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KELLY J. BARR, ESQ.
Manager, Regulatory Affairs & Contracts

January 30, 2004

Mr. Ernest Johnson
Director, Utilities Division
Arizona Corporation Commission
1200 W. Washington Street
Phoenix, AZ 85007

Re: Ten-Year Plan, Docket No. E-00000D-03-0047

Dear Mr. Johnson:

Enclosed are an original and thirteen (13) copies of The Salt River Project's 2004-2013 Ten-Year Plan filed pursuant to A.R.S. Section §40-360-02.

Please contact Mr. Robert Kondziolka, Manager, Transmission Planning Department at (602) 236-0971 if you have any questions concerning this plan.

Sincerely,

Kelly J. Barr

KJB/bjh

Enclosures (14)

Arizona Corporation Commission
DOCKETED

JAN 30 2004

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SALT RIVER PROJECT

10 YEAR PLAN
2004 — 2013

04-0025-01 01/04

Delivering more than power.™

SALT RIVER PROJECT

TEN-YEAR PLAN

2004 - 2013

Prepared for the

Arizona Corporation Commission

January 2004

SALT RIVER PROJECT

OVERALL TRANSMISSION REVIEW
2004 - 2013

This report updates and replaces the ten-year transmission plan of the Salt River Project Agricultural Improvement and Power District (SRP), submitted January 2003 pursuant to A.R.S. Section 40-360.02. The following general review is intended to complement and clarify the individual tabular pages included herein.

Any future facilities which might have appeared in previous ten-year plans, but which are not shown in this plan, are either completed, no longer scheduled in the period covered, or are no longer required to be part of the ten-year plan.

CENTRAL ARIZONA TRANSMISSION SYSTEM (CATS) STUDY

The CATS Phase I and Phase II studies were collaborative regional transmission studies with the purpose of developing a high-level transmission plan for Central Arizona with the objective of maximizing regional benefits while developing a plan that makes more efficient use of the existing transmission system. These studies were only comparative analyses of the transmission system and were not representative of a specific time frame.

The CATS Phase III Study is a regional transmission collaborative effort with the purpose of developing a ten-year transmission plan for Central Arizona. The objective of the CATS Phase III Study was to develop a new process that would take each participant's individual ten-year plans and analyze how they perform in a regional environment with the end result being a coordinated ten-year regional plan for Central Arizona. An executive summary of the Phase III work, included

within the full report, can be found in Appendix 1 and a generalized map of the study area is provided in Attachment A.

500kV TRANSMISSION

The SRP 500kV-transmission system is shown on Attachment B. This system provides major support to SRP's local transmission network and its ability to deliver power and provide service to its customers.

Palo Verde - Pinal West

In June 2002, SRP began a siting study and public process to site what was initially named the Palo Verde to Southeast Valley/Build-out Browning Project. The Palo Verde to Southeast Valley/Build-out Browning Project consisted of two elements identified through the CATS Phase I effort to develop a 500kV transmission system blueprint for central Arizona. Initially, the project participants planned to build the two elements concurrently but because of timing issues associated with the project participants, it became necessary to separate the projects.

This first project is identified as the Palo Verde to Pinal West 500kV Transmission Project. The second project, the Pinal West to Southeast Valley/Build-out Browning Project, is described in more detail in a later section.

The Palo Verde to Pinal West 500kV Transmission Project entails the construction of two parallel single circuit 500kV transmission lines originating at the Hassayampa Switchyard near the Palo Verde Nuclear Generating Station and terminating near the Maricopa and Pinal County lines at a new substation, designated as the Pinal West Substation, southeast of the Maricopa County planning area. The new Pinal West Substation will allow for the interconnection of Tucson Electric Power Company's (TEP) 345kV line from the Westwing Substation in northwest Phoenix to the

South Substation in south Tucson. The scheduled in service date for the first line of the Palo Verde to Pinal West Project is 2006. SRP expects the second line of the project to be constructed within the next twenty years.

Participants in this project include Arizona Public Service Company (APS), TEP, Santa Cruz Water and Power Districts Association and SRP. SRP serves as the project manager. In December 2003 SRP filed on behalf of the project participants, an application for a Certificate of Environmental Compatibility (CEC) for this project.

Pinal West – Southeast Valley/Build Out Browning

A siting study for the construction of a 500kV line from the proposed Pinal West Substation to the Browning substation is underway. With the communities' input, SRP is developing a number of potential routing alternatives, as a number of jurisdictions and communities would be impacted. Following completion of the environmental and public process, SRP will file for a CEC for this project.

SRP currently plans for portions of the line to be built to accommodate a second circuit designed for 230kV attachments. SRP anticipates that this project will be staged such that the segment from Pinal West to the existing APS Santa Rosa Substation will be complete by 2007. A new 500/230kV substation will be constructed at Santa Rosa. The 230kV portion of the double circuit segment from Browning to a new substation (RS19) in the southeast valley could be complete by 2008. The current plans call for the remainder of the 500kV circuitry to be complete in the 2011 time frame.

Palo Verde - Raceway

SRP is participating in the initial siting and permitting work for a new 500kV line from the Palo Verde Nuclear Generating Station to a new 500/230kV station at the existing Raceway Substation

in northwest Phoenix. APS will have the lead on this project. This project is reflected in three separate detail sheets – Palo Verde-TS5, Raceway Loop-in of Navajo-Westwing 500kV Line and TS5-Raceway. All three portions of the project are expected to be complete by 2010.

230kV TRANSMISSION

SRP's 230kV transmission network is used to transmit power from the bulk power stations on the periphery of the Phoenix metropolitan area to the various load centers in SRP's service territory (Attachment C). Additional transmission capacity will be required during the next ten years to meet load growth and for system reliability.

Rudd Loop-in of Liberty - Orme and Anderson - Orme

Two new 230kV projects have been identified in this year's plan. Both are expected to be in service during 2007. The first project is a loop in of the existing Liberty – Orme 230kV line into the Rudd Substation. Because this requires station work only, a CEC is not required. The second project is a new circuit from the Anderson Substation in south Phoenix to the Orme Substation in southwest Phoenix. The current transmission line between the two substations is built double circuit with the two circuits paralleled. Reconfiguring the current facilities will create the new circuit but no new structures will be needed. Therefore, a CEC is not required.

RS 19

During the RS18 (Browning Substation) work, SRP identified the need for an additional 230/69kV RS19 Receiving Station in the southeast valley. RS19 will be a key facility in the ability to serve load in the eastern Queen Creek and southern Apache Junction areas. As mentioned in the Pinal West – Southeast Valley/Build Out Browning 500kV project description, SRP plans to serve this station from the Browning Substation in Mesa using the second circuit position of the Pinal West – Browning 500/230kV double circuit transmission line, with an expected in-service date of 2008.

Fountain Hills

SRP has identified the need for a 230/69kV or 115/69kV receiving station in the Fountain Hills area. The projected load in the area will stress the underlying 69kV system to its limits by approximately 2012. Two methods of serving this station are being investigated. One method is to use the 115kV system and to construct a line from either Goldfield or Stewart Mountain into the Fountain Hills area. The other possibility is to construct a 230kV line from Goldfield into the Fountain Hills area. The final line routing will be determined through a public and environmental process to support preparation of an application for a CEC.

RS17

SRP has identified the need for the future RS17 230/69kV Receiving Station in the Gilbert/Queen Creek area to support the forecasted customer load growth for the area. However, the need date has moved beyond SRP's ten-year planning window. The station site was established during a previous environmental study for the RS16 (Schrader) transmission line siting process (Case No. 86). Initial service to the RS17 receiving station will utilize existing transmission lines constructed in 1998 for the Schrader project.

RS19 – RS23

In this year's report, SRP has also included a potential line from the proposed RS19 Receiving Station to the proposed RS23 Receiving Station. This project would support the future load growth requirements in the east valley/north Pinal County portion of SRP's service territory. While the anticipated need for this project is beyond SRP's ten-year planning window, SRP is including this project in the event the project schedule is accelerated.

Potential Future Projects

A key element of SRP's transmission planning function is to utilize existing transmission corridors and open circuit positions on existing transmission structures, where feasible. The following projects have been included in this plan as informational items that may become firm plans, as system studies look farther into the future. These potential projects include:

- Rogers to Browning
- Silver King to Browning
- Silver King to Browning 230kV/Superior tie
- Westwing to Pinnacle Peak
- Pinnacle Peak to Brandow with a possible loop into Rogers or Thunderstone
- Rogers to Corbell

When system conditions are such that these facilities are needed, more definitive descriptions and schedules will be provided.

115kV TRANSMISSION

Carrel

A new 115/12kV distribution substation, designated as the Carrel Substation, is in the plan this year to provide service to growing loads in the Apache Junction area. SRP is planning to loop the existing Spurlock to Goldfield line into this new substation.

EASTERN MINING AREA TRANSMISSION

Additional transmission facilities will eventually be required in SRP's Eastern Mining Area (Attachment D). If mining loads increase between Superior and Hayden, a 230kV line from Silver King to New Hayden may be required. Depending on where new load is added, this 230kV line may have an intermediate termination at Knoll Station. The line may be constructed in phases,

with the Silver King to Knoll line being constructed first, followed by Knoll to New Hayden line, when required. The existing 115kV line from Kearny to Hayden will be looped into the New Hayden Station. The in-service dates for these lines are contingent upon customer need, but are currently projected beyond the ten-year plan.

Attached as Appendix 2 to this report is a summary of SRP's six-year planning work of this past year to support the need for the work reflected in this report. This includes the proposed Fountain Hills and Carrel projects.

January 2004

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
2006

LINE DESIGNATION:		Palo Verde – Pinal West
SIZE:		
(a)	Voltage	500kV
(b)	Capacity	1200MVA
(c)	Point of Origin	Hassayampa Switchyard SEC 15, T1S, R6W
(d)	Intermediate Point	Jojoba Switchyard SEC 25, T2S, R4W
(e)	Point of Termination	Pinal West Substation TBD
(f)	Length	Approximately 55 Miles

ROUTING: Dependent upon final approval by Arizona Corporation Commission.

PURPOSE: The Central Arizona Transmission System Study identified a number of system additions necessary to accommodate load growth and access to energy sources in the central Arizona area. This project, comprised of two transmission lines, is one of the first segments of a series of transmission lines to serve the central Arizona region. This segment will initially provide an interconnection for an Independent Power Producer to market power to the Tucson area.

DATE:

(a) Right of Way/Property Acquisition:	Fall 2004
(b) Construction to Start:	Winter 2004
(c) Estimated In-Service Date:	Summer 2006 (1st line) To be determined (2nd line)

NOTES:
SRP has made application for a CEC. This project has been assigned Case No. 124.

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
2006

LINE DESIGNATION:		Carrel 115/12kV Distribution Substation
SIZE:		
(a)	Voltage	115kV
(b)	Capacity	28MVA
(c)	Point of Origin	Carrel Substation SEC 34, T1N, R9E
(d)	Point of Termination	N/A
(e)	Length	Less than one mile

ROUTING: From the existing Spurlock to Goldfield 115kV line to the station site immediately adjacent to the transmission line corridor.

PURPOSE: Serve the increasing load in the eastern Valley and Apache Junction.

DATE:

(a) Construction to Start:	Winter 2005
(b) Estimated In-Service Date:	Winter 2006

NOTES:
Due to the placement of the station, there may be a series of structures erected to establish the loop in. SRP is reviewing the need to file an application for a CEC for this project.

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
2007, 2011

LINE DESIGNATION:		Pinal West – Browning
SIZE:		
(a)	Voltage	500kV / 230kV
(b)	Capacity	1200MVA
(c)	Point of Origin	Pinal West Substation SEC 18, T5S, R5E
(d)	Intermediate Point	Santa Rosa Substation SEC 30, T5S, R4E
(e)	Intermediate Point	Future RS19 Southeast Valley Substation TBD (T3S, R8/9E)
(f)	Point of Termination	Browning SEC 12, T1S, R8E
(g)	Length	Approximately 55 to 70 miles, depending on final route

ROUTING: Dependent upon final approval by Arizona Corporation Commission.

PURPOSE: The Central Arizona Transmission System Study identified a number of system additions necessary to accommodate load growth and access to energy sources in the central Arizona area. This transmission line is one of the first segments of a series of transmission lines to serve the central Arizona region. This segment will initially provide an interconnection with the Palo Verde market area to market power to the Phoenix, central Arizona, and Tucson areas, and to accommodate the growth in development and number of customers in Pinal County.

DATE:

(a) Right of Way/Property Acquisition:	Spring 2005
(b) Construction to Start:	Summer 2005
(c) Estim. In-Service Date for PW to SR:	Summer 2007
(d) Estim. In-Service for Browning to RS19:	2008

(e) Estim. In-Service for SR to Browning: 2011

NOTES:
SRP does not hold a CEC for this project, but will be seeking a Certificate subsequent to an environmental and public process to site the line.

January 2004

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
2007

LINE DESIGNATION:		Palo Verde-TS5
SIZE:		
(a)	Voltage	500kV
(b)	Capacity	To be determined
(c)	Point of Origin	Palo Verde Switchyard or nearby 500kV substation TBD
(d)	Point of Termination	TS5 500/230kV substation to be constructed TBD
(e)	Length	Approximately 45 miles of single-circuit line

ROUTING: Generally north from Palo Verde/Hassayampa for approximately 45 miles.

PURPOSE: This line will serve projected need for electric energy in the area immediately north and west of the Phoenix Metropolitan area. It will increase the import and export capability from the Palo Verde/Hassayampa area.

DATE:

(a) Construction to Start:	2006
(b) Estimated In-Service Date:	2007

NOTES:
It is expected that an application for a CEC will be filed during 2004.

SRP is a participant; APS is the lead and project manager.

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
2007

LINE DESIGNATION:		Anderson – Orme
SIZE:		
(a)	Voltage	230kV
(b)	Capacity	875MVA
(c)	Point of Origin	Anderson Substation SEC 12, T1S, R3E
(d)	Point of Termination	Orme Substation SEC 19, T1N, R2E
(e)	Length	Existing, no new construction

ROUTING: Second circuit on the existing Anderson – Orme 230kV line

PURPOSE: Relieve 230kV transmission line overloads in the valley

DATE:

(a) Construction to Start:	Spring 2006
(b) Estimated In-Service Date:	Summer 2007

NOTES:
This project entails breaking the parallel of the existing circuits and adding conductor to the existing circuits. No new transmission line construction is necessary, and SRP will not be seeking a CEC for this project.

January 2004

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
2007

LINE DESIGNATION:		Rudd Loop-in of Liberty – Orme 230kV Line
SIZE:		
(a)	Voltage	230kV
(b)	Capacity	875MVA
(c)	Point of Origin	Orme Substation SEC 19, T1N, R2E
(d)	Intermediate Point	Rudd Substation SEC 24, T1N, R1W
(e)	Point of Termination	Liberty Substation SEC 19, T1N, R2W
(f)	Length	No additional construction

ROUTING: Loop in of existing transmission line into an existing station. No new transmission construction.

PURPOSE: Provides the backup or contingency to the 500kV facilities at Southeast Valley Station and to provide service to new receiving stations in SRP's distribution service territory.

DATE:

(a) Construction to Start:	Spring 2006
(b) Estimated In-Service Date:	Summer 2007

NOTES:
No new transmission line construction is necessary, and SRP will not be seeking a CEC for this project.

January 2004

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
2010

LINE DESIGNATION:		Raceway Loop-in of Navajo-Westwing 500kV Line
SIZE:		
(a)	Voltage	500kV
(b)	Capacity	To be determined
(c)	Point of Origin	Navajo-Westwing 500kV line SEC 4, T5N, R1E
(d)	Intermediate Point	A point approximately one mile from the existing Raceway 230kV Substation
(e)	Point of Termination	Raceway 230kV Substation SEC 4, T5N, R1E
(f)	Length	Approximately one mile of double circuit 230kV lines and one span of double-circuit 500kV line

ROUTING: Navajo-Westwing 500kV line

PURPOSE: The loop-in of Raceway 500kV line will be needed to provide contingency support to Raceway and increase system reliability.

DATE:

(a) Construction to Start:	2009
(b) Estimated In-Service Date:	2010

NOTES:
This is a loop-in of an existing transmission line into an existing substation and the project participants will not be seeking a CEC for this project.

SRP is a participant; APS is the lead and project manager.

January 2004

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
2010

LINE DESIGNATION:		TS5 – Raceway
SIZE:		
(a)	Voltage	500kV
(b)	Capacity	To be determined
(c)	Point of Origin	Buckeye/Sun Valley Area TBD
(d)	Point of Termination	Raceway 230kV Substation SEC 4, T5N, R1E
(e)	Length	Approximately 40 miles of single-circuit line

ROUTING: North from TS5 substation and then in a northeasterly direction to the Raceway Substation

PURPOSE: This line will be needed to serve projected electric energy load in the area immediately north and west of the Phoenix Metropolitan area.

DATE:

(a) Construction to Start:	2008
(b) Estimated In-Service Date:	2010

NOTES:
An application for a CEC has not yet been filed.

SRP is a participant; APS is the lead and project manager.

January 2004

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
2012

LINE DESIGNATION: Fountain Hills Station

SIZE:

(a)	Voltage	115kV, 230kV, or 345kV
(b)	Capacity	560MVA
(c)	Point of Origin	To be determined
(d)	Point of Termination	Fountain Hills Station Northeast Scottsdale/Fountain Hills area
(e)	Length	To be determined

ROUTING: SRP will embark upon a facilities siting/environmental assessment/public process to determine the location of the station and the transmission lines supplying the station. Contingent upon final plan of service for the station and the transmission lines supplying the station.

PURPOSE: Provide a source for the development occurring in and around the Fountain Hills area, as well as relieve the stress on the lower voltage system currently supplying the Fountain Hills/Rio Verde area.

DATE:

(a) Right of Way Acquisition:	2007
(b) Construction to Start:	2010
(c) Estimated In-Service Date:	2012

NOTES:
SRP does not hold a CEC for this project, but will be seeking a Certificate subsequent to an environmental and public process to site the line.

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
TBD

LINE DESIGNATION:		RS17 Loop In
SIZE:		
(a)	Voltage	230kV
(b)	Capacity	875MVA
(c)	Point of Origin	RS17 Substation SEC 1, T2S, R6E
(d)	Point of Termination	RS17 Substation SEC 1, T2S, R6E
(e)	Length	0

ROUTING: No new line construction.

PURPOSE: Service to customer load in the Gilbert/Queen Creek area.

DATE:

(a) Construction to Start:	To be determined
(b) Estimated In-Service Date:	To be determined

NOTES:
No CEC is required for this project.

This information is included in this ten-year plan because the in-service date could advance into the ten-year reporting period.

January 2004

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
TBD

LINE DESIGNATION:		RS19 to RS23
SIZE:		
(a)	Voltage	230kV
(b)	Capacity	875MVA
(c)	Point of Origin	Future RS19, Queen Creek area TBD (T2S, R8E)
(d)	Point of Termination	Future RS23, Florence Junction area TBD (T1 or 2S, R10E)
(e)	Length	To be determined

ROUTING: Easterly from the future RS19 Substation (Queen Creek area) to the future RS23 Substation (Florence Junction area).

PURPOSE: To meet expected load growth in the eastern distribution area.

DATE:

(a) Construction to Start:	To be determined
(b) Estimated In-Service Date:	To be determined

NOTES:
SRP does not hold a CEC for this project, but will be seeking a Certificate subsequent to an environmental and public process to site the line.

This information is included in this ten-year plan because the in-service date could advance into the ten-year reporting period.

January 2004

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
TBD

LINE DESIGNATION:		Palo Verde – Saguaro Line
SIZE:		
(a)	Voltage	500kV
(b)	Capacity	1200MVA
(c)	Point of Origin	Palo Verde Generating Station Switchyard/Hassayampa Switchyard SEC 15, T1S, R6W
(d)	Intermediate Point	Site in the Mobile area TBD (T4S, R1E)
(e)	Point of Termination	Saguaro Substation SEC 14, T10S, R10E
(f)	Length	Approximately 125 miles

ROUTING: Generally south and east from the Palo Verde area to a point near Gillespie Dam, then generally easterly until the point at which the Palo Verde – Kyrene 500kV line diverges to the north and east. The corridor then is generally south and east again adjacent to a gas line corridor until meeting up with the Tucson Electric Power Company's Westwing – South 345kV line. The corridor follows the 345kV line until a point due west of the Saguaro Generating Station. The corridor then follows a lower voltage line into the 500kV yard just south and east of the generating station.

PURPOSE: Provide for the delivery of power and energy from the Palo Verde area into the central and southern portions of Arizona.

DATE:

(a) Right of Way/Property Acquisition:	To be determined
(b) Construction to Start:	To be determined
(c) Estimated In-Service Date:	To be determined

NOTES:
A CEC was applied for and granted in 1974 for this line (Case No. 24).

SRP is including this description sheet as a CATS participant with no definite in-service date.

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
TBD

LINE DESIGNATION:		Rogers – Browning
SIZE:		
(a)	Voltage	230kV
(b)	Capacity	875MVA
(c)	Point of Origin	Rogers Substation SEC 13, T1N, R5E
(d)	Point of Termination	Browning Substation SEC 12, T1S, R7E
(e)	Length	Approximately 9 miles

ROUTING: To be determined through environmental and public processes, but generally east and south from Rogers, using existing right of way, where possible.

PURPOSE: Provide adequate transmission facilities to deliver reliable power and energy to SRP's customers in the eastern valley area.

DATE:

(a) Right of Way/Property Acquisition:	To be determined
(b) Construction to Start:	To be determined
(c) Estimated In Service Date:	To be determined

NOTES:
This information is included in this ten-year plan because the in-service date could advance into the ten-year reporting period.

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
TBD

LINE DESIGNATION:		Silver King to Browning
SIZE:		
(a)	Voltage	230kV
(b)	Capacity	875MVA
(c)	Point of Origin	Silver King Substation Parts of SEC 15 & 16, T1S, R13E
(d)	Point of Termination	Browning 500/230kV Substation SEC 12, T1S, R7E
(e)	Length	38 miles*

ROUTING: From Silver King in a westerly direction to Browning

PURPOSE: To deliver Coronado or other power in eastern Arizona into SRP's distribution service territory

DATE:

(a) Construction to Start:	To be determined
(b) Estimated In-Service Date:	To be determined

NOTES:
A CEC exists for the 6 mile segment of this line from the Browning Substation to a point on the Silver King – Kyrene 500kV line corridor in Apache Junction (T1S, R8E, Section 11 & 12) (Case No. 20).

This information is included in this ten-year plan because the in-service date could advance into the ten-year reporting period.

* SRP proposes stringing 17 miles of conductor on existing lattice towers on Forest Service lands on structures built by Federal permit predating the AZ CEC process. The remaining 15 miles of the line will be new construction. SRP does not hold a CEC for this portion of the project, but will be seeking a Certificate subsequent to an environmental and public process to site the line.

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
TBD

LINE DESIGNATION:		Silver King-Browning 230kV/Superior Tie
SIZE:		
(a)	Voltage	230kV
(b)	Capacity	875MVA
(c)	Point of Origin	Point on the Silver King to Browning 230kV transmission line SEC 34, T1S, R12E
(d)	Point of Termination	Superior Substation SEC 34, T1S, R12E
(e)	Length	Approximately 1/2 mile

ROUTING: Southeast from the proposed Silver King to Browning Line to the existing Superior Substation.

PURPOSE: To provide adequate transmission capacity to meet future load growth and/or to improve electric system reliability in SRP's eastern distribution service area.

DATE:

(a) Construction to Start:	To be determined
(b) Estimated In-Service Date:	To be determined

NOTES:
SRP does not hold a CEC for this project, but will be seeking a Certificate subsequent to an environmental and public process to site the line.

This information is included in this ten-year plan because the in-service date could advance into the ten-year reporting period.

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
TBD

LINE DESIGNATION:		Westwing to Pinnacle Peak
SIZE:		
(a)	Voltage	230kV
(b)	Capacity	875MVA
(c)	Point of Origin	Westwing Substation SEC 12, T4N, R1W
(d)	Point of Termination	Pinnacle Peak Substation SEC 10, T4N, R4E
(e)	Length	Approximately 22 miles

ROUTING: Second circuit on APS Westwing-Raceway-Pioneer-Pinnacle Peak 230kV transmission line.

PURPOSE: To provide additional transfer capability from the northwest Phoenix area to the northeast Phoenix area.

DATE:

(a) Construction to Start:	To be determined
(b) Estimated In-Service Date:	To be determined

NOTES:
A CEC for this route was issued 6/18/03 (Case No. 120). The authorization to construct the second circuit of the project expires fifteen years from the date of the CEC (6/18/18).

This information is included in this ten-year plan because the in-service date could advance into the ten-year reporting period.

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
TBD

LINE DESIGNATION:		Pinnacle Peak to Brandow (with future tie into Rogers or Thunderstone)
SIZE:		
(a)	Voltage	230kV
(b)	Capacity	875MVA
(c)	Point of Origin	Pinnacle Peak Substation SEC 10, T4N, R4E
(d)	Point of Termination	Brandow Substation SEC 11, T1N, R4E
(e)	Length	To be determined

ROUTING: Use of available circuit position on existing SRP Pinnacle Peak – Papago Buttes 230kV structures from Pinnacle Peak to Brandow; easterly from a point on that line to a termination at either Rogers or Thunderstone.

PURPOSE: Provide adequate transmission capacity to accommodate SRP customer load.

DATE:

(a) Construction to Start:	To be determined
(b) Estimated In-Service Date:	To be determined

NOTES:
A CEC was awarded for this circuit as a part of Case No. 69, Pinnacle Peak – Brandow/Papago Buttes 230kV line, dated 1/85.

This information is included in this ten-year plan because the in-service date could advance into the ten-year reporting period.

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
TBD

LINE DESIGNATION:		Rogers to Corbell
SIZE:		
(a)	Voltage	230kV
(b)	Capacity	875MVA
(c)	Point of Origin	Rogers Substation SEC 13, T1N, R5E
(d)	Point of Termination	Corbell Substation SEC 10, T1S, R5E
(e)	Length	Approximately 12 miles

ROUTING: Use of available circuit position on existing 230kV structures in the area.

PURPOSE: Provide adequate transmission capacity to accommodate future load growth.

DATE:

(a) Construction to Start:	To be determined
(b) Estimated In-Service Date:	To be determined

NOTES:
SRP will be using existing structures for its entirety.

This information is included in this ten-year plan because the in-service date could advance into the ten-year reporting period.

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
TBD

LINE DESIGNATION:		Silver King to Knoll to New Hayden
SIZE:		
(a)	Voltage	230kV
(b)	Capacity	875MVA
(c)	Point of Origin	Silver King Substation Parts of SEC 15 & 16, T1S, R13E
(d)	Intermediate Termination	Knoll Substation SEC 23, T3S, R13E
(e)	Point of Termination	New Hayden Substation SEC 7, T5S, R15E
(f)	Length	Approximately 35 miles

ROUTING: South from Silver King, looped into Knoll, continuing to the Hayden area.

PURPOSE: To increase the transmission capacity to serve a new mining load.

DATE:

(a) Construction to Start:	To be determined
(b) Estimated In-Service Date:	Contingent upon customer need

NOTES:
SRP does not hold a CEC for this project, but will be seeking a Certificate subsequent to an environmental and public process to site the line.

This information is included in this ten-year plan because the in-service date could advance into the ten-year reporting period.

SALT RIVER PROJECT
TEN-YEAR PLAN
TRANSMISSION FACILITIES
TBD

LINE DESIGNATION:		Point on the Kearny-Hayden 115kV line to New Hayden; double circuit loop
SIZE:		
(a)	Voltage	115kV
(b)	Capacity	190MVA
(c)	Point of Origin	Point on Kearny to Hayden 115kV Line, SEC 7, T5S, R15E
(d)	Point of Termination	New Hayden Substation SEC 7, T5S, R15E
(e)	Length	Approximately 0.75 miles

ROUTING: Southwest from the existing Kearny-Hayden 115kV line to the New Hayden Transmission Station.

PURPOSE: To increase the transmission capacity to serve a new mining load.

DATE:

(a) Construction to Start:	To be determined
(b) Estimated In-Service Date:	Contingent upon customer need

NOTES:
SRP does not hold a CEC for this project, but will be seeking a Certificate subsequent to an environmental and public process to site the line.

This information is included in this ten-year plan because the in-service date could advance into the ten-year reporting period.

ATTACHMENT A

LEGEND:

STATION CODES:

- GENERATION STATION W/ TRANSMISSION SUBSTATION
- GENERATION STATION OTHER UTILITIES
- PROPOSED NEW GENERATION
- EXISTING GENERATION WITH NEW ADDITION
- TRANSMISSION SUBSTATION
- TRANSMISSION SUBSTATION OTHER UTILITY
- SWITCHYARD
- TRANSMISSION SUBSTATION OR SWITCHYARD (FUTURE)
- SRP GENERATION STATION
- SUBSTATION
- SUBSTATION OTHER UTILITIES

- 115kv SRP LINES
- 115kv LINES OTHER UTILITY
- 138kv LINES OTHER UTILITY
- 161kv LINES OTHER UTILITY
- 230kv SRP LINES
- 230kv LINES OTHER UTILITY
- 345kv LINES OTHER UTILITY
- 500kv SRP LINES
- 500kv APS LINES
- 500kv LINES OTHER UTILITY
- PROPOSED ADDITION

CATS PHASE 3 STUDY

NO CHANGES SHOULD BE MADE TO THIS DRAWING WITHOUT PERMISSION FROM THE CATS STEERING COMMITTEE

N

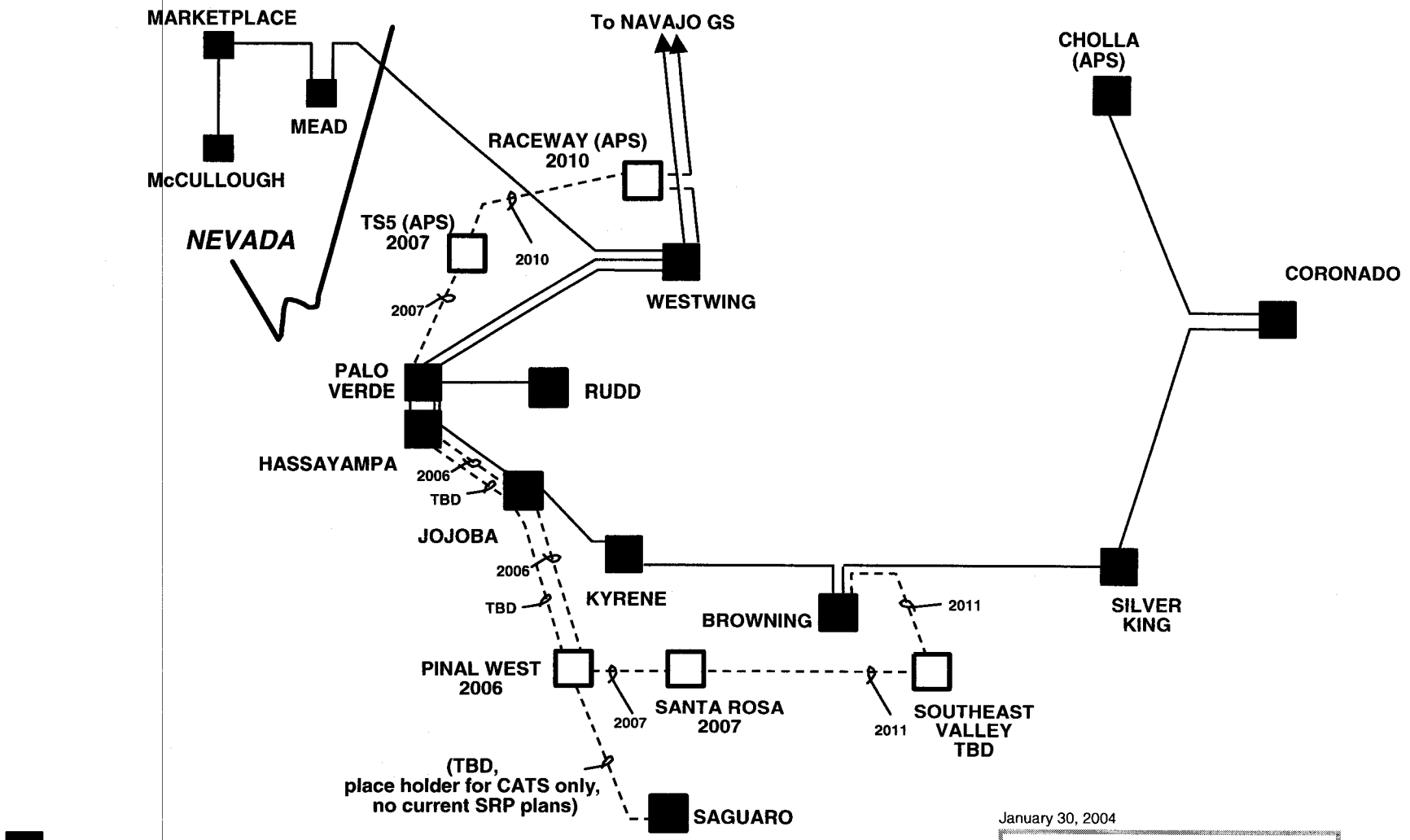
Scale in Miles

0 5 10 15 20 25

SRP makes no representation as to the accuracy of this mapping product nor as to its fitness for a particular purpose.

Cartographic & GIS Services

1/21/2004 [BOBCATS]CATSPH3.DGN
REF: PSPROJ3.TIF

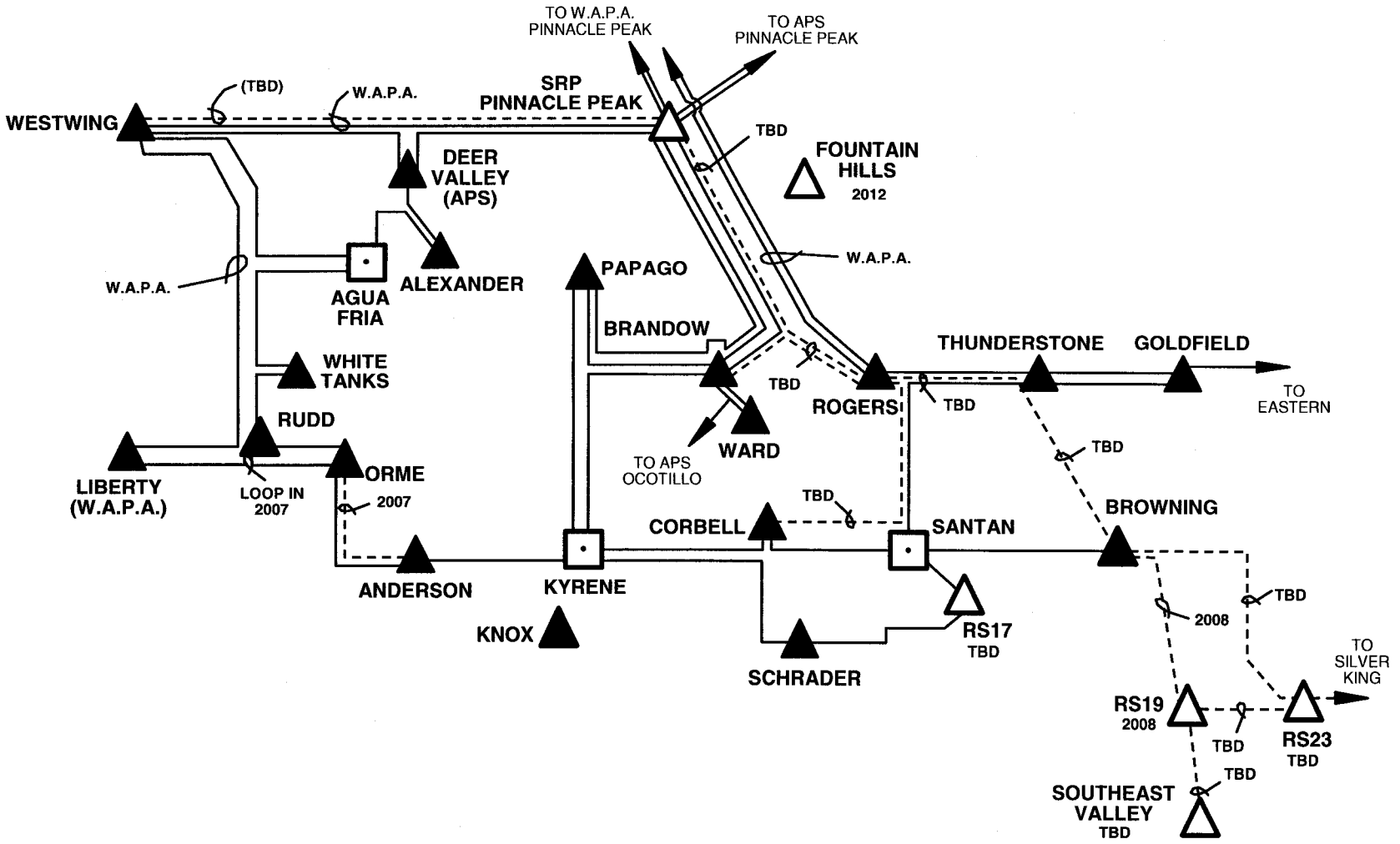


January 30, 2004

SALT RIVER PROJECT
500kV SYSTEM

ATTACHMENT B

1/29/2004 000705-1



EXISTING 230kV SUBSTATIONS

FUTURE 230kV SUBSTATIONS

GENERATING STATION

EXISTING 230kV CIRCUIT

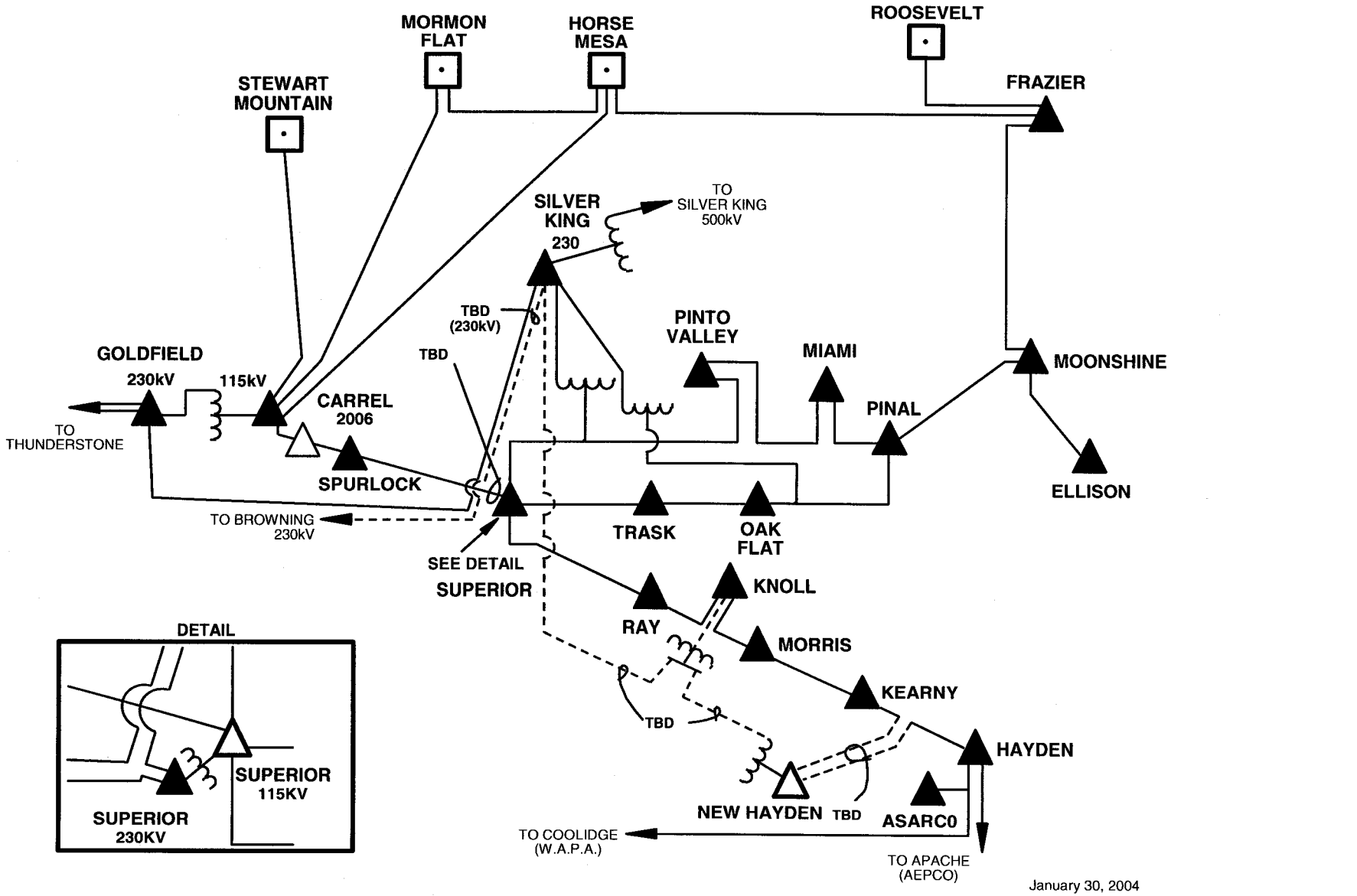
FUTURE 230kV CIRCUIT

January 30, 2004

SALT RIVER PROJECT
230kV SYSTEM

ATTACHMENT C

1/29/2004 000705-2



January 30, 2004

SALT RIVER PROJECT
EASTERN MINING AREA SYSTEM

ATTACHMENT D

1/29/2004 000705-3

SALT RIVER PROJECT

10 YEAR PLAN
2004 — 2013

APPENDIX 1

Report on the Phase III Study of the Central Arizona Transmission System (CATS)

Volume One
Prepared for the CATS Steering Committee
By Arizona Public Service, Salt River Project, Tucson Electric Power, Public Service Company of New Mexico

September 24, 2002

04-0024-01 - 01/04

Delivering more than power.™ SRP

Report on the Phase III Study Of the Central Arizona Transmission System (CATS)

Prepared For the
CATS Steering Committee

By

Arizona Public Service
Salt River Project
Southwest Transmission Cooperative
Tucson Electric Power
Western Area Power Administration

January 27, 2004

Central Arizona Transmission System (CATS) Phase III

Introduction

The CATS Phase I and Phase II studies were collaborative regional transmission studies with the purpose of developing a high-level transmission plan for Central Arizona with the objective of maximizing regional benefits while developing a plan that makes more efficient use of the existing transmission system. These studies were only comparative analysis of the transmission system. They did not represent a specific time frame.

The CATS Phase III Study is a regional transmission collaborative effort with the purpose of developing a ten-year transmission plan for Central Arizona. The objective of the CATS Phase III Study was to develop a new process which would take each participant's individual ten-year plans and analyze how they perform in a regional environment with the end result being a Ten-year regional plan for Central Arizona and a ten year coordinated base case.

This report contains a summary of the CATS Phase III study work, study results, conclusions and recommendations.

Table of Contents

Appendices:

Page

Central Arizona Transmission System (CATS) Phase III

A. Report Summary

I. Introduction

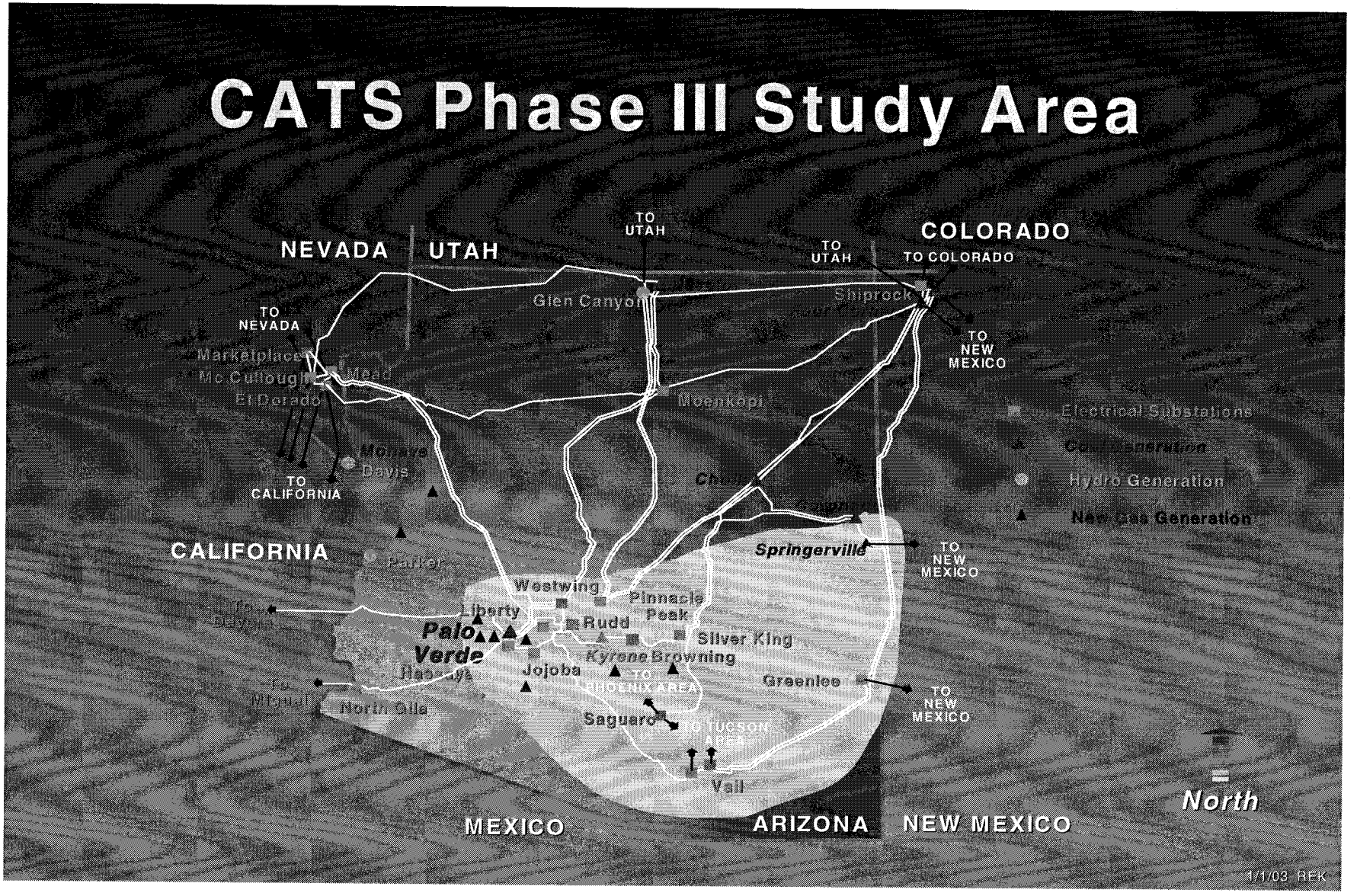
Historically, the Utility Companies in central Arizona have developed individual ten-year transmission plans The plans have been developed using an initial coordinated base case, which models the current electrical facilities. This coordinated base case was originally developed for the Phoenix Valley Operating study and is used as the seed case for future planning cases. Forecasted loads and resources are added to the seed case to develop planning cases for each year of the ten-year time frame.

In the past each individual Utility in Central Arizona have developed their own planning cases using the Phoenix Valley Operating Study base case as the seed case. Ten-year plans were developed individually and shared among the utilities before the annual filings with the ACC. Recent efforts have resulted in significant improvement in the coordination of planning cases and studies. This improved coordination has made it possible for each utility to include the latest updates to the other utilities planning assumptions during the annual ten-year planning process.

The objective of the CATS Phase III study was to develop a regional ten-year transmission plan for Central Arizona in a formalized setting (CATS). This was accomplished by building a 2012 base case with each participant's ten-year plan modeled in the case. N-0 and N-1 power flow analysis were conducted to verify that there were no thermal overloads or voltage problems for the 2012 time frame with all participants 2012 planned facilities modeled in the case.

The CATS Phase III Study Area was defined by the central Arizona region, which encompasses an area bounded by the Phoenix Metropolitan area to the north, the Tucson Metropolitan area to the south, the Palo Verde Generating Station to the west and the Arizona/New Mexico border to the east. This area includes Coolidge, Casa Grande, Eloy, Marana, Florence, Maricopa as well as the major metropolitan areas of Phoenix and Tucson. A map of the study area is shown in the highlighted area in Figure 1.

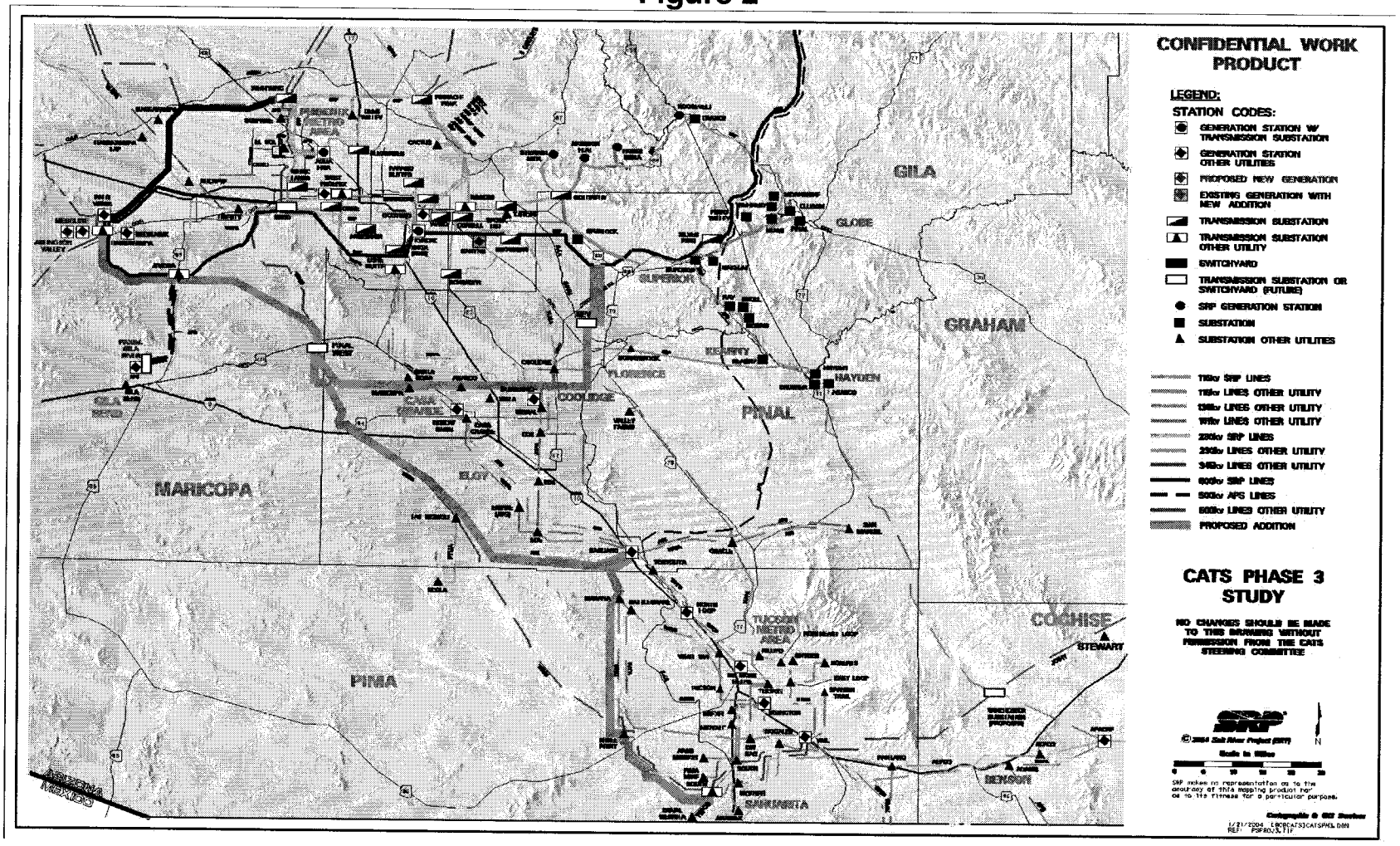
Figure 1.


CATS Phase III Study Area
NEVADA
UTAH
COLORADO
TO UTAH
TO UTAH
TO COLORADO
TO NEVADA
Glen Canyon
Shiprock
TO NEW MEXICO
Marketplace
Mc Cullough
Mead
El Dorado
Moenkopi
Electrical Substations
Coal Generation
Hydro Generation
New Gas Generation
Mohave
Davis
TO CALIFORNIA
Cholla
Springerville
CALIFORNIA
Parker
TO NEW MEXICO
Westwing
Pinnacle Peak
Liberty
Rudd
Silver King
Palo Verde
Kyrene
Browning
Jojoba
TO PHOENIX AREA
Greenlee
TO NEW MEXICO
North Gila
Saguaro
TO TUCSON AREA
Vail
North
MEXICO
ARIZONA
NEW MEXICO
1/1/03 REK

The CATS Phase III Study analyzed each individual transmission plan for each of the CATS participants in central Arizona. Each plan was modeled in a 2012 base case. N-0 and N-1 power flow analysis was conducted to determine how they would perform when modeled together in a single case.

The Participants 2012 Transmission Additions are listed in Appendix 2. Figure 2 is the CATS Phase III System, which represents the EHV system modeled in the CATS Phase III base case.

CATS TEN-YEAR PLAN
CATS PHASE III BASE SYSTEM
Figure 2



II. CATS Phase III Objectives

The objectives of the CATS Phase III study were as follows:

- Perform a Ten Year Regional Transmission Assessment for Central Arizona.
- Develop a 2012 joint base case for Central Arizona.
- Assess the impact of the individual transmission plans on the overall transmission system for Central Arizona.

III. CATS Phase III Conclusions

Based on the results of the CATS Phase III study, the following was concluded.

1) There were no EHV N-0 and N-1 problems in the Study Area.
2) Individual ten-year plans had no negative effects on the overall system when studied together for N-0 and N-1 analysis.
3) There were several problems identified on the under-lying systems. These problems were flagged and will be addressed in the individual short term planning arenas.

IV. CATS Phase III Recommendations

1) This ten-year plan study process should continue to be done every two years to coincide with the ACC biennial transmission assessment.
2) The study process should use coordinated cases developed for joint planning studies.
3) In the future CATS should be used as a forum to coordinate Transmission Studies and to fulfill Regulatory requirements as deemed necessary to do so.

B. CATS Phase III Study Results.

I. Introduction

The CATS Phase III study effort is a collaborative regional study with the purpose of developing a ten-year regional transmission plan for Central Arizona. The objective of the study was to analyze the performance of each participant's ten-year plan in a base case that included all the participant's planned facilities for the year 2012.

The CATS Phase III base map, shown in Figure 2, includes 2012 EHV transmission facilities for Central Arizona.

This report summarizes the study work done by Arizona Public Service, Salt River Project, Tucson Electric Company, Southwest Transmission Cooperative and Western Area Power Administration.

II. Report Organization.

This section of the report is organized as follows:

- Introduction and Summary of Results
- Study Scope
- Study Assumptions
- Methodology
- Individual Study Reports
- Tables
- Appendices
- One-lines
- Attachments

The conclusions are summarized in the Report Summary section of this report.

III. CATS Phase III Study Scope

The CATS Phase III Study is a high-level ten-year transmission study, which analyzed the performance of each participant's individual transmission plans within a coordinated regional base case. The base case was modeled for the 2012 Central Arizona planned EHV system.

The scope of the study work for Phase III was limited to power flow analysis of the EHV transmission System. EHV and underlying transmission systems were monitored for thermal and voltage violations for N-0 and N-1 disturbances.

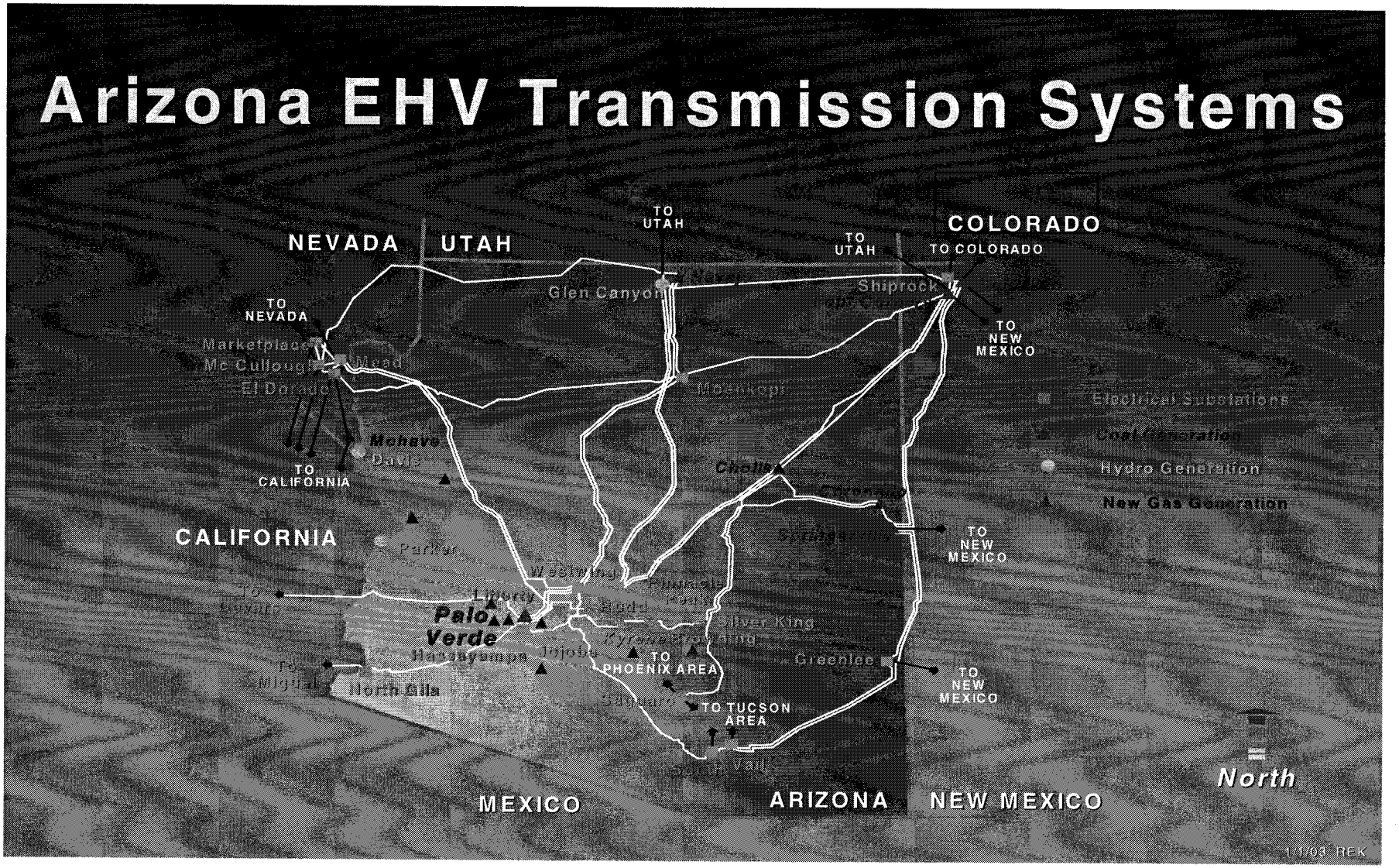
IV. Study Assumptions

Generation

The 2006 starting base case represented a 2006 load with an economic Valley generation schedule. To maintain this economic valley schedule, generation from the Palo Verde Hub was scheduled to serve the load increase from the 2006 to the 2012 time frame.

The generation modeled in the CATS Phase III base case included existing and planned generation for the 2012 study year. Figure 3 map shows new and existing generation for Arizona. A complete list of Arizona generation modeled in the study case is included in as an Attachment to this report.

FIGURE 3


Arizona EHV Transmission Systems
NEVADA
UTAH
COLORADO
TO UTAH
TO UTAH
TO COLORADO
TO NEVADA
Glen Canyon
Shiprock
TO NEW MEXICO
Marketplace
Mc Cullough
El Dorado
Mead
Mohave
Davis
TO CALIFORNIA
CALIFORNIA
Moenkopi
Eletrical Substations
Coal Generation
Hydro Generation
New Gas Generation
Cholla
Coronado
Springerville
TO NEW MEXICO
Westwing
Liberty
Palo Verde
Hassayampa
Jojoba
Kyrene
Browning
Silver King
Greenlee
TO PHOENIX AREA
TO NEW MEXICO
North Gila
TO TUCSON AREA
Vail
MEXICO
ARIZONA
NEW MEXICO
North
1/1/03 REK

Study Area

The Central Arizona Study Area encompasses an area bounded by the Phoenix Metropolitan area to the north, the Tucson Metropolitan area to the south, the Palo Verde Generation Station to the west and the Arizona/New Mexico border to the east. This area includes Coolidge, Casa Grande, Eloy, Marana, Florence, Maricopa as well as the major metropolitan areas of Phoenix and Tucson. A map of the study area is shown in the highlighted areas on Figure 2 in the Report Summary section of this report.

Load

The load was initially established in the CATS base case from a WECC 2006 heavy summer peak case. There were four major load centers identified for this study. These load centers consisted of the Phoenix area load, Central Arizona area load, Tucson area load, and Southern Arizona area load. The Phoenix area load consisted of (55%) SRP Valley Load and (45%) APS Valley Load while the Southern Arizona area load consisted of (80%) TEP Load and (20%) SWTC Load. The Central Arizona load consisted of the load area between South Phoenix and North Tucson. The load for these four major load centers was increased to a 2012-forecasted summer peak load.

Base Case

The WECC 2006 Heavy Summer base case was selected for development for this study. The load was increased and facilities were added to represent the Central Arizona area for a 2012 summer peak time frame.

V. Ten Year Plan Transmission Additions

Highlighted in Appendix 2 are the Ten-year plan additions modeled in the CATS Phase III base case.

VI. Methodology

The CATS Phase III Study is a regional transmission collaborative effort with the purpose of developing a ten-year transmission plan for Central Arizona. The CATS Phase III Study analyzed each participant's ten-year plans and how the combination of the participant's ten-year plans performed.

Power flow studies were performed using the General Electric Positive Sequence

Load Flow (GE PSLF) program. The Western Electric Coordinating Council (WECC) 2006 Heavy Summer case was selected for use in this study and the CATS Phase III base case was developed from this case. Study participants added all planned facilities to represent a 2012 time frame. Load was added to the case to represent forecasted 2012 summer peak loads.

The 2006 starting base case represented a 2006 load with an economic Valley Generation Schedule. To maintain this economic valley schedule, generation from the Palo Verde Hub was used to serve the forecasted 2012 load.

The study consisted of solely N-0 and N-1 power flow analysis. A contingency list was developed for all facilities 115kV to 500kV voltage levels in area Arizona (14). These contingencies were run on the 2012 combined ten-year planning case. All facilities of voltage levels 115kV to 500kV in area Arizona were monitored for overload conditions. A complete contingency list located in Appendix 3.

Results were analyzed for thermal and voltage violations. These violations were compiled and solutions were identified.

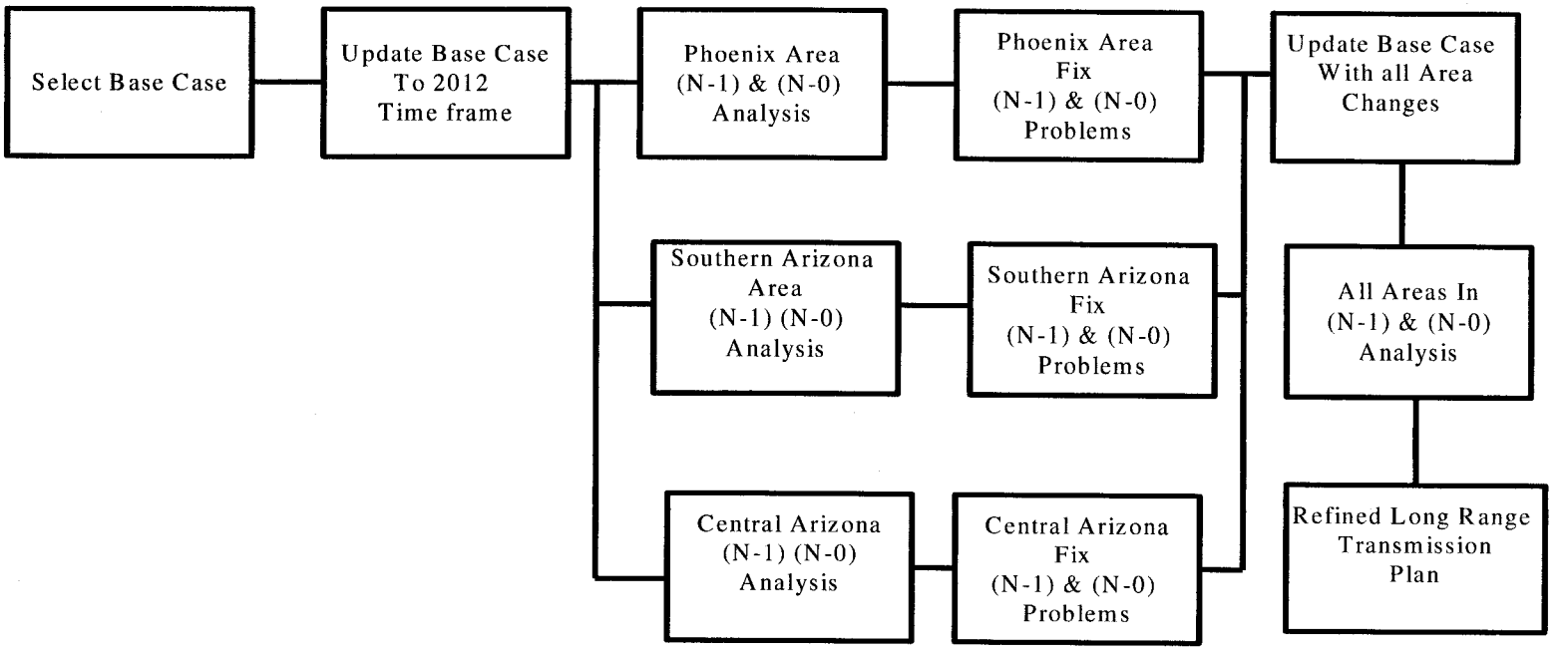
For a final run all solutions were modeled in a final version of the CATS Phase III 2012 case and additional power flow simulations were evaluated for N-0 and N-1 conditions. This was done to verify that all identified solutions were adequate.

Study performance standards were based on WECC Reliability Criteria for Transmission System Planning and individual utility ratings for facilities. All study simulations were evaluated with all facilities in service (N-0) and under single contingency conditions (N-1).

A flow chart of the CATS Phase III Study Methodology is shown in Figure 4.

Figure 4

CATS Phase III Ten Year Transmission Assessment (Methodology)



GTR 10/16/02

Summary of Technical Results

Arizona Public Service

Arizona Public Service (APS) studied the APS Transmission System for N-0 and N-1 conditions for 2012 Summer Peak time frame.

Objective

The objective of this study was to assess the performance of the APS 10 year plan in conjunction with the 10 Year plans of the study participants.

Base Case

A base case was built from a 2006 heavy summer case to represent a 2012 time frame for all study participants. Loads were added to the case to represent forecasted 2012 load levels. Facilities were added to represent APS's current 10 Year plan and the 10 Year plans for all the study participants.

Load

The loads in the case represent the APS 2012 summer peak forecast.
APS Valley load is modeled on the 230kV buses, except for the southeast, where the detailed system was represented to facilitate the CATS EHV study work.

Generation

The 2006 starting base case represented a 2006 load with an economic Valley Generation Schedule. To maintain this economic valley schedule, Generation from the Palo Verde Hub was turned on to serve the load increase from the 2006 to the 2012 time frame.

Transmission Facilities

The CATS case contains the additions presented in the 2003 APS Ten Year Plan. These additions are highlighted in Appendix 2 under the APS Additions.

Study

The study consisted of solely N-0 and N-1 power flow analysis. A contingency list was developed for all facilities 115kV to 500kV voltage levels in area Arizona (14). These contingencies were run on the 2012 combined 10 Year planning case. All facilities of voltage levels 115kV to 500kV in area Arizona were monitored for overload conditions.

Study Results

Some of the apparent overloads are due mainly to the bulk representation of the case. The Cactus - Ocotillo, Cactus - Pinnacle Peak, and Meadowbrook – Sunnyslope, and Deer Valley - Westwing lines do not overload in the detailed cases, where the sub-transmission network mitigates EHV flows.

The Agua Fria - Glendale - Country Club circuit is limited by the overhead conductor between Agua Fria and Grand Terminal. APS has been aware of this issue and plans to re-conductor the line section.

The APS - WAPA Pinnacle Peak bus tie is limited by 1600A switches and breakers. APS has been aware of this issue and is presently evaluating switch and breaker replacements.

The Lincoln Street - West Phoenix line overloads for a number of contingencies and APS has been evaluating alternatives such as re-conductor of the entire circuit or addition of a second circuit.

Below is a table summarizing the findings, with the worst case overload of each circuit identified. The N-0 overload values are not shown because they are all due to bulk representation.

Equip.	Overload	Outage	Comment
Deer Valley-Westwing	112%	Agua Fria–Alexander	Bulk rep./OK in Det. rep.
Cactus-Ocotillo	136%	Cactus-Pinnacle Peak	Bulk rep./OK in Det. rep.
Cactus-Pinnacle Peak	130%	Cactus-Ocotillo	Bulk rep./OK in Det. rep.
Meadowbk-Sunnyslope	101%	Reach-Lone Peak	Bulk rep./OK in Det. rep.
Glendale-Agua Fria	128%	Lincoln St-West Phnx	Re-conductor
Country Club-Glendale	118%	Lincoln St-West Phnx	Re-conductor
APS-WAPA PPk Tie	132%	Lincoln St-West Phnx	SW/BKR Replacement
Lincoln St.-West Phnx	117%	Country Club-Glendale	Reconductor

Conclusions

APS examined the N-0 and N-1 contingency overloads for the 2012 CATS Phase 3 Rev. 7 case. Overall, the system performed well without any unexpected results.

The above 230kV problems will be studied with further detailed analysis and addressed through the 10 year planning process.

Salt River Project

The Salt River Project (SRP) studied the SRP Transmission System for N-0 and N-1 conditions for 2012 Summer Peak time frame.

Objective

The objective of this study was to assess the performance of the SRP 10 year plan in conjunction with the 10 Year plans of the study participants.

Base Case

A base case was built from a 2006 heavy summer case to represent a 2012 time frame for all study participants. Loads were added to the case to represent forecasted 2012 load levels. Facilities were added to represent SRP's current 10 Year plan and the 10 Year plans for all the study participants.

Load

SRP forecasted loads for SRP's portion of the Valley load and the forecasted loads for the SRP Eastern Mining Area for the summer peak 2012 was represented in the case

SRP Valley load is modeled on the 69kV bus on the 69kV side of the 230/69kV transformers. The underlying 69kV system was not modeled.

Several fictitious static var compensator devices (SVD) were added to the SRP/APS system. The SVDs were added to the Kyrene 230kV, Rudd 230kV, Pinnacle Peak 230kV, Agua Fria 230kV and the Santan 230kV buses. These SVDs were sized to provide sufficient vars to support the scheduled bus voltages in the base case for pre contingency conditions. The SVDs fixed were and held constant for post-contingency runs.

Generation

The 2006 starting base case represented a 2006 load with an economic Valley Generation Schedule. Too maintain this economic valley schedule, Generation from the Palo Verde Hub was turned on to serve the load increase from the 2006 to the 2012 time frame. A Generation table for the base case can be viewed in Appendix 1.

Transmission Facilities

A list of transmission facilities that represent SRP's Ten Year Plan are highlighted in Appendix 2 under the SRP Additions.

Study

The study consisted of solely N-0 and N-1 power flow analysis. A contingency list was developed for all facilities 115kV to 500kV voltage levels in area Arizona (14). These contingencies were run on the 2012 combined 10 Year planning case. All facilities of voltage levels 115kV to 500kV in area Arizona were monitored for overload conditions.

Study Results

The following is a list of SRP facilities that were overloaded for an N-0 or N-1 conditions.

Overloaded Equipment	Loading	Outage Causing Overload
Rogers-Thunderstone 230kV	106%	Santan-Thunderstone 230kV
Brandow-Ward #1 230kV	103%	Brandow-Ward #2 230kV
Brandow-Ward #2 230kV	103%	Brandow-Ward #1 230kV
Santan-Thunderstone 230kV	172%	Silver King 500/230kV xfmr
Rudd-Orme 230kV	105%	Jojoba-Kyrene 500kV
Kyrene 500/230kV #6 xfmr	101%	Kyrene 500/230kV #7 xfmr
Kyrene 500/230kV #7 xfmr	101%	Kyrene 500/230kV #6 xfmr
Mormon Flat-Goldfield 115kV	105%	Goldfiled-Horsemesa 115kV

Conclusions

1. To resolve the Rogers/Thunderstone 230kV line loading, this line can be bundled.

2. To resolve the Brandow/Ward 230kV line loading. Brandow/Ward #1 and Brandow/Ward #2 230kV these lines can be bundled.

3. To resolve the Santan/Thunderstone 230kV line loading, this line can be bundled.

4. To resolve the Rudd/Orme 230kV line loading, the Orme/Liberty 230kV line can be looped into Rudd. This solution will cause the Orme/Anderson 230kV line to have loading problems. Therefore in conjunction with the Orme/Liberty loop-into-Rudd, the double circuit Anderson/Orme 230kV would have to be separated and bundled.

5. To resolve the Kyrene 500/230 Transformer loading, the addition of another 500/230kV Transformer can be installed.

6. To resolve the Goldfield/Mormon Flat 115kV line loading, the upgrade of a CT and Bus work would be required.

7. All the above 230kV line loading problems can also be resolved with the addition(s) of new 230kV lines.

8. The above mentioned 230kV line problems will be flagged for further detailed analysis and addressed through the 10 year planning process. These overloads may not be realized when studied in the short term planning arena, where detailed cases as used, which include the underlying 69kV system.

Southwest Transmission Cooperative

The SWTC Transmission System for N-0 and N-1 conditions was studied for the 2012 Summer Peak time frame.

Objective

The objective of this study was to assess the performance of the SWTC ten-year plan in conjunction with the ten-year plans of the study participants.

Base Case

A base case was built from a 2006 heavy summer case to represent a 2012 time frame for all study participants. Loads were added to the case to represent forecasted 2012 load levels. Facilities were added to represent SWTC's current ten-year plan and the ten-year plans for all the study participants.

Load

SWTC loads were modeled on the 115kV and 69kV buses using the 2012 forecasted peak values.

Generation

Additional generation was added to the existing Apache generation for the 2012 time frame. A Generation table for the base case can be viewed in Appendix 1.

Transmission Facilities

The transmission facilities that represent SWTC's Ten Year Plan are highlighted in SWTC Additions in Appendix 2.

Study

The study consisted of solely N-0 and N-1 power flow analysis. A contingency list was developed for all facilities 115kV to 500kV voltage levels in area Arizona (14). These contingencies were run on the 2012 combined ten-year planning case. All facilities of voltage levels 115kV to 500kV in area Arizona were monitored for overload conditions.

Study Results

The following is a list of SWTC facilities that were overloaded for N-0 or N-1 conditions.

1. The Apache 115/69 kV transformer loads to the emergency rating for the Apache/Butterfield 230kV line outage.

2. The Greenlee 193 MVA 345/230 kV transformer exceeds the emergency rating with an outage of the Greenlee 224 MVA 345/230 kV transformer.

3. The Sandario/Threepoints 115 kV line loads to the emergency rating for the Pinal West/South 345 kV line outage.

4. The Avra/Sandario 115 kV line exceeds the emergency rating for the Pinal West/South 345 kV line outage

Conclusions

1. To resolve the Apache 115/69 kV transformer loading, an additional 115/69 kV transformer will be put into service.

2. To resolve the Greenlee 193 MVA 345/230 kV transformer loading, load will be shed.

3. To resolve the Sandario/Threepoints 115 kV line loading, this line will be upgraded.

4. To resolve the Avra/Sandario 115 kV line loading, this line will be upgraded.

Tucson Electric Power

Tucson Electric (TEP) studied the TEP Transmission System for N-0 and N-1 conditions for 2012 Summer Peak time frame.

Objective

The objective of this study was to assess the performance of the TEP ten-year plan transmission additions in conjunction with the ten-year plan facilities of the study participants.

Base Case

A base case was built from a 2006 heavy summer case to represent a 2012 time frame for all study participants. Loads were added to the case to represent forecast 2012 load levels. Facilities were added to represent TEP's current ten-year plan and the ten-year plans of all the study participants.

Load

TEP forecast for the 2012 summer peak was used to represent the Tucson metro area loads. Load forecasts for the "old" Citizen's Electric (now UniSource electric services (UES)) were from a consultant study done by R. W. Beck in 2002. This was used to determine Santa Cruz county loads for the 2012 study period.

TEP and Citizen's load was lumped on the low side of 138/115 kV transformers. These loads represent 13.2, 13.8, or 46 kV distribution/radial subtransmission circuits.

Additionally, it is anticipated that an isolated portion of the Comision Federal de Electricidad (CFE) system will be connected to the TEP system at the Gateway 345kV bus. The study cases assume a 400 MW transfer to CFE as modeled by a 400 MW load at the Gateway 345kV bus.

Generation

The 2006 starting base case represented a 2006 load with a high level of TEP generation dispatch. For this study, TEP loads were increased to represent a 2012 time frame and a 400 MW transfer to CFE was modeled. However, metro Tucson generation was reduced to a minimal level – just enough to meet basic N-0 voltage and loading requirements. All additional generation required to meet load and transfer obligations was dispatched from the Palo Verde hub area.

Transmission Facilities

A list of transmission facilities that represent TEP's Ten Year Plan are highlighted in Appendix 2 under the TEP Additions.

Study

The study consisted of a power flow analysis comprised of only N-0 and N-1 contingencies. A contingency list was developed for all facilities 115kV to 500kV voltage levels in areas Arizona (14), WAPA (19), and New Mexico (10). These contingencies were run on the 2012 combined ten-year planning case. All facilities of voltage levels 115kV to 500kV throughout the previously mentioned regions were monitored for overload conditions.

Approximately 1400 MW of Palo Verde hub generation was dispatched to accommodate the TEP and Southwest Transmission Cooperative (SWTC) load growth modeled in the CATS base case.

A fictitious static var device (SVD) was added to the Sonoita 115 kV bus on the UES electric system in the Nogales area to aid in convergence of the power flow program. It is acknowledged that there are low voltage issues in the immediate area of Nogales due to the nature of the 115 kV system and delays in permitting for a planned 345 kV line to the Nogales area. UES is studying the problem in parallel with this study to determine viable solutions, especially during the interim period before EHV transmission reinforcement can be added.

Study Results

The following table describes the N-1 results assuming the South – Gateway 345 kV lines as the only TEP ten-year plan EHV addition in service:

Overloaded Equipment	Loading	Outage Causing Overload
No solution	---	Winchester – Vail 345 kV
Marana Tap – Saguaro 115 kV	101%	Springerville – Greenlee 345 kV
Tortolita – North Loop #2 138 kV	99%	Tortolita – North Loop #1 138 kV
Tortolita – North Loop #1 138 kV	99%	Tortolita – North Loop #2 138 kV
Springerville – Greenlee 345 kV	95%	Springerville – Vail 345 kV
Tortolita 500/138 kV #2 xfmr	92%	Saguaro – Tortolita #1 500 kV
Tortolita 500/138 kV #1 xfmr	92%	Saguaro – Tortolita #2 500 kV
Vail – Wilmot 138 kV	91%	South 345/138 kV xfmr
Springerville – Vail 345 kV	91%	Springerville – Greenlee 345 kV

Note: Loading is given in terms of percent of emergency rating in the case. A 90% threshold cutoff was used for reporting purposes.

The following table describes the N-1 results with all TEP ten-year plan EHV additions in service:

Overloaded Equipment	Loading	Outage Causing Overload
Apache – Butterfield 230 kV	91%	Winchester – Vail 345 kV

Note: Loading is given in terms of percent of emergency rating in the case. A 90% threshold cutoff was used for reporting purposes.

As mentioned previously, TEP metro area generation was dispatched at a minimal level, just enough to meet N-0 voltage and loading requirements. This level of generation is not adequate for the Winchester – Vail outage in the first case (no additional EHV) with loads modeled 10 years out as shown by the "No solution" entries. It was desirable, however, to have consistent generation dispatch between the two scenarios.

Conclusions

With all the currently proposed EHV projects identified in TEP's ten-year plan in place, the transmission system will be adequate to serve the TEP system ten years from now.

Western Area Power Administration

Western studied its transmission system in Revision 7 of the CATS Phase 3 power flow case for N-0 and N-1 conditions. The CATS Phase 3 case represents the year 2012 with projected heavy summer loads.

Objective

The study objective was to evaluate the performance of the Western transmission system at a ten-year planning horizon in conjunction with the ten-year plans of the other CATS Phase 3 study participants.

Base Case

All study participants built a year 2012 heavy summer case from a year 2006 heavy summer case. Facilities were added to the case by all participants, including Western, to represent each participant's current ten-year plan. Loads were added to the case by all participants, including Western, to represent forecasted 2012 load levels.

Load

Western "guesstimated" some peak load growth in its southern Arizona system to be 7%/year, from the year 2006 (starting case) to the year 2012 (horizon case). Seeking to develop good load projections, the CATS_HV group expects to develop load density maps that predict future load growth in the southern Arizona system (between Phoenix and Tucson).

Loads embedded on Western's system are modeled at both transmission and subtransmission buses. An attempt was made to model customers' subtransmission systems where their interconnections impact Western's transmission system through parallel path flows.

Western did not use fictitious static var compensators in the case representation of its system.

Generation

In the year 2012 horizon case, Parker and Davis dispatch totaled 290 MW (about

80% of their station ratings). Hoover dispatch totaled 1240 MW (about 60% of its station rating). Glen Canyon dispatch totaled 700 MW (about 55% of its station rating). The independent power producers were each at about 100% of their station ratings: Sundance at 440 MW, Griffith at 540 MW, South Point at 520 MW, and Blythe at 500 MW. Big Sandy generation was offline. A Generation table for the base case can be viewed in Appendix 1.

Transmission Facilities

The transmission facilities that represent Western's Ten-Year Plan are highlighted in the WAPA Additions of Appendix 2.

Study

The study consisted of only N-0 and N-1 steady-state power flow analysis. A single-contingency outage list was developed for all transmission facilities in Arizona, ranging from 115kV through 500kV. The single contingency outages were run on the year 2012 base case, which incorporated each participant's Ten-Year Transmission Plan. All Arizona transmission facilities, ranging from 115kV through 500kV, were monitored for overloads.

Study Results

The following is a list of Western transmission facilities that were overloaded for an N-0 or N-1 condition.

1. The Pinnacle Peak 230kV bus tie between APS and Western exceeds its continuous rating (of 1600 amps) by about 9% on one APS 230kV bus tie breaker and on the breaker's two disconnect switches.

Conclusions

1. APS plans to replace (or upgrade) the limiting components in the 230kV bus tie to solve the Pinnacle Peak 230kV bus tie overload.

Appendices

Appendix 1

Generation List

NAME	KV	BUS#	ID	ST	PGEN	PMAX	QGEN	QMAX	QMIN	AREA	ZONE
AGUAFR 1	13.80	15901	1	1	109.0	110.0	23.4	64.0	-9.0	14	150
AGUAFR 2	13.80	15902	2	1	111.0	113.0	23.4	64.0	-9.0	14	150
AGUAFR 3	18.00	15903	1	1	181.0	181.0	-0.8	40.0	-38.0	14	150
AGUAFR 4	13.80	15904	1	1	67.9	70.0	37.0	37.0	-8.0	14	150
AGUAFR 5	13.80	15905	1	1	67.9	72.0	13.2	32.0	-10.0	14	150
AGUAFR 6	13.80	15906	2	1	67.9	72.0	13.2	32.0	-10.0	14	150
APACHCT1	13.80	17024	1	1	9.0	10.0	0.5	7.0	-5.0	14	170
APACHCT2	13.80	17025	1	1	20.0	20.0	1.2	9.0	-8.0	14	170
APACHCT3	13.80	17026	1	1	65.0	65.0	10.0	30.0	-26.0	14	170
APACHCT4	13.80	17027	1	1	40.0	40.0	-9.9	37.5	-25.0	14	170
APACHCT5	13.80	17021	1	1	40.0	40.0	-9.9	37.5	-25.0	14	170
APACHCT6	13.80	17023	1	1	40.0	40.0	-9.9	37.5	-25.0	14	70
APACHCT7	13.80	17041	1	1	40.0	40.0	-9.9	37.5	-25.0	14	170
APACHCT8	13.80	17043	1	1	40.0	40.0	-9.9	37.5	-25.0	14	170
APACHST1	13.80	17028	1	1	75.0	75.0	11.0	40.0	-30.0	14	170
APACHST2	20.00	17029	1	1	175.0	175.0	21.6	100.0	-70.0	14	170
APACHST3	20.00	17030	1	1	175.0	175.0	21.8	100.0	-70.0	14	170
ARL-CT	18.00	15145	1	1	190.0	200.0	28.2	122.3	-65.0	14	158
ARL-CT2	18.00	15146	1	1	190.0	200.0	28.2	122.3	-65.0	14	158
ARL-ST1	18.00	15147	1	1	310.0	320.0	46.1	197.3	-100.0	14	158
BOWIE 1	18.00	16831	1	0	150.0	155.0	0.0	130.0	-50.0	14	160
BOWIE 2	18.00	16832	2	0	150.0	155.0	0.0	130.0	-50.0	14	160
BOWIE 3	18.00	16833	3	0	180.0	230.0	0.0	230.0	-50.0	14	160
BOWIE 4	18.00	16834	4	0	150.0	155.0	0.0	130.0	-50.0	14	160
BOWIE 5	18.00	16835	5	0	150.0	155.0	0.0	130.0	-50.0	14	160
BOWIE 6	18.00	16836	6	0	180.0	230.0	0.0	230.0	-50.0	14	160
CHOLLA	13.80	14900	1	1	110.0	110.0	-42.0	70.0	-42.0	14	141
CHOLLA2	22.00	14901	1	1	245.0	245.0	17.9	140.0	-100.0	14	141
CHOLLA3	22.00	14902	1	1	260.0	260.0	19.6	140.0	-100.0	14	141
CHOLLA4	22.00	14903	1	1	380.0	380.0	29.8	200.0	-142.0	14	141
CORONAD1	22.00	15971	1	1	435.0	435.0	57.9	190.0	-50.0	14	158
CORONAD2	22.00	15972	1	1	427.0	427.0	57.0	190.0	-50.0	14	158
DBG-CT1	18.00	14987	1	1	175.0	175.0	31.9	90.0	-10.0	14	141
DBG-CT2	18.00	14988	1	1	175.0	175.0	32.0	90.0	-10.0	14	141
DBG-ST1	18.00	14989	1	1	190.0	190.0	37.0	58.0	-30.0	14	141
DMPCCT#1	13.80	16514	1	1	73.0	73.0	-5.5	47.0	-10.0	14	160
DMPCCT#2	13.80	16520	1	1	73.0	73.0	-5.5	47.0	-10.0	14	160
FCNGEN 1	20.00	14911	1	1	170.0	170.0	-3.7	84.0	-60.0	14	141
FCNGEN 2	20.00	14912	1	1	170.0	170.0	-4.0	84.0	-60.0	14	141
FCNGEN 3	20.00	14913	1	1	220.0	220.0	-6.3	112.0	-80.0	14	141
FCNGN4CC	22.00	14914	4	1	750.0	750.0	68.7	395.0	-280.0	14	141
FCNGN5CC	22.00	14915	5	1	750.0	750.0	-18.6	395.0	-280.0	14	141
GBPP-CT1	18.00	14971	1	1	136.0	170.3	20.7	56.8	-35.0	14	141
GBPP-CT2	18.00	14972	1	1	136.0	170.3	25.0	56.8	-35.0	14	141
GBPP-CT3	18.00	14973	1	1	136.0	170.3	25.0	56.8	-35.0	14	141
GBPP-ST1	22.00	14970	1	1	275.0	390.0	-141.0	200.0	-142.0	14	141

Generation List
Continued

NAME	KV	BUS#	ID	ST	PGEN	PMAX	QGEN	QMAX	QMIN	AREA	ZONE
GIL-CT1	18.00	14800	1	1	175.0	176.0	28.0	110.0	-70.0	14	141
GIL-CT2	18.00	14801	1	1	175.0	176.0	28.0	110.0	-70.0	14	141
GIL-CT3	18.00	14803	1	1	175.0	176.0	28.0	110.0	-70.0	14	141
GIL-CT4	18.00	14804	1	1	175.0	176.0	28.0	110.0	-70.0	14	141
GIL-CT5	18.00	14806	1	1	170.0	176.0	27.4	110.0	-70.0	14	141
GIL-CT6	18.00	14807	1	1	170.0	176.0	28.0	110.0	-70.0	14	141
GIL-CT7	18.00	14809	1	1	175.0	176.0	28.0	110.0	-70.0	14	141
GIL-CT8	18.00	14810	1	1	175.0	176.0	28.0	110.0	-70.0	14	141
GIL-ST1	18.00	14802	1	1	173.0	255.0	27.7	160.0	-110.0	14	141
GIL-ST2	18.00	14805	1	1	173.0	255.0	27.7	160.0	-110.0	14	141
GIL-ST3	18.00	14808	1	1	125.0	255.0	23.0	160.0	-110.0	14	141
GIL-ST4	18.00	14811	1	0	0.0	255.0	45.9	160.0	-110.0	14	141
HAVASU12	13.20	19076	2	1	-42.0	50.0	7.7	24.0	-15.0	14	190
HAVASU12	13.20	19076	1	1	-42.0	50.0	7.7	24.0	-15.0	14	190
HAVASU34	13.20	19077	3	0	0.0	50.0	0.0	24.0	15.0	14	190
HAVASU34	13.20	19077	4	0	0.0	50.0	0.0	24.0	-15.0	14	190
HAVASU56	13.20	19078	6	0	0.0	50.0	0.0	24.0	-15.0	14	190
HAVASU56	13.20	19078	5	0	0.0	50.0	0.0	4.0	-15.0	14	190
HGC-CT1	16.00	15157	1	1	254.0	254.0	65.9	130.0	-110.0	14	158
HGC-CT2	16.00	15159	1	1	254.0	254.0	60.9	130.0	-110.0	14	158
HGC-CT3	16.00	15161	1	1	254.0	254.0	60.9	130.0	-110.0	14	158
HGC-ST1	13.80	15158	1	1	134.0	134.0	34.6	65.5	-58.0	14	158
HGC-ST2	13.80	15160	1	1	134.0	134.0	32.1	65.5	-58.0	14	158
HGC-ST3	13.80	15162	1	1	134.0	134.0	32.1	65.5	-58.0	14	158
HRSMS123	13.80	15931	1	1	9.8	10.0	1.5	1.5	1.5	14	159
HRSMS123	13.80	15931	2	1	9.8	10.0	1.5	1.5	1.5	14	159
HRSMS123	13.80	15931	3	1	9.8	10.0	1.5	1.5	1.5	14	159
HRSMS4	13.80	15934	1	1	95.0	95.0	20.0	20.0	20.0	14	159
IRVNTCT	13.80	16504	2	1	22.0	22.0	-0.7	15.0	-10.0	14	160
IRVNTCT	13.80	16504	1	1	22.0	22.0	-0.7	15.0	-10.0	14	160
IRVTGE1	13.80	16507	1	1	77.5	77.5	16.2	80.0	-15.0	14	160
IRVTGE2	13.80	16508	1	1	77.5	77.5	16.2	80.0	-15.0	14	160
IRVTGE3	13.80	16509	1	1	94.3	108.5	12.4	65.0	-15.0	14	160
IRVTGE4	18.00	16503	1	1	110.0	124.0	9.9	120.0	-30.0	14	160
KYRENE 1	12.50	15911	1	0	0.0	34.0	22.0	22.0	-11.0	14	153
KYRENE 2	12.50	15912	1	0	0.0	73.0	36.6	50.0	-21.0	14	153
KYRENE 4	13.80	15914	1	0	0.0	52.0	13.7	27.0	-19.0	14	153
KYRENE 5	13.80	15915	2	0	0.0	56.0	26.2	29.0	-14.0	14	153
KYRENE 6	13.80	15916	1	0	0.0	54.0	25.9	29.0	-14.0	14	153
KYRENE 7	13.80	15919	1	1	155.0	160.0	44.3	75.0	-55.0	14	153
KYRENGT7	18.00	15918	1	1	90.0	90.0	67.5	120.0	-80.0	14	153
MES-CT1	18.00	15164	1	1	180.0	185.0	28.9	115.0	-61.0	14	158
MES-CT2	18.00	15165	1	1	180.0	185.0	28.9	115.0	-61.0	14	158
MES-CT3	18.00	15167	1	1	180.0	185.0	28.9	115.0	-61.0	14	158
MES-CT4	18.00	15168	1	1	180.0	185.0	28.9	115.0	-61.0	14	158
MES-ST1	18.00	15166	1	1	310.0	321.0	51.2	200.0	-100.0	14	158
MES-ST2	18.00	15169	1	1	310.0	321.0	51.2	200.0	-100.0	14	158

Generation List
Continued

NAME	KV	BUS#	ID	ST	PGEN	PMAX	QGEN	QMAX	QMIN	AREA	ZONE
MRMFLT12	13.80	15941	2	1	47.0	47.0	5.61	5.0	-15.0	14	159
MRMFLT12	13.80	15941	1	1	11.0	11.0	1.0	1.0	-1.0	14	159
NAVAJO 1	26.00	15981	1	1	805.0	805.0	48.9	350.0	-140.0	14	158
NAVAJO 2	26.00	15982	1	1	805.0	805.0	49.2	350.0	-140.0	14	158
NAVAJO 3	26.00	15983	1	1	602.5	805.0	25.7	350.0	-140.0	14	158
NLOOPCT	13.80	16510	3	1	22.0	22.0	0.5	15.0	-10.0	14	160
NLOOPCT	13.80	16510	4	1	20.0	20.0	0.4	15.0	-10.0	14	160
NLOOPCT	13.80	16510	1	1	22.0	22.0	0.5	5.0	-5.0	14	160
NLOOPCT	13.80	16510	2	1	22.0	22.0	0.5	15.0	-10.0	14	160
OCOTGT1	13.80	14921	1	0	40.9	55.9	-0.2	33.0	-20.0	14	141
OCOTGT2	13.80	14922	1	0	40.9	55.9	14.7	33.0	-20.0	14	141
OCOTST1	13.80	14925	1	1	110.0	114.9	54.2	70.0	-42.0	14	141
OCOTST2	13.80	14924	1	1	110.0	114.9	54.3	70.0	-42.0	14	141
PALOVRD1	24.00	14931	1	1	1440.0	1444.0	460.5	710.0	-310.0	14	141
PALOVRD2	24.00	14932	1	1	1440.0	1444.0	460.5	710.0	-310.0	14	141
PALOVRD3	24.00	14933	1	1	1352.0	1377.0	460.5	710.0	-310.0	14	141
PVNGSCT1	13.80	14934	1	0	0.0	0.0	10.4	50.0	-18.0	14	141
PVNGSCT2	13.80	14935	1	0	0.0	0.0	10.4	50.0	-18.0	14	141
RED-CT1	18.00	14974	1	1	150.0	182.0	26.1	107.3	-60.0	14	141
RED-CT2	18.00	14975	1	1	150.0	182.0	24.9	107.3	-60.0	14	141
RED-CT3	18.00	14976	1	1	150.0	182.0	25.7	107.3	-60.0	14	141
RED-CT4	18.00	14977	1	1	150.0	182.0	22.8	107.3	-60.0	14	141
RED-CT5	18.00	14978	1	0	0.0	0.0	45.9	123.3	-68.0	14	141
RED-CT6	18.00	14979	1	0	0.0	0.0	45.9	123.3	-68.0	14	141
RED-CT7	18.00	14980	1	0	0.0	0.0	45.9	123.3	-68.0	14	141
RED-CT8	18.00	14981	1	0	0.0	0.0	45.9	123.3	-68.0	14	141
RED-ST1	18.00	14982	1	1	160.0	204.0	25.6	123.3	-68.0	14	141
RED-ST2	18.00	14983	1	1	170.0	204.0	24.3	123.3	-68.0	14	141
RED-ST3	18.00	14984	1	0	0.0	0.0	45.9	123.3	-68.0	14	141
RED-ST4	18.00	14985	1	0	0.0	0.0	45.9	123.3	-68.0	14	141
RSVLTGEN	13.80	15951	1	1	35.0	36.0	4.0	4.0	4.0	14	159
SAG. CT1	13.80	14944	1	0	54.5	54.5	4.5	33.0	-20.0	14	141
SAG. CT2	13.80	14943	1	0	54.5	54.5	4.4	33.0	-20.0	14	141
SAG. CT3	13.80	14945	1	1	72.0	80.0	5.9	55.0	-26.0	14	141
SAGUARO1	15.50	14941	1	1	110.0	110.0	29.8	62.0	-39.0	14	141
SAGUARO2	15.50	14942	1	1	99.0	99.0	29.4	62.0	-39.0	14	141
SANTAN 1	13.80	15921	1	1	92.0	92.0	32.8	70.0	-28.0	14	156
SANTAN 2	13.80	15922	1	1	89.0	89.0	32.2	70.0	-28.0	14	156
SANTAN 3	13.80	15923	1	1	94.0	94.0	33.2	70.0	-28.0	14	156
SANTAN 4	13.80	15924	1	1	92.0	92.0	32.3	70.0	-28.0	14	156
SPR GEN1	19.00	16500	1	1	380.0	420.0	31.1	215.0	-120.0	14	160
SPR GEN2	19.00	16501	1	1	380.0	420.0	31.1	215.0	-120.0	14	160
SPR GEN3	19.00	16518	1	0	380.0	380.0	0.0	100.0	-100.0	14	160
STEWMTN	11.00	15961	1	1	13.0	13.0	5.0	5.0	-5.0	14	159
ST_CT_5A	18.00	15926	1	1	141.0	153.8	22.1	80.0	-60.0	14	156
ST_CT_5B	18.00	15927	1	1	141.0	153.8	35.5	80.0	-60.0	14	156
ST_CT_6A	18.00	15929	1	1	141.0	153.8	35.5	80.0	-60.0	14	156

Generation List
Continued

NAME	KV	BUS#	ID	ST	PGEN	PMAX	QGEN	QMAX	QMIN	AREA	ZONE
ST_ST_5S	18.00	15928	1	1	270.0	274.0	70.2	195.0	-90.0	14	156
ST_ST_6S	13.80	15930	1	1	125.0	136.0	34.4	83.0	-63.0	14	156
WADDEL23	13.80	19300	2	1	4.1	7.6	-1.6	4.0	-3.0	14	140
WADDEL23	13.80	19300	3	1	4.1	7.6	-1.6	4.0	-3.0	14	140
WADDEL67	13.80	19301	7	1	4.0	7.6	-1.6	4.0	-3.0	14	140
WADDEL67	13.80	19301	6	1	4.1	7.6	-1.6	4.0	-3.0	14	140
WPCC4CT1	13.80	14958	1	1	91.0	91.0	51.6	64.0	-35.0	14	141
WPCC4ST1	13.80	14950	1	1	34.0	44.6	27.5	27.5	-19.5	14	141
WPCC5CT1	15.00	14966	1	1	167.0	181.0	19.1	112.0	-88.0	14	141
WPCC5CT2	15.00	14967	1	1	167.0	181.0	35.7	112.0	-88.0	14	141
WPCC5ST1	16.50	14968	1	1	192.0	200.6	38.1	124.0	-94.0	14	141
WPHX CC1	13.80	14951	1	1	85.0	85.0	23.2	64.0	-35.0	14	141
WPHX CC2	13.80	14952	1	1	85.0	85.0	23.3	64.0	-35.0	14	141
WPHX CC3	13.80	14953	1	1	85.0	85.0	24.4	64.0	-35.0	14	141
WPHX GT1	13.80	14954	1	0	56.2	56.2	9.4	33.0	-20.0	14	141
WPHX GT2	13.80	14957	1	0	56.2	56.2	9.8	33.0	-20.0	14	141
WPHX ST4	12.50	14955	1	0	0.0	0.0	-8.4	20.0	-15.0	14	141
WPHX ST6	12.50	14959	1	0	62.0	62.0	24.6	40.0	-30.0	14	141
YUCCACT1	13.20	14961	1	1	15.7	19.1	12.0	12.0	-7.0	14	141
YUCCACT2	13.20	14962	1	0	0.0	0.0	12.0	12.0	-7.0	14	141
YUCCACT3	13.80	14963	1	0	0.0	0.0	12.8	32.0	-18.0	14	141
YUCCACT4	13.80	14964	1	0	0.0	0.0	12.6	32.0	-18.0	14	141
YUCCAGEN	13.80	14965	1	1	75.0	75.0	30.8	54.0	-32.0	14	141
YUMA EQ.	69.00	14406	1	1	51.0	56.0	18.0	33.0	-18.0	14	847
BLYENG1	16.00	19322	1	1	155.0	155.0	21.2	96.0	-96.0	19	199
BLYENG2	16.00	19323	1	1	155.0	155.0	6.0	96.0	-96.0	19	199
BLYENG3	16.00	19324	1	1	193.0	193.0	6.0	120.0	-97.0	19	199
DAVISG1	13.80	19001	1	1	42.0	52.0	4.3	19.5	-25.5	19	190
DAVISG2	13.80	19002	1	1	42.0	52.0	4.3	19.5	-25.5	19	190
DAVISG3	13.80	19003	1	1	42.0	52.0	4.3	19.5	-25.5	19	190
DAVISG4	13.80	19004	1	1	42.0	52.0	4.3	19.5	-25.5	19	190
DAVISG5	13.80	19005	1	1	42.0	52.0	4.3	19.5	-25.5	19	190
GLENC1-2	13.80	79150	2	1	100.0	165.0	-0.7	62.0	-58.0	19	190
GLENC1-2	13.80	79150	1	1	100.0	165.0	-0.7	62.0	-58.0	19	190
GLENC3-4	13.80	79151	4	1	100.0	165.0	0.8	62.0	-58.0	19	190
GLENC3-4	13.80	79151	3	1	100.0	165.0	0.8	62.0	-58.0	19	190
GLENC5-6	13.80	79152	6	1	100.0	165.0	0.8	62.0	-58.0	19	190
GLENC5-6	13.80	79152	5	1	100.0	165.0	08	62.0	-58.0	19	190
GLENC7-8	13.80	79153	7	1	100.0	157.0	3.4	62.0	-58.0	19	190
GLENC7-8	13.80	79153	8	1	0.0	157.0	5.9	62.0	-58.0	19	190
GRIFFTH1	16.00	19311	1	1	166.0	230.0	1.6	111.0	-80.0	19	199
GRIFFTH2	16.00	19312	1	1	166.0	230.0	1.6	111.0	-80.0	19	199
GRIFFTH3	16.00	19313	1	1	208.0	320.0	2.2	155.0	-111.0	19	199
HEADGAT1	4.16	19305	1	0	6.5	7.0	-1.3	3.0	-3.0	19	190
HEADGAT2	4.16	19306	1	0	6.5	7.0	-1.3	3.0	-3.0	19	190
HEADGAT3	4.16	19307	1	0	6.5	7.0	-1.3	3.0	-3.0	19	190
HOOVERA3	16.50	19023	1	1	10.4	130.0	17.6	30.0	-30.0	19	190

Generation List
Continued

NAME	KV	BUS#	ID	ST	PGEN	PMAX	QGEN	QMAX	QMIN	AREA	ZONE
HOOVERA4	16.50	19024	1	1	85.0	130.0	19.5	30.0	-30.0	19	190
HOOVERA5	16.50	19025	1	1	85.0	127.0	9.7	30.0	-30.0	19	190
HOOVERA6	16.50	19026	1	1	85.0	130.0	7.9	30.0	-30.0	19	190
HOOVERA7	16.50	19027	1	1	85.0	130.0	9.5	30.0	-30.0	19	190
HOVRA1A2	16.50	19028	A2	1	85.0	130.0	8.4	30.0	-30.0	19	190
HOVRA1A2	16.50	19028	A1	1	85.0	130.0	8.4	30.0	-30.0	19	190
HOVRA8A9	16.50	19031	A9	1	0.0	68.5	4.1	30.0	-30.0	19	190
HOVRA8A9	16.50	19031	A8	1	0.0	61.5	3.7	30.0	-30.0	19	190
HOVRN1N2	16.50	19032	N2	1	100.0	130.0	9.6	30.0	-30.0	19	190
HOVRN1N2	16.50	19032	N1	1	100.0	130.0	9.6	30.0	-30.0	19	190
HOVRN3N4	16.50	19033	N3	1	100.0	130.0	9.6	30.0	-30.0	19	190
HOVRN3N4	16.50	19033	N4	1	100.0	130.0	9.6	30.0	-30.0	19	190
HOVRN5N6	16.50	19034	N5	1	100.0	130.0	13.2	30.0	-30.0	19	190
HOVRN5N6	16.50	19034	N6	1	100.0	130.0	13.2	30.0	-30.0	19	190
HOVRN7N8	16.50	19035	N8	1	0.0	130.0	12.5	30.0	-30.0	19	190
HOVRN7N8	16.50	19035	N7	1	100.0	127.0	8.9	30.0	-30.0	19	190
PARKERG1	6.90	19006	1	1	20.0	26.0	4.3	5.0	-12.0	19	190
PARKERG2	6.90	19007	1	1	20.0	26.0	4.3	5.0	-12.0	19	190
PARKERG3	6.90	19008	1	1	20.0	26.0	4.3	5.0	-12.0	19	190
PARKERG4	6.90	19009	1	1	20.0	26.0	4.3	5.0	-12.0	19	190
SOPOINT1	16.00	19317	1	1	182.0	182.0	27.6	108.0	-108.0	19	199
SOPOINT2	16.00	19318	1	1	182.0	182.0	28.3	108.0	-108.0	19	199
SOPOINT3	16.00	19319	1	1	157.0	177.0	27.6	105.0	-105.0	19	199
SUN G1	13.80	19411	1	1	43.7	43.7	11.4	30.0	-20.0	19	199
SUN G10	13.80	19420	1	1	43.7	43.7	11.4	30.0	-20.0	19	199
SUN G11	13.80	19427	1	0	43.7	43.7	12.4	30.0	-20.0	19	199
SUN G12	13.80	19428	1	0	43.7	43.7	12.4	30.0	-20.0	19	199
SUN G2	13.80	19412	1	1	43.7	43.7	11.4	30.0	-20.0	19	199
SUN G3	13.80	19413	1	1	43.7	43.7	11.4	30.0	-20.0	19	199
SUN G4	13.80	19414	1	1	43.7	43.7	11.4	30.0	-20.0	19	199
SUN G5	13.80	19415	1	1	43.7	43.7	11.4	30.0	-20.0	19	199
SUN G6	13.80	19416	1	1	43.7	43.7	11.4	30.0	-20.0	19	199
SUN G7	13.80	19417	1	1	43.7	43.7	11.4	30.0	-20.0	19	199
SUN G8	13.80	19418	1	1	43.7	43.7	11.4	30.0	-20.0	19	199
SUN G9	13.80	19419	1	1	43.7	43.7	11.4	30.0	-20.0	19	199

Appendix 2
Transmission Additions

APS Additions

I. Station Additions:

1. Pinal West 500/230 kV transformation to Santa Rosa
2. 2nd North Gila 500/69 kV transformer

II. 500kV Line Additions:

1. Silver King Cut-in of the Cholla – Saguaro 500kV line

III. 345kV Line Additions:

1. Flagstaff interconnection to WAPA 345kV

IV. 230kV Line Additions:

1. TS5- Trilby Wash – TS2 – TS3 – Rudd 230kV
2. Westwing – Raceway – Avery – Misty Willow – Pinnacle Peak 230kV.

SRP Additions

I. Stations Additions:

1. South East Valley 500/230kV Station
2. RS19 230/69kV Station

II. 500kV Line Additions:

1. Pinal West/South East Valley 500kV line
2. Loop in the Browning/Silver King 500kV line into South East Valley

III. 230kV Line Additions:

1. Southeast Valley/Browning 1 & 2 230kV Lines
2. RS19/Browning 230kV Line
3. RS19/Southest Valley 230kV Line
4. Thunderstone/Goldfield 230kV Line Bundle 1 & 2

SWTC Additions

I. Stations Additions:

1. Winchester 345/230 kV substation and transformer
2. Sandario 115 kV substation
3. Kartchner 115/69 kV transformer upgraded to 100 MVA
4. Saddlebrooke Ranch 115 kV substation
5. Second Bicknell 230/115 kV transformer
6. Dos Condados 2-230/69 kV transformers upgraded to 100 MVA
7. Sahuarita 230/69 kV transformer

II. 230 kV Line Additions:

1. Apache/Winchester 230 kV line

III. 115 kV Line Additions:

1. Loop the Avra/Marana 115 kV line into Sandario
2. Interconnect Saddlebrooke Ranch with the Saguaro/San Manual 115 kV

TEP Additions

I. Station Additions:

1. Gateway 345/115kV Station
2. Robert Bills – Wilmot 138 kV Station
3. Pantano 138kV Station
4. Cyprus Raw Water 138kV Station

II. 500kV Line Additions:

1. Pinal West/Saguaro 500 kV Line

III. 345kV Line Additions:

1. Loop-in of Westwing/South 345kV line into Pinal West
2. Saguaro/South 345 kV Line
3. South/Gateway 345 kV Line (2 ckts)

IV. 138/115kV Line Additions:

1. Gateway/Valencia 115kV
2. Loop-in of Irvington/Vail #2 138 kV line into Robert Bills/Wilmot
3. Loop-in of LosReales/East Loop 138 kV line into Pantano
4. Green Valley/Cyprus 138 kV with intermediate Cyprus Raw Water

WAPA Additions

The following is a list of transmission facilities that represent Western's Ten-Year Plan.

I. Station Additions:

1. Add a new 10 MVA transformer at Phoenix 230/12.47-kV.
2. Uprate Lone Butte from 115kV to 230kV.
3. Uprate Maricopa from 115kV to 230kV.
4. Add 230kV bus tie between Maricopa and APS' Santa Rosa.
5. Uprate Casa Grande from 115kV to 230kV.
6. Uprate Empire from 115kV to 230kV.
7. Uprate ED5 from 115kV to 230kV.
8. Uprate ED4 from 115kV to 230kV.
9. Uprate ED2 from 115kV to 230kV.
10. Add a 230/115-kV transformer at ED2.
11. Uprate Signal from 115kV to 230kV.
12. Uprate Valley Farms (Tap) from 115kV to 230kV.
13. Uprate Oracle from 115kV to 230kV.
14. Add a 230/115-kV transformer at Oracle (probably move one of two Coolidge transformers).
15. Build new Saguaro 230/115-kV (former Phoenix transformer).
16. Upgrade Marana (Tap) 115kV.
17. Build new North Havasu 230kV.
18. Add a new (third) 75 MVA transformer at Gila 161/69-kV.
19. Add a new 200 MVA transformer at North Gila 161/69-kV.
20. Upgrade Round Valley 230kV.
21. Loop Liberty – Westwing 230kV into existing Rudd.
22. Loop Round Valley – Prescott 230kV into Williamson Valley.
23. Loop Pinnacle Peak – Prescott 230kV into Gavilan Peak.
24. Loop Gavilan Peak – Prescott 230kV into Table Mesa.
25. Interconnect APS 230kV at Flagstaff 345kV station.

II. 230kV Line Additions:

1. Uprate Phoenix - Lone Butte from 115kV to 230kV.
2. Uprate Lone Butte - Maricopa from 115kV to 230kV.
3. Uprate Maricopa - Casa Grande from 115kV to 230kV.
4. Uprate Casa Grande - Empire from 115kV to 230kV.
5. Uprate Empire - ED5 from 115kV to 230kV.
6. Uprate ED5 - Saguaro from 115kV to 230kV.
7. Uprate ED5 - ED4 from 115kV to 230kV.
8. Uprate ED4 - ED2 from 115kV to 230kV.
9. Uprate ED2 - Coolidge from 115kV to 230kV.
10. Uprate ED2 – Signal - Coolidge from 115kV to 230kV.
11. Uprate Coolidge - Valley Farms Tap from 115kV to 230kV.
12. Uprate Valley Farms Tap - Oracle from 115kV to 230kV.
13. Uprate Oracle - Saguaro from 115kV to 230kV.
14. Loop Liberty - Westwing 230kV into existing Rudd.
15. Loop Topock - Parker 230kV into new North Havasu.
16. Loop Round Valley – Prescott 230kV into Williamson Valley.
17. Loop Pinnacle Peak – Prescott 230kV into Gavilan Peak.
18. Loop Gavilan Peak – Prescott 230kV into Table Mesa.

III. 161kV Line Additions:

Build Wellton Mohawk – North Gila 161kV.

Joint Ownership Additions

The following is a list of transmission facilities that are represent in the Ten-Year Plan with join ownership.

I. Station Additions:	Ownership
1. Rudd 4th 500/230kV Transformer	APS/SRP
2. Pinal West 500/345kV Station	APS/SRP/TEP
3. TS5 500/230kV Station	APS/SRP
4. Raceway 500/230kV Station	APS/SRP

II. 500kV Line Additions:

1. Hassyampa/Jojoba/Pinal West 500kV Line	APS/SRP/TEP
2. Palo Verde/TS5 500kV Line	APS/SRP
3. TS5/Raceway 500kV Line	APS/SRP

Appendix 3

Contingency List

Line/Xfmr	From Bus	To Bus	Circuit
Line	MARICOPA 230.0	SNTAROSA 230.0	1
Line	ALEXNDR 230.0	ALEXANDR 230.0	1
Line	SAN_JUAN 345.0	MCKINLEY 345.0	1
Line	SAN_JUAN 345.0	MCKINLEY 345.0	2
Line	HIDALGO 345.0	GREENLEE 345.0	1
Line	MOENKOPI 500.0	YAVAPAI 500.0	1
Line	MOENKOPI 500.0	ELDORDO 500.0	1
Line	NAVAJO 500.0	MOENKOPI 500.0	1
Line	NAVAJO 500.0	CRYSTAL 500.0	1
Line	SAGUARO 500.0	TORTOLIT 500.0	1
Line	SAGUARO 500.0	TORTLIT2 500.0	1
Line	YAVAPAI 500.0	WESTWING 500.0	1
Line	GILARIVR 500.0	WATRMLON 500.0	1
Line	JOJOBA 500.0	GILARIVR 500.0	1
Line	JOJOBA 500.0	WATRMLON 500.0	1
Line	JOJOBA 500.0	KYRENE 500.0	1
Line	JOJOBA 500.0	PINAL_W 500.0	1
Line	GILABDPP 500.0	WATRMLON 500.0	1
Line	CHOLLA 345.0	PNPKAPS 345.0	1
Line	CHOLLA 345.0	PRECHCYN 345.0	1
Line	FOURCORN 345.0	SAN_JUAN 345.0	1
Line	FOURCORN 345.0	WESTMESA 345.0	1
Line	FOURCORN 345.0	RIOPUERC 345.0	1
Line	FOURCORN 345.0	CHOLLA 345.0	1
Line	FOURCORN 345.0	CHOLLA 345.0	2
Line	PRECHCYN 345.0	PNPKAPS 345.0	1
Line	BUCKEYE 230.0	LIBERTY 230.0	1
Line	CACTUS 230.0	OCOTILLO 230.0	1
Line	CACTUS 230.0	PNPKAPS 230.0	1
Line	CASGRAPS 230.0	SAGUARO 230.0	1
Line	CASGRAPS 230.0	DBG 230.0	1
Line	CHOLLA 230.0	LEUPP 230.0	1
Line	COCONINO 230.0	VERDE S 230.0	1
Line	CTRYCLUB 230.0	GLENDALE 230.0	1
Line	CTRYCLUB 230.0	LINCSTRT 230.0	1
Line	DEERVALY 230.0	WESTWING 230.0	1
Line	DEERVALY 230.0	ALEXANDR 230.0	1
Line	DEERVALY 230.0	PINPKSRP 230.0	1

Contingency List
Continued

Line/Xfmr	From Bus	To Bus	Circuit
Line	EL SOL230.0	AGUAFRIA 230.0	1
Line	FOURCORN 230.0	PILLAR 230.0	1
Line	LINCSTRT 230.0	OCOTILLO 230.0	1
Line	LINCSTRT 230.0	WPHXAPSN 230.0	1
Line	LONEPEAK 230.0	PNPKAPS 230.0	1
Line	LONEPEAK 230.0	SUNYSLOP 230.0	1
Line	MEADOWBK 230.0	CTRYCLUB 230.0	1
Line	MEADOWBK 230.0	SUNYSLOP 230.0	1
Line	REACH 230.0	LONEPEAK 230.0	1
Line	REACH 230.0	PNPKAPS 230.0	1
Line	PNPKAPS 230.0	OCOTILLO 230.0	1
Line	PNPKAPS 230.0	PINPKSRP 230.0	1
Line	PNPKAPS 230.0	PINPKSRP 230.0	2
Line	PNPKAPS 230.0	PINPK 230.0	1
Line	SAGUARO 230.0	TATMOMLI 230.0	1
Line	SNTAROSA 230.0	TATMOMLI 230.0	1
Line	SNTAROSA 230.0	DBG 230.0	1
Line	PINAL_W 230.0	SNTAROSA 230.0	1
Line	SURPRISE 230.0	EL SOL 230.0	1
Line	SURPRISE 230.0	WESTWING 230.0	1
Line	VERDE N 230.0	VERDE S 230.0	1
Line	WHTNKAPS 230.0	EL SOL 230.0	1
Line	WHTNKAPS 230.0	WPHXAPSN 230.0	1
Line	RUDD 230.0	WWG-DSW 230.0	1
Line	WPHXAPSS 230.0	RUDD 230.0	1
Line	YAVAPAI 230.0	VERDE N 230.0	1
Line	YAVAPAI 230.0	WILOWLKE 230.0	1
Line	GILABEND 230.0	GILARIVR 230.0	1
Line	GILABDPP 230.0	GILABEND 230.0	1
Line	GLENDALW 230.0	GLENDALE 230.0	1
Line	GLENDALW 230.0	AGUAFRIA 230.0	1
Line	WILOWLKW 230.0	PRESCOTT 230.0	1
Line	WILOWLKW 230.0	WILOWLKE 230.0	1
Line	BONNYBKE 115.0	BONNYBKW 115.0	1
Line	PRESCOTT 115.0	BAGDAD 115.0	1
Line	SAG.EAST 115.0	SAG.WEST 115.0	1
Line	SAG.WEST 115.0	SNMANUEL 115.0	1
Line	CORONADO 500.0	CHOLLA 500.0	1
Line	CORONADO 500.0	SILVERKG 500.0	1
Line	KYRENE 500.0	BROWNING 500.0	1
Line	PALOVRDE 500.0	WESTWING 500.0	1

Contingency List
Continued

Line/Xfmr	From Bus	To Bus	Circuit
Line	PALOVRDE 500.0	WESTWING 500.0	2
Line	PALOVRDE 500.0	RUDD 500.0	1
Line	PALOVRDE 500.0	DEVERS 500.0	1
Line	PERK PS1 500.0	PERKINPS 500.0	1
Line	PERK PS2 500.0	PERKINPS 500.0	1
Line	PERKINPS 500.0	WESTWING 500.0	1
Line	HASSYAMP 500.0	JOJOBA 500.0	1
Line	HASSYAMP 500.0	JOJOBA 500.0	2
Line	HASSYAMP 500.0	REDHAWK 500.0	1
Line	HASSYAMP 500.0	REDHAWK 500.0	2
Line	HASSYAMP 500.0	PALOVRDE 500.0	1
Line	HASSYAMP 500.0	PALOVRDE 500.0	2
Line	HASSYAMP 500.0	PALOVRDE 500.0	3
Line	HASSYAMP 500.0	ARLINTON 500.0	1
Line	HASSYAMP 500.0	HARQUAHA 500.0	1
Line	HASSYAMP 500.0	MESQUITE 500.0	1
Line	HASSYAMP 500.0	N.GILA 500.0	1
Line	HASSYAMP 500.0	PINAL_W 500.0	1
Line	ASARCOTP 115.0	ASARCOSR 115.0	1
Line	ASARCOTP 115.0	BONNEYTP 115.0	1
Line	BONNEYTP 115.0	BONNYBKW 115.0	1
Line	BONNEYTP 115.0	COOLIDGE 115.0	1
Line	CARLOTA 115.0	PINTOVLY 115.0	1
Line	CARLOTA 115.0	SILVERK2 115.0	1
Line	ELLISON 115.0	83.9E3NT 115.0	1
Line	FRAZIER 115.0	MOONSHIN 115.0	1
Line	FRAZIER 115.0	ROOSEVLT 115.0	1
Line	GOLDFELD 115.0	HORSMESA 115.0	1
Line	GOLDFELD 115.0	MRMNFLAT 115.0	1
Line	GOLDFELD 115.0	SPURLOCK 115.0	1
Line	HAYDENAZ 115.0	ASARCOTP 115.0	1
Line	HAYDENAZ 115.0	KEARNYTP 115.0	1
Line	HORSMESA 115.0	FRAZIER 115.0	1
Line	HORSMESA 115.0	MRMNFLAT 115.0	1
Line	KEARNYTP 115.0	KEARNY 115.0	1
Line	KEARNYTP 115.0	MORRISAZ 115.0	1
Line	KNOLL 115.0	MORRISAZ 115.0	1
Line	MIAMI 115.0	PINAL 115.0	1
Line	MIAMI 115.0	PINTOVLY 115.0	1
Line	MIAMI 115.0	83.9E3NT 115.0	1
Line	MOONSHIN 115.0	PINAL 115.0	1

Contingency List
Continued

Line/Xfmr	From Bus	To Bus	Circuit
Line	MOONSHIN 115.0	83.5E3NT 115.0	1
Line	OAKFLAT 115.0	SILVERT1 115.0	1
Line	PINAL 115.0	SILVERT1 115.0	1
Line	RAY 115.0	KNOLL 115.0	1
Line	RAY 115.0	SUPERIOR 115.0	1
Line	REFINERY 115.0	83.5E3NT 115.0	1
Line	SILVERK1 115.0	SILVERT1 115.0	1
Line	SILVERK2 115.0	SUPERIOR 115.0	1
Line	SPURLOCK 115.0	SUPERIOR 115.0	1
Line	STEWMTN 115.0	GOLDFELD 115.0	1
Line	SUPERIOR 115.0	OAKFLAT 115.0	1
Line	83.5E3NT 115.0	83.9E3NT 115.0	1
Line	AGUAFRIA 230.0	WESTWING 230.0	1
Line	AGUAFRIA 230.0	ALEXANDR 230.0	1
Line	AGUAFRIA 230.0	WHITETNK 230.0	1
Line	SEV 230.0	BROWNING 230.0	1
Line	SEV 230.0	RS19 230.0	1
Line	KYR-NEW 230.0	ANDERSON 230.0	1
Line	ORME 230.0	ANDERSON 230.0	2
Line	ANDERSON 230.0	ORME 230.0	1
Line	BRANDOW 230.0	KYRENE 230.0	1
Line	BRANDOW 230.0	PAPAGOBT 230.0	1
Line	BRANDOW 230.0	WARD 230.0	1
Line	BRANDOW 230.0	WARD 230.0	2
Line	CORBELL 230.0	KYRENE 230.0	1
Line	KYRENE 230.0	SCHRADER 230.0	1
Line	ORME 230.0	RUDD 230.0	1
Line	ORME 230.0	RUDD 230.0	2
Line	KYR-NEW 230.0	PAPAGOBT 230.0	1
Line	PAPAGOBT 230.0	PINPKSRP 230.0	1
Line	PINPKSRP 230.0	BRANDOW 230.0	1
Line	PINPKSRP 230.0	BRANDOW 230.0	2
Line	ROGERS 230.0	THUNDRST 230.0	1
Line	SANTAN 230.0	CORBELL 230.0	1
Line	SANTAN 230.0	THUNDRST 230.0	1
Line	SCHRADER 230.0	SANTAN 230.0	1
Line	SILVERKG 230.0	GOLDFELD 230.0	1
Line	THUNDRST 230.0	GOLDFELD 230.0	1
Line	THUNDRST 230.0	GOLDFELD 230.0	2
Line	KNOX 230.0	SNTAROSA 230.0	1
Line	BROWNING 230.0	SANTAN 230.0	1

Contingency List
Continued

Line/Xfmr	From Bus	To Bus	Circuit
Line	BROWNING 230.0	RS19 230.0	1
Line	KYR-NEW 230.0	OCOTILLO 230.0	1
Line	KYR-NEW 230.0	KNOX 230.0	1
Line	RUDD 230.0	WHTNKAPS 230.0	1
Line	RUDD 230.0	WHITETNK 230.0	1
Line	GREENLEE 345.0	WINCHSTR 345.0	1
Line	MCKINLEY 345.0	SPRINGR 345.0	1
Line	MCKINLEY 345.0	SPRINGR 345.0	2
Line	SOUTH 345.0	GATEWAY 345.0	1
Line	SOUTH 345.0	GATEWAY 345.0	2
Line	SPRINGR 345.0	LUNA 345.0	1
Line	SPRINGR 345.0	CORONADO 345.0	1
Line	SPRINGR 345.0	GREENLEE 345.0	1
Line	SPRINGR 345.0	VAIL2 345.0	1
Line	VAIL 345.0	SOUTH 345.0	1
Line	WINCHSTR 345.0	VAIL 345.0	1
Line	DMP 138.0	N. LOOP 138.0	1
Line	DMP 138.0	NE.LOOP 138.0	1
Line	DMP 138.0	SN.CRUZ 138.0	1
Line	DREXEL 138.0	IRVNGTN 138.0	1
Line	DREXEL 138.0	MIDVALE 138.0	1
Line	E. LOOP 138.0	NE.LOOP 138.0	1
Line	E. LOOP 138.0	ROBERTS 138.0	1
Line	E. LOOP 138.0	PANTANO 138.0	1
Line	IRVNGTN 138.0	SOUTH 138.0	1
Line	IRVNGTN 138.0	TUCSON 138.0	1
Line	IRVNGTN 138.0	VAIL 138.0	1
Line	IRVNGTN 138.0	RBWILMOT 138.0	1
Line	N. LOOP 138.0	RILLITO 138.0	1
Line	N. LOOP 138.0	WESTINA 138.0	1
Line	NE.LOOP 138.0	RILLITO 138.0	1
Line	RANVISTO 138.0	LACANADA 138.0	1
Line	RANVISTO 138.0	CATALINA 138.0	1
Line	RILLITO 138.0	LACANADA 138.0	1
Line	RV TAP 138.0	RANVISTO 138.0	1
Line	S.TRAIL 138.0	ROBERTS 138.0	1
Line	SN.CRUZ 138.0	IRVNGTN 138.0	1
Line	SNYDER 138.0	E. LOOP 138.0	1
Line	SNYDER 138.0	NE.LOOP 138.0	1
Line	SOUTH 138.0	MIDVALE 138.0	1
Line	SOUTH 138.0	ASARCO 138.0	1

Contingency List
Continued

Line/Xfmr	From Bus	To Bus	Circuit
Line	SOUTH 138.0	CYPRUS 138.0	1
Line	SOUTH 138.0	GREENVLY 138.0	1
Line	TORTOLIT 138.0	N. LOOP 138.0	1
Line	TORTOLIT 138.0	N. LOOP 138.0	2
Line	TORTOLIT 138.0	RV TAP 138.0	1
Line	TUCSON 138.0	WESTINA 138.0	1
Line	TWNTYSEC 138.0	E. LOOP 138.0	1
Line	TWNTYSEC 138.0	IRVNGTN 138.0	1
Line	VAIL 138.0	S.TRAIL 138.0	1
Line	VAIL 138.0	FT.HUACH 138.0	1
Line	RBWILMOT 138.0	VAIL 138.0	1
Line	LOSREALS 138.0	VAIL 138.0	1
Line	PANTANO 138.0	LOSREALS 138.0	1
Line	CYPRS RW 138.0	CYPRUS 138.0	1
Line	GREENVLY 138.0	CYPRS RW 138.0	1
Line	KANTOR 115.0	CANEZ 115.0	1
Line	CANEZ 115.0	SONOITA 115.0	1
Line	SONOITA 115.0	VALENCIA 115.0	1
Line	GATEWAY 115.0	VALENCIA 115.0	1
Line	BLK MESA 230.0	BMA ARIZ 230.0	1
Line	BLYTHE 161.0	BLY-LOAD 161.0	1
Line	DAVIS 230.0	DAVIS-LD 230.0	1
Line	MEAD 500.0	PERKINS 500.0	1
Line	PARKER 161.0	PARKERLD 161.0	1
Line	BOUSE 161.0	BLACK PK 161.0	1
Line	LIBERTY 230.0	RUDD 230.0	1
Line	LIBERTY 230.0	RUDD 230.0	2
Line	ORACLE 115.0	SNMANUEL 115.0	1
Line	PINPK 230.0	PINPKSRP 230.0	1
Line	PINPK 230.0	PINPKSRP 230.0	2
Line	WLTNMOHK 161.0	WML-LOAD 161.0	1
Line	GLT-DSW 161.0	GOLDMINE 161.0	1
Line	EGL-DSW 230.0	EAGLEYE 230.0	1
Line	RVL-DSW 230.0	ROUNDVLY 230.0	1
Line	ADA-DSW 115.0	ADAMS 115.0	1
Line	RGS-DSW 230.0	ROGERS 230.0	1
Line	RGS-DSW 230.0	ROGERS 230.0	2
Line	RED ROCK 115.0	SAG.EAST 115.0	1
Line	SPOOKHIL 230.0	THUNDRST 230.0	1
Line	NOGALES 115.0	KANTOR 115.0	1
Line	HAT-DSW 230.0	HASSYAMP 230.0	1

Contingency List
Continued

Line/Xfmr	From Bus	To Bus	Circuit
Line	HARCUVAR 115.0	BHP-CAP 115.0	1
Line	HARCUVAR 115.0	LHP-CAP 115.0	1
Line	WWG-DSW 230.0	WESTWING 230.0	1
Line	WWG-DSW 230.0	WESTWING 230.0	2
Line	PINTO PS 345.0	FOURCORN 345.0	1
Line	SHIPROCK 345.0	FOURCORN 345.0	1
Line	SEV 500.0	SILVERKG 500.0	1
Line	SEV 500.0	BROWNING 500.0	1
Line	SEV 500.0	PINAL_W 500.0	1
Line	WESTWING 345.0	PINALWST 345.0	1
Line	PINALWST 345.0	SOUTH 345.0	1
Line	RUDD 230.0	TS3 230.0	1
Line	LIBERTY 230.0	TS3 230.0	1
Line	HLT-DSW 230.0	HILLTOP 230.0	1
Line	RACEWAY 230.0	WESTWING 230.0	1
Line	PINPK 230.0	GAVILNPK 230.0	1
Line	N.WADDEL 230.0	RACEWAY 230.0	1
Line	TS3 230.0	TS2 230.0	1
Line	TRILBWSH 230.0	TS2 230.0	1
Line	PALOVRDE 500.0	TS5 500.0	1
Line	TS5 230.0	TRILBWSH 230.0	1
Line	NAVAJO 500.0	TABLMESA 500.0	1
Line	TABLMESA 500.0	WESTWING 500.0	1
Line	TS5 500.0	TABLMESA 500.0	1
Line	TABLMESA 230.0	PRESCOTT 230.0	1
Line	GAVILNPK 230.0	TABLMESA 230.0	1
Line	TABLMESA 230.0	RACEWAY 230.0	1
Line	CHOLLA 500.0	SILVERKG 500.0	1
Line	SILVERKG 500.0	SAGUARO 500.0	1
Line	AVERY 230.0	RACEWAY 230.0	1
Line	AVERY 230.0	MISTYWLO 230.0	1
Line	MISTYWLO 230.0	PNPKAPS 230.0	1
Line	JOJOBA 230.0	GILARIVR 230.0	1
Line	LIBERTY 230.0	BUCKEYE 230.0	2
Line	LIBERTY 230.0	JOJOBA 230.0	1
Line	CHOLLA 230.0	SECDKNOL 230.0	1
Line	FORTROCK 230.0	ROUNDVLY 230.0	1
Line	FORTROCK 230.0	JUNIPRMT 230.0	1
Line	JUNIPRMT 230.0	SELIGMAN 230.0	1
Line	LEUPP 230.0	FLAGSTAF 230.0	1
Line	FLAGSTAF 230.0	COCONINO 230.0	1

Contingency List
Continued

Line/Xfmr	From Bus	To Bus	Circuit
Line	SAG.WEST 115.0	S.BRKRCH 115.0	1
Line	S.BRKRCH 115.0	SNMANUEL 115.0	1
Line	ADAMS 115.0	APACHE 115.0	1
Line	SAG.EAST 115.0	MARANATP 115.0	1
Line	DAVIS 230.0	RIVIERA 230.0	1
Line	APACHE 115.0	HAYDENAZ 115.0	1
Line	APACHE 230.0	BUTERFLD 230.0	1
Line	APACHE 230.0	RED TAIL 230.0	1
Line	APACHE 230.0	WINCHSTR 230.0	1
Line	BICKNELL 115.0	THREEPNT 115.0	1
Line	BICKNELL 345.0	VAIL 345.0	1
Line	BUTERFLD 230.0	PANTANO 230.0	1
Line	BUTERFLD 230.0	SAN RAF 230.0	1
Line	DOSCONDO 230.0	MORENCI 230.0	1
Line	GREEN-AE 345.0	GREENLEE 345.0	1
Line	MARANA 115.0	MARANATP 115.0	1
Line	MARANA 115.0	MARANATP 115.0	2
Line	MARANATP 115.0	RATTLSNK 115.0	1
Line	MORENCI 230.0	GREEN-AE 230.0	1
Line	MORENCI 230.0	PD-MORNC 230.0	1
Line	PANTANO 115.0	KARTCHNR 115.0	1
Line	PANTANO 230.0	SAHUARIT 230.0	1
Line	RED TAIL 230.0	DOSCONDO 230.0	1
Line	SAHUARIT 230.0	BICKNELL 230.0	1
Line	AVRA 115.0	SNDARIO 115.0	1
Line	THREEPNT 115.0	SNDARIO 115.0	1
Line	PERKINPS 500.0	PERKINS 500.0	1
Line	AVRA 115.0	MARANA 115.0	1
XFMR	CHOLLA 500.0	CHOLLA 345.0	1
XFMR	CHOLLA 500.0	CHOLLA 345.0	2
XFMR	FOURCORN 500.0	FOURCORN 345.0	1
XFMR	SAGUARO 500.0	SAG.EAST 115.0	1
XFMR	SAGUARO 500.0	SAG.WEST 115.0	1
XFMR	WESTWING 500.0	WESTWING 230.0	1
XFMR	WESTWING 500.0	WESTWING 230.0	2
XFMR	WESTWING 500.0	WESTWING 230.0	3
XFMR	WESTWING 500.0	WESTWING 345.0	1
XFMR	YAVAPAI 500.0	YAVAPAI 230.0	1
XFMR	YAVAPAI 500.0	YAVAPAI 230.0	2
XFMR	GILARIVR 500.0	GILARIVR 230.0	1
XFMR	GILABDPP 500.0	GILABDPP 230.0	1

Contingency List
Continued

Line/Xfmr	From Bus	To Bus	Circuit
XFMR	CHOLLA 345.0	CHOLLA 230.0	1
XFMR	FOURCORN 345.0	FOURCORN 230.0	1
XFMR	FOURCORN 345.0	FOURCORN 230.0	2
XFMR	PNPKAPS 345.0	PNPKAPS 230.0	1
XFMR	PNPKAPS 345.0	PNPKAPS 230.0	2
XFMR	PNPKAPS 345.0	PNPKAPS 230.0	3
XFMR	CASGRAPS 230.0	CASGRAPS 69.0	1
XFMR	OCOTILLO 230.0	OCOTILLO 69.0	1
XFMR	SAGUARO 230.0	SAG.EAST 115.0	1
XFMR	SAGUARO 230.0	SAG.WEST 115.0	1
XFMR	SNTAROSA 230.0	SNTAROSA 69.0	1
XFMR	WPHXAPSS 230.0	WPHXAPS 69.0	1
XFMR	WPHXAPSS 230.0	WPHXAPS 69.0	2
XFMR	PRESCOTT 230.0	PRESCOTT 115.0	1
XFMR	PRESCOTT 230.0	PRESCOTT 115.0	2
XFMR	SNMANUEL 115.0	SNMANUEL 100.0	1
XFMR	SNMANUEL 115.0	SNMANUL1 12.5	1
XFMR	SNMANUEL 115.0	SNMANUL2 12.5	1
XFMR	SNMANUEL 115.0	SNMANUL3 12.5	1
XFMR	SNMANUEL 115.0	SNMANUL4 12.5	1
XFMR	YUCCA 69.0	YUCCA 161.0	1
XFMR	YUCCA 69.0	YUCCA 161.0	2
XFMR	PINAL_W 500.0	PINALWST 345.0	1
XFMR	CORONADO 500.0	CORONADO 345.0	1
XFMR	KYRENE 500.0	KYR-NEW 230.0	5
XFMR	KYRENE 500.0	KYRENE 230.0	6
XFMR	KYRENE 500.0	KYRENE 230.0	7
XFMR	SILVERKG 500.0	SILVERKG 230.0	1
XFMR	BROWNING 500.0	BROWNING 230.0	1
XFMR	BROWNING 500.0	BROWNING 230.0	2
XFMR	RUDD 500.0	RUDD 230.0	1
XFMR	RUDD 500.0	RUDD 230.0	2
XFMR	RUDD 500.0	RUDD 230.0	3
XFMR	RUDD 500.0	RUDD 230.0	4
XFMR	SEV 500.0	SEV 230.0	3
XFMR	PINAL_W 500.0	PINAL_W 230.0	1
XFMR	MESQUITE 500.0	MESQUITE 230.0	1
XFMR	HGC-CT2 16.0	HARQUAHA 500.0	1
XFMR	AGUAFRIA 230.0	AF-NORTH 69.0	3
XFMR	AGUAFRIA 230.0	AF-NORTH 69.0	4
XFMR	ALEXANDR 230.0	ALEXANDR 69.0	1

Contingency List
Continued

Line/Xfmr	From Bus	To Bus	Circuit
XFMR	ALEXANDR 230.0	ALEXANDR 69.0	2
XFMR	ALEXANDR 230.0	ALEXANDR 69.0	3
XFMR	ANDERSON 230.0	ANDERSRS 69.0	1
XFMR	ANDERSON 230.0	ANDERSRS 69.0	2
XFMR	ANDERSON 230.0	ANDERSRS 69.0	3
XFMR	ANDERSON 230.0	ANDERSRS 69.0	4
XFMR	BRANDOW 230.0	BRANDOW 69.0	1
XFMR	BRANDOW 230.0	BRANDOW 69.0	2
XFMR	BRANDOW 230.0	BRANDOW 69.0	3
XFMR	CORBELL 230.0	CORBELRS 69.0	1
XFMR	CORBELL 230.0	CORBELRS 69.0	2
XFMR	CORBELL 230.0	CORBELRS 69.0	3
XFMR	CORBELL 230.0	CORBELRS 69.0	4
XFMR	GOLDFELD 230.0	GOLDFELD 115.0	1
XFMR	GOLDFELD 230.0	GOLDFELD 115.0	2
XFMR	KYRENE 230.0	KYRENEGT 69.0	2
XFMR	KYRENE 230.0	KYRENEGT 69.0	3
XFMR	KYRENE 230.0	KYRENEGT 69.0	4
XFMR	ORME 230.0	ORME RS 69.0	1
XFMR	ORME 230.0	ORME RS 69.0	2
XFMR	ORME 230.0	ORME RS 69.0	3
XFMR	ORME 230.0	ORME RS 69.0	4
XFMR	PAPAGOBT 230.0	PAPAGOBT 69.0	1
XFMR	PAPAGOBT 230.0	PAPAGOBT 69.0	2
XFMR	PAPAGOBT 230.0	PAPAGOBT 69.0	3
XFMR	PAPAGOBT 230.0	PAPAGOBT 69.0	4
XFMR	ROGERS 230.0	ROGERS 69.0	1
XFMR	ROGERS 230.0	ROGERS 69.0	2
XFMR	ROGERS 230.0	ROGERS 69.0	4
XFMR	SANTAN 230.0	SANTAN 69.0	2
XFMR	SANTAN 230.0	SANTAN 69.0	3
XFMR	SANTAN 230.0	SANTAN 69.0	4
XFMR	SANTAN 230.0	SANTAN 69.0	5
XFMR	SCHRADER 230.0	SCHRADER 69.0	1
XFMR	SCHRADER 230.0	SCHRADER 69.0	2
XFMR	SCHRADER 230.0	SCHRADER 69.0	3
XFMR	SILVERKG 230.0	SILVERK1 115.0	1
XFMR	SILVERKG 230.0	SILVERK2 115.0	1
XFMR	THUNDRST 230.0	THUNDRST 69.0	1
XFMR	THUNDRST 230.0	THUNDRST 69.0	2
XFMR	THUNDRST 230.0	THUNDRST 69.0	3

Contingency List
Continued

Line/Xfmr	From Bus	To Bus	Circuit
XFMR	THUNDRST 230.0	THUNDRST 69.0	4
XFMR	THUNDRST 230.0	THUNDRST 69.0	5
XFMR	WARD 230.0	WARD 69.0	1
XFMR	WARD 230.0	WARD 69.0	2
XFMR	WARD 230.0	WARD 69.0	3
XFMR	WHITETNK 230.0	WHITETNK 69.0	1
XFMR	WHITETNK 230.0	WHITETNK 69.0	2
XFMR	KNOX 230.0	KNOX 69.0	1
XFMR	BROWNING 230.0	BROWNING 69.0	1
XFMR	RS19 230.0	RS19 69.0	1
XFMR	MCKINLEY 345.0	YAHTAHEY 115.0	1
XFMR	SOUTH 345.0	SOUTH 138.0	1
XFMR	VAIL 345.0	VAIL 138.0	1
XFMR	VAIL2 345.0	VAIL 138.0	1
XFMR	DMP 138.0	DMP 47.2	1
XFMR	E. LOOP 138.0	E. LOOP 47.2	1
XFMR	IRVNGTN 138.0	IRVNGTN 47.2	1
XFMR	IRVNGTN 138.0	IRVNGTN 47.2	2
XFMR	N. LOOP 138.0	N. LOOP 47.2	1
XFMR	N. LOOP 138.0	N. LOOP2 47.2	1
XFMR	NE.LOOP 138.0	NE.LOOP1 47.2	1
XFMR	NE.LOOP 138.0	NE.LOOP2 47.2	1
XFMR	SOUTH 138.0	SOUTH 47.2	1
XFMR	TORTOLIT 138.0	TORTOLIT 500.0	1
XFMR	TORTOLIT 138.0	TORTLIT2 500.0	1
XFMR	TUCSON 138.0	TUCSON 47.2	1
XFMR	CYPRS SM 47.2	CYPRUS 138.0	1
XFMR	DMP6 13.8	DMP 138.0	1
XFMR	DMP7 13.8	DMP 138.0	1
XFMR	DREXEL 13.8	DREXEL 138.0	1
XFMR	DREXEL2 13.8	DREXEL 138.0	1
XFMR	E.LPLD2 13.8	E. LOOP 138.0	1
XFMR	E.LPLD3 13.8	E. LOOP 138.0	1
XFMR	E.LPLD4 13.8	E. LOOP 138.0	1
XFMR	IRVNGTN1 13.8	IRVNGTN 138.0	1
XFMR	LACANADA 13.8	LACANADA 138.0	1
XFMR	MIDVALE 13.8	MIDVALE 138.0	1
XFMR	RANVISTO 13.8	RANVISTO 138.0	1
XFMR	RILLITO1 13.8	RILLITO 138.0	1
XFMR	RILLITO2 13.8	RILLITO 138.0	1
XFMR	RILLITO3 13.8	RILLITO 138.0	1

Contingency List
Continued

Line/Xfmr	From Bus	To Bus	Circuit
XFMR	ROBERTS1 13.8	ROBERTS 138.0	1
XFMR	ROBERTS2 13.8	ROBERTS 138.0	1
XFMR	S.TRAIL 13.8	S.TRAIL 138.0	1
XFMR	S.TRAIL2 13.8	S.TRAIL 138.0	1
XFMR	SN.CRUZ1 13.8	SN.CRUZ 138.0	1
XFMR	SN.CRUZ2 13.8	SN.CRUZ 138.0	1
XFMR	SNYDER1 13.8	SNYDER 138.0	1
XFMR	TWNTYSEC 13.8	TWNTYSEC 138.0	1
XFMR	VAIL1 13.8	VAIL 138.0	1
XFMR	WESTINA1 13.8	WESTINA 138.0	1
XFMR	WESTINA2 13.8	WESTINA 138.0	1
XFMR	RBWILMOT 13.8	RBWILMOT 138.0	1
XFMR	LOSREALS 13.8	LOSREALS 138.0	1
XFMR	PANTANO 13.8	PANTANO 138.0	1
XFMR	RANVIST2 13.8	RANVISTO 138.0	1
XFMR	ASARCO 4.2	ASARCO 138.0	1
XFMR	CATALINA 13.8	CATALINA 138.0	1
XFMR	CYPRS RW 13.8	CYPRS RW 138.0	1
XFMR	CYPRUS1 7.2	CYPRUS 138.0	1
XFMR	DREXEL3 13.8	DREXEL 138.0	1
XFMR	FT.HUACH 13.8	FT.HUACH 138.0	1
XFMR	GREENVLY 13.8	GREENVLY 138.0	1
XFMR	MIDVALE2 13.8	MIDVALE 138.0	1
XFMR	SNYDER4 13.8	SNYDER 138.0	1
XFMR	TWNTYSC2 13.8	TWNTYSEC 138.0	1
XFMR	WESTINA3 13.8	WESTINA 138.0	1
XFMR	LACANAD2 13.8	LACANADA 138.0	1
XFMR	CYPRUS2 7.2	CYPRUS 138.0	1
XFMR	CYPRUS3 7.2	CYPRUS 138.0	1
XFMR	S.TRAIL3 13.8	S.TRAIL 138.0	1
XFMR	MIDVALE3 13.8	MIDVALE 138.0	1
XFMR	RANVIST3 13.8	RANVISTO 138.0	1
XFMR	KANTOR 13.2	KANTOR 115.0	1
XFMR	CANEZ 13.2	CANEZ 115.0	1
XFMR	SONOITA1 13.2	SONOITA 115.0	1
XFMR	SONOITA2 13.2	SONOITA 115.0	1
XFMR	VALNCIA1 13.2	VALENCIA 115.0	1
XFMR	VALNCIA2 13.2	VALENCIA 115.0	1
XFMR	SGR-DSW 230.0	SAG.WEST 115.0	1
XFMR	BLACKMTN 115.0	BLKMTN 13.8	1
XFMR	BLACKMTN 115.0	BLKMTN 13.8	2

Contingency List
Continued

Line/Xfmr	From Bus	To Bus	Circuit
XFMR	BRADY 115.0	BRADY 13.8	1
XFMR	BRADY 115.0	BRADY 13.8	2
XFMR	BRAWLEY 115.0	BRAWLEY 13.8	1
XFMR	BRAWLEY 115.0	BRAWLEY 13.8	2
XFMR	PICACHOW 115.0	PICACHOW 13.8	1
XFMR	PICACHOW 115.0	PICACHOW 13.8	2
XFMR	RED ROCK 115.0	REDROCK 13.8	1
XFMR	RED ROCK 115.0	REDROCK 13.8	2
XFMR	SANDARIO 115.0	SANDARIO 13.8	1
XFMR	SANDARIO 115.0	SANDARIO 13.8	2
XFMR	SANXAVER 115.0	SANXAVER 13.8	1
XFMR	SANXAVER 115.0	SANXAVER 13.8	2
XFMR	SNYDHILL 115.0	SNYDHILL 13.8	1
XFMR	SNYDHILL 115.0	SNYDHILL 13.8	2
XFMR	SPOOKHIL 230.0	SPOOKHIL 69.0	1
XFMR	SPOOKHIL 230.0	SPOOKHIL 69.0	2
XFMR	TWINPEAK 115.0	TWINPEAK 13.8	1
XFMR	TWINPEAK 115.0	TWINPEAK 13.8	2
XFMR	N.GILA 500.0	N.GILA 69.0	1
XFMR	N.GILA 500.0	N.GILA 69.0	2
XFMR	WPHXAPSS 230.0	WPHXAPS 69.0	3
XFMR	TS5 500.0	TS5 230.0	2
XFMR	TABLMESA 500.0	TABLMESA 230.0	2
XFMR	FLAGSTAF 345.0	FLAGSTAF 230.0	1
XFMR	GATEWAY 115.0	GATEWAY 345.0	1
XFMR	VALNCIA3 13.2	VALENCIA 115.0	1
XFMR	APACHE 69.0	APACHE 115.0	1
XFMR	APACHE 69.0	APACHE 115.0	2
XFMR	APACHE 230.0	APACHE 115.0	1
XFMR	APACHE 230.0	APACHE 115.0	2
XFMR	BICKNELL 230.0	BICKNELL 115.0	1
XFMR	BICKNELL 230.0	BICKNELL 115.0	2
XFMR	BICKNELL 345.0	BICKNELL 230.0	1
XFMR	BICKNELL 345.0	BICKNELL 230.0	2
XFMR	DAVIS 230.0	DAVBNK10 69.0	1
XFMR	DOSCONDO 69.0	DOSCONDO 230.0	1
XFMR	DOSCONDO 69.0	DOSCONDO 230.0	2
XFMR	DOSCONDO 69.0	DOSCONDO 230.0	3
XFMR	GREEN-AE 345.0	GREEN-AE 230.0	1
XFMR	GREEN-AE 345.0	GREEN-AE 230.0	2
XFMR	WINCHSTR 345.0	WINCHSTR 230.0	1

Contingency List
Continued

Line/Xfmr	From Bus	To Bus	Circuit
XFMR	KARTCHNR 69.0	KARTCHNR 115.0	1
XFMR	PANTANO 230.0	PANTANO 115.0	1
XFMR	RED TAIL 69.0	RED TAIL 230.0	1
XFMR	RIVIERA 69.0	RIVIERA 230.0	1
XFMR	RIVIERA 69.0	RIVIERA 230.0	2
XFMR	SAN RAF 69.0	SAN RAF 230.0	1
XFMR	TOPOCK 69.0	TOPOCK 230.0	1
XFMR	SAHUARIT 69.0	SAHUARIT 230.0	1

Attachments

Attachment 1
CATS STUDY
LIST OF
PARTICIPANTS

- Arizona Corporation Commission
- Arizona Public Service Company
- Tucson Electric Power
- Salt River Project
- Southwest Transmission Cooperative
- Western Area Power Authority
- Public Service Company of New Mexico
- Citizens Utilities
- Williams Energy Mkfg & Trading
- Industrial Power Tech.
- Arizona Power Authority
- Power Up Corp.
- Desert Energy
- Central Arizona Project
- NRG Energy
- Southwestern Power Group
- Reliant Energy
- PPL Sundance Energy
- Allegheny Energy Supply
- Pinnacle West Energy
- Mountain County Co Generation
- Trans - Elect
- Panda Energy
- TECo Energy
- Power Development Enterprises
- Duke Energy & Trading
- ED #3 & MSIDD
- Pacific Gas and Electric Company

Attachment 2

Central Arizona Transmission Study
(CATS)
PHASE III
Study Plan

Introduction

Phase I of the CATS Study served as a screening process that evaluated a large group of transmission alternatives. This work was used to narrow down the transmission options that merited further study 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.

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 regional study for Central Arizona for the 2012 time frame.

Objective

The objectives of this study are:

1. Perform a 10-year regional transmission assessment of the study participant's plans, generally for the State of Arizona.

2. Evaluate the adequacy of the individual transmission plans on an integrated basis.

3. Determine whether proposed underlying transmission reinforcements are adequate to interface with the proposed EHV system enhancements and the lower voltage systems.

Scope

Conduct a 10-year transmission study for the year 2012 within the state of Arizona, primarily in the central and southern areas of the state. Individual plans for the 10-year Horizon will be added to the base system. The updated base system will be the basis for analysis using N-0 and N-1 power flow studies.

Study Time Frame

A year 2012 study time frame, that is, a ten-year planning horizon, is proposed.

Study Participants

The following is a list of Study Participants, which will be performing study work.

1. APS
2. SRP
3. TEP
4. SWTC
5. WAPA
6. K. R. SALINE

Technical Working Group

A CATS Phase III Technical Working Group has been form to coordinate and facilitate the study work. This technical working group will report to the CATS Steering committee. The following is a list of Participants currently having representatives on the Technical Working Group.

1. APS
2. SRP
3. TEP
4. SWTC
5. WAPA
6. K. R. SALINE

Generation

All Arizona generation sites scheduled to be in service for the study time frame will be used to serve the 10-year load for the region. Future needs beyond planned generation will be met by unknown resources identified by the Technical committee.

Loads

Arizona is predominately a summer peaking system and, as such, represents the period of time when Arizona's transmission system is under the most stress. Therefore, projected heavy summer peak loads will be modeled for the Study time frame. The need to evaluate other seasons will be assessed.

Base Cases

The starting base case to be used for development of the Year 2012 study cases will be the Year 2006 case that has been developed for the PV/SEV and the CATS-HV studies in GE PSLF Version 13.1 format. The study participants will take an active role in the selection and development of the Year 2012 study cases in order to represent the study period being evaluated. Some significant changes to the starting case will include the following:

1. Increase CATS loads from year 2006 projected peak summer loads to year 2012 projected peak summer loads.

2. Include generating units planned to be installed in Arizona by year 2012

3. Include all planned facilities for the 2012 time frame.

Analysis Requirements

Study analysis for this study will include (N-0) and (N-1) Analysis.

The GE PSLF program version 13.1 (or latest WECC version of PSLF) will be used to facilitate the above Study requirements.

Study Guidelines/Criteria

Study guidelines and criteria will be based on NERC/WECC Reliability Criteria and individual utility criteria, where applicable. All study participants will be required to provide system representation and rating information for their facilities.

Methodology

The base case will be benchmarked with all planned facilities modeled for the 2013 time frame. An N-1 and N-0 study will be performed. Reliability violations of any CATS transmission lines found during the N-1 and N-0 study will be mitigated. In order to demonstrate that the mitigation solves the reliability violation, an N-1 and N-0 study will also be performed on each mitigation case.

Study Areas

1. Phoenix Area: APS and SRP will study the Phoenix Area.

   a) APS will study its EHV and underlying system.
   b) SRP will study its EHV and underlying system.

1. Tucson Area: TEP and SWTC will study the Tucson Area.

2. Central Arizona: CATS-HV Subcommittee will study Central Arizona System.

3. WAPA will study its system.

Phase III Study Report

A report will be written to document the study work. This report will be submitted to the ACC. Each entity will document their own study work to be included in the body of the report. The Technical Working Group will prepare a summary report with conclusions and recommendations.

SALT RIVER PROJECT

10 YEAR PLAN
2004 — 2013

APPENDIX 2

Summary of Need
for the Fountain Hills Substation
and Carrel Substation

Delivering more than power.™

04-0024-01 - 01/04

Project # FT-23

2004 CAPITAL PROJECT DESCRIPTION

Budget Year 2011/2012

Date: January 27, 2004 ***Location:*** Fountain Area

Job Title: New Receiving Station or new 69kV line into the Fountain area

Project Summary: Construct a new Fountain Area Receiving Station or a new 69kV line of unknown mileage and origin in the Fountain area by 05/12.

Description of Work:

STATION WORK

- New 230/69kV or 115/69kV Substation

SUBTOTAL $UNKNOWN

LINE WORK

- Either a 115kV or 230kV transmission from the Goldfield area to a new station Fountain Hills area

LINE SUBTOTAL $
ESTIMATED TOTAL $UNKNOWN

In-Service Date: April 30, 2012

_____ _____
Manager ***Date***

Load Growth Project, TSP Contact: Chuck Russell

Justification:

- Voltage levels in the Fountain Hills area fall below acceptable limits at several 69kV stations for an outage of the Evergreen/Pima 69kV line.
- A new 230kV or 115kV substation will provide for longer term solutions in the area than a single 69kV subtransmission line.

NOTE: This option will require further evaluation of viable options before any design begins.

2004 Project Summary: This project was not identified in the 2004 6 Year Construction Plan.

2004 CAPITAL PROJECT DESCRIPTION

Budget Year 2006/2007

EHV Diagrams 115, 230 & 500kV
Area Switching Diagrams emasyst.pdf
Rec. Station Diagrams
Dist. Station Diagrams carrel115b.pdf

Date: January 15, 2004 ***Location:*** 47E-0.5N

Job Title: Carrel (47E-0.5N), New Substation, 1st Transformer (28MVA), and Provide 115kV Service.

Project Summary: Construct a new single bay substation. Install 1-115/12.47kV, 28MVA unit transformer and 1-115kV transformer protector in Bay 2 at the new site by 11/06. Provide 115kV service tapped from the Goldfield/Spurlock 115kV line, about 2.5 miles from the Spurlock end.

Description of Work:

STATION WORK

- Construct a 115kV Bay 2.
- Install 1-115/12.47kV, 28MVA unit transformer in Bay 2.
- Install 4-12kV, 1200kVAR capacitor banks (4800KVAR total) in Bay 2.
- Install 1-115kV transformer protector in Bay 2.
- Install 3-115kV Disconnect Switches.

STATION SUBTOTAL $1,500,000

OPERATIONAL/RELIABILITY WORK

Note: Tapped service is recommended for load growth, after considering reliability of the Goldfield/Spurlock line, road widening, and criticality of customers.

OPERATIONAL/RELIABILITY SUBTOTAL $

12KV LINE WORK

- Construct feeders for Bay 2.

12KV LINE SUBTOTAL $1,000,000

115KV LINE WORK

- Install 1-115kV line and line drop to Bay 2 and perform associated work.

115KV LINE SUBTOTAL $500,000
R.O.W ACQUISITION $100,000
ESTIMATED TOTAL $ 3,100,000

In-Service Date: November 15, 2006

_____ _____
Manager ***Date***

Load Growth Project, ESP&E Contact: Tom Olivas (12kV), TSP Contact: Tatyana Dhaliwal (69kV, 115kV)

Justification:

- Strong residential development at the base of the Superstition Mountains is expected to continue with service and support needed from this new station. Area developments include: the 870 acre Superstition Mountain and the 800 acre Superstition Gateway Master Planned Communities.
- A new 115kV line must be constructed to serve this new station. Some savings in line construction will be realized because of the proximity of the future substation to Goldfield/Spurlock 115kV line.

2003 Project Summary: Construct a new single bay substation. Install 1-115/12.47kV, 28MVA unit transformer and 1-115kV transformer protector in Bay 2 at the new site by 11/05. Provide 115kV service tapped from the Goldfield/Spurlock 115kV line, about 2.5 miles from the Spurlock end.