmission rights to deliver to the PNM control area (115 kV) over this interconnection. Therefore, the TTC and ATC for the Luna control area interconnection in either direction are:

TTC = 0 MW

ATC = 0 MW

LunaLEF:

A generating plant (Luna Energy Facility (LEF)) has been constructed with its interconnection to the Luna 345 kV bus. Therefore, a Point of Receipt for transmission service from this plant for EPE will be Luna 345 kV. For scheduling and e-tag purposes for power deliveries from the LEF, EPE has created a LUNALEF-LUNA345 line segment and an AREF of 190 MW on the OASIS.

Hidalgo 345 kV:

The EPE control area is interconnected to the PNM control area at the Hidalgo 345 kV bus, with the control area metering at Hidalgo 345 kV. EPE has no transmission rights to deliver power from the EPE control area (345 kV) to the PNM control area (115 kV) over this interconnection. Therefore, the TTC and ATC for Hidalgo control area interconnection in either direction are:

TTC = 0 MW

ATC = 0 MW

Amrad 115 kV Bus Interconnection Segment:

The EPE control area interconnects to the PNM control area at the Amrad 115 kV bus through the PNM owned Amrad-Alamogordo 115 kV transmission line. EPE has no scheduling rights, either from the EPE control area to the PNM control area or from the PNM control area to the EPE control area, over this control area interconnection point. Therefore, the TTC and ATC in either direction for this interconnection are:

TTC = 0 MW

ATC = 0 MW

Afton 345 kV:

A generating plant has been constructed and interconnected to the EPE Afton 345 kV bus. The Point of Receipt for transmission service from this plant will, therefore, be Afton 345. From that point, the transmission service will utilize EPE's posted transmission paths.

Macho Springs 345 kV:

A generating plant (wind) has been constructed and interconnected to the EPE Macho Springs 345 kV bus. The Point of Receipt for transmission service from this plant will, therefore, be Macho Springs 345. From that point, the transmission service will utilize EPE's posted transmission paths.

Comisión Federal de Electricidád (CFE) Interconnection:

The EPE control area interconnects with the electrical grid of the national Mexican utility Comisión Federal de Electricidád (CFE) through two 115 kV transmission lines from EPE's Diablo Substation to CFE's Insurgentes Substation and EPE's Ascarate Substation to CFE's Riverena Substation. The TTC for this interconnection is limited by the Presidential Permits

EPE has obtained from the Department of Energy (DOE) for these facilities (DOE Docket No. PP-48-3 and DOE Docket No. PP-92). Additionally, EPE has obtained an Export Authorization from the DOE (DOE Docket No. EA-48-I) that limits exports by EPE to CFE over these facilities to 200 MW. Additionally, for power resources outside the EPE underlying system, the transfers to the CFE interconnection is limited by the amount of power that can be transferred over EPE's 345/115 kV interface. This interface is called "EPE Shell" and is limited to what transfers are between EPE's 345 kV busses and the EPE.RESLOAD Point of Delivery.

Unlike the other interconnections with outside control areas, the interconnection EPE has with CFE must be operated under special conditions. The CFE national grid and the WECC, including EPE, are operated asynchronously. Therefore, in order to serve a load on the CFE system, that load must be "islanded" to the EPE system. This means that the load must be physically disconnected from the CFE national grid and physically connected to the EPE grid through the Diablo to Insurgentes 115 kV line and Ascarate to Riverena 115 kV line. To date, the island served by EPE through this interconnection contains no generation resources, therefore, the load served through the interconnection varies as the CFE load varies.

Since the transmission lines connecting CFE with EPE, the Diablo to Insurgentes 115 kV line and the Ascarate to Riverena 115 kV line, must be closed in order for this interconnection to operate, the TTC and ATC for this interconnection will depend upon their status. With no contracts to serve CFE, the status of these lines will be open, with a resulting TTC and ATC of 0 MW. Therefore, the TTC and ATC for this interconnection also depends upon the contractual arrangements between CFE and other parties in WECC, EPE included.

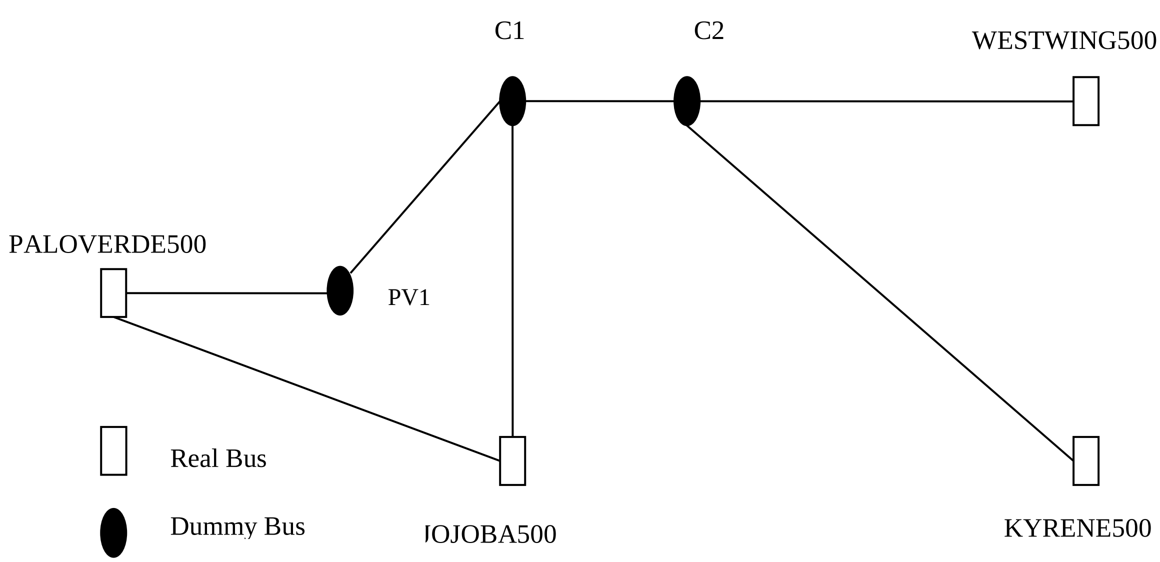
The TTC and ATC values which are posted on the OASIS are values for the EPE transmission system with all transmission lines in-service. However, during contingencies or during times when transmission lines are out-of-service for maintenance, these values will change. The amount of curtailments for EPE's major transmission system outages are given on EPE's OASIS. To obtain the times and amounts of curtailments of TTC and ATC for EPE's transmission paths, look in the "Transmission Information" section of EPE's Internet Home Page at the address: http://www.epelectric.com and on the OASIS at the Outage Manager or the Notices page.

XII. TTC/ATC FOR EPE EXTERNAL TRANSMISSION SEGMENTS

EPE owns several transmission lines in the Arizona transmission system in connection with its Palo Verde ownership. These transmission lines are designated as the Palo Verde East Path and are operated by Salt River Project (SRP). The technical studies performed to evaluate the Palo Verde East system rating, i.e., TTC, are performed by SRP with agreement of the other Palo Verde East system owners, PNM and Arizona Public Service Company (APS). EPE posts this system on the OASIS with the transmission capacities determined through these studies.

Palo Verde East Transmission System:

The Palo Verde East Path is composed of two line segments, the Palo Verde to Westwing line segment, the Jojoba to Kyrene line segment. The Palo Verde to Jojoba line segment is not part of the Palo Verde East Path and is rated separately. The TTC for the Palo Verde East system is developed as a combination of these segments concatenated into two sub-paths: the Palo Verde to Westwing path and the Jojoba to Kyrene path (also considering the Palo Verde-Jojoba sub-path). The TTC for EPE's portion of the total PV East system is 1034 MW and is bi-directional as measured at Westwing/Kyrene and Palo Verde/Jojoba. In other words, the maximum schedule going into and out of Palo Verde/Jojoba is 1034 MW and the maximum schedule going into and out of a combination of Westwing and Kyrene is 1034 MW. The Palo Verde to Jojoba line segment is flow rated at 555 MW. To post these lines, both segments and paths, on the OASIS such that the TTC (and ATC) for the Path can be shared by the two sub-paths, a special technique is used. This technique involves inserting a "dummy bus", PV1, between the Palo Verde Bus (PALOVERDE500) and both Westwing (WESTWING500) and Jojoba (JOJOBA500) buses, as shown in the one-line below. In addition, to account for transactions on the Jojoba-Kyrene line segment that translate to the Palo Verde-Westwing segment, and vice versa, an additional set of "dummy" busses, C1 and C2, is inserted between the PV1 bus and the WESTWING500 bus and the JOJOBA500 bus and the KYRENE500 bus, as shown below:



The TTC for each segment is the TTC for the PV East system, 1034 MW. The TTC for the Palo Verde to Jojoba segment is 555 MW. To obtain the interaction of one segment on another segment, the common buses are used to translate a transaction on the PALOVERDE500 to WESTWING500 path to the JOJOBA500 to KYRENE500 path.

The purpose of this methodology is to increase the flexibility of posting the transmission capacities of the Palo Verde East system such that this flexibility is usable by the market. This method does not increase or decrease the Palo Verde East system TTC or ATC, it merely redistributes it based on the market needs. *It is noted, however, that using this modeling, the ATC on any one component path can be directly affected by the transactions that take place on any of the other component paths. For example, assume that Palo Verde-Westwing path and Jojoba-Kyrene path each show an ATC of 100 MW. An "Accepted" transmission reservation of 100 MW on the Palo Verde-Westwing path will utilize the ATC on both the Palo Verde-Westwing path and the Jojoba-Kyrene path, thus rendering a 0 MW ATC for both paths.*

Based on the common segments in the paths, the following table is developed showing the impacts between the segments and paths:

Path with Transaction	Impacted Segments	Common Segment
PV-WW	JJ-KY	C1-C2
	PV-KY	C1-C2
PV-JJ	PV-KY	PV-JJ
PV-KY	PV-WW	C1-C2
	PV-JJ	PV-JJ
JJ-KY	PV-WW	C1-C2

Note: PV = PALOVERDE500, WW = WESTWING500, JJ = JOJOBA500, KY=KYRENE500

For the paths that interact, there is a common segment (PV-PV1 or C1-C2) that will map the transaction from the impacting path to the impacted path. For example, a transaction on the PALOVERDE500 to WESTWING500 path will impact the ATC on the JOJOBA500 to KYRENE500 paths. For this transaction, the common segment C1-C2 will translate the decrement in ATC to the JOJOBA500 to KYRENE500 segment (path). Since, in the determination of ATC on a multi-segmented path, the segments are treated in series, the segment with the lowest ATC governs the ATC of the entire path. With this methodology, there is no "double counting" of transaction impacts on series segments.

Going in the other direction, on the PV East Path, the table is developed as:

Path with Transaction	Impacted Segments	Common Segment
WW-PV	KY-JJ	C2-C1
	KY-PV	C2-C1
KY-PV	WW-PV	C2-C1
	KY-JJ	C2-C1
KY-JJ	WW-PV	C2-C1

For most of the paths in this direction, there are also common segments (PV1-PV or C2-C1) that will map the transaction from the impacting segment to the impacted segment. However, on two path interactions, the WW-PV to the KY-JJ and the KY-JJ to the WW-PV, there needs to be an the additional common segment, C2-C1. With this common segment, the transactions on the WW-PV path will be mapped onto the KY-JJ path by mapping the transactions on the C2-C1 segment. Likewise, transactions on the KY-JJ path will impact the WW-PV path, so that impact will be mapped again on the C2-C1 segment. However, transactions on the KY-JJ path will not map to the JJ-PV path, and vice versa. Using these common segments, the transfer capacity of the Palo Verde East system in the direction from Palo Verde can be utilized by each "sub-path" in the path.

Palo Verde to Westwing 500 kV Transmission Segment:
OASIS Name: PALOVERDE500-WESTWING500 Segment

EPE owns an 18.7% share of the three 500 kV transmission lines going east from Palo Verde (called Palo Verde East system (PV East)) for delivery of its owned Palo Verde generation entitlement. The TTC for these transmission lines is limited on an operational basis by an outage of one of the lines to Westwing and the remaining Westwing line reaching its emergency rating of 3000 amperes. System studies (June 2007) show that the transfer capacity of PV East is 7510 MW (which includes the Palo Verde-Rudd 500 kV line and interconnections at Jojoba), of which EPE has an ownership interest of 1034 MW.

To import its Palo Verde generation entitlement, EPE must reserve its plant ownership capacity on all of the EPE-owned Palo Verde 500 kV lines. Powerflow analyses on the original PV East system showed that on average the Palo Verde-Westwing 500 kV lines carried approximately 68% of EPE's Palo Verde generation entitlement. However, at the time of this PV East uprating (June 2007), EPE has reserved sufficient capacity for native load requirements. Therefore, EPE has retained for native load uses 439 MW (AREF SetAside) on this line segment and applied all of the June 2007 path increase to ATC.

As a result, the TTC and ATC of EPE's share of the Palo Verde-Westwing 500 kV lines, with a Point of Receipt at Palo Verde 500 kV bus and a Point of Delivery at Westwing 500 kV bus are:

TTC= 1034 MW (TTC for PV East system)

ATC= TTC – 439 MW (AREF SetAside) – Common Segment transactions

Westwing to Palo Verde 500 kV Transmission Segment:
OASIS Name: WESTWING500 - PALOVERDE500

The transmission capability of the ANPP Transmission System from east to west has been agreed to by the owners of the system to be equal to the rating of Palo Verde East of 7510 MW, or 1034 MW for EPE. Additionally, the rating of each segment of PV East from the east to west direction is assumed to be the same rating as in the west to east direction.

In 1982 EPE entered into the "*Tucson-El Paso Power Exchange and Transmission Agreement"* with TEP whereby EPE assigned to TEP 200 MW of its rights from Westwing to Palo Verde of the Palo Verde-Westwing 500 kV line 1 and 100 MW from Westwing to Palo Verde of Palo Verde-Westwing 500 kV Line 2. In 1983, EPE assigned TEP an additional 100 MW of transmission rights from Westwing to Palo Verde or 75 % of EPE's remaining rights on Palo Verde-Westwing Line 2, whichever is less. Therefore, EPE has a total Committed Use (AREF SetAside) on this line segment of 400 MW, resulting in the following TTC and ATC values:

TTC = 1034 MW (TTC for PV East system in east to west direction)

ATC = TTC – 400 MW (AREF SetAside) – Common Segment transactions

Palo Verde to Jojoba 500 kV Transmission Segment:
OASIS Name: PALOVERDE500 - JOJOBA500

As part of its ownership in the Palo Verde transmission system (the 500 kV transmission lines going east from Palo Verde), EPE has an 18.7% ownership in the Palo Verde to Kyrene line. In 2002 a new substation was constructed in the Palo Verde to Kyrene 500 kV line named Jojoba 500 kV Substation. This Substation is meant to interconnect with the generation that was constructed near the Jojoba Substation and with the underlying 230 kV system in that area. As a result of this substation, the original Palo Verde to Kyrene path is divided into the Palo Verde to Jojoba to Kyrene line segments.

Studies performed by SRP have determined that the Palo Verde to Jojoba 500 kV line should not be part of the Palo Verde East System. This transmission path cannot reach a reliability rating and is flow rated at 555 MW (determined in study performed in 2014).

TTC = 555 MW (not part of PV East system)

To import its Palo Verde generation entitlement, EPE must reserve its plant ownership capacity on all of the EPE-owned Palo Verde 500 kV lines. Powerflow analyses on the original PV East system showed that on average the Palo Verde-Kyrene 500 kV line carried approximately 32 % of EPE's Palo Verde generation entitlement. Therefore, EPE has retained for native load uses 203 MW (AREF SetAside) on this line segment.

As a result, the TTC and ATC of EPE's share of the Palo Verde-Jojoba 500 kV line, with a Point of Receipt at Palo Verde 500 kV bus and a Point of Delivery at Jojoba 500 kV bus are:

TTC = 555 MW (TTC for PV East system)

ATC = TTC – 203 MW (AREF SetAside) – Common Segment transactions

Jojoba to Kyrene 500 kV Transmission Segment:
OASIS Name: JOJOBA500 - KYRENE500

As part of its ownership in the Palo Verde East Path (the 500 kV transmission lines going east from Palo Verde), EPE has an 18.7% ownership in the Palo Verde to Kyrene line. In 2002 a new substation was constructed in the Palo Verde to Kyrene 500 kV line named Jojoba 500 kV Substation. This Substation is meant to interconnect with the generation that was constructed near the Jojoba Substation and the underlying 230 kV system in that area. As a result of this substation, the original Palo Verde to Kyrene path is divided into the Palo Verde to Jojoba to Kyrene path.

As stated above, SRP performs the studies that determine the rating of the Palo Verde East system. These studies have shown that the TTC for the Palo Verde East system is limited on an operational basis by an outage of one of the Palo Verde to Westwing lines and the remaining Westwing line reaching its emergency rating of 3000 amperes. These system studies show that the transfer capacity of the Palo Verde East Path is a total of 7510 MW, of which EPE’s interest is 1034 MW.

To import its Palo Verde generation entitlement, EPE must reserve its plant ownership capacity on all of the EPE-owned Palo Verde 500 kV lines. Powerflow analyses on the original PV East system showed that on average the Palo Verde-Kyrene 500 kV line carried approximately 32 % of EPE’s Palo Verde generation entitlement. However, at the time of this PV East system uprating (June 2007), EPE has reserved sufficient capacity for native load requirements. Therefore, EPE has retained for native load uses 203 MW (AREF SetAside) on this line segment and applied all of the June 2007 path increase to ATC.

As a result, the TTC and ATC of EPE’s share of the Jojoba-Kyrene 500 kV line, with a Point of Receipt at Jojoba 500 kV bus and a Point of Delivery at Kyrene 500 kV bus are:

TTC = 1034 MW (TTC for PV East system)

ATC = TTC – 203 MW (AREF SetAside) – Common Segment transactions

Kyrene to Jojoba 500 kV Transmission Segment:
OASIS Name: KYRENE500 - JOJOBA500 Segment

As part of its ownership in the Palo Verde East system (the 500 kV transmission lines going east from Palo Verde), EPE has an 18.7% bi-directional ownership in the Palo Verde to Kyrene line. In 2002, a new substation was constructed in the Palo Verde to Kyrene 500 kV line named Jojoba 500 kV Substation. This Substation is meant to interconnect with the generation that was constructed near the Jojoba Substation and with the underlying 230 kV system in that area. As a result of this substation, the original Kyrene to Palo Verde path is divided into the Kyrene to Jojoba to Palo Verde path.

The transmission capability of the ANPP Valley Transmission System from east to west has been agreed to by the owners of the system to be equal to the PV East system (west to east) described above, or 7510 MW. Therefore, the TTC for this transmission segment is defined as 1034 MW. At the present time, there is no Committed Uses on this segment, therefore, the TTC and ATC for the Kyrene to Jojoba 500 kV transmission segment is:

TTC = 1034 MW (TTC for PV East system in east to west direction)

ATC = TTC – Common Segment transactions

Jojoba to Palo Verde 500 kV Transmission Segment:
OASIS Name: JOJOBA500 - PALOVERDE500

As part of its ownership in the Palo Verde system (the 500 kV transmission lines going east from Palo Verde), EPE has an 18.7% bi-directional ownership in the Palo Verde to Kyrene line. In 2002, a new substation was constructed in the Palo Verde to Kyrene 500 kV line named Jojoba 500 kV Substation. This Substation is meant to interconnect with the generation that was constructed near the Jojoba Substation and the underlying 230 kV system in that area. As a result of this substation, the original Kyrene to Palo Verde path is divided into the Kyrene to Jojoba to Palo Verde path.

The transmission capability of the ANPP Transmission System from east to west has been agreed to by the owners of the system to be equal to the capacity in the west to east direction. Studies performed by SRP have determined that the Palo Verde to Jojoba 500 kV line should not be part of the Palo Verde East System. This transmission path cannot reach a reliability rating and is flow rated at 555 MW (determined in study performed in 2014). Currently there is no Committed Uses on this path, so the TTC and ATC for the Jojoba to Palo Verde 500 kV transmission segment is:

TTC = 555 MW (TTC of PV East system in east to west direction)

ATC = TTC – Common Segment transactions

XIII. TTC/ATC FOR SEGMENTS INTERNAL TO EPE CONTROL AREA

The above determinations of TTC and ACT are limited to the transmission segments which connect the EPE control area to neighboring control areas, i.e., control area boundaries, and the transmission segments external to the EPE control area on which EPE has transmission ownership. The transmission paths internal to the EPE control area, made up of transmission segments in which EPE has ownership, are expected to be of some interest to EPE's and third parties wholesale merchant functions. Therefore, the TTC and ATC for these segments have been determined, again using the methodology as delineated in NERC Standard MOD-29. Depending upon the transaction, the TTC and ATC for transmission paths using these segments will be determined by either the TTC and ATC of the segment at the control area boundary, if one point, either the Point of Receipt (POR) and Point of Delivery (POD), is specified at that point, or defined by the TTC determined under MOD-29 methodology of the internal transmission segment along the specified path.

The transmission paths internal to the EPE control area are made up of transmission segments. The ATC for these paths will be dependent upon the transmission transactions over transmission paths which utilize common segments. For example, a transaction over the transmission path Eddy 230 to Luna 345 will utilize some of the same transmission segments as a transaction utilizing the transmission path Newman 345 to Greenlee 345:

Transmission segments for the Eddy 230 - Luna 345 kV transmission path:

Eddy 230 - Eddy 345
Eddy 345 - Amrad 345
Amrad 345 - Caliente 345
Caliente 345 - Newman 345
Newman 345 – Afton 345
Afton 345 - Luna 345

Transmission segments for the Newman 345 - Greenlee 345 transmission path:

Newman 345 – Afton 345
Afton 345 - Luna 345
Luna 345 - Hidalgo 345
Hidalgo 345 - Greenlee 345

In this example, the common transmission segments are the Newman-Afton 345 segment and Afton–Luna 345 segment. If the transaction using the Eddy 230 - Luna 345 transmission path utilizes the full ATC for those segments, the transmission transaction utilizing the Newman 345-Greenlee 345 cannot occur. Therefore, when determining the availability of ATC on any one path, the ATC on each transmission segment will be the determining factor.

Below are the TTC and ATC for the transmission segments internal to the EPE control area. Again, please note that the TTC and ATC values determined for these transmission segments are determined as per the procedures and methodologies as delineated in NERC Standard MOD-29.

The TTC and ATC values which are posted on the OASIS are values for the EPE transmission system with all transmission lines in-service. However, during contingencies or during times when transmission lines are out-of-service for maintenance, these values will change. The amount of curtailments for EPE's major transmission system outages are given on EPE's OASIS. To obtain the times and amounts of curtailments of TTC and ATC for EPE's transmission paths, look on the OASIS.

Hidalgo 345 to Luna 345 Transmission Segment:
OASIS Name: HIDALGO345 - LUNA345

As a signatory and owner in the 1977 "*Southwest New Mexico Transmission Project (SWNMT) Agreement"*, EPE has a 57.2% ownership interest in this transmission segment. Under that Agreement, the transmission capability of that transmission segment was deemed to be 500 MW, with EPE having 286 MW ownership interest. The studies using the NERC Standard MOD-29 methodology determined that the TTC for this line segment is greater than the contractual limit. Therefore, the TTC and ATC is determined using the contractual limit. The TTC for this transmission segment is limited by EPE's ownership in the line:

TTC = 286 MW

The ATC for this transmission segment is dependent upon the schedules at both Greenlee and Hidalgo 345. EPE reserves, as part of the transmission required to import its remote resources for native load uses (SetASide on the OASIS), a maximum of 107 MW at the Greenlee Interconnection Point (Greenlee 345 - Hidalgo 345) with TEP. As this line segment is in series with the Greenlee-Hidalgo line, this reservation must also be made on this transmission segment. Additionally, EPE can purchase for Native Load use generation at Hidalgo. Therefore, EPE has a Committed Use (MI) for native load of an additional 179 MW for this line segment. Therefore, the ATC for this transmission segment is:

ATC = TTC – 107 MW (SetASide) – 179 MW (MI)

On either a forced or scheduled outage of this transmission segment, since EPE has no ownership in a parallel transmission path, the TTC and ATC of any point to point transmission path using this transmission segment will go to zero.

Luna 345 to Hidalgo 345 Transmission Segment:
OASIS Name: LUNA345 - HIDALGO 345

As a signatory and owner in the 1977 "*Southwest New Mexico Transmission (SWNMT) Project Agreement"*, EPE has a 57.2% ownership interest in this transmission segment. Under that Agreement, the transmission capability of that transmission segment was deemed to be 500 MW, with EPE having 286 MW ownership interest. The studies using the NERC Standard MOD-29 methodology determined that the TTC for this line segment is flow limited and thus uses the "prevailing flow" methodology in MOD-29. This gives a rating greater than the contractual limit and thus the contractual limit is used to define the TTC. The TTC for this transmission segment is limited by EPE's ownership in the line:

TTC = 286 MW

Under the 1982 "*Tucson-El Paso Power Exchange and Transmission Agreement"*, EPE assigned TEP 200 MW of firm transmission rights in the Springerville to Luna to Hidalgo to Greenlee 345 kV transmission path. As a result, this amount (200 MW) has been reserved as a Committed Use (MI) on this line segment.

In addition, beginning December 18, 1996, EPE and Plains Electric Generation and Transmission Cooperative, Inc. (now Tri-State Generation and Transmission Association) agreed to establish an additional delivery point at Hidalgo 345 under the 1994 *Long Term Firm Transmission Service Agreement between EPE and Plains*. Since EPE receives the power under this Agreement at either WestMesa or Springerville, the path that power would take on the EPE system to Hidalgo 345 would utilize this transmission segment. Therefore, an additional 50 MW of transmission capacity is reserved as a Committed Use (MI) on this line segment for that Agreement.

Therefore, the ATC of this transmission segment can be sold partially only as firm transmission by EPE, with the remainder as non-firm:

ATC = TTC – Committed Use (MI)

On either a forced or scheduled outage of this transmission segment, since EPE has no ownership in a parallel transmission path, the TTC and ATC of any point to point transmission path using this transmission segment will go to zero.

Macho Springs 345 to Luna 345 Transmission Segment:
OASIS Name: MACHOSPRG345 - LUNA345

In 2011, a wind farm (51 MW) was energized approximately 30 miles north of Luna substation. To interconnect this generating plant, EPE constructed the Macho Springs 345 kV substation. This substation split the existing Luna to Springerville 345 kV line.

Although this line segment is not part of Path 47, it is in series with the Springerville-Macho Springs 345 kV segment of that Path. As a result, EPE reserves 454 MW for native load and 4 MW for RGEC service (AREF, FirmSetAside on the OASIS). This reservation is to import EPE's remote generation at Palo Verde and Four Corners into the EPE load area. Also, under the 1982 "*Tucson-El Paso Power Exchange and Transmission Agreement"*, EPE has assigned TEP 200 MW of firm transmission rights from Springerville to Luna to Hidalgo to Greenlee. This is treated on the OASIS as an existing contract (MI). Therefore, EPE has reserved on this segment a total of 658 MW.

The TTC for this line segment is determined using MOD-29 methodology as is:

TTC= 658 MW

Therefore, the ATC of this transmission segment can be sold partially only as firm transmission by EPE, with the remainder as non-firm:

ATC = TTC – Committed Use (MI)

On either a forced or scheduled outage of this transmission segment, since EPE has no ownership in a parallel transmission path, the TTC and ATC of any point to point transmission path using this transmission segment will go to zero.

Luna 345 to Macho Springs 345 Transmission Segment:
OASIS Name: LUNA345 - MACHOSPRG345

In 2011, a wind farm (51 MW) was energized approximately 30 miles north of Luna substation. To interconnect this generating plant, EPE constructed the Macho Springs 345 kV substation. This substation split the existing Luna to Springerville 345 kV line. The natural flow in this line is from Macho Springs to Luna. Due to this, the rating of the path from Luna to Macho Springs utilizes the "prevailing flow" standard in MOD-29. This is because there is insufficient generation in southern New Mexico/El Paso to actually cause power to flow from EPE to WECC on this path. Therefore, the TTC for the Luna to Macho Springs path is to be:

TTC = 658 MW

Since there are no Committed Uses in the east (EPE) to west (TEP) direction on this path, the ATC is:

ATC = TTC

Luna 345 to Diablo 345 Transmission Segment:
OASIS Name: LUNA345 - DIABLO345

The 345 kV transmission line from Luna to Diablo is wholly-owned by EPE and terminates in three 345/115 kV auto-transformers at the Diablo Substation. A third auto-transformer was installed in 2008 that increased the transfer capacity into the EPE load area over all of EPE's auto-transformers. The TTC for this line segment is determined through NERC Standard MOD-29 studies. The TTC is determined to be:

TTC = 395 MW

The Committed Uses for this line segment is dependent upon the Committed Uses at Springerville, Hidalgo, Luna and Greenlee. EPE reserves, as part of the transmission required to import its remote resources, 107 MW on the Greenlee interconnection (Greenlee 345 - Hidalgo 345) and 457 MW on the Springerville interconnection (Springer 345 - Luna 345) with TEP. Additionally, EPE purchases power for native load from generation near Hidalgo and has purchases and Network Resources at Luna. However, due to a parallel path, the Luna-Afton-Newman 345 kV line, this power is divided based on system impedances on these two paths. During contingencies or line maintenance, however, all of the power will flow on one (Luna-

Diablo) or the other (Luna-Afton-Newman) segments. To account for this power flow, 395 MW is reserved as a Committed Use. Therefore, the ATC is:

ATC = TTC – 395 MW Committed Use (CU)

On either a forced or scheduled outage of this transmission segment, the TTC and resulting ATC of the southern New Mexico import paths (WestMesa, Springerville and Greenlee) are decreased on a pro-rata basis according to the curtailments given in Section XV. If one of the auto-transformers, however, is lost, either due to forced outage or maintenance, the TTC of this transmission segment is reduced, with a resulting pro-rata reduction in ATC. It should be noted that this transmission segment is only connected to EPE native load therefore no other party could utilize it.

Diablo 345 to Luna 345 Transmission Segment:
OASIS Name: DIABLO345 - LUNA345

This 345 kV transmission segment is wholly-owned by EPE and originates at three 345/115 kV auto-transformers located at the Diablo Substation (the third auto-transformer was installed in 2008). Therefore, all of the flow on this line segment must be transferred over those transformers. The capacity of this segment is based on MOD-29 studies that utilize the "prevailing flow" method, or the capacity in the opposite direction (Luna to Diablo), 395 MW. The TTC is:

TTC = 395 MW

There is no Committed Uses on this transmission segment, therefore the ATC is:

ATC = TTC

On either a forced or scheduled outage of this transmission segment, the TTC and resulting ATC are decreased on a pro-rata basis according to the curtailments given in Section XV.

Luna 345 to Afton 345 Transmission Segment:
OASIS Name: LUNA345 - AFTON345

This transmission segment is wholly-owned by EPE and is constructed of double-bundled 954 MCM ACSR. The TTC listed for this internal line segment has been calculated by powerflow studies using the MOD-29 methodology. The TTC of this line segment is:

TTC = 523 MW

The Committed Uses for this line segment is dependent upon the Committed Uses at Springerville, Hidalgo, Luna and Greenlee as those Committed Uses will flow on this line segment. EPE reserves, as part of the transmission required to import its remote resources for native load uses, 107 MW on the Greenlee interconnection (Greenlee 345 - Hidalgo 345) and

457 MW on the Springerville interconnection (Springer 345 - Luna 345) with TEP. Additionally, EPE has designated as a Network Resource 125 MW at Luna whose ATC is reserved through a SetASide in this line segment. Finally, EPE can purchase resources at Hidalgo for native load use. As a result of these uses and since this line is in parallel with the Luna-Diablo line segment, EPE has reserved 490 MW as Committed Uses on this line segment.

The ATC of this segment is:

ATC = TTC – AREF SetAside - Committed Uses (CU)

On either a forced or scheduled outage of this transmission segment, the TTC and resulting ATC are decreased on a pro-rata basis according to the curtailments given in Section XV.

Afton 345 to Luna 345 Transmission Segment:
OASIS Name: Afton 345 - Luna 345

This transmission segment is wholly-owned by EPE and is constructed using double-bundled 954 MCM ACSR. The TTC listed for this internal line segment is based on the MOD-29 standards and uses the "prevailing flow" rating. The TTC of this line segment is:

TTC = 523 MW

Beginning December 18, 1996, EPE and Plains Electric Generation and Transmission Cooperative, Inc. (now Tri-State Generation and Transmission Association) agreed to establish an additional delivery point at Hidalgo 345 under the 1994 *Long Term Firm Transmission Service Agreement between EPE and Plains*. Since EPE receives the power under this Agreement at either WestMesa or Springerville, the path that power would take on the EPE system to Hidalgo 345 would utilize this transmission segment. Therefore, 50 MW of transmission capacity is reserved as a Committed Use (MI) on this line segment for that Agreement.

The ATC of this segment is:

ATC = TTC – Committed Uses (MI)

On either a forced or scheduled outage of this transmission segment, the TTC and resulting ATC are not affected in this direction since there are parallel transmission paths.

Afton 345 to Newman 345 Transmission Segment:
OASIS Name: AFTON345 - NEWMAN345

This transmission segment is wholly-owned by EPE and is constructed using double-bundled 954 MCM ACSR. The TTC listed for this internal line segment has been calculated by powerflow studies using the MOD-29 methodology. The TTC of this line segment is:

TTC = 585 MW

The Committed Uses for this line segment are dependent on the Luna to Afton line segment, the flow on this line segment and the ability for native load purchases at Afton. EPE has reserved the amount of 376 MW for Committed Use on this line segment. Additionally, a SetAside on 125 MW is made on this line segment. Additionally, PNM has a long term purchase of 30 MW (plus 111 MW generation dependent) on this segment under the 2003 EPE/PNM Settlement Agreement.

It should also be noted that like other transmission segments in the EPE system, this segment can only be utilized to deliver power to EPE native load or, as with the PNM purchase, deliver power to WestMesa through the PST. The capacity on the PST is fully utilized by the PNM purchase. The ATC of this segment is:

ATC = TTC – SetASide - Committed Uses

On either a forced or scheduled outage of this transmission segment, the TTC and resulting ATC are decreased on a pro-rata basis according to the curtailments given in Section XV.

Newman 345 to Afton 345 Transmission Segment:
OASIS Name: NEWMAN345 - AFTON345

This transmission segment is wholly-owned by EPE and is constructed using double-bundled 954 MCM ACSR. The TTC listed for this internal line segment has been determined using the "prevailing flow" methodology of NERC Standard MOD-29. The TTC of this line segment is:

TTC = 585 MW

Beginning December 18, 1996, EPE and Plains Electric Generation and Transmission Cooperative, Inc. (now Tri-State Generation and Transmission Association) agreed to establish an additional delivery point at Hidalgo 345 under the 1994 *Long Term Firm Transmission Service Agreement between EPE and Plains*. Since EPE receives the power under this Agreement at either WestMesa or Springerville, the path that power would take on the EPE system to Hidalgo 345 would utilize this transmission segment. Therefore, 50 MW of transmission capacity is reserved as a Committed Use (MI) on this line segment for that Agreement.

The ATC of this segment is:

ATC = TTC – Committed Uses (MI)

On either a forced or scheduled outage of this transmission segment, the TTC and resulting ATC are not affected in this direction since there are parallel transmission paths.

Caliente 345 to Picante 345 Transmission Segment:
OASIS Name: CALIENTE345 – PICANTE345

This internal transmission segment is wholly-owned by EPE and is constructed using double-bundled 954 MCM ACSR. The TTC listed for this internal line segment has been determined using the "prevailing flow" methodology of NERC Standard MOD-29. The TTC of this line segment is:

TTC = 428 MW

This line segment is used only for native load service, therefore a Committed Use of 300 MW, based on the flow on the line, has been reserved.

ATC = TTC – Committed Use (MI)

On either a forced or scheduled outage of this transmission segment, the TTC and resulting ATC are not affected in this direction since there are parallel transmission paths through the EPE underlying system.

Picante 345 to Caliente 345 Transmission Segment:
OASIS Name: PICANTE345 - CALIENTE345

This internal transmission segment is wholly-owned by EPE and is constructed using double-bundled 954 MCM ACSR. The TTC listed for this internal line segment has been calculated by powerflow studies using the MOD-29 methodology. The TTC of this line segment is:

TTC = 428 MW

This line segment is used only for native load service; therefore a Committed Use of 200 MW has been reserved on the line. Therefore, the ATC for this line segment is:

ATC = TTC – Committed Use (MI)

On either a forced or scheduled outage of this transmission segment, the TTC and resulting ATC are not affected in this direction since there are parallel transmission paths through the EPE underlying system.

Picante 345 to Newman 345 Transmission Segment:
OASIS Name: PICANTE345 – NEWMAN345

This internal transmission segment is wholly-owned by EPE and is constructed using double-bundled 954 MCM ACSR. The TTC listed for this internal line segment has been determined using the "prevailing flow" methodology of NERC Standard MOD-29. The TTC of this line segment is:

TTC = 441 MW

This line segment is used only for native load service; therefore a Committed Use of 300 MW, based on the flow on the line, has been reserved.

ATC = TTC – Committed Use (MI)

On either a forced or scheduled outage of this transmission segment, the TTC and resulting ATC are not affected in this direction since there are parallel transmission paths through the EPE underlying system.

Newman 345 to Picante 345 Transmission Segment:
OASIS Name: PICANTE345 - CALIENTE345

This internal transmission segment is wholly-owned by EPE and is constructed using double-bundled 954 MCM ACSR. The TTC listed for this internal line segment has been calculated by powerflow studies using the MOD-29 methodology. The TTC of this line segment is:

TTC = 441 MW

This line segment is used only for native load service; therefore a Committed Use of 200 MW has been reserved on the line. Therefore, the ATC for this line segment is:

ATC = TTC – Committed Use (MI)

On either a forced or scheduled outage of this transmission segment, the TTC and resulting ATC are not affected in this direction since there are parallel transmission paths through the EPE underlying system.

Arroyo 345 to Newman 345 Transmission Segment:
OASIS Name: ARROYO345 - NEWMAN345

This internal transmission segment is wholly-owned by EPE and is constructed using double-bundled 954 MCM ACSR. The TTC listed for this internal line segment has been calculated by powerflow studies using the NERC standard MOD-29 methodology. The TTC of this line segment is:

TTC = 260 MW

Beginning December 18, 1996, EPE and Plains Electric Generation and Transmission Cooperative, Inc. (now Tri-State Generation and Transmission Association) agreed to establish an additional delivery point at Hidalgo 345 kV under the 1994 *Long Term Firm Transmission Service Agreement between EPE and Plains*. Since EPE receives the power under this Agreement at either WestMesa or Springerville, the path that power would take on the EPE system to Hidalgo 345 kV would utilize this transmission segment. Therefore, 50 MW of transmission capacity is reserved as a Committed Use (MI) on this line segment for that Agreement. In addition, this is the primary line segment for deliveries of power from northern

New Mexico to the El Paso load center over EPE Arroyo Phase Shifting Transformer (PST) for native load use. The amount of this capacity is the amount EPE has reserved on the PST of 124 MW. Therefore, this amount is also reserved as a Committed Use (MI) for native load on this line segment.

ATC = TTC – Committed use (MI)

On either a forced or scheduled outage of this transmission segment, the TTC and resulting ATC are not affected in this direction since there are parallel transmission paths on the EPE underlying system.

Newman 345 to Arroyo 345 Transmission Segment:
OASIS Name: NEWMAN345 - ARROYO345

This internal transmission segment is wholly-owned by EPE and is constructed using double-bundled 954 MCM ACSR. The TTC listed for this internal line segment has been determined using the "prevailing flow" methodology of NERC Standard MOD-29. The TTC of this line segment is:

TTC = 260 MW

This line segment is used for native load service for delivery of power to the two 200 MVA auto-transformers at Arroyo (second auto-transformer installed in 2008), therefore a Committed Use of 260 MW based on the Arroyo auto-transformer sizes and the MOD-29 determined rating has been reserved on this line. The ATC for this line segment is:

ATC = TTC – Committed Uses (MI)

On either a forced or scheduled outage of this transmission segment, the TTC and resulting ATC are not affected in this direction since there are parallel transmission paths on the EPE underlying system.

Amrad 345 to Caliente 345 Transmission Segment:
OASIS Name: AMRAD345 - CALIENTE345

This internal transmission segment is wholly-owned by EPE and is constructed using double-bundled 954 MCM ACSR. The line, however, is terminated in two 345/115 kV 200 MVA auto-transformers at Caliente. Upon the loss of the Caliente to Newman 345 kV line, these transformers can become the limiting factor in determining the TTC of this transmission segment. However, there is a relatively weak underlying system at Amrad that reduced the TTC further. Using these constraints, the TTC listed for this internal line segment has been calculated by powerflow studies using the NERC standard MOD-29 methodology. This TTC is:

TTC = 175 MW

EPE utilizes this line for native load service; therefore a Committed Use of 90 MW has been reserved on this line segment. The ATC of this line segment is therefore:

ATC = TTC – Committed Use (MI)

On either a forced or scheduled outage of this transmission segment, the TTC and resulting ATC are not affected in this direction since there are parallel transmission paths on the underlying EPE system.

Caliente 345 to Amrad 345 Transmission Segment:
OASIS Name: CALIENTE345 - AMRAD345

This transmission segment is wholly-owned by EPE and is constructed using double-bundled 954 MCM ACSR. However, a limiting element of this path is the auto-transformer at Amrad (200 MVA) and the Eddy County HVDC Terminal (200 MW). Additionally, there is 400 MVA of transformation at Caliente. The TTC listed for this internal line segment has been calculated by powerflow studies using the NERC standard MOD-29 methodology. The TTC of this segment is:

TTC = 257 MW

This line segment is used only for native load service, therefore a Committed Use of 257 MW, has been reserved on the line. The ATC for this line segment is:

ATC = TTC – Committed Use (MI)

On either a forced or scheduled outage of this transmission segment, the TTC and resulting ATC are not affected in this direction since there are parallel transmission paths on the EPE underlying system.

Eddy 345 to Amrad 345 Transmission Segment:
OASIS Name: EDDY345 - AMRAD345

This transmission segment is 2/3 owned by EPE, with the other line owner being PNM. The transmission line is constructed with 954 MCM ACSR, with a thermal rating of 862 MW. However, on the eastern terminal of this line is the HVDC terminal at Eddy, connecting EPE with the Southwest Power Pool. This terminal is rated at 200 MW (non-firm ATC available only), with EPE owning 2/3 and PNM owning 1/3. Therefore, EPE's ownership rights in the terminal are 133 MW. Additionally, this line is terminated on the western terminal by a 230 MVA transformer, of which EPE owns 30.84% but has a 50% capacity share, and the Amrad to Caliente 345 kV line. Upon the loss of that line, the TTC for this path is limited to the amount able to flow over the auto-transformer. Since an entity can purchase transmission on this segment and then use PNM terminal/transformer rights, the TTC for this segment will be based on the those capacities. Please note, however, that this TTC is determined from contracts and agreements. If a request is made for capacity above 200 MW on the line, or 133 MW from EPE, a study will be performed to determine the actual line segment TTC depending on the additional amount of generation on the line.

At the current time, EPE has no purchase over the Eddy County HVDC Terminal for native load use. Therefore, the TTC and ATC for this transmission segment are:

TTC = 133 MW

ATC = TTC

The TTC and ATC for this transmission segment is automatically reduced to zero upon the loss of either the Eddy HVDC terminal (transmission segment Eddy 230-Eddy 345) or the Eddy-Amrad 345 kV line. Additionally, on the loss of the Amrad to Caliente 345 kV line, the TTC and ATC for this segment is curtailed as determined in Section XV.

Amrad 345 to Eddy 345 Transmission Segment:
OASIS Name: AMRAD345 - EDDY345

This transmission segment is 2/3 owned by EPE, with the other line owner being PNM. The transmission line is constructed with 954 MCM ACSR, with a thermal rating of 862 MW. The transmission segment terminates on the eastern side with an HVDC terminal at Eddy. This terminal is rated at 200 MW (non-firm ATC available only), with EPE owning 2/3 and PNM owning 1/3. EPE’s ownership rights on this segment are based on EPE rights in the Eddy County HVDC Terminal of 133 MW. There are no Committed Uses on this line segment. The TTC and ATC for this transmission segment in this direction are:

TTC = 133 MW

ATC = TTC

The TTC and ATC for this transmission segment is automatically reduced to zero upon the loss of either the Eddy HVDC terminal (transmission segment Eddy 230-Eddy 345) or the Eddy-Amrad 345 kV line.

A possible reduction change of conductor capacity for this line segment may be due to the grounding of the line structures. With transfers above approximately 250 MW, heating can occur at the point where the grounding is connected to the structure and pole fires may result. If ATC is requested in greater amounts than approximately 250 MW, studies would be required to determine the probability of the damage.

Amrad 345 to Amrad 115 Transmission Segment:
OASIS Name: AMRAD345 - AMRAD115

This transmission segment is over the Amrad 345/115 kV auto-transformer which is 30.84% owned by EPE and 69.16% owned by PNM. This auto-transformer is rated at 230 MVA (new transformer installed 2009) and interconnects the 345 kV transmission system from the Eddy HVDC terminal and the EPE/PNM underlying 115 kV system. The capacity of the transformer, however, under the "*EPE-TNMP Third Supplemental Agreement to the Amrad to Artesia 345 kV Transmission System and DC Terminal Participation Agreement"*, dated December 7, 1987, is shared on a 50% to EPE and 50% to TNMP (now PNM) basis. This transformer is flow limited under the methodology of the NERC standard MOD-29. The maximum normal flow on this auto-transformer is approximately 122 MW which is delivered into the EPE 115 kV system for native load use. Therefore, with a transformer rating of 230 MVA, this segment is flow rated. Using the March 4, 2011 NERC waiver, EPE therefore utilizes a rating of 230 MW (assuming unity power factor) for this segment and reserves a portion for native load use as a Committed Use. The TTC and ATC for this transmission segment are:

TTC = 115 MW

ATC = TTC – Committed Use (CU)

Amrad 115 to Amrad 345 Transmission Segment:

OASIS Name: AMRAD115 - AMRAD345

This transmission segment is over the Amrad 345/115 kV auto-transformer which is 30.84% owned by EPE, with the remaining 69.16% owned by PNM. This auto-transformer is rated at 230 MVA (new transformer installed 2009) and interconnects the 345 kV transmission system from the Eddy HVDC terminal and the EPE/PNM underlying 115 kV system. The capacity of the transformer, however, under the "*EPE-TNMP Third Supplemental Agreement to the Amrad to Artesia 345 kV Transmission System and DC Terminal Participation Agreement"*, dated December 7, 1987, is shared on a 50% to EPE and 50% to TNMP (now PNM) basis. The normal flow on this auto-transformer is in the 345 kV to 115 kV direction. Therefore, TTC listed for this internal line segment has been determined using the "prevailing flow" methodology of NERC Standard MOD-29. There is no Committed Use on the line segment. The TTC and ATC for this transmission segment are:

TTC = 122 MW

ATC = TTC

Local Generation:

The transmission path specified for the general Point of Receipt of EPE Local generation is not a defined path. This point (Local Generation) refers to EPE's generating stations at Newman, Rio Grande and Copper and will be utilized to deliver power from those stations to a Point of Delivery either internal to or at the boundaries of EPE's control area. For the purposes of scheduling, the Point of Receipt for this transmission path is taken to be Newman 345 kV bus, regardless of the generator used in a transaction. This path is *not* bi-directional, in that the Point of Delivery cannot be Local Generation.

EPE Resident Load:

The general Point of Delivery for transmission service into the EPE underlying system is "EPE.RESLOAD". This point is connected to the EPE transmission system through the various 345/115 kV transformers. The 345/115 kV transformers is simulated in the transmission paths as "EPE.SYSSHEL". Technical studies using the methodology of NERC standard MOD-29 have shown that the transfer capability over the transformers or from the transmission system to EPE.RESLOAD is dependent upon the location of the power resource. Additionally, the TTC for each auto-transformer is flow limited under MOD-29 methodology. Therefore, each path over the EPE.SYSSHEL has a TTC, however, as with all paths in the EPE system, the path over one transformer impacts to TTC of the path using another transformer. Additionally, since these are the paths that all power produced other than Local Gen uses to serve EPE native load, a native load reservation is made on all of these segments. It should be noted that these line segments (auto-transformers) only serve EPE Native Load and there is no third party load that can be served by these segments. In addition, due to a Network Resource designation at Luna, an additional 125 MW is reserved for native load. The TTC's and ATC's for each auto-transformer is:

345 kV Bus	Resource Location	Intermediate Point	TTC	Committed Use (NL Res.)	ATC
ARROYO	WM	↓	254 MW	254 MW	0 MW
NEWMAN	Luna/Other	↓	95 MW	95 MW	0 MW
DIABLO	Luna/Other	EPE.SYSSHEL	398 MW	398 MW	0 MW
CALIENTE	Caliente/Eddy	↑	298 MW	298 MW	0 MW
AMRAD	Caliente/Eddy	↑	123 MW	123 MW	0 MW
	Total TTC over auto-transformers ->		1,168 MW		

In addition, due to a Network Resource designation at Luna, a path has been established using the above listed auto-transformers from Luna:

345 kV Bus	Resource Location	Intermediate Point	TTC	Committed Use (NL Res.)	ATC
LUNA	Luna	EPE.SYSSHELL	564 MW	564 MW	0 MW

For this path, 125 MW is reserved for native load in addition to the above listed reservations.

Once the power reaches the "EPE.SYSSHEL", it then goes over the "EPE.RESLOAD" boundary. The TTC and ATC for this boundary are:

POR	POD	TTC	Committed Use (NL Res.)	ATC
EPE.SYSSHEL	EPE.RESLOAD	840 MW	947 MW	0 MW

Note: AREF SetASide for Native Load into the EPE load Area (EPE.ResLoad) is the sum of SetASides on EPE's import paths (Path 47 and Eddy County HVDC Tie and Luna Network Resource).

XIV. TRANSMISSION PATH LOSSES

When a transmission customer uses one or more of EPE's posted transmission paths, that customers' usage creates real power losses for which that customer must be charged. The transmission customer may elect, on a monthly basis, to (1) supply the capacity and/or energy necessary to compensate EPE for such real power losses; (2) receive an amount of electricity at delivery points that is reduced by the amount of real power losses incurred by EPE; or (3) with the concurrence of EPE, have EPE supply the capacity and/or energy necessary to compensate for such real power losses. For transmission paths external to the EPE control area in which EPE has transmission rights to post on the OASIS, these real power losses will be the same amount which EPE is charged by the original transmission path owner. These losses are primarily guided by contracts and are given as a percentage of the *scheduled* power. Below are the losses EPE is charged by the original transmission owners for both firm and non-firm transmission service.

Losses for Transmission Paths External to the EPE Control Area:

On November 1, 2006, the Palo Verde East participants developed a new loss procedure to more accurately account for the losses on that system. This procedure is Operating Procedure No. T1, Revision G. In accordance with Paragraph 7.3.2.11 of the ANPP Valley Transmission System Participation Agreement, this procedure is agreed to for calculating, scheduling, and accounting for transmission losses for the ANPP Valley Transmission System. Revision G is necessary to accommodate improved accuracy in the loss methodology.

This revision will remain in effect as long as one of the ANPP Valley transmission lines is in service. The procedure provides a calculation for each line of the ANPP Valley Transmission System, so no additional calculations are required during extended outages.

Transmission Loss Determination

Transmission loss responsibility schedules will be based on hourly integrated actual line flow, each participant's hourly net schedule, and each participant's fixed loss responsibility as determined by SRP and agreed to by the participants. The transmission losses are determined as summarized in Attachment 1.

Transmission Loss Scheduling

Transmission loss responsibility will be agreed to in advance by SRP and each participant or their designated representative. SRP will contact each participant or their designated representative with their respective loss responsibility in accordance with the WECC Preschedule Calendar.

All loss schedules will be firm and are not normally subject to change during the actual daily operations; however, loss schedule revisions may occasionally be necessary as a result of emergency conditions, etc.

It is intended that the loss schedules will approximate the total combined losses on the ANPP Valley Transmission System. The deviation between actual losses accrued and the loss payback will be kept at a minimum. Any accumulated deviation will be carried into the next month.

Power and energy losses will be scheduled to SRP at SRP designated points of delivery.

Transmission Loss Accounting

SRP will contact each participant or designated representative and affected Balancing Authority Areas (i.e. control areas) to check and verify transmission loss schedules, after the fact, in accordance with NERC Standards.

Procedure Review and Revision

This procedure is subject to periodic review and revision. SRP will check actual losses on the ANPP Valley Transmission System annually and otherwise as necessary, based on the addition or subtraction of transmission system components and/or firm operation of the generating units. Updates to the load loss calculations will be performed as necessary with appropriate revisions to Attachment 1.

ATTACHMENT 1

Derivation of transmission loss responsibility calculations is documented in the ANPP Valley Transmission System Loss Procedure Update Report under "Derivation of Actual Flow Loss Equations". No-load losses will be charged to each participant based on their ANPP Valley Transmission System ownership percentage and the hours that each element of the ANPP Valley Transmission System remains in service. Actual losses will be calculated using historical meter reads to determine hourly integrated actual line flow on the ANPP Valley Transmission System. An expected loss value will be calculated according to each participant's hourly net schedule, taking into account the direction of flow for that hour. The difference between the actual losses and the expected losses will be inadvertent losses. The participant's share of inadvertent losses will be based on ownership percentages. Total participant loss responsibility will be allocated according to their expected loss based on schedules plus the participant share of no load loss and inadvertent losses.

Total No Load Loss

Hassayampa 500/Jojoba 500	=	42.105 kW
Jojoba 500/Kyrene 500	=	119.29 kW
Palo Verde 500/Westwing 500 #1	=	94.7 kW
Palo Verde 500/Westwing 500 #2	=	94.7 kW
Transformer No Load Loss	=	446.18 kW

Total Load Line Loss (kW)

Hassayampa 500/Jojoba 500	=	0.001221045 * (Line Flow in amps)**2 (1d)
Jojoba 500/Kyrene 500	=	0.003161319 * (Line Flow in amps)**2 (1e)
Palo Verde 500/Westwing 500 #1	=	0.002746590 * (Line Flow in amps)**2 (1f)

Palo Verde 500/Westwing 500 #2	=	0.002746590 * (Line Flow in amps)**2 (1f)

Total Transformer Load Loss (kW)

Kyrene Bank 6 Transformer	=	0.0011117 * MVA Load **2 (2a)
Kyrene Bank 7 Transformer	=	0.0010937 * MVA Load **2 (2b)

Ownership Percentages

APS	=	34.6 %
EPE	=	18.7 %
PNM	=	12.1 %
SRP	=	34.6 %

End of Attachment 1

Losses for Transmission Paths Internal to the EPE Control Area:

For both firm and non-firm point to point transactions internal to the EPE control area, FERC has determined that the real power losses EPE must charge transmission customers are based upon the average EPE system losses. EPE's tariff defines these losses as 4.23%. Therefore, EPE will apply this loss factor to all scheduled usage of its internal transmission system:

Real Power Losses = 0.0423 x Scheduled Power at Point of Delivery

Billing for Transmission Path Losses

For losses incurred by transmission customers on Point-to-Point transmission paths EPE has sold on the OASIS, EPE's OATT states in Section 15.7 (Real Power Losses) "the Transmission Customer is responsible for replacing losses associated with all transmission service as calculated by the Transmission Provider. The applicable real power losses factors and rates for Real Power Loss service at set forth in Schedule 10."

XV. TTC AND ATC CURTAILMENTS DURING TRANSMISSION FORCED OUTAGES AND INITIALLY OUT OF SERVICE (IOS) CONDITIONS

Based upon the system conditions and facilities available for service, EPE shall determine the amount of transmission capability available and any need for a system curtailment. Curtailments shall be made on a non-discriminatory basis giving due effect to OATT service priorities and to the electrical effectiveness that would be obtained by curtailing a specific transaction(s) so as to alleviate the constraint.

When a curtailment is required, the following order of priority will be followed in calling for reduced use with the lowest priority listed first:

Secondary Use of Firm Point-to-Point OATT Section 22.1 ("Priority 1");
Hourly Non-Firm OATT Section 14.7 ("Priority 2");
Daily Non-Firm OATT Section 14.7 (Priority 3");
Weekly Non-Firm OATT Section 14.7 ("Priority 4");
Monthly Non-Firm OATT Section 14.7 ("Priority 5");
Secondary Non-Firm Network Resources OATT Section 28.4 (“Priority 6”); and
Firm Native Load, Network Load and Point-to-Point (“Priority 7”).

If relief to the reliability constraint can be provided by reducing Non-Firm Point-to-Point Services (“Priority 1-5”), then EPE shall curtail these schedules proportionately based on the Non-Firm Point-to-Point transactions in place at the time in the order of priority above. EPE will curtail all Non-Firm Point-to-Point schedules prior to curtailing any Secondary Network Resources ("Secondary Services"), Native Load, Network Integration Transmission Service Agreement customers ("NITSA Customers") or Firm Point-To-Point Customers.

In the event that additional transmission service curtailments are required following the curtailment of Non-Firm Point-to-Point Services, EPE shall curtail on a pro-rata basis all Secondary Services contributing to the potential reliability problem.

In the event that additional transmission service curtailments are required following the curtailment of Non-Firm Point-to-Point Services (‘Priority 1-5”) and Secondary Services (“Priority 6”), EPE shall curtail on a pro-rata basis all Priority 7 Firm uses contributing to the reliability constraint including: Point-to-Point Customers and Native Load Customers. Any Short Term Firm Point-to-Point Customers shall be included in curtailments in allocating the required curtailments among the various Priority 7 customers.

Curtailments for EPE Internal System Initially Out Of Service Conditions (Loss of One Line)

Following a transmission, and certain generation, contingency, the EPE system TTC and ATC must be curtailed to readjust the system to maintain the reliability for the loss of the next critical element. These curtailments are dependent upon the IOS condition and the state and configuration of the system at the time of the readjustment. Since the TTC over the transmission segments connecting the EPE control area with the WECC, i.e., the control area interties, are determined by nomograms and are simultaneous, a contingency on one segment may affect the TTC of the other segments. Below is given the curtailment required for the critical segment of a path following a system adjustment upon the loss of a single line. Any additional paths which utilize this segment will experience the same curtailment. The curtailments for the various contingencies and IOS conditions are given on the EPE Website at “www.epelectric.com” and on the OASIS under Outage Manager or Notices page under Outage Manager or Notices page.

Curtailments for Single Contingencies External to EPE System

Certain contingencies in the transmission system external to the EPE and southern New Mexico systems can also require curtailments of both SNMIC and EPE imports. These curtailments will result in curtailments primarily over the transmission segments interconnecting EPE with WECC. These contingencies are in the TEP system and the PNM system. For contingencies in the TEP system, EPE’s scheduling capability through the northern New Mexico system is not affected, only the amount through the TEP system. Likewise, for contingencies on the PNM northern New Mexico system, EPE’s scheduling capability at WestMesa is reduced but not the capability through TEP. However, since the total amount of capacity of EPE’s WECC interconnections is reduced, the TTC over all of these interconnections (WestMesa, Springerville and Greenlee) must be reduced on a pro-rata basis. The curtailments for the various contingencies and IOS conditions are given on the EPE Website at “www.epelectric.com” and on the OASIS at the Outage Manager or Notices page.

XVI. TTC AND ATC CURTAILMENTS DURING MULTIPLE TRANSMISSION CONTINGENCIES

During multiple transmission contingencies, i.e., the simultaneous loss of two or more 345 kV transmission lines in the southern New Mexico and El Paso areas, the TTC of the New Mexico/El Paso system is severely limited. The TTC on the transmission paths in the direction of normal flow must be curtailed into the firm transmission usage for reliability purposes. Therefore, for a multiple 345 kV transmission contingencies, the ATC of all EPE transmission paths internal to the southern New Mexico and El Paso systems and in the direction of normal power flow are reduced to zero.

XVII. DOCUMENT VERSION UP-DATES

Document Version: 1.1
Date: March 18, 1998
Update:
1. Corrected TTC and ATC equation for WestMesa 345-EPE@WestMesa
2. Corrected TTC equation for Springer 345-EPE@Springer
3. Corrected TTC equation for Greenlee 345-EPE@Greenlee
4. Corrected wording in PaloVerd 500-Kyrene 500
5. Corrected wording in Kyrene 500-PaloVerd 500

Document Version: 1.2
Date: April 27, 1998
Update:
1. Corrected TTC and ATC equation for WestMesa 345-EPE@WestMesa

Document Version 1.2.1
Date: May 20, 1998
Update:
1. Corrected TTC equation for WestMesa 345-EPE@WestMesa
2. Corrected wording in Comisión Federal de Electricidad (CFE) Interconnection Segment
3. Added EPE Internet Home Page address for transmission outage curtailment information

Document Version: 1.2.2
Date: September 2, 1998
Update:
1. Added paths and path indexes which are currently on the EPE OASIS
2. Corrected designation of Amrad 345-Amrad 115 transmission segment
3. Corrected wording in Section IX

Document Version: 1.2.3
Date: January 8, 1999
Update:
1. Corrected the San Juan-Four Corners 345 kV/Four Corners-San Juan 345 kV segments and paths to be Springer-Four Corners 345 kV/Four Corners-Springer 345 kV segments and paths

Document Version: 1.2.4
Date: September 30, 1999
Update:
1. Converted document from WordPerfect to Word and edited graphics
2. Added paths and path indexes which are currently on the EPE OASIS
3. Corrected EPE CBM narrative/requirements in accordance with FERC rulings
4. Corrected TTC for Arroyo-WestMesa 345 kV path in accordance with new WSCC Firm Netting rule

Document Version: 1.2.5
Date: January 2, 2001
Update:
1. Added paths and path indexes which are currently on the EPE OASIS

Document Version: 1.2.6

Date: February 1, 2001
Update: 1. Updated Palo Verde East transmission system TTC and ATC

Document Version: 1.2.7
Date: March 2, 2001
Update: 1. Changed name of Artesia to Eddy, i.e., Artesia 230 becomes Eddy 230
2. Change reference to Plains Electric Generation & Transmission Coop., Inc. (Plains or PGT) to Tri-State Generation & Transmission Association, Inc. (Tri-State or TST)

Document Version: 1.2.8
Date: May 21, 2001
Update: 1. Corrected ATC for Springerville to Luna to Hidalgo to Greenlee 345 kV transmission path to reflect inadvertent omission of terms of the 1982 "Tucson-El Paso Power Exchange and Transmission Agreement".

Document Version: 1.2.9
Date: August 2, 2001
Update: 1. Edited document for non-owned EPE transmission paths as per FERC Order No. 888 statement that transmission owners need only post transmission that is "owned, operated or controlled" by the transmission entity. Removed all transmission paths that are not owned, operated or controlled by EPE in accordance with FERC policy.

Document Version: 1.3.0
Date: January 10, 2002
Update: 1. Added Afton 345 in the Newman 345 to Luna 345 segment
2. Added paths from Afton 345 to take account of anticipated generation
3. Added paths from Luna 345 to take account of anticipated generation

Document Version: 1.3.01
Date: October 15, 2002
Update: 1. Adjusted TTC for Palo Verde 500 kV paths based on new rating

Document Version: 1.3.02
Date: February 24, 2003
Update: 1. Added Jojoba 500 Substation in Palo Verde to Kyrene 500 path.
2. Updated internal EPE system transmission IOS curtailments.
3. Added mechanism for transmission losses.

Document Version: 1.3.03
Date: January 27, 2004
Update: 1. Edited Section XVI regarding Real Power Loss rates and payback.
2. Added Jojoba-Westwing 500 kV Path

Document Version: 1.4.01
Date: June 14, 2005

Update: 1. General update to reflect changes made in transfer to webOASIS
2. Removed IOS curtailment values as these will be posted separately on the webOASIS

Document Version: 1.4.02
Date: November 7, 2005
Update: 1. Update to reflect changes made in Native Load reservations (AREF) at WestMesa, Springerville and Greenlee
2. Updated increase of Tri-State wheeling purchase on WestMesa-Arroyo 345 kV line (PST Base Setting) to 50 MW.
3. Added WM345 to Holloman 115 path.

Document Version: 1.4.03
Date: March 29, 2006
Update: 1. Corrected ownership and capacity rights for Amrad 345 to Amrad 115 segment.

Document Version: 1.4.04
Date: August 11, 2006
Update: 1. Updated TTC values for several internal line segments based on studies.

Document Version: 1.4.05
Date: October 2, 2006
Update: 1. Edit to correct formatting problems
2. Clarify use of TRM in line segment ATC determinations.

Document Version: 1.5.01
Date: June 1, 2007
Update: 1. Clarify use of CBM/TRM in EPE system.
2. General edit to correct wording errors, typos and changes in ownership.
3. General update to incorporate FERC Order 890 requirements re OASIS formulas.
4. Update TTC values for Palo Verde East Path.

Document Version: 1.5.02
Date: August 15, 2007
Update: 1. Further general update to incorporate FERC Order 890 requirements.
2. Added reservation (MI) for 1994 Plains Long Term Transmission Agreement on Arroyo-Newman-Afton-Luna-Hidalgo line segments inadvertently left off.
3. Updated Path 47 nomogram adjustments.

Document Version: 1.5.03
Date: October 29, 2007
Update: 1. Corrected loss determination on the Palo Verde East transmission lines.

Document Version: 1.5.04
Date: February 25, 2008

Update: 1. Merged TTC and ATC calculations for Palo-Verde-Westwing and Palo Verde-Jojoba-Kyrene on PV East path (bi-directional).
2. Further general update to incorporate FERC Order 890-A language.
3. Added WM345-AMRAD115 path.

Document Version: 1.5.05
Date: January 15, 2009
Update: 1. Updated TTC for internal EPE transmission segments based on additional auto-transformers at Diablo and Arroyo.
2. Updated Native Load Reservations on internal EPE transmission segments based on powerflows with new auto-transformers at Diablo and Arroyo.
3. Removed TRM designations for line segments previously limited by Diablo auto-transformers.
4. General minor edits and updates and clarifications.

Document Version: 1.5.06
Date: August 17, 2009
Update: 1. Updated TTC for Amrad 345/115 kV Auto-transformer based on new auto-transformer.
2. Updated firm/non-firm TTC/ATC availability of Eddy County HVDC Terminal.

Document Version: 1.6.01
Date: April 1, 2011
Update: 1. Updated for NERC Standard MOD-29 methodology.
2. Added Newman #5 generator.
3. Added Picante 345 kV Substation.
4. General minor edits and updates and clarifications.

Document Version: 1.7.01
Date: April 1, 2012
Update: 1. Added Macho Springs Substation.

Document Version: 1.7.02
Date: October 25, 2012
Update: 1. Updated SNMIC section.

Document Version: 1.7.03
Date: April 1, 2013
Update: 1. FAC-013 Language clarification.

Document Version: 1.7.04
Date: June 17, 2013
Update: 1. Added Rio Grande #9 generator.

Document Version: 1.7.05
Date: February 5, 2014
Update: 1. Clarified use of TRM on EPE system.

Document Version: 1.7.06
Date: April 4, 2014
Update:
1. Corrected modeling on Palo Verde East Path to exclude Palo Verde to Jojoba 500 kV line.
2. Changed Palo Verde to Jojoba 500 kV line to flow rated at 555 MW as per 2014 SRP rating study.