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January 31, 2003

Carmen Madrid
Docket control
Arizona Corporation Commission
1200 W. Washington
Phoenix, AZ 85007

Re: Docket E-00000D-03-0047

Dear Ms. Madrid:

Enclosed for filing is one original and 13 copies of Tucson Electric Power Company's Ten Year Plan for Years 2003-2012 in the above referenced docket.

Please call me if you have any questions.

Sincerely,

Michael W. Patten
For the Firm

MWP/srs
enclosures

Arizona Corporation Commission
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Tucson Electric Power

A UniSource Energy Company

Arizona Corporation Commission
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JAN 31 2003

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TUCSON ELECTRIC POWER COMPANY
TEN YEAR PLAN
FOR YEARS
2003-2012

SUBMITTED TO THE
ARIZONA CORPORATION COMMISSION
JANUARY 2003

DOCKET NO: E-00000D-03-0047

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INTRODUCTION

EHV Transmission System

Since submission of last year's Ten-year plan, TEP has continued its involvement in the multi-utility Central Arizona Transmission Study (CATS) effort. Currently, CATS has completed two study phases. Phase I of the CATS Study served as a screening process that evaluated a large group of transmission alternatives in Central Arizona. This work was used to narrow down the transmission options that merited further evaluation in the second phase of the Study. The results of the CATS phase I study were used to develop a long-range EHV transmission system for Central Arizona.

Phase II of the CATS Study took a high-level, long-range look at the performance of the CATS EHV transmission system and compared several transmission alternatives to this base EHV system. The Salt River Project (SRP) has filed a copy of the Phase II report with the Commission on behalf of all the CATS participants.

It is important to note, because of the nature of the CATS Phase I and Phase II studies, only a comparative analysis of the transmission alternatives were performed. Consequently the study did not represent a specific time frame.

The CATS Phase III study will be a collaborative regional study for Central Arizona for the 2012 time frame. TEP intends to participate in the Phase III effort. This participation, along with its own internal study work, will be used to refine, prioritize, and develop a timetable for the projects identified in Phases I and II.

The projects contemplated in CATS are listed in the Ten-Year plan summary sheets. However, ultimate implementation of any or all of these projects will require further study.

138kV Local Transmission System

TEP performs an annual review of its 138kV system performance over a ten-year planning horizon. This results in a schedule for new facilities and upgrades to existing facilities assuring adequate transmission capacity within TEP's service territory as Tucson continues to grow. TEP's 138kV system is improved to accommodate new 138 / 14kV substations and increased line loading.

Load projection analysis looks at distribution system shortfalls and identifies the impact of load growth at each of TEP's distribution substations. This results in requirements for new 138/13.8 kV substations and new 138kV transmission lines. Load projection also provides input to the power flow analysis used to identify thermal overloads.

Power flow analysis looks for thermal overloads during normal and contingency operation based on WECC/NERC Level A, B and C reliability criteria. Contingencies include:

- Loss of major EHV import
- Loss of critical local generation
- Single 138kV circuit outages
- Credible 138kV multiple circuit outages
- Critical circuits initially out of service with system operating acceptably followed by a subsequent outage.

Thermal overloads are addressed with:

- New transmission lines
- Uprating existing lines (increase NESC clearances or larger ampacity wire)
- New generation (when more economic than transmission)

Transmission facilities are also added at 138kV to increase reliability at substations that are served radially.

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Interconnection of Westwing – South 345 kV with future Jojoba – Southeast Station 500 kV via Pinal West 500/345 kV Substation
Size	
a) Voltage	345-kV
b) Capacity	System dependent
c) Point of Origin	N/A
d) Point of Termination	New Substation tentatively named Pinal West
e) Length	Less than 1 mile
Routing	Adjacent to Westwing – South 345 kV line.
Purpose	To reinforce Tucson Electric Power Company's EHV system and to provide a higher capacity link for the flow of power from the Palo Verde area into TEP's service territory.
Date	
a) Construction Start	2004-2005
b) In-Service Date	20005-2006
Is Certificate Necessary	Yes
Technical Studies	Studies in progress via CATS, WATS, and Palo Verde – Southeast Station study groups.

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Pinal West Substation to Saguaro Substation
Size	
a) Voltage	500-kV
b) Capacity	System dependent
c) Point of Origin	New Substation tentatively named Pinal West
d) Point of Termination	Saguaro Substation (Sec. 15 T10S R10E)
e) Length	Unknown
Routing	Unknown
Purpose	To reinforce Tucson Electric Power Company's EHV system and to provide a higher capacity link for the flow of power from the Palo Verde area into TEP's northern service territory.
Date	
a) Construction Start	Under Review
b) In-Service Date	Under Review
Is Certificate Necessary	Yes
Technical Studies	Studies in progress via CATS

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Saguaro Station to Winchester Station
Size	
a) Voltage	500-kV
b) Capacity	System dependent
c) Point of Origin	Saguaro Substation (Sec. 15 T10S R10E)
d) Point of Termination	Winchester Substation
e) Length	Approximately 80 miles
Routing	As described in Case no. 23
Purpose	To reinforce Tucson Electric Power Company's EHV system and to provide a higher capacity link for the flow of power from the Palo Verde area into TEP's eastern transmission system.
Date	
a) Construction Start	Under Review
b) In-Service Date	Under Review
Is Certificate Necessary	No
Technical Studies	Studies in progress via CATS and internal TEP study efforts.

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Winchester Substation to Vail Substation – 2nd circuit
Size	
a) Voltage	345-kV
b) Capacity	System dependent
c) Point of Origin	Winchester Subtation
d) Point of Termination	Vail Substation (Sec. 4 T16S R15E)
e) Length	Approximately 40 miles
Routing	Parallel to existing Greenlee – Vail Line
Purpose	To reinforce Tucson Electric Power Company's EHV system and to provide additional transmission capacity from the future Winchester Station into Tucson
Date	
a) Construction Start	Under Review
b) In-Service Date	Under Review
Is Certificate Necessary	Yes
Technical Studies	Studies in progress via CATS and internal TEP study efforts.

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Vail Station to South Station – 2nd circuit
Size	
a) Voltage	345-kV
b) Capacity	System dependent
c) Point of Origin	Vail Substation (Sec. 4 T16S R15E)
d) Point of Termination	South Substation (Sec. 36 T16S R13E)
e) Length	14 miles
Routing	Parallel to existing Vail – South Line
Purpose	To reinforce Tucson Electric Power Company's EHV system and to provide additional transmission capacity between Vail and South Substations
Date	
a) Construction Start	Under Review
b) In-Service Date	Under Review
Is Certificate Necessary	No
Technical Studies	Studies in progress via CATS and internal TEP study efforts.

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Saguaro Substation to Tortolita Substation – 2nd circuit.
Size	
a) Voltage	500-kV
b) Capacity	System dependent
c) Point of Origin	Saguaro Substation (Sec. 15 T10S R10E)
d) Point of Termination	Tortolita Substation (Sec. 14 T10S R10E)
e) Length	1 Mile
Routing	Parallel to existing Saguaro to Tortolita line.
Purpose	To reinforce Tucson Electric Power Company's EHV system and to provide a higher capacity link for the flow of power from Saguaro Substation into TEP's service territory.
Date	
a) Construction Start	2003
b) In-Service Date	June 2003
Is Certificate Necessary	No
Technical Studies	See record of siting case no. 39. TEP has updated studies available upon request.

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Springerville Substation to Greenlee Substation.
Size	
a) Voltage	345-kV
b) Capacity	System dependent
c) Point of Origin	Springerville Substation (Sec. 34 T11N R30E)
d) Point of Termination	Greenlee Substation (Sec. 29 T5S R31E)
e) Length	110 Miles - 27 Miles in Arizona.
Routing	Parallel to existing Springerville to Greenlee line.
Purpose	To deliver power and energy from major TEP interconnections in the Four Corners and Eastern Arizona regions.
Date	
a) Construction Start	Under Study
b) In-Service Date	Under Study
Is Certificate Necessary	Issued in 1975, 1977, 1982 and 1986
Technical Studies	Base studies conducted in coordination with neighboring utilities formed the basis for the design of TEP's original EHV system in the 70's. This project is based on that original work. Detailed studies will be developed in

the future upon a determination of need for this project by TEP.

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Tortolita Substation to South Substation.
Size	
a) Voltage	345-kV
b) Capacity	System dependent
c) Point of Origin	Tortolita Substation (Sec. 23 T10S R10E)
d) Point of Termination	South Substation (Sec. 36 T16S R13E)
e) Length	68 Miles
Routing	From Tortolita Substation south through Avra Valley to existing Westwing-South 345-kV transmission line right-of-way, then parallel to existing Westwing – South line to South Substation.
Purpose	To reinforce Tucson Electric Power Company's EHV system and to provide a high capacity link for the flow of power in Southern Arizona.
Date	
a) Construction Start	Under Review
b) In-Service Date	Under Review
Is Certificate Necessary	Issued in 1980 and 1981
Technical Studies	Being re-evaluated as part of CATS study

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Westwing Substation to South Substation (2nd circuit)
Size	
a) Voltage	345-kV
b) Capacity	System dependent
c) Point of Origin	Westwing Substation (Sec. 12 T4N R1W)
d) Point of Termination	South Substation (Sec. 36 T16S R13E)
e) Length	178 Miles
Routing	Parallel to existing Westwing to South line.
Purpose	To deliver power and energy from major TEP interconnections in the Northwest Phoenix region.
Date	
a) Construction Start	Under Review
b) In-Service Date	Under Review
Is Certificate Necessary	No – See Case No. 15
Technical Studies	Base studies conducted in coordination with neighboring utilities formed the basis for the design of TEP's original EHV system in the very early 70's. This project is based on that original work. Detailed studies will be developed in the future upon a determination of need for this project by TEP.

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	TEP-Citizens 345 kV Interconnection Line--South Substation to future Gateway Substation (2 ckts.)
Size	
a) Voltage	345-kV
b) Capacity	500 MW
c) Point of Origin	South Substation (Sec. 36 T16S R13E)
d) Points of Termination	Gateway Substation in (Sec. 12 T24S R13E)
e) Length	Approximately 60 Miles
Routing	Southerly from South Substation, in or near the Santa Cruz Valley to Nogales area.
Purpose	To provide an alternate transmission path to Citizen's Communication Company in Nogales, Arizona pursuant to ACC order.
Date	
a) Construction Start	Dependent upon permitting
b) In-Service Date	Undetermined
Is Certificate Necessary	Issued in 2002
Technical Studies	See record of Siting Case in no. 111

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Gateway Substation to Comision Federal de Electricidad (CFE) (2 ckts.)
Size	
a) Voltage	345-kV
b) Capacity	500 MW
c) Point of Origin	Gateway Substation (Sec. 12 T24S R13E)
d) Points of Termination	Arizona-Sonora boundary (Sec. 13 T24S R13E)
e) Length	Approximately 2 Miles
Routing	Southerly from Gateway Substation, in or near the Nogales area.
Purpose	To interconnect to the Comision Federal de Electricidad in Sonora, Mexico.
Date	
a) Construction Start	Dependent upon permitting
b) In-Service Date	Undetermined
Is Certificate Necessary	Yes
Technical Studies	See record of siting case no. 111

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Loop-in of TEP Winchester Switchyard
Size	
a) Voltage	345-kV
b) Capacity	System Dependant
c) Point of Origin	Existing Greenlee – Vail 345 kV line Northeast of Pomerene, Arizona
d) Points of Termination	New Winchester Substation
e) Length	Less than 1 Mile
Routing	Southeasterly from existing TEP 345 kV Greenlee – Vail transmission line.
Purpose	To provide for interconnection of Southwest Transmission Cooperative 230 kV line.
Date	
a) Construction Start	2003
b) In-Service Date	2004
Is Certificate Necessary	Application pending
Technical Studies	Study results provided to ACC by Southwest Transmission Cooperative – See Case No. 121

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Irvington Substation to East Loop Substation (through 22nd Street Substation).	
Size		
a) Voltage	138-kV	
b) Capacity	System dependent	
c) Point of Origin	Irvington Substation (Sec. 03 T15S R14E)	
d) Point of Termination	East Loop Substation (Sec. 08 T14S R15E)	
e) Length	9 Miles	
Routing	North and East of Irvington Substation, through 22nd Street Substation, then East and North to East Loop Substation.	
Purpose	To provide additional electric service to the central area of Tucson Electric Power Company's service area and to reinforce the local transmission system.	
Date		
a) Construction Start	1985	
b) In-Service Date	Phase 1 – 1994 (Completed)	Irvington Station to 22nd St. Substation
	Phase 2 – 2000 (Completed)	22nd St. Substation to East Loop Substation
	Phase 3 –	2nd Circuit

	Under Review	of Phase I
Is Certificate Necessary	Issued - 1984	

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Vail Substation to East Loop Substation (through Houghton Loop Switching Station*, Spanish Trail and Roberts Substations).
Size	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	Vail Substation (Sec. 4 T16S R15E)
d) Point of Termination	East Loop Substation (Sec. 8 T14S R15E)
e) Length	22 Miles
Routing	East and north from Vail Substation along existing transmission line to Irvington and Houghton Roads, then north along Houghton Road to Speedway Boulevard, then east and north to Roberts Substation and west along Speedway to East Loop Substation.
Purpose	To provide additional electric service to the eastern portion of Tucson Electric Power Company's service area and to reinforce the local transmission system.
Date	
a) Construction Start	1976
b) In-Service Date	Phase 1 - 1977 (Completed) — Spanish Trail Substation and 138-kV lines to East Loop and Vail Substations.

	Phase 2 - 1983 (Completed)	Roberts Substation and associated 138-kV lines
	Phase 3 – Under Review	Third 138-kV line from Vail to East Loop Substation
Is Certificate Necessary	Issued in 1973, 1976 and 1982	

*Houghton Loop switching station has been removed from TEP's plans. Name retained for reference only.

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	East Loop Substation to Northeast Substation (through Snyder Substation)	
Size		
a) Voltage	138-kV	
b) Capacity	System dependent	
c) Point of Origin	East Loop Substation Sec. (8 T14S R15E)	
d) Point of Termination	Northeast Substation Sec. (28 T13S R14E)	
e) Length	13 Miles	
Routing	North and west of East Loop Substation, then south and west to termination point.	
Purpose	To provide additional electric service to the northeastern area of Tucson Electric Power Company's service area.	
Date		
a) Construction Start	1985	
b) In-Service Date	Phase 1 - 1987 (Completed)	Snyder Substation and 138-kV line to East Loop Substation
	Phase 2 – 1999-2005 (Interim line in service. Final completion date dependent upon public improvements)	138-kV line from Snyder Substation to Northeast Substation
Is Certificate Necessary	Issued 1980	

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Loop existing North Loop Substation to DeMoss Petrie Station line through Sweetwater Substation.
Size	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	Sec. 20 T13S R13E
d) Point of Termination	Sec. 20 T13S R13E
e) Length	Less than one mile
Routing	Loop existing line at Sweetwater (Roger Road) and Santa Cruz River; west on Sweetwater Road into new Sweetwater Substation.
Purpose	To provide additional electric service to the western part of Tucson Electric Power Company's service area.
Date	
a) Construction Start	Under Review
b) In-Service Date	Under Review
Is Certificate Necessary	Issued 1982

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Loop existing Irvington Station to Vail Substation #1 line through Robert Bills – Wilmot (formerly Littletown) Substation.
Size	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	Vail – Irvington Corridor (Sec. 36 T15S R14E)
d) Point of Termination	Robert Bills – Wilmot Substation (Sec. 23 T15S R14E)
e) Length	4 Miles
Routing	Unknown
Purpose	To provide additional electric service to the south-central part of Tucson Electric Power Company's service area.
Date	
a) Construction Start	2004
b) In-Service Date	2005
Is Certificate Necessary	Yes

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Loop existing Vail Substation to East Loop Substation line through Pantano and Los Reales Substations.
Size	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	Phase 1: Sec. 24, T15S R15E Phase 2: Sec. 28, T14S R15E
d) Point of Termination	Phase 1: Sec. 24, T15S R15E Phase 2: Sec. 28, T14S R15E
e) Length	Substations are less than one span from the existing line.
Routing	Phase 1 Loop existing line east of Houghton Road and south of Valencia Road through Los Reales Substation. Phase 2 Loop existing line east of Pantano Road and south of Golf Links through Pantano Substation.
Purpose	To provide additional electric service to the eastern part of Tucson Electric Power Company's service area.
Date	
a) Construction Start	2001
b) In-Service Date	Phase 1 - Completed Phase 2 - 2011
Is Certificate Necessary	No

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Extend 138-kV line from Midvale Substation to San Joaquin Sub-station.
Size	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	Midvale Substation (Sec. 3 T15S R13E)
d) Point of Termination	Future San Joaquin Substation
e) Length	Approximately 20 miles
Routing	Reviewing use of common corridor
Purpose	To provide additional electrical service to the far western portion of Tucson Electric Power Company's service area and to reinforce the local distribution system.
Date	
a) Construction Start	Under Review
b) In-Service Date	Under Review
Is Certificate Necessary	Under Review

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	South Substation to DeMoss Petrie Substation
Size	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	South Substation (Sec. 36 T16S R13E)
d) Point of Termination	DMP Substation (Sec. 35 T13S R13E)
e) Length	Approximately 18 miles
Routing	Unknown
Purpose	To reinforce Tucson Electric Power Company's 138kV system and to provide additional service to the western part of Tucson Electric Power Company's service area.
Date	
a) Construction Start	Under Review
b) In-Service Date	Under Review
Is Certificate Necessary	Yes

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	South Substation to Cyprus Sierrita Substation through Green Valley Substation.	
Size		
a) Voltage	138-kV	
b) Capacity	System dependent	
c) Point of Origin	South Substation (Sec. 36 T16S R13E)	
d) Point of Termination	Cyprus-Sierrita Substation (Sec. 10 T18S R12E)	
e) Length	Approximately 24 miles	
Routing	Unknown	
Purpose	To provide additional electrical service to southern area of Tucson Electric Power Company's service area and to reinforce the local transmission system.	
Date		
a) Construction Start	1995	
b) In-Service Date	Phase 1 -1997 (Completed)	South 138-kV line to Green Valley.
		Phase 2 -2006 138-kV line from Green Valley to Cyprus-Sierrita substation
Is Certificate Necessary	Issued 1995.	

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Rancho Vistoso Substation to Catalina Substation
Size	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	Rancho Vistoso Substation (Sec. 36 T11S R13E)
d) Point of Termination	New Catalina Substation (physical location to be determined)
e) Length	Approximately 7 Miles
Routing	Reviewing partial use of WAPA corridor
Purpose	To provide additional electrical service to far northern area of Tucson Electric Power Company's service area and to reinforce the local distribution system.
Date	
a) Construction Start	2007
b) In-Service Date	2008
Is Certificate Necessary	Yes

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Loop existing Irvington Station to Vail Substation #2 line through University of Arizona Tech Park Substation.
Size	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	Vail – Irvington Corridor
d) Point of Termination	U of A Tech Park Substation
e) Length	Approximately 5 miles
Routing	Loop existing Irvington – Vail #2 line into future U of A Tech Park substation
Purpose	To provide additional electric service to the U of A Tech Park expansion and the southern part of Tucson Electric Power Company's service area.
Date	
a) Construction Start	2008
b) In-Service Date	2009
Is Certificate Necessary	Yes

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Tortolita – North Loop (Lines #117 and #118)
Size	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	N/A
d) Point of Termination	N/A
e) Length	14.5 miles
Routing	N/A
Purpose	Reconductor circuits to provide additional capacity on TEP's local 138 kV system.
Date	
a) Construction Start	2002
b) In-Service Date	2003
Is Certificate Necessary	No

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Irvington – South and Irvington Drexel 138 kV (lines #105 and #130)
Size	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	N/A
d) Point of Termination	N/A
e) Length	
Routing	N/A
Purpose	Reconductor circuits to provide additional capacity on TEP's local 138 kV system.
Date	
a) Construction Start	2004
b) In-Service Date	2004
Is Certificate Necessary	No

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Tortolita – Rancho Vistoso and Rancho Vistoso - La Canada 138 kV (lines #122 and #128).
Size	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	N/A
d) Point of Termination	N/A
e) Length	N/A
Routing	N/A
Purpose	Reconductor circuits to provide additional capacity on TEP's local 138 kV system.
Date	
a) Construction Start	2004
b) In-Service Date	2005
Is Certificate Necessary	No

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	La Canada - Rillito 138 kV (line #120).
Size	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	N/A
d) Point of Termination	N/A
e) Length	N/A
Routing	N/A
Purpose	Reconductor circuits to provide additional capacity on TEP's local 138 kV system
Date	
a) Construction Start	2008
b) In-Service Date	2009
Is Certificate Necessary	No

TUCSON ELECTRIC POWER COMPANY

10 YEAR PLAN

TRANSMISSION FACILITIES

Line Designation	Rillito – Northeast 138 kV (line #124).
Size	
a) Voltage	138-kV
b) Capacity	System dependent
c) Point of Origin	N/A
d) Point of Termination	N/A
e) Length	N/A
Routing	N/A
Purpose	Reconductor circuits to provide additional capacity on TEP's local 138 kV system
Date	
a) Construction Start	2010
b) In-Service Date	2011
Is Certificate Necessary	No

Reliability Must Run (RMR) Analysis

This study was prepared using the reliability criterion defined in the Second Biennial Transmission Assessment, 2002-2011, which states "...reliability practices are founded on the principle of continuity of service for single contingency outages (N-1) of transmission lines." It should be noted that Tucson Electric Power operates and plans its transmission system to meet the WECC / NERC Reliability Criteria of both level B (N-1) and level C (N-2; N-1-1.) . Because this RMR analysis reflects the less strict criteria required by the biennial assessment the results are not applicable to operation of TEP's system. Therefore the results of this analysis will not coincide with import limits identified in previous TEP submittals to the ACC.

Definitions: SIL Simultaneous import limit; maximum bus load which can be served meeting the N-1 WECC / NERC level B criterion without any local generating units on line. Also must meet WECC Voltage Stability criteria.

PEAK Simultaneous instantaneous bus load peak expected for the year

MLSC Maximum Load Serving Capacity: maximum bus load which can be served meeting the N-1 WECC / NERC level B criterion with maximum local generation on line, minus spinning reserves. Also must meet WECC Voltage Stability criteria.

Each of the three years studied has a system configuration change from previous studies: in 2003, the Saguaro - Tortolita 500 kV parallel connection will be in service; in 2004, Winchester Substation will be in service; and in 2005, the Gateway project will be in service. Because the three years have different system configurations, the SIL, PEAK, and MLSC conditions have more varied results than if the same system configuration were in effect and only peak load changed.

The base case used for the study was the approved WECC Operating case 2003 HS04A. This case accurately represent's TEP's system for 2003; for 2004 and 2005 studies, the respective new facilities were added to the case.

Section 1: Annual SIL

Year	SIL (bus load)	(system load)	Critical outage	Nature of Constraint
2003	1575	1606	Springerville / Vail 345 kV	Var Margin
2004	1750	1785	Springerville / Vail 345 kV	Var Margin
2005	1750	1785	Springerville / Vail 345 kV	Var Margin

Import Transmission elements

Year	From	kV	To	kV	Ckt	Emergency Rating
2003	Saguaro	500	Tortolita	500	1	806 MVA (xfmr)
	Saguaro	500	Tortolita	500	2	806 MVA (xfmr)
	Springerville	345	Vail	345	1	806 MVA (xfmr)
	Greenlee	345	Vail	345	1	1858 AMP (ct/relay)
	Westwing	345	South	345	1	806 MVA (xfmr)

2004	Saguaro	500	Tortolita	500	1	806 MVA (xfmr)
	Saguaro	500	Tortolita	500	2	806 MVA (xfmr)
	Springerville	345	Vail	345	1	806 MVA (xfmr)
	Winchester	345	Vail	345	1	1858 AMP (ct/relay)
	Westwing	345	South	345	1	806 MVA (xfmr)
2005	Saguaro	500	Tortolita	500	1	806 MVA (xfmr)
	Saguaro	500	Tortolita	500	2	806 MVA (xfmr)
	Springerville	345	Vail	345	1	806 MVA (xfmr)
	Winchester	345	Vail	345	1	1858 AMP (ct/relay)
	Westwing	345	South	345	1	806 MVA (xfmr)

Discussion

The limiting N-1 outage for the SIL for all three years studied was the Springerville / Vail 345 kV transmission line. The SIL was the highest load at which this outage met the WECC / NERC voltage stability criteria. The next limiting outage is of the South 345/138kV T2, which causes thermal overloads on the Irvington / Vail 138kV transmission lines.

DATA

Year	SIL	Limiting Outage	Type of Constraint
2003	1606	Springerville / Vail 345 kV	Var Margin
2004	1785	Springerville / Vail 345 kV	Var Margin
2005	1785	Springerville / Vail 345 kV	Var Margin

There are no known particular external system load or generation patterns that impact the local SIL or RMR conditions.

Section 2: Local Generating Units

Base Loadable	Min Dispatch	Max Dispatch	Qmin	Qmax
Irvington Unit #1	20 MW	77.5 MW	-15 MVar	80 MVar
Irvington Unit #2	20 MW	77.5 MW	-15 MVar	80 MVar
Irvington Unit #3	25 MW	108.5 MW	-15 MVar	65 MVar
Irvington Unit #4	35 MW	118 MW	-30 MVar	120MVar
DMP GT *	40 MW	73 MW	-10 MVar	47 MVar

Peaking	Min Dispatch	Max Dispatch	Qmin	Qmax
Irvington GT #1	22 MW	22 MW	-10 MVar	15 MVar
Irvington GT #2	22 MW	22 MW	-10 MVar	15 MVar
N. Loop GT #1	22 MW	22 MW	-10 MVar	15 MVar
N. Loop GT #2	22 MW	22 MW	-10 MVar	15 MVar
N. Loop GT #3	22 MW	22 MW	-10 MVar	15 MVar
N. Loop GT #4 **	20 MW	20 MW	0 MVar	0 MVar

* DMP GT is included as a dispatchable unit as opposed to a peaking unit because its MVar capcity combined with its location has a significant benefit for voltage stability.
** N. Loop GT #4 is a jet engine with no MVar capacity.

Maintenance Schedule for Local Generating units for 2003 - 2005:

Unit	2003	2004	2005
Irvington Unit #1	----------	1/9-2/22	----------
Irvington Unit #2	4/21-4/27	3/19-4/4	----------
Irvington Unit #3	4/4-4/20	----------	2/19/4/3
Irvington Unit #4	1/3-2/26	----------	1/7-1/23
Irvington GT #1	----------	----------	----------
Irvington GT #2	----------	----------	----------
N. Loop GT #1	----------	----------	----------
N. Loop GT #2	----------	----------	----------
N. Loop GT #3	----------	----------	----------
N. Loop GT #4	----------	----------	----------
DMP GT #1	----------	----------	----------

Section 3: Annual RMR Conditions (for 2003 - 2005)

Year	SIL	Expected Peak	RMR Magnitude	Annual Hours in RMR
2003	1606	1930	324	337
2004	1785	1996	211	163
2005	1785	2066	281	341

Section 4: Generation Sensitivity Analysis

Discussion:

Unit commitment with minimun MW required, as well as least cost, was determined for the peak loads of the years studied. Below is a table showing the results.

2003 PEAK LOAD, 1930 MW:

GENERATOR #1	GENERATOR #2	GEN #1 MW OUTPUT	GEN #2 MW OUTPUT	TOTAL MW
Irvington Unit #1	DMP CT	20	40	60
Irvington Unit #4	---	35	---	35
Irvington Unit #1	Irvington Unit #3	20	25	45
Irvington Unit #2	Irvington Unit #3	20	25	45
Irvington Unit #2	DMP CT	20	40	60
Irvington Unit #3	DMP CT	25	40	65

2004 PEAK LOAD, 1996 MW:

GENERATOR #1	GENERATOR #2	GEN #1 MW OUTPUT	GEN #2 MW OUTPUT	TOTAL MW
Irvington Unit #1	DMP CT	20	40	60
Irvington Unit #4	---	35	---	35
Irvington Unit #2	DMP CT	20	40	60
Irvington Unit #3	DMP CT	25	40	65

2005 PEAK LOAD, 2066 MW:

GENERATOR #1	GENERATOR #2	GEN #1 MW OUTPUT	GEN #2 MW OUTPUT	TOTAL MW
Irvington Unit #1	DMP CT	20	40	60
Irvington Unit #4	Irvington Unit #1	35	20	55
Irvington Unit #4	Irvington Unit #2	35	20	55
Irvington Unit #4	Irvington Unit #3	35	25	60
Irvington Unit #2	DMP CT	20	40	60
Irvington Unit #3	DMP CT	25	40	65
Irvington Unit #4	DMP CT	35	40	75

Below is a table showing MLSC for the three years studied. The results include surviving the loss of any single transmission element or generating unit.

Year	MLSC	Local Generation MW	Spinning Reserve
2003	2371	551.5	73
2004	2525	551.5	74
2005	2525	551.5	76

Section 5: Effectiveness of alternative solutions

Please refer to jointly-reported CATS study results.

Section 6: Comparative analysis of all alternative solutions

The SIL could be raised by building as-yet-un-permitted transmission lines to increase the import capacity to the TEP service area. The SIL could also be raised by converting one or more existing generating units to synchronous condensors; however, that option has not been priced because all existing MW of owned generation is needed to serve load at peak if the spot market is more expensive than local generation. Because the TEP service area is var margin limited, dynamic var sources are foremost in the solutions sought to date, and the siting and sizing of new local generating units has been driven by the need for dynamic var support. System losses are also minimized by utilizing as much local generation as possible, because the MW do not have to travel over a large distance of "lossy" transmission lines. Of the combinations of local generating units that provided best solutions to the RMR conditions, there is no significant difference in system losses, since the MW import variation is small among the choices, and the flows into the service area are nearly the same.

Summary SIL, MLCS, and Costs for dispatch to mitigate the annual RMR conditions in section 4:

Year	SIL	MLCS	Peak Load	RMR	Annual Costs ($)
2003	1606	2371	1930	337	$146,370
2004	1785	2525	1996	163	$31,104
2005	1785	2525	2066	341	$69,447

Total emission pollutants produced by lowest local generation dispatch mitigating the annual RMR condition, for each year studied:

Year	EST. LBS SO_2	EST. LBS NO_x	EST.LBS PM	EST. LBS CO
2003	118	18,789	1,892	5,362
2004	57	9,088	915	2,594
2005	119	19,012	1,914	5,426