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Southwest
Transmission
COOPERATIVE, INC

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50TP

January 31, 2007

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

RE: Docket No. E-00000D-05-0040

Dear Mr. Johnson:

Enclosed is the Southwest Transmission Cooperative, Inc. ("SWTC") Ten Year Plan for the period 2007 – 2016. I have enclosed an original plus thirteen (13) copies pursuant to A.R.S. Section 40-360-02.

Sincerely,

James Rein
Manager of Transmission Planning

enclosures

c/ L. Huff w/o enclosures

Arizona Corporation Commission
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**Southwest
Transmission**
COOPERATIVE, INC

TEN YEAR PLAN

2007 – 2016

JANUARY 2007

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

TEN YEAR PLAN

2007 – 2016

Prepared for the

ARIZONA CORPORATION COMMISSION

TRANSMISSION PLANNING

JANUARY 2007

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SOUTHWEST TRANSMISSION COOPERATIVE, INC.

TEN YEAR PLAN

GENERAL INFORMATION

This Ten Year Plan is submitted to the Arizona Corporation Commission ("Commission") to satisfy the requirements of section 40-360.02 of the Arizona Revised Statutes ("A.R.S."), relating to power plant and transmission line siting requirements. It outlines the plans of Southwest Transmission Cooperative, Inc. ("SWTC") to install electric facilities required to meet anticipated system growth of its Distribution Cooperative Members (Member).

This report contains projects that SWTC anticipates may be constructed over the next ten-year period. As noted in A.R.S. section 40-360.02.F, the plans contained in this report are tentative information only and are subject to change at any time at the discretion of SWTC. SWTC anticipates that any changes to this plan will likely be due to changes in load forecasts, environmental constraints, and/or regulatory and legal developments. Changes of any significance that occur prior to the next Ten Year Plan filing, will be discussed with the Commission staff.

The report is divided into three sections, as outlined in the Table of Contents on page 2. Section I describes planned transmission lines SWTC may construct over the ten-year plan period, whose nominal rating is equal to or greater than one hundred fifteen thousand volts (115 kV). Section II contains SWTC's internal planning criteria and facility ratings, pursuant to Commission Decision #63876, dated July 25, 2001. Section III is a Technical Study Report of the planned transmission projects contained in Section I, to satisfy the requirements of paragraph C.7 of A.R.S. Section 40-360.02.

The planned transmission lines that are listed in Section I are needed to serve load in the load areas of the SWTC Member Distribution Cooperatives. Due to the proximity of the new lines to the Member load being served, studies conducted show little impact to the overall interconnected system.

REGIONAL PLANNING

SWTC continues to participate in Regional Planning efforts in the State by involvement in the Southwest Area Transmission (“SWAT”) Planning Group. SWTC is involved in the following subcommittees of SWAT: the Central Arizona Transmission EHV (“CATS-EHV”), Central Arizona Transmission HV (“CATS-HV”), Colorado River Transmission Subcommittee (“CRT”) and the Arizona-New Mexico EHV Subcommittee (“AZNM”). In addition, SWTC is monitoring the efforts of the newly formed Transmission Expansion Planning Policy Committee of the Western Electricity Coordination Council (WECC), and the Southwest Expansion Planning Group (STEP).

SWTC was involved in the development of the “CATS-HV Saturated Load and Transmission Study, A Transmission Option to Serve Saturated Loads in Pinal County, Arizona,” which was completed in September of this past year. Further information on this Study can be found in the SRP 2007-2016 Ten Year Plan submittal where the final progress report has been included as Appendix 1. The results of the study show a fully developed or saturated load of approximately 10,400 MW could be realized in Pinal County and parts of Pima County. However, the study does not predict when the area will be fully developed, but calculates the load that would be associated with full build-out.

The Saturated Load Study is of interest to SWTC for the information that it provides of the possible load for southeastern Pinal and northeastern Pima Counties, which is in the service area of one of SWTC’s Distribution Cooperative Members. The study also identifies future 500 kV projects, which are of interest of SWTC, such as Southeast Valley Project (of which SWTC is a participant) and the Winchester to Pinal South Project.

The Southeast Arizona Transmission Study (SATS), which includes all or part of Pima, Pinal, Cochise, and Santa Cruz counties in its study effort, was recently formed. SWTC is an active participant in SATS as the study area includes the service territories of two of its Members.

The following is a brief description of the projects that SWTC either is a participant in, or is evaluating interest in, through the Regional Planning Process, that are contemplated for completion during this 10 Year Plan Filing (2007-2016) timeframe:

Hassayampa to Pinal West

A CEC (Case No. 124) for this project was granted in May 2004 and is for two parallel single circuit 500 kV transmission lines from Hassayampa (Palo Verde hub) to a new Pinal West Substation, which will loop in the Westwing – South 345 kV line, which has an anticipated in-service date of 2008. SWTC is a joint participant in the project and Salt River Project (SRP) is the project manager.

Pinal West to Southeast Valley/Browning

A CEC (Case No. 126) for this project was issued in August 2005, with an amendment to the CEP approved in November 2005, for construction of a 500 kV line from Pinal West to Browning, with the segment from Santa Rosa to the proposed Pinal South Substation being proposed as a double-circuit 500/230 kV line, as is a segment of the Pinal South to the Southeast Valley Substation line. SWTC is a participant in the 500 kV segment from Pinal West to Pinal South. SRP is the project manager for this project, which has an anticipated in-service date of 2011.

Pinal South to Tortolita

This project contemplates construction of a 500 kV line from the proposed Pinal South Substation to the TEP Tortolita Substation. SWTC is evaluating possible participation in this project. TEP will be the project manager for this project, which has an anticipated in-service date of 2011.

Tortolita to Vail

This project contemplates construction of a 345 kV line from Tortolita Substation to Vail Substation, with a routing through East Loop Substation. SWTC is evaluating possible participation in this project. TEP will be the project manager for this project, which has an anticipated in-service date of 2014.

Other projects

In addition to the above projects that SWTC is evaluating possible participation in, SWTC is also evaluating the following projects whose in-service dates have not yet been established and are currently under review at TEP:

- 1) Tortolita to Winchester 500 kV line
- 2) Winchester to Vail 2nd 345 kV line
- 3) Vail Substation to South Substation 2nd 345 kV line
- 4) Tortolita to South Substation 345 kV line
- 5) Westwing to South Substation 2nd 345 kV line

CHANGES FROM 2006 AMMENDED TEN YEAR PLAN FILING

SWTC notes only minor changes in this Ten Year Plan Filing over its Amended Ten Year Plan Filing dated June 27, 2006. These changes have been made to reflect study work that was done by a consultant for SWTC, as noted in the Amended Ten Year Plan filing. The changes are noted below:

Sandario Substation Project. Now in-service.

Saddlebrooke Ranch Substation Project. In-service date changed from 2006 to 2007 to better coordinate project schedule with other ongoing work.

Marana 115 kV Line Project. In-service date changed from 2007 to 2009 due to ongoing negotiations with the Western Area Power Administration (Western).

Addition of Santa Rosa to Pinal South Project. SWTC is now a participant in this segment of the Pinal West to Southeast Valley/Browning Project.

Gordon Sloan Substation. Name has been changed to simply "Sloan Substation."

Apache to Hayden 115 kV Line to APS San Manuel Substation. Name for this project has been changed to Redington Switchyard. This represents a slight change from the last filing and reflects the loop in of the Apache to Hayden 115 kV line into Redington, with a short 115 kV jumper from Redington to the APS San Manuel Substation.

Thornsdale to CAP Twin Peaks 115 kV line. This is now the Thornsdale to Picture Rocks 115 kV line Project.

Upgrade of Apache to Butterfield 230 kV Line Project. New Project, which is discussed in greater detail in the Technical Study Report.

Upgrade of Pantano to Kartchner 115 kV Line Project. New Project, which is discussed in greater detail in the Technical Study Report.

San Rafael to Kartchner 230 kV Line Project. New Project, which is discussed in greater detail in the Technical Study Report.

Finally, talks are under way between SWTC and the Central Arizona Project that may change the configuration and/or the in-service date of the Valencia to CAP Black Mountain 115 kV Line Project and the Sandario to CAP Brawley 115 kV Line Project.

SECTION I

SWTC PLANNED TRANSMISSION LINES

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Saddlebrooke Ranch 115 kV Substation
Size	
a) Voltage	115 kV
b) Capacity	50 MVA
c) Point of Origin	APS 115 kV line Sec. 33 T9S R15E
d) Point of Termination	Saddlebrooke Ranch Substation Sec. 33 T9S R15E
e) Length	0 miles
Routing	Substation to be located on the APS Oracle to San Manual 115 kV line approximately 4 miles east of Oracle Substation, and approximately 16 miles west of San Manual Substation
Purpose	To provide for anticipated load growth in Southern Pinal County area of SWTC's Western Area
Date	
a) Construction Start	2006
b) In-Service Date	2007
Is Certificate Necessary?	No

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Marana 115 kV Line Upgrade
Size	
a) Voltage	115 kV
b) Capacity	To be determined
c) Point of Origin	Marana Tap Sec. 26 T11S R10E
d) Point of Termination	Marana Substation Sec. 26 T11S R10E
e) Length	Approximately 0.2 miles. Proposed loop-in to the Marana Substation
Routing	Same R.O.W. as existing Marana Tap to Marana 115 kV Line
Purpose	To mitigate various thermal overloads and/or voltage criteria violations due to N-1 outages on the 115 kV system between Bicknell and Marana and to provide for anticipated load growth in SWTC's Western Area.
Date	
a) Construction Start	2009
b) In-Service Date	2009
Is Certificate Necessary?	No

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Hackberry 230/69 kV Substation
Size	
a) Voltage	230 kV
b) Capacity	250 MVA
c) Point of Origin	Tap of existing Dos Condados to Morenci 230 kV line. Sec. 29 T6S R27E
d) Point of Termination	Hackberry Substation Sec. 29 T6S R27E
e) Length	0 miles
Routing	Substation to be located on the Dos Condados to Morenci 230 kV line, approximately 7.4 miles north of Dos Condados Substation and approximately 27.3 miles west of Morenci Substation.
Purpose	To provide transmission service to PD's Safford mining operations in Graham County and to provide for enhanced service reliability to the existing Graham County 69 kV system in SWTC's Northern Area.
Date	
a) Construction Start	2006
b) In-Service Date	2007
Is Certificate Necessary?	No

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Hassayampa to Pinal West
Size	
a) Voltage	500 kV
b) Capacity	1200 MVA
c) Point of Origin	Hassayampa Switchyard Sec. 15 T1S R6W
e) Point of Termination	Pinal West Substation Sec. 18 T5S R5E
f) Length	Approximately 52 miles
Routing	South and east of the Hassayampa Switchyard along the existing Palo Verde-Kyrene 500 kV line to a point where the gas pipeline splits from the transmission line, then generally along the pipeline (except in the Maricopa County Mobile Planning Area) to the new Pinal West Substation
Purpose	Identified by SWAT as necessary to accommodate load growth and access to energy sources in the central AZ area. The project provides for increased transfer capability to SWTC loads in Southeast Arizona
Date	
a) Construction Start	2006
b) In-Service Date	2008
Is Certificate Necessary?	Yes. The Commission in Case 124 issued a Certificate of Environmental Compatibility (Decision No. 67012) on May 24, 2004. SWTC is a participant; SRP is the project manager

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Pinal West to Santa Rosa
Size	
a) Voltage	500 kV
b) Capacity	1200 MVA
c) Point of Origin	Pinal West Substation Sec. 18 T5S R2E
e) Point of Termination	Santa Rosa Substation Sec. 30 T5S R4E
f) Length	Approximately 14.5 miles
Routing	South and east from the Pinal West substation to approximately Teel Road, then east to the Santa Rosa substation.
Purpose	Identified by SWAT as necessary to accommodate load growth and access to energy sources in the central AZ area. The project provides for increased transfer capability to SWTC loads in Southeast Arizona
Date	
a) Construction Start	2006
b) In-Service Date	2011
Is Certificate Necessary?	Yes. The Commission in Case 126 issued a Certificate of Environmental Compatibility (Decision No. 68093) on August 25, 2005. SWTC is a participant; SRP is the project manager

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Santa Rosa to Pinal South
Size	
a) Voltage	500 kV
b) Capacity	1200 MVA
c) Point of Origin	Santa Rosa Substation Sec. 30 T5S R4E
e) Point of Termination	Pinal South Substation Sec. 6 T7S R8E
f) Length	Approximately 0.0 miles
Routing	From Santa Rosa easterly to approximately the Santa Rosa Wash, then generally south to approximately a half mile north of I-8 where it turns east and then easterly to about the location of the ED2 substation and continuing east to the UPRR to where it turns north.
Purpose	Identified by SWAT as necessary to accommodate load growth and access to energy sources in the central AZ area. The project provides for increased transfer capability to SWTC loads in Southeast Arizona
Date	
a) Construction Start	2006
b) In-Service Date	2011
Is Certificate Necessary?	Yes. The Commission in Case 126 issued a Certificate of Environmental Compatibility (Decision No. 68093) on August 25, 2005. SWTC is a participant; SRP is the project manager

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Naviska to Saguaro 115 kV
Size	
a) Voltage	115 kV
b) Capacity	167 MVA
c) Point of Origin	Naviska Substation Sec. 5 T11S R11E
d) Point of Termination	Saguaro Substation Sec. 14 T10S R10E
e) Length	Approximately 3.2 miles
Routing	Northwest from Naviska Substation to the APS Saguaro Substation paralleling existing transmission lines
Purpose	To provide for anticipated load growth in Northern Pima and Southern Pinal County areas of SWTC's Western Area.
Date	
a) Construction Start	2007
b) In-Service Date	2008
Is Certificate Necessary?	Yes

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation Size	Redington Switchyard
a) Voltage	115 kV
b) Capacity	To be determined
c) Point of Origin	Apache-Hayden 115 kV line near San Manual Sec. 19 T9S R18E
d) Point of Termination	APS San Manual Substation Sec. 29 T9S R17E
e) Length	Approximately 4.5 miles of double circuit 115 kV line
Routing	Apache-Hayden 115 kV line, heading generally West then Southwest to Redington Switchyard and interconnecting at San Manual Substation
Purpose	Provide for increased transfer capability and voltage support in Southern Pinal County and to provide for anticipated load growth in Southern Pinal County area of SWTC's Western Area.
Date	
a) Construction Start	2008
b) In-Service Date	2008
Is Certificate Necessary?	Yes

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Sloan 230/69 kV Substation
Size	
a) Voltage	230 kV
b) Capacity	100 MVA
c) Point of Origin	Tap of existing Butterfield to Pantano 230 kV Line. Sec. 29 T16S R20E
d) Point of Termination	Sloan Substation Sec. 29 T16S R20E
e) Length	0 miles
Routing	Substation to be located on the Butterfield to Pantano 230 kV line, approximately 11.5 miles west of Butterfield Substation and approximately 19.5 miles east of Pantano Substation.
Purpose	To provide for anticipated load growth in SWTC's Southern Area.
Date	
a) Construction Start	2008
b) In-Service Date	2008
Is Certificate Necessary?	No

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Valencia to CAP Black Mountain 115 kV Line
Size	
a) Voltage	115 kV
b) Capacity	167 MVA
c) Point of Origin	Valencia Substation Sec. 17 T15S R12E
d) Point of Termination	CAP Black Mountain Substation Sec. 2 T15S R12E
e) Length	Approximately 4.5 miles
Routing	From Valencia Substation heading North and East to the CAP Black Mountain Substation
Purpose	To provide an additional source to the SWTC 115 kV system and for the Valencia Substation which is currently served by a radial 115 kV line from Three Points Substation
Date	
a) Construction Start	2010
b) In-Service Date	2011
Is Certificate Necessary?	Yes

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Valencia to San Joaquin 115 kV Line
Size	
a) Voltage	115 kV
b) Capacity	167 MVA
c) Point of Origin	Valencia Substation Sec. 17 T15S R12E
d) Point of Termination	San Joaquin Substation Sec. 29 T14S R12E
e) Length	Approximately 3.2 miles
Routing	North from Valencia Substation to San Joaquin Substation
Purpose	Provide for increased transfer capability and voltage support in Southern Pima County and to provide for anticipated load growth in Southern Pima County area of SWTC's Western Area.
Date	
a) Construction Start	2008
b) In-Service Date	2009
Is Certificate Necessary?	Yes

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Sandario to San Joaquin 115 kV Line
Size	
a) Voltage	115 kV
b) Capacity	167 MVA
c) Point of Origin	Sandario Substation Sec. 5 T14S R11E
d) Point of Termination	San Joaquin Substation Sec. 29 T14S R12E
e) Length	Approximately 8.0 miles
Routing	From Sandario Substation heading Southeast to Joaquin Substation
Purpose	Provide for increased transfer capability and voltage support in Southern Pima County and to provide for anticipated load growth in Southern Pima County area of SWTC's Western Area.
Date	
a) Construction Start	2011
b) In-Service Date	2012
Is Certificate Necessary?	Yes

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Naviska to Thornydale 115 kV Line
Size	
a) Voltage	115 kV
b) Capacity	167 MVA
c) Point of Origin	Naviska Substation Sec. 5 T11S R11E
d) Point of Termination	Thornydale Substation Sec. 33 T11S R12E
e) Length	Approximately 7.0 miles
Routing	Southeast from Naviska Substation to Thornydale Substation
Purpose	Provide for increased transfer capability and voltage support in Southern Pima County and to provide for anticipated load growth in Southern Pima County area of SWTC's Western Area.
Date	
a) Construction Start	2008
b) In-Service Date	2009
Is Certificate Necessary?	Yes

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Thornydale to Picture Rocks 115 kV Line
Size	
a) Voltage	115 kV
b) Capacity	167 MVA
c) Point of Origin	Thornydale Substation Sec. 33 T11S R12E
d) Point of Termination	Picture Rocks Substation Sec. 14 T12S R11E
e) Length	Approximately 11.5 miles
Routing	Southwest from Thornydale Substation to Twin Peaks Substation
Purpose	Provide for increased transfer capability and voltage support in Southern Pima County and to provide for anticipated load growth in Southern Pima County area of SWTC's Western Area.
Date	
a) Construction Start	2011
b) In-Service Date	2012
Is Certificate Necessary?	Yes

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Picture Rocks to CAP Twin Peaks 115 kV Line
Size	
a) Voltage	115 kV
b) Capacity	167 MVA
c) Point of Origin	Picture Rocks Substation Sec. 14 T12S R11E
d) Point of Termination	Twin Peaks Substation Sec. 14 T12S R11E
e) Length	Approximately 1 mile
Routing	West from Picture Rocks Substation to Twin Peaks Substation
Purpose	Provide for increased transfer capability and voltage support in Southern Pima County and to provide for anticipated load growth in Southern Pima County area of SWTC's Western Area.
Date	
a) Construction Start	2011
b) In-Service Date	2012
Is Certificate Necessary?	Yes

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Sandario to CAP Brawley 115 kV Line	
Size		
	a) Voltage	115 kV
	b) Capacity	167 MVA
	c) Point of Origin	Sandario Substation Sec. 5 T14S R11E
	d) Point of Termination	CAP Brawley Substation Sec. 33 T13S R11E
	e) Length	Approximately 1 mile
Routing	Northeast from Sandario Substation to Brawley Substation	
Purpose	Provide for increased transfer capability and voltage support in Southern Pima County and to provide for anticipated load growth in Southern Pima County area of SWTC's Western Area.	
Date		
	a) Construction Start	2011
	b) In-Service Date	2012
Is Certificate Necessary?	Yes	

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Adonis 115/24.9 kV Substation	
Size		
a) Voltage		115 kV
b) Capacity		50 MVA
c) Point of Origin		Tap of Naviska to Thornydale 115 kV line Sec. 23 T11S R11E
d) Point of Termination		Adonis Substation Sec. 23 T11S R11E
e) Length		0 miles
Routing	Southeast from Naviska Substation to Adonis Substation	
Purpose	Provide for increased transfer capability and voltage support in Southern Pima County and to provide for anticipated load growth in Southern Pima County area of SWTC's Western Area.	
Date		
a) Construction Start		2012
b) In-Service Date		2013
Is Certificate Necessary?		No

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	New Tucson 230/24.9 kV Substation
Size	
a) Voltage	230 kV
b) Capacity	50 MVA
c) Point of Origin	Tap of Pantano to Sahuarita 230 kV Line Sec. 34 T16S R16E
d) Point of Termination	New Tucson Substation Sec. 34 T16S R16E
e) Length	0 miles
Routing	West of Pantano Substation and East of Sahuarita Substation
Purpose	Provide for increased transfer capability and voltage support in Southern Pima County and to provide for anticipated load growth in Southern Pima County area of SWTC's Western Area.
Date	
a) Construction Start	2013
b) In-Service Date	2014
Is Certificate Necessary?	No

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Camino de Manana 115/24.9 kV Substation
Size	
a) Voltage	115 kV
b) Capacity	50 MVA
c) Point of Origin	Tap of Thornydale to Picture Rocks 115 kV Line. Sec. 23 T12S R12E
d) Point of Termination	Camino de Manana Substation Sec. 23 T12S R12E
e) Length	0 miles
Routing	Southeast from Thornydale Substation to Camino de Manana Substation
Purpose	Provide for increased transfer capability and voltage support in Southern Pima County and to provide for anticipated load growth in Southern Pima County area of SWTC's Western Area.
Date	
a) Construction Start	2014
b) In-Service Date	2015
Is Certificate Necessary?	No

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Upgrade of Marana to Avra Valley 115 kV Line
Size	
a) Voltage	115 kV
b) Capacity	167 MVA
c) Point of Origin	Marana Substation Sec. 26 T11S R10E
d) Point of Termination	Avra Valley Substation Sec. 11 T13S R10E
e) Length	Approximately 8.75 miles
Routing	Same R.O.W. as existing Marana to Avra Valley 115 kV line
Purpose	To mitigate various thermal overloads and/or voltage criteria violations due to N-1 outages on the 115 kV system between Bicknell and Marana and to provide for anticipated load growth in Southern Pima County area of SWTC's Western Area.
Date	
a) Construction Start	2015
b) In-Service Date	2015
Is Certificate Necessary?	Yes

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Upgrade of Apache to Butterfield 230 kV Line
Size	
a) Voltage	230 kV
b) Capacity	438 MVA
c) Point of Origin	Apache Substation Sec. 10 T16S R24E
d) Point of Termination	Butterfield Substation Sec. 31 T16S R22E
e) Length	Approximately 16.0 miles
Routing	Same R.O.W. as existing Apache to Butterfield 230 kV line
Purpose	To mitigate various thermal overloads and/or voltage criteria violations due to N-1 outages on the 230 kV system and to provide for anticipated load growth in SWTC's Southern Area.
Date	
a) Construction Start	2014
b) In-Service Date	2015
Is Certificate Necessary?	Yes

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	Upgrade of Pantano to Kartchner 115 kV Line
Size	
a) Voltage	230 kV
b) Capacity	438 MVA
c) Point of Origin	Pantano Substation Sec. 11 & 12 T17S R17E
d) Point of Termination	Kartchner Substation Sec. 33 T21S R20E
e) Length	Approximately 36.0 miles
Routing	Same R.O.W. as existing Pantano to Kartchner 115 kV line
Purpose	To mitigate various thermal overloads and/or voltage criteria violations due to N-1 outages on the 230 kV system and to provide for anticipated load growth in SWTC's Southern Area.
Date	
a) Construction Start	2014
b) In-Service Date	2015
Is Certificate Necessary?	Yes

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation	San Rafael to Kartchner 230 kV Line
Size	
a) Voltage	230 kV
b) Capacity	438 MVA
c) Point of Origin	San Rafael Substation Sec. 17 T22S R21E
d) Point of Termination	Kartchner Substation Sec. 33 T21S R20E
e) Length	Approximately 8.3 miles
Routing	
Purpose	To mitigate various thermal overloads and/or voltage criteria violations due to N-1 outages on the 230 kV system and to provide for anticipated load growth in SWTC's Southern Area.
Date	
a) Construction Start	2014
b) In-Service Date	2015
Is Certificate Necessary?	Yes

SECTION II

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

INTERNAL PLANNING CRITERIA AND FACILITY RATINGS

The following represents the internal planning criteria of Southwest Transmission Cooperative, Inc. ("SWTC") and also identifies the assumptions and methodologies used by SWTC to determine electrical facility ratings. This criteria is published in the FERC FORM #715 Filing that is made annually by the Western Electricity Coordinating Council ("WECC") for its members.

The assumptions used below represent criteria that SWTC has used for a number of years, to meet requirements of the North American Electric Reliability Council ("NERC"), the Federal Energy Regulatory Commission ("FERC") and the WECC.

1) Nominal Operating Limit

- Transmission lines should not be loaded greater than 100% of the thermal rating of the conductors.
- Transformers, circuit breakers, current transformers, and other equipment should not be loaded above their continuous nameplate rating.
- Transmission system voltages should not fall below 0.95 per unit (p.u.) of nominal nor rise above 1.05 p.u. of nominal

2) Emergency Operating Limit

- Transmission lines should not be loaded greater than 110% of the thermal rating of the conductors.
- Transformers, circuit breakers, current transformers, and other equipment should not be loaded above their continuous nameplate rating.
- Transmission system voltages should not fall below 0.90 p.u. of nominal nor rise above 1.10 p.u. of nominal.

3) Transformer Loading Criteria

For study purposes, transformers are generally considered in nominal operating conditions at the maximum of their 55°C rise; and represented at the maximum of their 65°C rise under emergency operating conditions.

4) Conductor Loading Criteria

Ampacities for the bulk of SWTC's transmission lines have been developed, using the House and Tuttle formula for Aluminum Conductor Steel Reinforced (ACSR) overhead conductors as developed by the Western Area Power Administration (Power System Bulletin 510, dated January 14, 1992).

The Conductor type and Ampacities are listed below at 75 degrees Celsius conductor operating temperature, 2 foot per second wind velocity and 40 degrees Celsius ambient air temperature:

Type	Amps
#2 CU	240
#4 ACSR	120
1/0 ACSR	240
3/0 ACSR	310
4/0 ACSR	360
266.8 ACSR	380
336.4 ACSR	500
477 ACSR	620
795 ACSR	840
954 ACSR	920
1272 ACSR	1100
2-954 ACSR	1370

5) The following table summarizes the conditions establishing limits for SWTC.

Circuit Feature	Nominal Limit	Emergency Limit
Power Circuit Breaker	100% rating	100% rating
Bushing CT	100% connection	100% connection
Wound CT	100% thermal	100% thermal rating
Switches	100% rating	100% rating
Conductor	100% thermal rating	110% thermal rating
Regulator	100% rating	100% rating
Transformer	100% rating @ 55°C rise	100% rating @ 65°C rise
Reactor	100% rating	100% rating
Relay Setting	80% of setting	80% of setting

- 6) Table 1 below describes the electrical load limits of SWTC's facilities under nominal and emergency conditions. The methodology for determining the path was to pass through the from-bus and stop just before the to-bus. Transformers, jumpers, and other equipment were considered when determining the limiting element for the from-bus only.

Table 1: Load Limits

Station A From	Station B To	Voltage KV	Nominal Limit Amps	Emergency Limit Amps	Nominal Limit MVA	Emergency Limit MVA	Limiting Equipment
BICKNELL	VAIL	345	251	323	150	193	Transformer
VAIL	BICKNELL	345	1370	1507	819	901	Conductor
GREEN-SW	GREENLEE	345	586	698	350	417	Transformer
GREENLEE	GREEN-SW	345	1370	1507	819	901	Conductor
APACHE	BUTERFLD	230	840	924	335	368	Conductor
BUTERFLD	APACHE	230	840	924	335	368	Conductor
APACHE	RED TAIL	230	1100	1210	438	482	Conductor
RED TAIL	APACHE	230	1100	1210	438	482	Conductor
BUTERFLD	PANTANO	230	840	924	335	368	Conductor
PANTANO	BUTERFLD	230	251	281	100	110	Transformer
BUTERFLD	SAN RAF	230	920	1012	367	403	Conductor
MORENCI	GREEN-SW	230	1100	1210	438	482	Conductor
GREEN-SW	MORENCI	230	251	323	150	193	Transformer
DOSCONDO	MORENCI	230	1100	1210	438	482	Conductor
MORENCI	DOSCONDO	230	1100	1210	438	482	Conductor
MORENCI	PD-MORNC	230	920	1012	367	403	Conductor
PD-MORNC	MORENCI	230	753	843	300	336	Transformer
PANTANO	SAHUARITA	230	251	281	100	110	Transformer
SAHUARITA	PANTANO	230	840	924	335	368	Conductor
SAHUARITA	BICKNELL	230	840	924	335	368	Conductor
BICKNELL	SAHUARITA	230	251	323	150	193	Transformer
RED TAIL	DOSCONDO	230	1100	1210	438	482	Conductor
DOSCONDO	RED TAIL	230	1100	1210	438	482	Conductor
DAVIS	RIVIERA	230	1100	1210	438	482	Conductor
APACHE	WINCHSTR	230	1100	1210	438	482	Conductor
WINCHSTR	APACHE	230	702	773	420	462	Transformer
APACHE	HAYDENA	115	620	682	123	136	Conductor
HAYDENA	APACHE	115	620	682	123	136	Conductor
AVRA	MARANA	115	360	396	72	79	Conductor
MARANA	AVRA	115	360	396	72	79	Conductor
BICKNELL	THREEPNT	115	251	281	100	112	Transformer
THREEPNT	BICKNELL	115	620	682	123	136	Conductor
BICKNELL	MILLSITE	115	251	281	100	112	Transformer
MILLSITE	BICKNELL	115	620	682	123	136	Conductor
BICKNELL	OXIDEPLT	115	251	281	100	112	Transformer
OXIDEPLT	BICKNELL	115	620	682	123	136	Conductor
MARANA	MARANATP	115	500	550	100	110	Jumpers
MARANATP	MARANA	115	500	550	100	110	Jumpers
PANTANO	KARTCHNR	115	251	281	100	112	Transformer
AVRA	SANDARIO	115	360	396	72	79	Conductor
SANDARIO	AVRA	115	360	396	72	79	Conductor
THREEPNT	SANDARIO	115	360	396	72	79	Conductor
SANDARIO	THREEPNT	115	360	396	72	79	Conductor
THREEPNT	VALENCIA	115	620	682	123	136	Conductor

SECTION III

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

TEN YEAR PLAN

2007 – 2016

TECHNICAL STUDY REPORT

**SUBMITTED TO THE ARIZONA CORPORATION COMMISSION
IN FULFILLMENT OF A.R.S. §40-360.02 ¶C.7**

**TRANSMISSION PLANNING
JANUARY 2007**

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2011 Base System Case with Valencia to Black Mountain Added	52 - 53
2012 Base System Case with Sandario to San Joaquin, Thornydale to Picture Rocks, Picture Rocks to Twin Peaks and Sandario to Brawley Added	54 - 55
2013 Base System Case with Adonis Added	56 - 57
2014 Base System Case with New Tucson Added	58 - 59
2015 Base System Case with Camino de Manana, Upgrade of the Marana to Avra Line, San Rafael to Kartchner, Upgrades of the Pantano to Kartchner and Apache to Butterfield Lines Added	60 - 61
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SOUTHWEST TRANSMISSION COOPERATIVE, INC.
TEN YEAR PLAN
2006 – 2015
TECHNICAL STUDY REPORT

INTRODUCTION

This technical report is submitted to the Arizona Corporation Commission (“Commission”) pursuant to the Arizona Revised Statutes (“ARS”) §40-360.02 ¶C.7, and Decision No. 63876, dated July 25, 2001, regarding the Biennial Transmission Assessment prepared by Commission Utilities Division Staff.

Power flow analyses performed for this report looked at N-0 conditions for each year from 2007 to 2016 and N-1 conditions for the years 2015 and 2016, of this Ten Year Plan. This provided an excellent snapshot of the problems that will be encountered with the most recent forecasted loads used in this Ten Year Plan Filing. The analyses showed that under a variety of N-1 conditions in these later years, the system performed with no violations of SWTC’s internal criteria.

The last stability analyses completed by SWTC were included in the SWTC 2002 Ten Year Plan Filing for the Winchester Project. These studies were performed on the system using summer of 2004 conditions, which was reported in the 2002 SWTC Ten Year Plan filing to the Commission. Stability studies for the expanded systems of 2007 and later have not been performed.

POWER FLOW ANALYSIS

Power flow studies were performed using General Electric’s Positive Sequence Load Flow (“PSLF”) program. Power flow cases were created for the years 2007-2016 of the study plan using the latest base cases from the Western Electricity Coordinating Council (“WECC”). The base cases from WECC were updated with the latest load projections of SWTC, as noted above, and other entities participating in the Southwest Area Transmission (“SWAT”) Planning Group. Representations of the sub-transmission systems of SWTC’s member-owners were added to the cases as necessary. Base case and single contingency conditions were evaluated using PSLF to determine system impacts and timing of transmission facilities needed to mitigate those system impacts.

Numerous outage simulations were performed for the years 2015 and 2016, of the study period. The analyses looked at the impact of the most recent projected member system load growth to the interconnected transmission system, which follow closely those used in the June 27, 2006 Amended Filing. The analyses determined where facilities would be placed to most economically serve this projected member system load. As a result of these studies, SWTC will be assured of maintaining reliability and quality of service for its interconnected transmission system and for the customers of its member-owners.

The studies that were performed for the Amended Ten Year Plan Filing, dated June 27, 2006, stated that of the numerous N-1 analyses that were conducted for the year 2015, there were no violations to SWTC's internal planning criteria with the exception of the loss of the Apache to Butterfield and Butterfield to San Rafael 230 kV lines. The outage of these two lines were not able to be resolved through local remedial action, due to an increased load forecast from one of SWTC's Member Owners.

Three new projects have been introduced in this Ten Year Plan Filing that mitigates these two outages:

- 1) Upgrade of Apache to Butterfield 230 kV line
- 2) Upgrade of Pantano to Kartchner 115 kV line
- 3) Addition of San Rafael to Kartchner 230 kV line

With the addition of these planned projects in this Ten Year Plan, the numerous N-1 analyses for the years 2015 and 2016, showed no violations to SWTC's internal planning criteria under normal and emergency conditions.

SWTC is working closely with the affected Member and has taken steps to start the necessary environmental and siting study work that will be needed to place these future facilities into service by 2015.

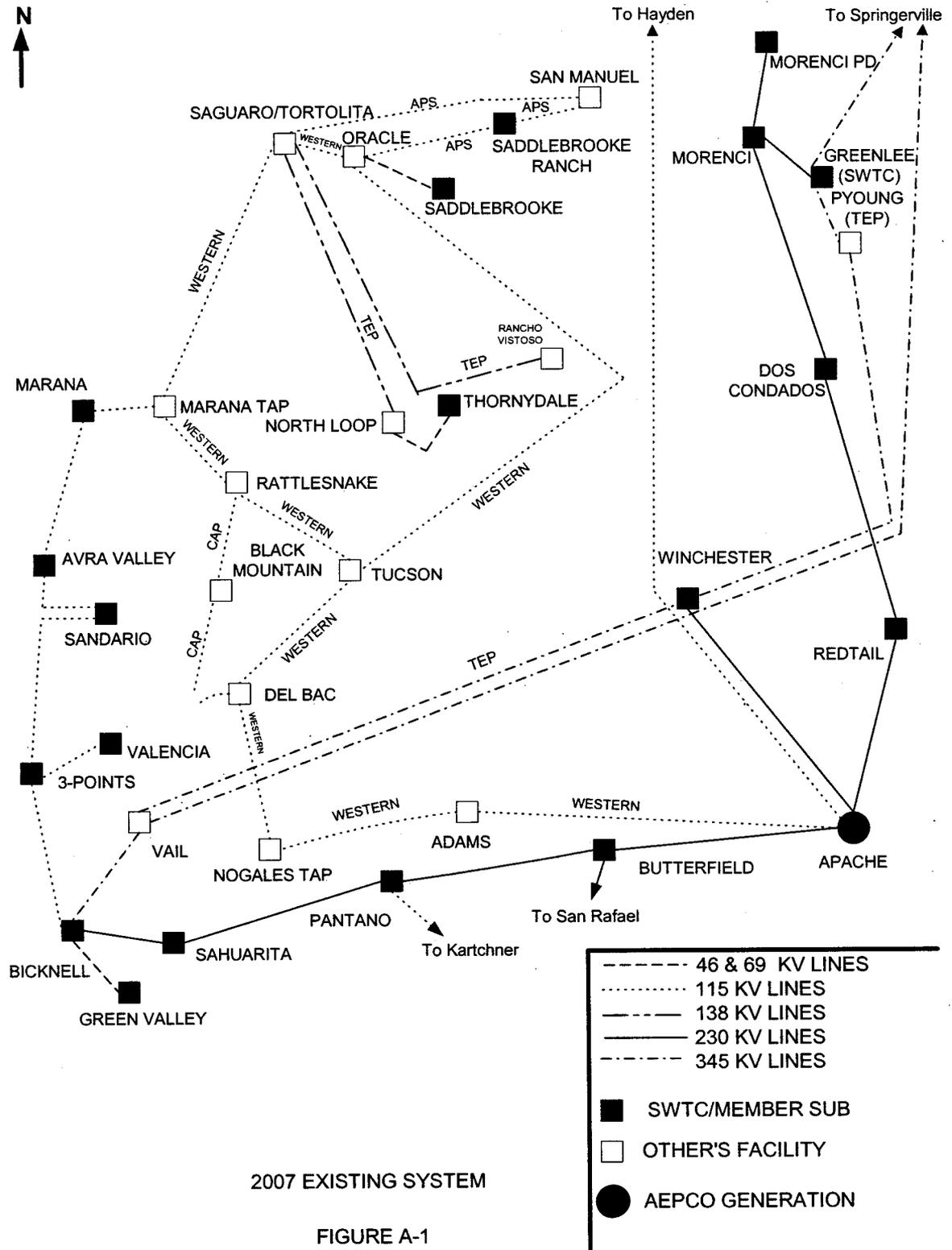
SWTC's existing and proposed transmission system maps are included in Appendix A, which starts on page 37. Power flow one-line diagrams are included in Appendix B, which starts on page 40. The power flow diagrams show the entire SWTC system for all years of the Ten Year Plan.

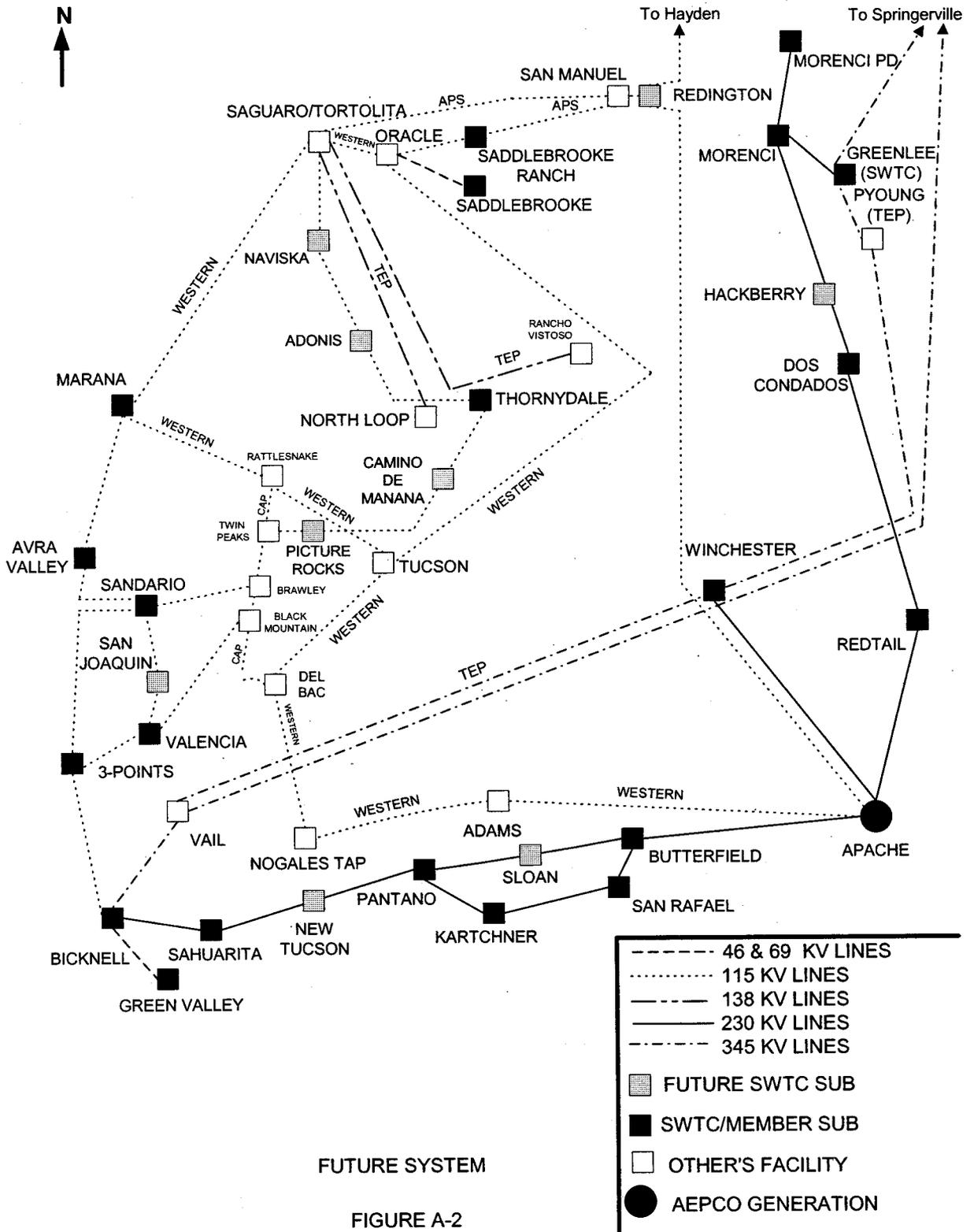
STABILITY ANALYSIS

Extensive stability studies were performed for the Winchester Interconnect Project as reported in the 2002 SWTC Ten Year Plan filing to the Commission. SWTC has not performed any stability analyses for the expanded systems of 2007 and beyond.

APPENDIX A

EXISTING AND PROPOSED TRANSMISSION SYSTEM MAPS

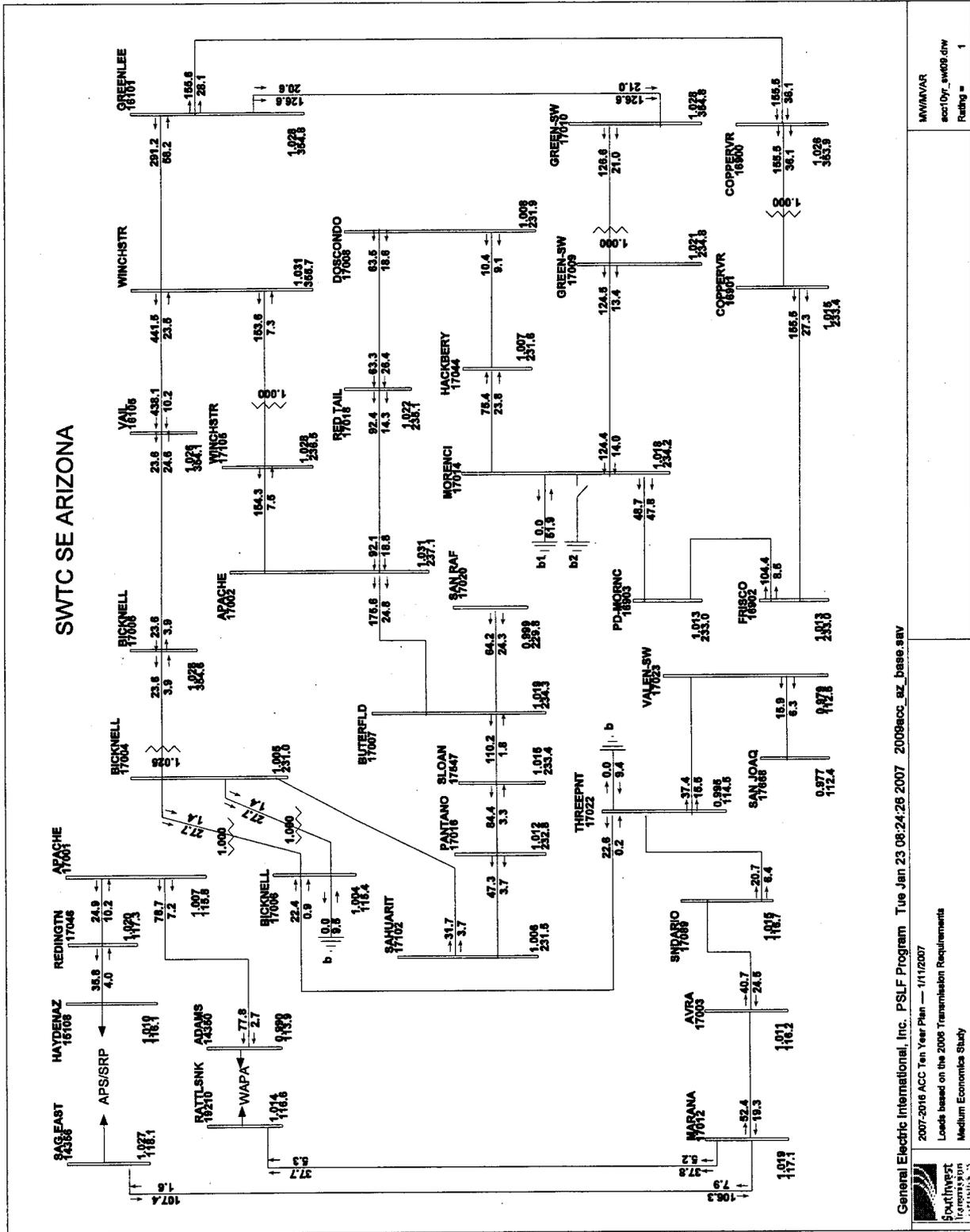




APPENDIX B

POWER FLOW ONE LINE DIAGRAMS

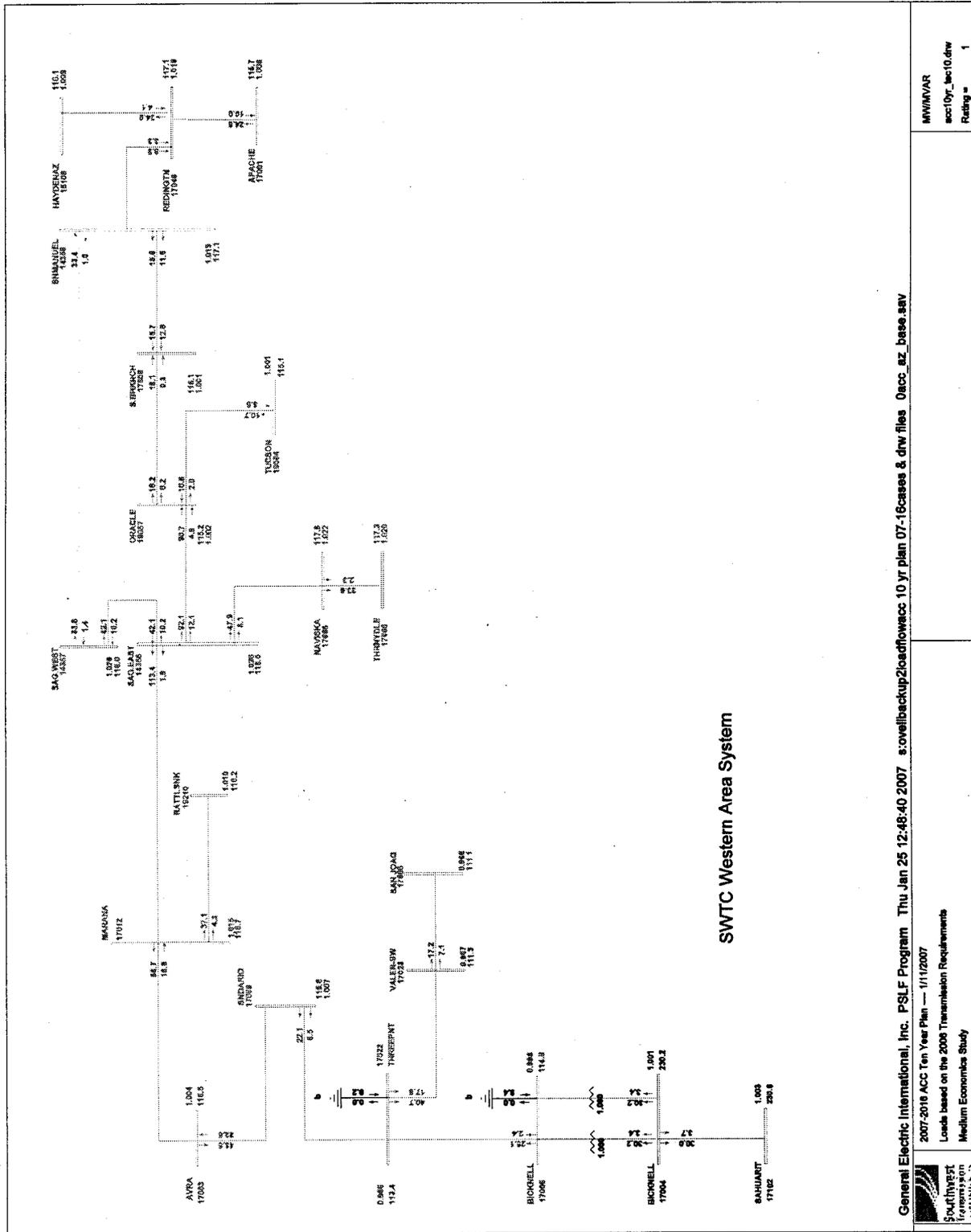
2009 Southwest Transmission Cooperative Base System with Naviska to Thornydale 115 kV line, Valencia to San Joaquin 115 kV line and Marana Tap Upgrade



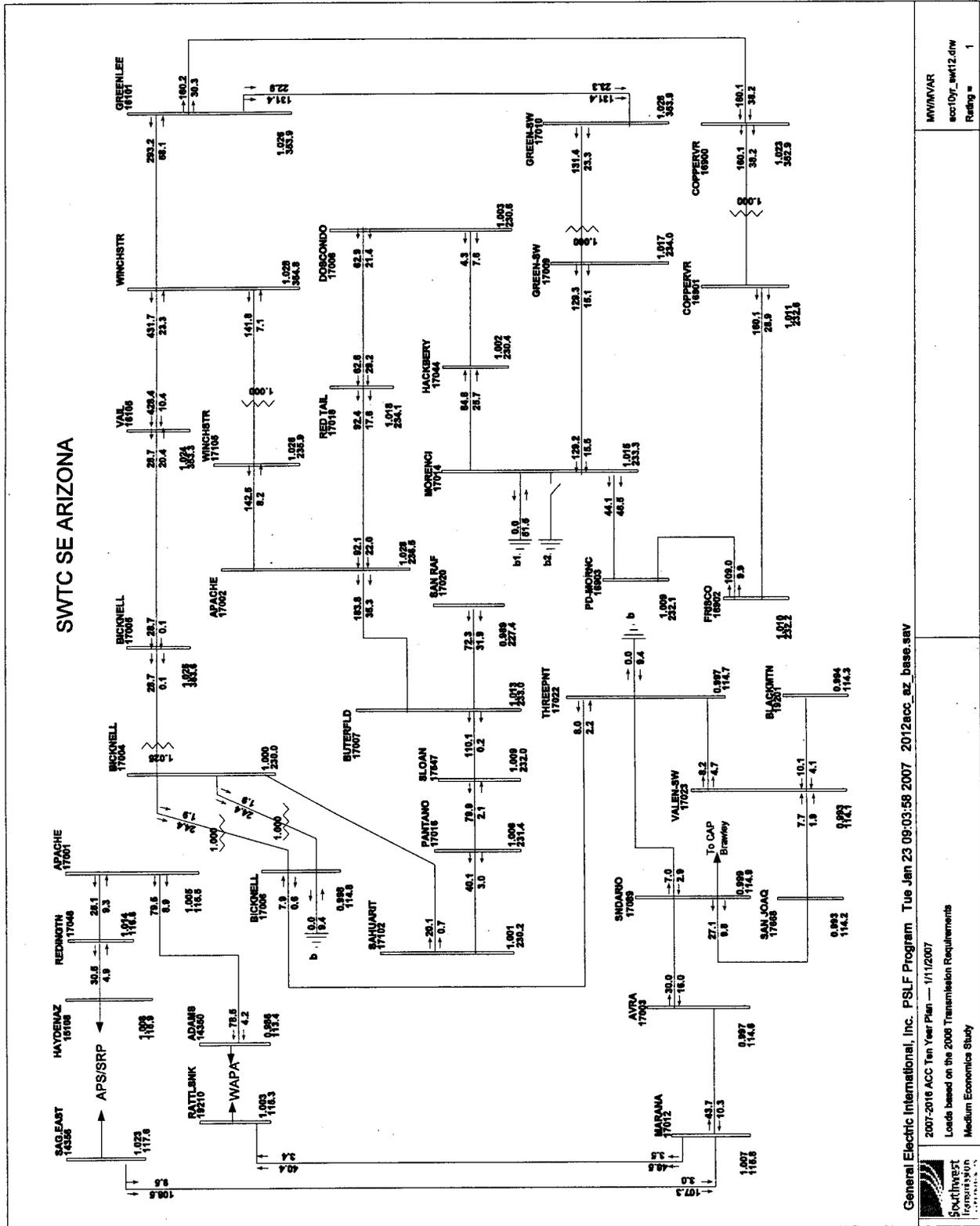
General Electric International, Inc. PSLE Program Tue Jan 23 08:24:26 2007 2008acc_az_base.sav
 2007-2016 ACC Ten Year Plan - 1/11/2007
 Loads based on the 2006 Transmission Requirements
 Medium Economics Study

MW/MVAR
 acc/tyr_sw08.drw
 Rating = 1

2011 Southwest Transmission Cooperative detail of SWTC's Western Area with a new 115 kV interconnection between Valencia and a new 115 kV Substation near CAP's Black Mountain



2012 Southwest Transmission Cooperative Base System with Sandario to San Joaquin 115 kV line, Thornydale to Picture Rocks 115 kV line and new 115 kV interconnections between Picture Rocks and CAP's Twin Peaks and between Sandario and CAP's Brawley

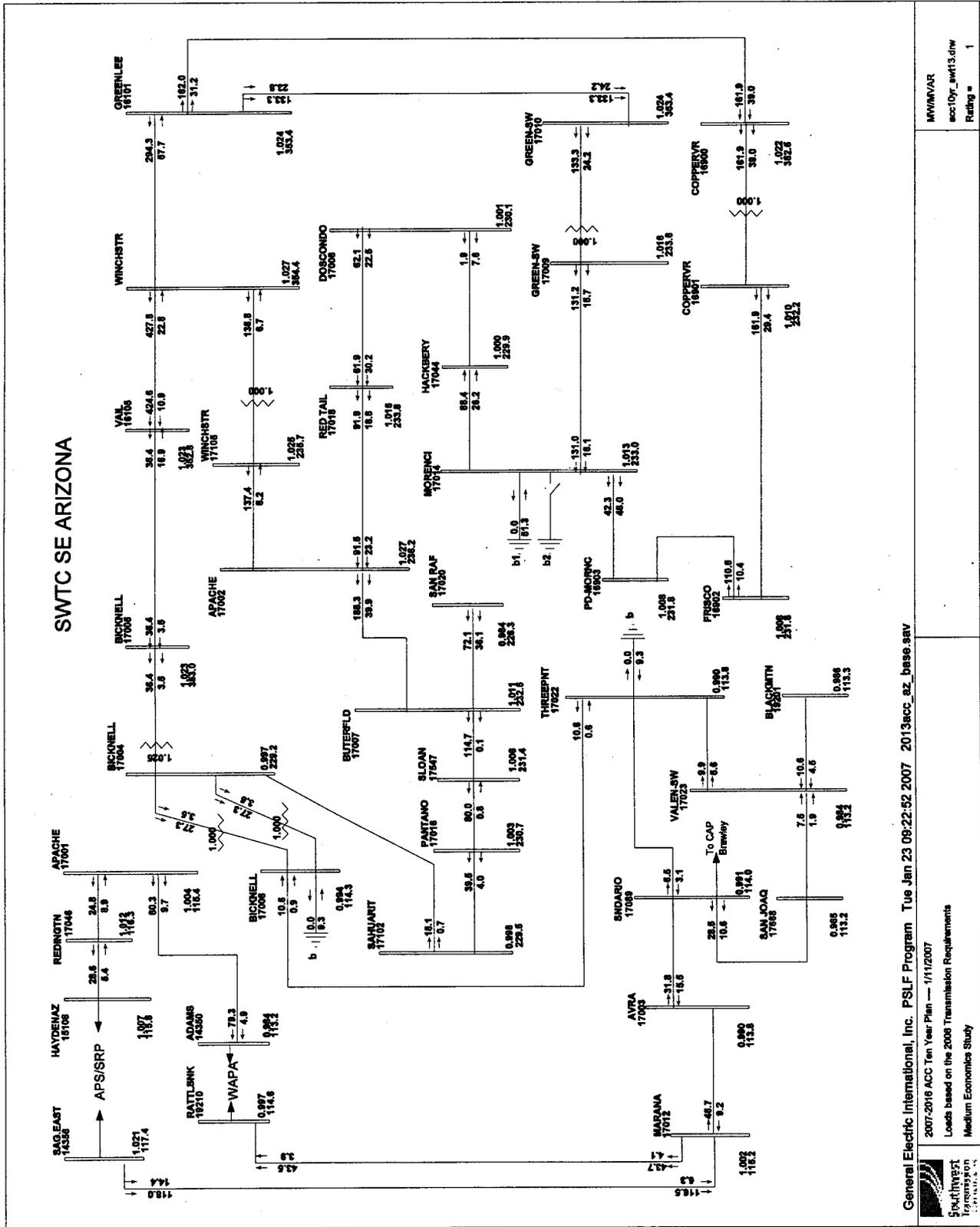


General Electric International, Inc. PSLF Program Tue Jan 23 09:03:58 2007 2012acc_az_base.ssv

2007-2016 ACC Ten Year Plan - 1/11/2007
 Leads based on the 2006 Transmission Requirements
 Medium Economics Study

MW/MVAR
 acc10yr_swt12.dwg
 Rating = 1

2013 Southwest Transmission Cooperative Base System with the addition of Adonis 115 kV Substation tapping the Naviska to Thornydale 115 kV line



General Electric International, Inc. PSUF Program Tue Jan 23 09:22:52 2007 2013secc_02_base.sav

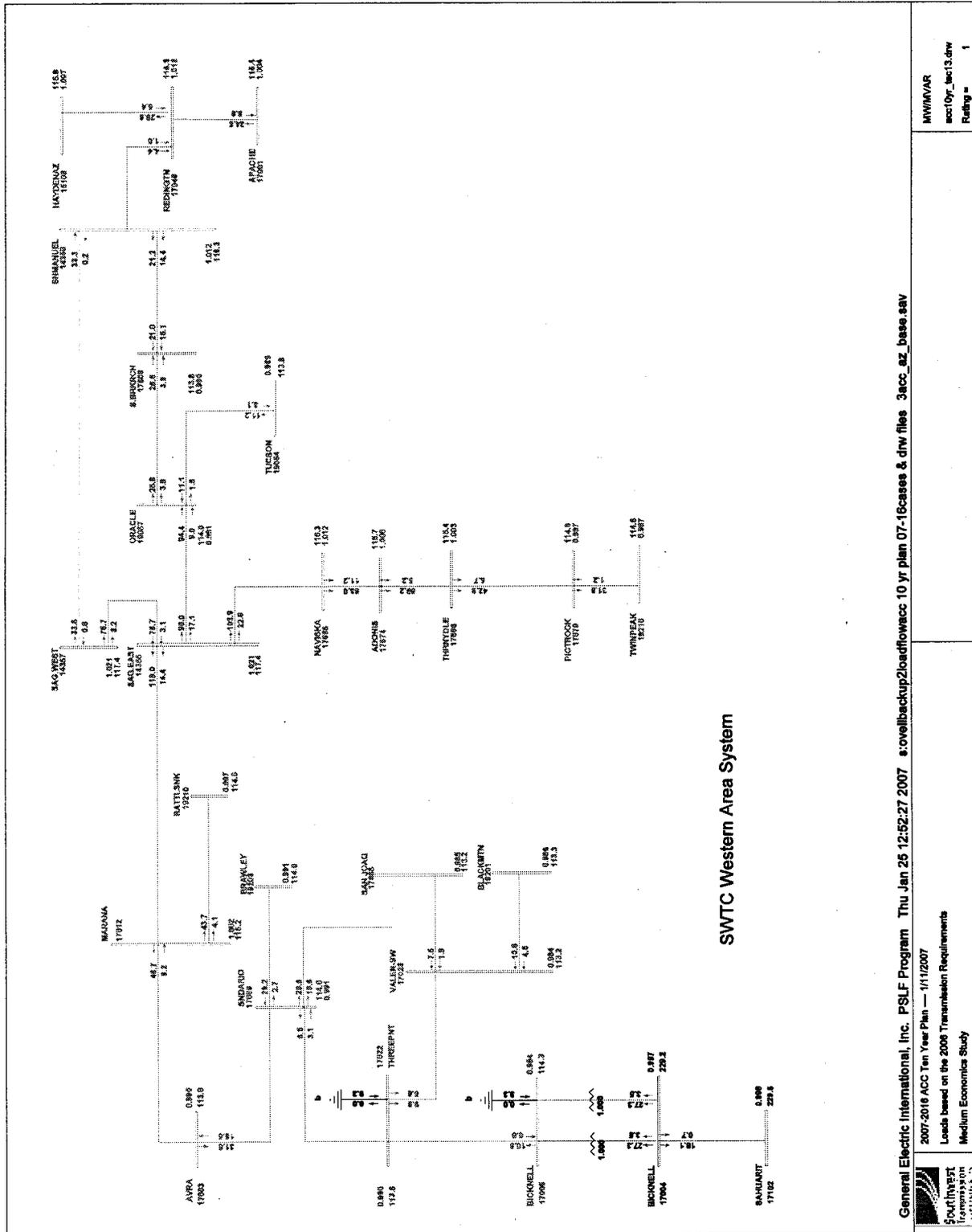
2007-2016 ACC Ten Year Plan - 1/11/2007

Loads based on the 2008 Transmission Requirements Medium Economics Study



MHW/AVR
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Rating = 1

2013 Southwest Transmission Cooperative detail of SWTC's Western Area with the addition of Adonis 115 kV Substation tapping the Naviska to Thornydale 115 kV line

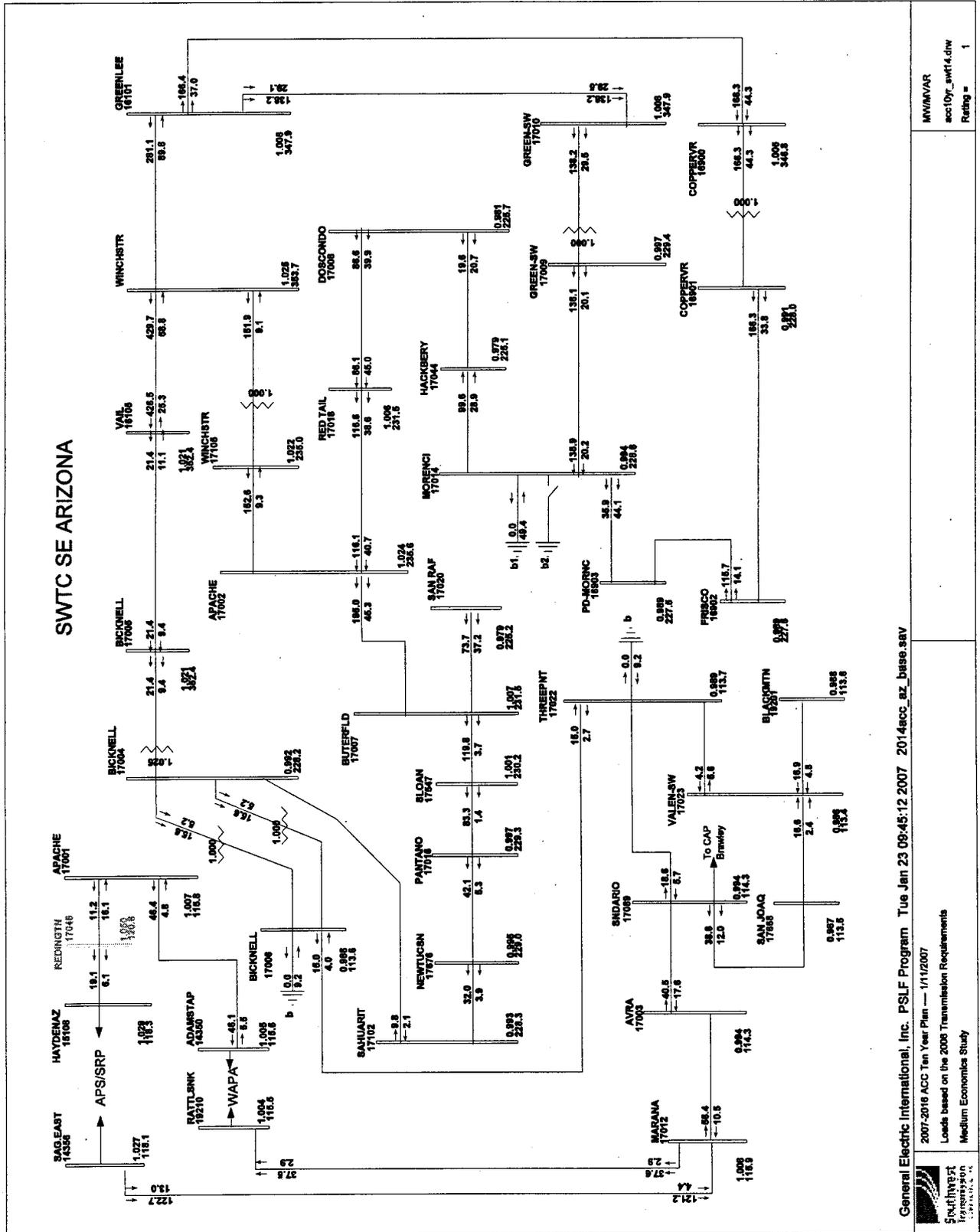


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2007-2016 ACC Ten Year Plan — 1/11/2007
 Loads based on the 2006 Transmission Requirements
 Medium Economics Study

MW/MVAR
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2014 Southwest Transmission Cooperative Base System with the addition of New Tucson 230 kV Substation tapping the Pantano to Sahuarita 230 kV line



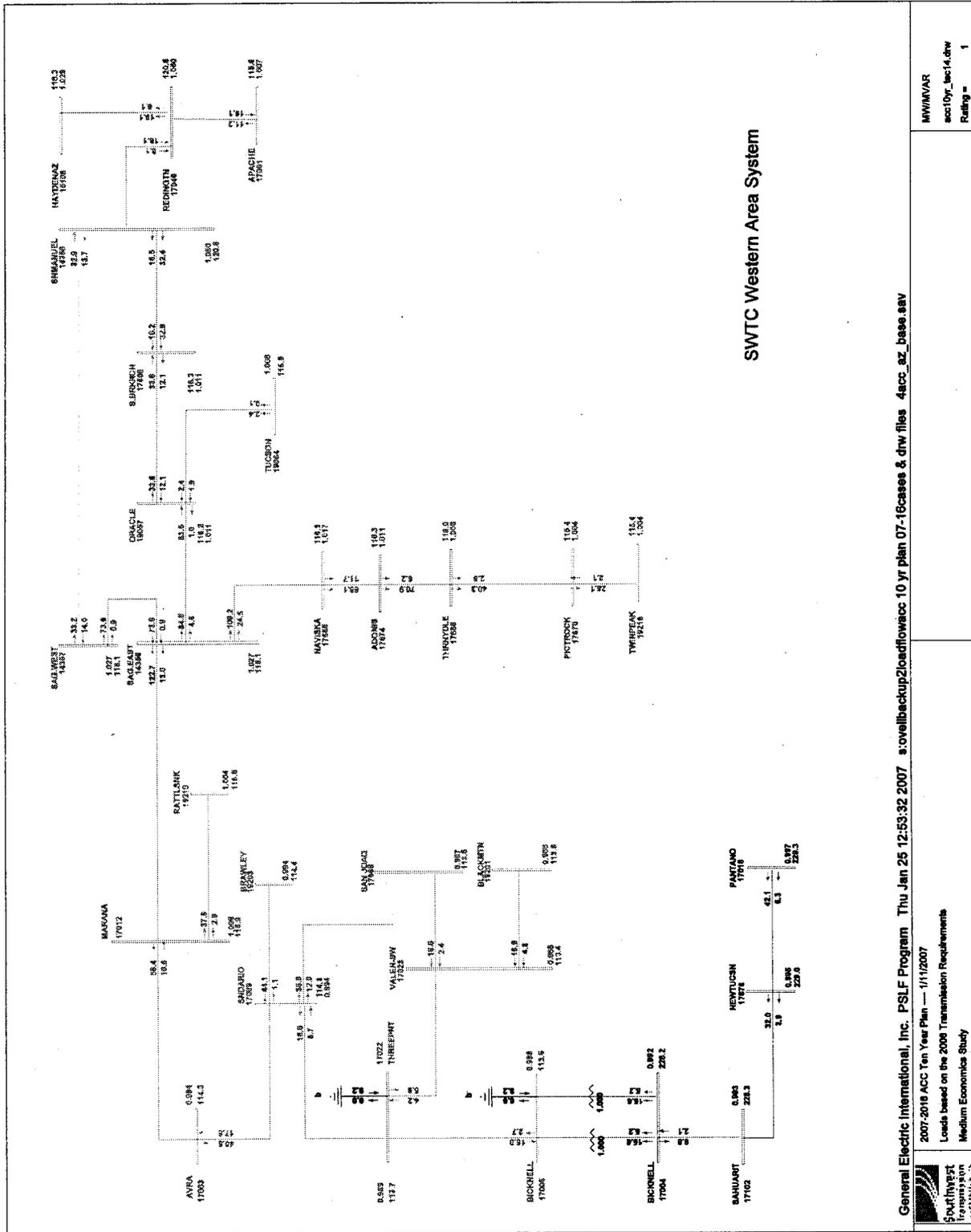
General Electric International, Inc. PSLE Program Tue Jan 23 09:45:12 2007 2014acc_az_base.sav

2007-2016 ACC Ten Year Plan - 1/11/2007

Southwest Transmission
 Medium Economic Study

MW/MVAR
 sec10y_swh14.dwg
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2014 Southwest Transmission Cooperative detail of SWTC's Western Area with the addition of New Tucson 230 kV Substation tapping the Pantano to Sahuarita 230 kV line

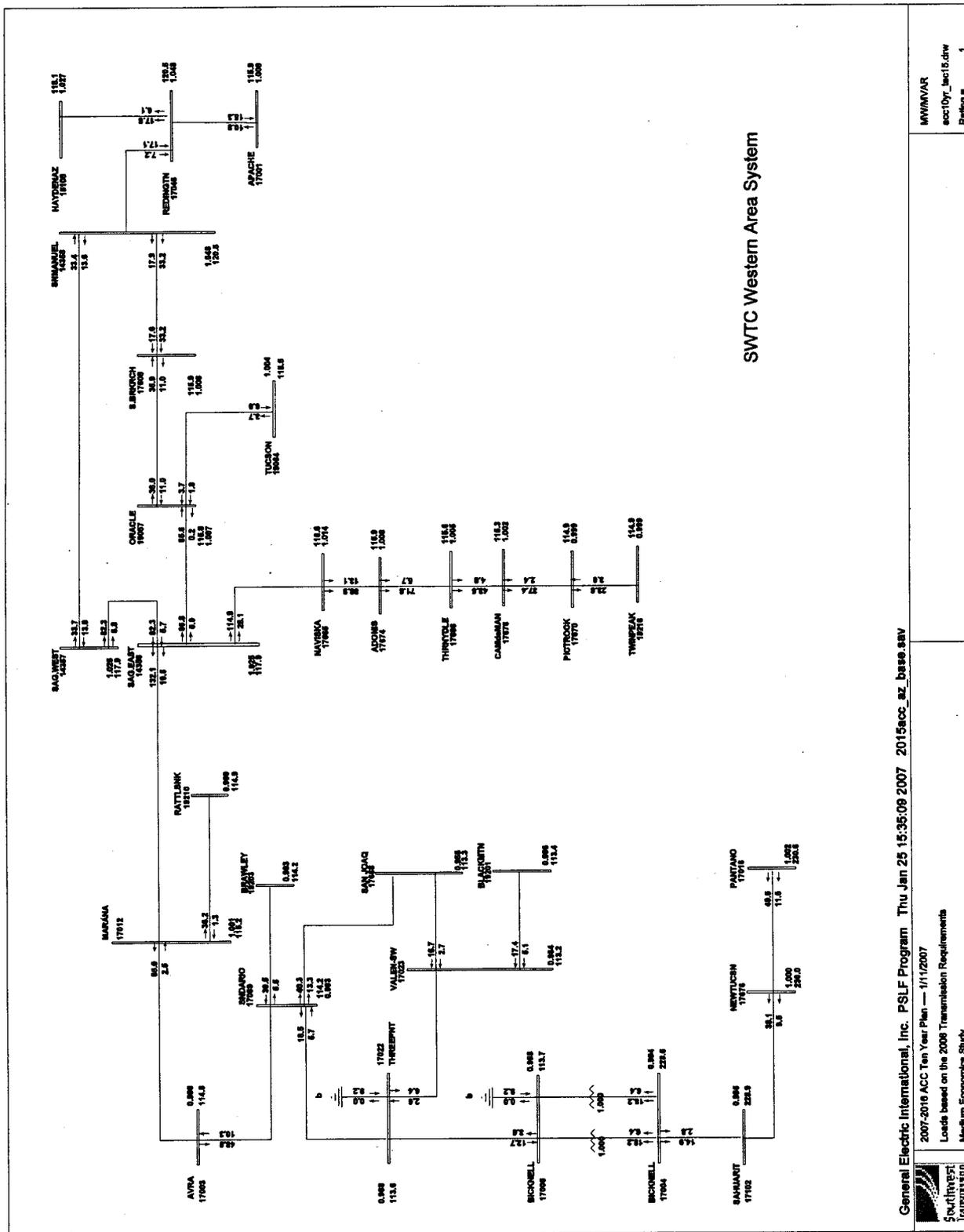


General Electric International, Inc. PSLF Program Thu Jan 25 12:53:32 2007 s:\ovell\backup2\loadflow\acc 10 yr plan 07-16\cases & drw files 4acc_az_base.sav

2007-2016 ACC Ten Year Plan - 1/11/2007
 Loads based on the 2000 Transmission Requirements
 Medium Economics Study

MW/MVAR
 acc10yr_acc14.drw
 Rating = 1

2015 Southwest Transmission Cooperative detail of SWTC's Western Area with the addition of Camino de Manana 115 kV Substation tapping the Thornydale to Picture Rocks 115 kV line and an upgrade of the Marana to Avra Valley 115 kV line



General Electric International, Inc. PSLF Program Thu Jan 25 15:35:09 2007 2015ecc_az_base.sav

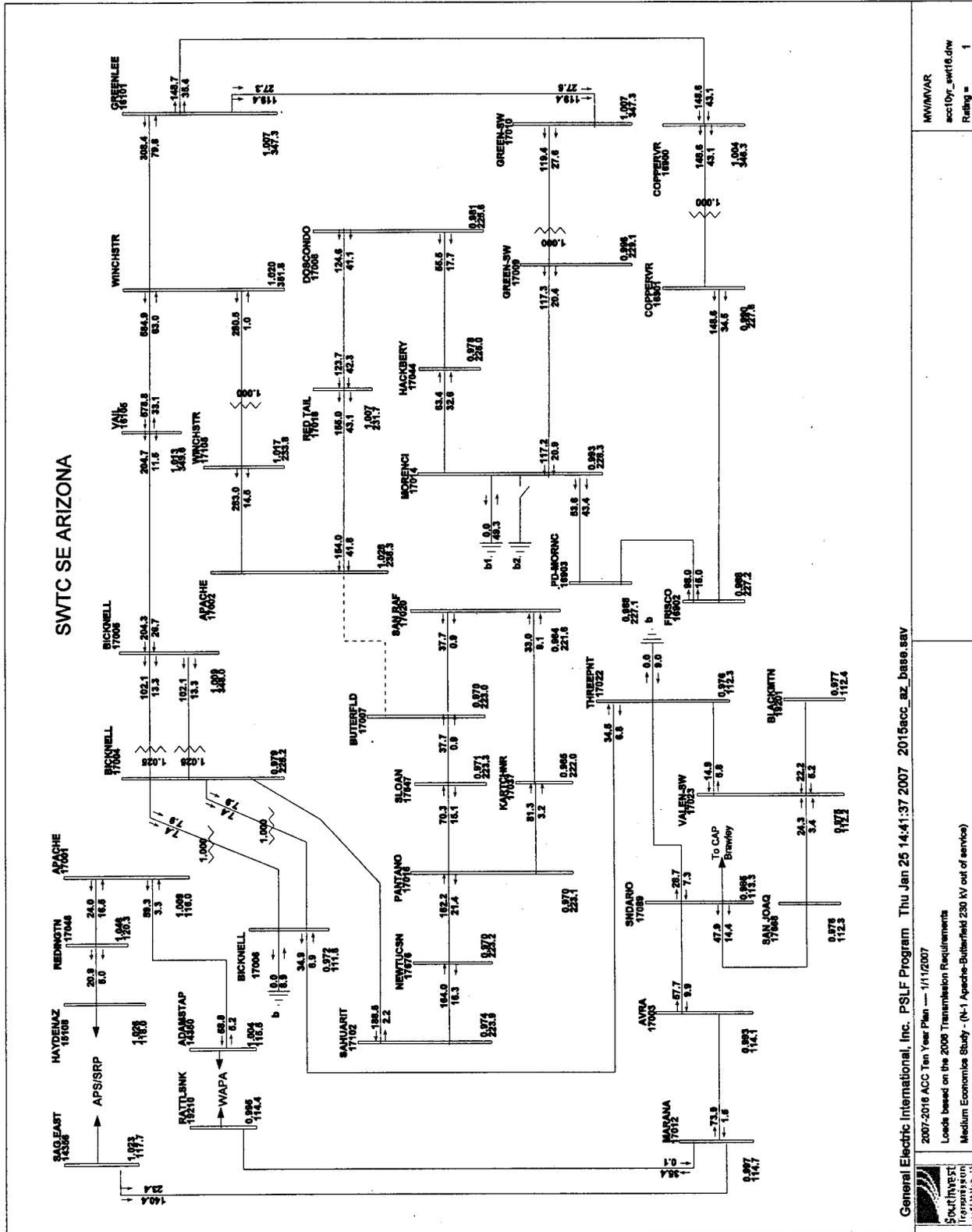
2007-2016 ACC Ten Year Plan - 1/11/2007

Loads based on the 2006 Transmission Requirements Medium Economics Study



MWMAVAR
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2015 Southwest Transmission Cooperative Base System with Apache-Butterfield 230 kV out of service

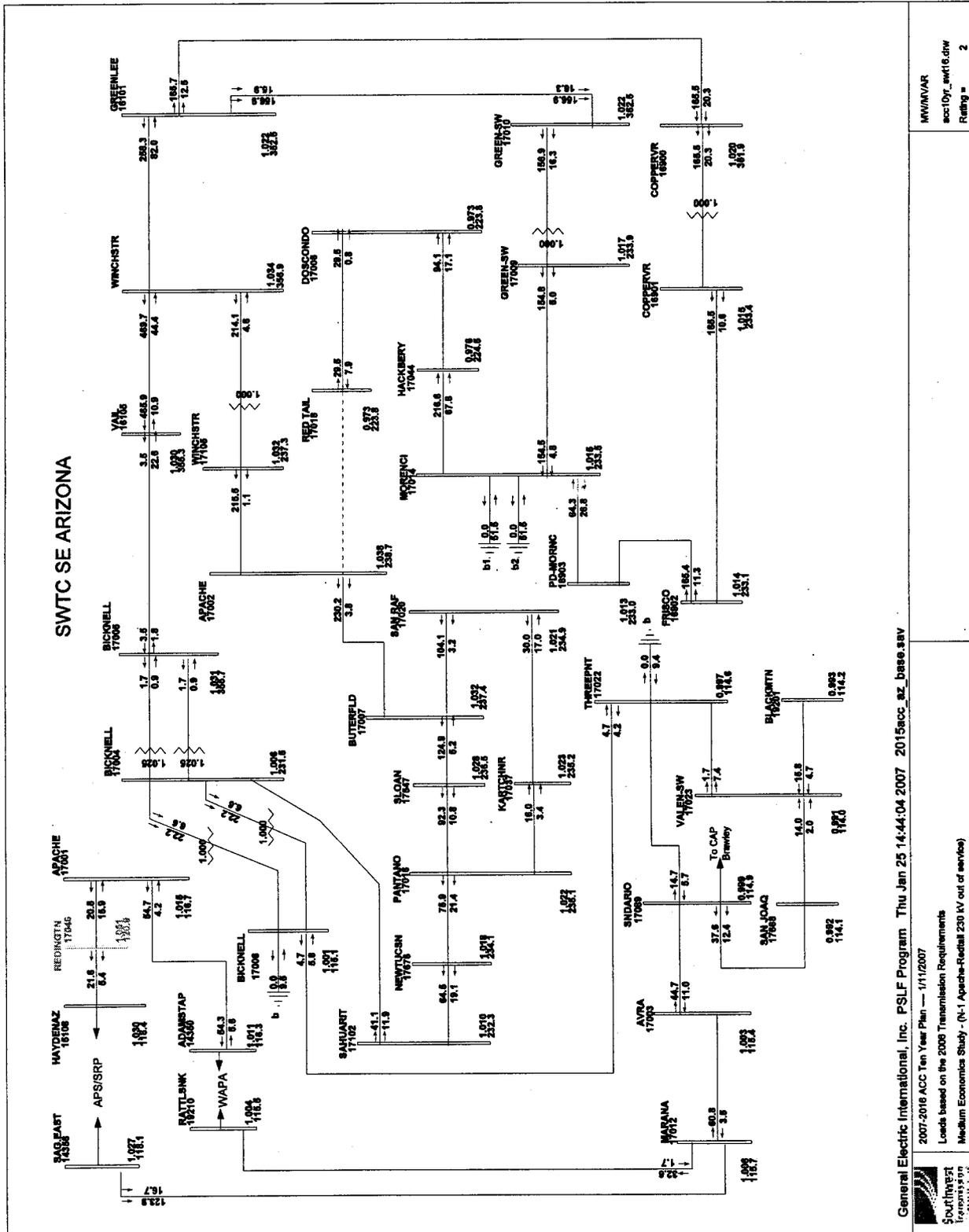


General Electric International, Inc. PSLF Program Thu Jan 25 14:41:37 2007 2015acc_az_base.sav

2007-2016 ACC Ten Year Plan - 1/11/2007
 Loads based on the 2008 Transmission Requirements
 Medium Economic Study - (N-1 Apache-Butterfield 230 kV out of service)

MW/MVAR
 secDy_swft6.dwg
 Rating = 1

2015 Southwest Transmission Cooperative Base System with Apache-Redtail 230 kV out of service

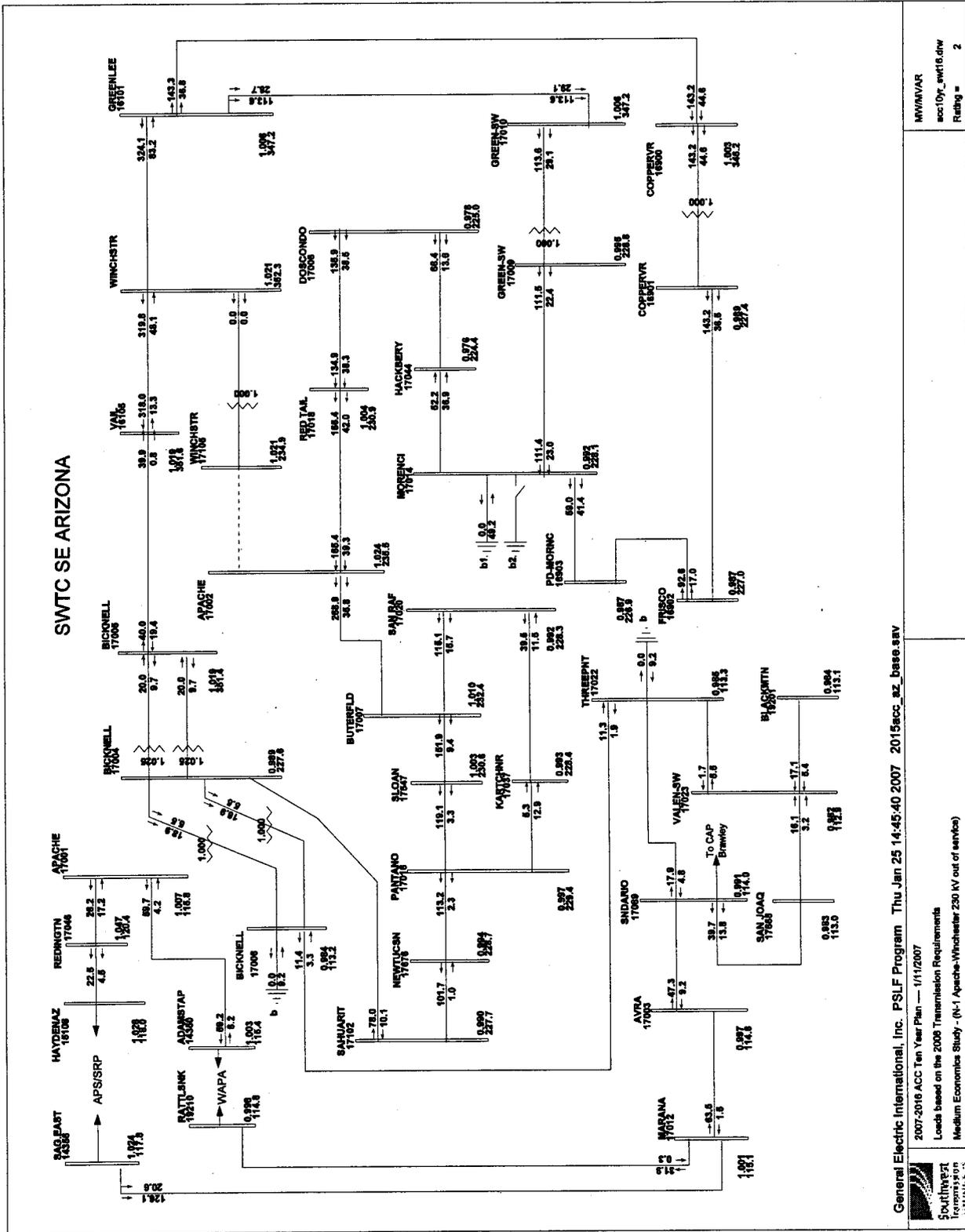


General Electric International, Inc. PSLF Program Thu Jan 25 14:44:04 2007 2015sec_az_base.sav

2007-2016 ACC Ten Year Plan - 1/11/2007
 Loads based on the 2006 Transmission Requirements
 Medium Economics Study - (N-1 Apache-Redtail 230 kV out of service)

MW/MVAR
 sec10yr_mw16.drw
 Rating = 2

2015 Southwest Transmission Cooperative Base System with Apache-Winchester 230 kV out of service

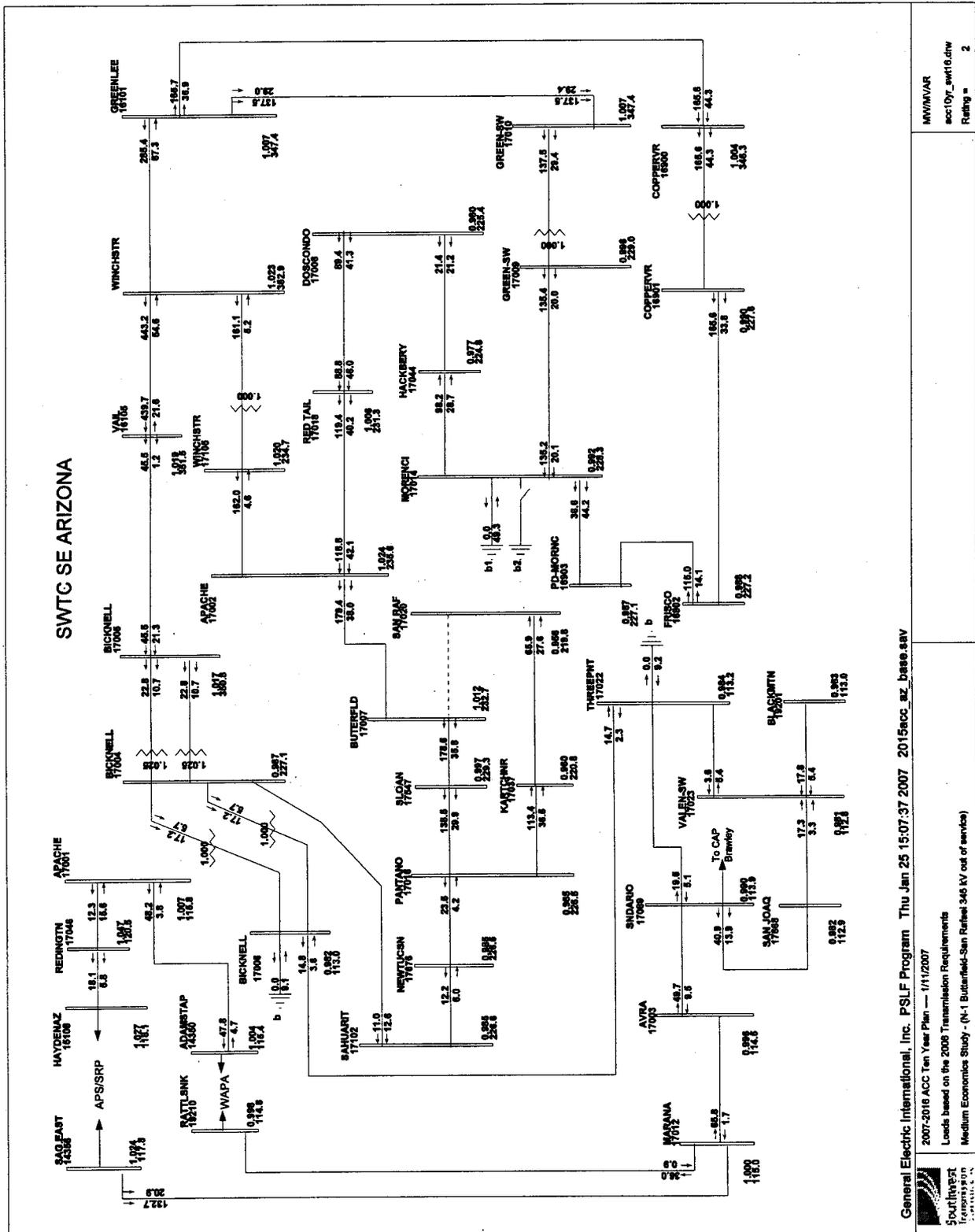


General Electric International, Inc. PSLF Program Thu Jan 25 14:45:40 2007 2015sec_az_base.sav

2007-2016 ACC Ten Year Plan — 1/11/2007
 Loads based on the 2006 Transmission Requirements
 Medium Economic Study — (N-1 Apache-Winchester 230 kV out of service)

MWINVAR
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 Rating = 2

2015 Southwest Transmission Cooperative Base System with Butterfield-San Rafael 230 kV out of service

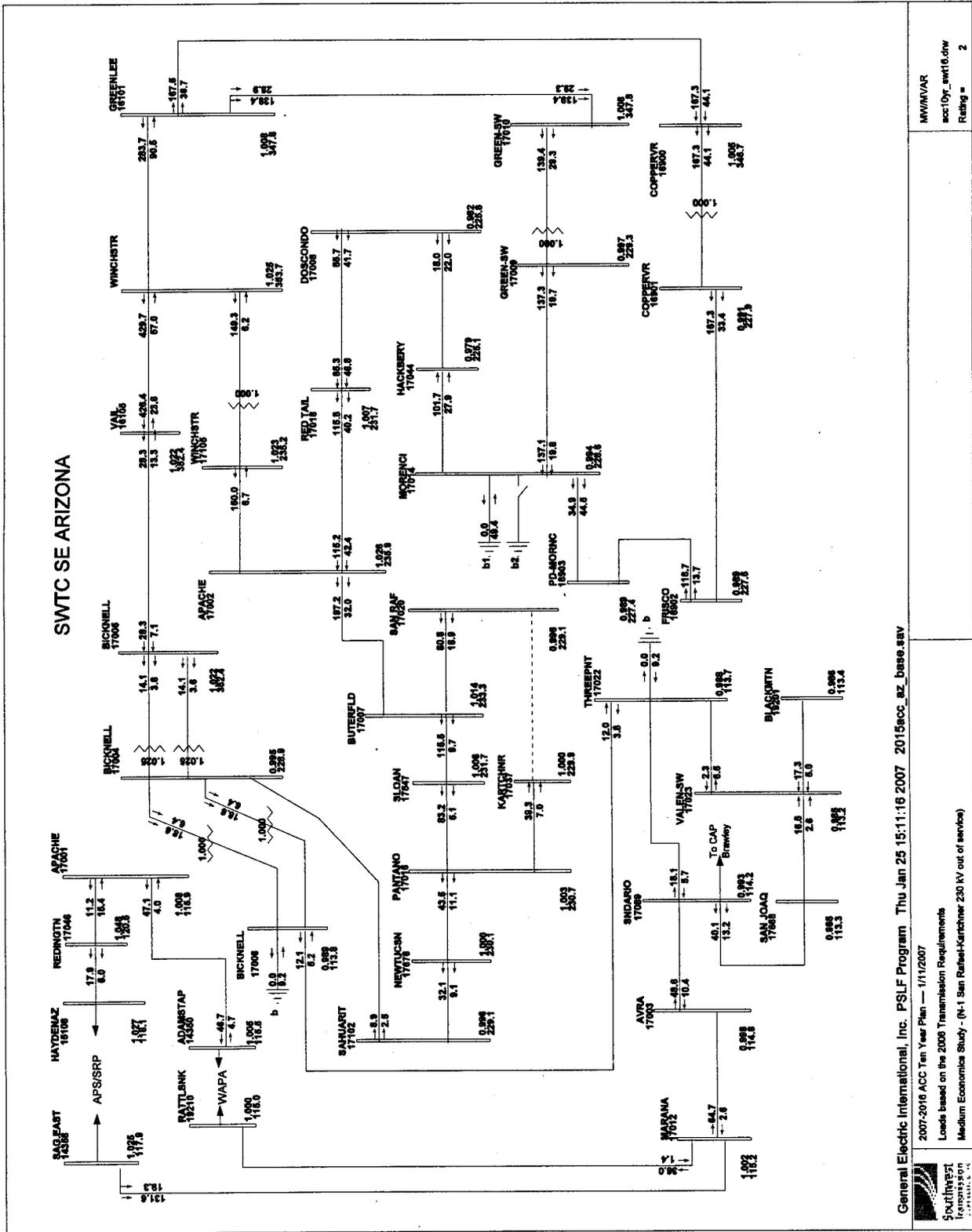


General Electric International, Inc. PSLF Program Thu Jan 25 15:07:37 2007 2015acc_az_base.sav

2007-2016 ACC Ten Year Plan - 1/11/2007
 Loads based on the 2006 Transmission Requirements
 Medium Economic Study - (N-1 Butterfield-San Rafael 345 kV out of service)

MW/MVAR
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2015 Southwest Transmission Cooperative Base System with San Rafael-Kartchner 230 kV out of service

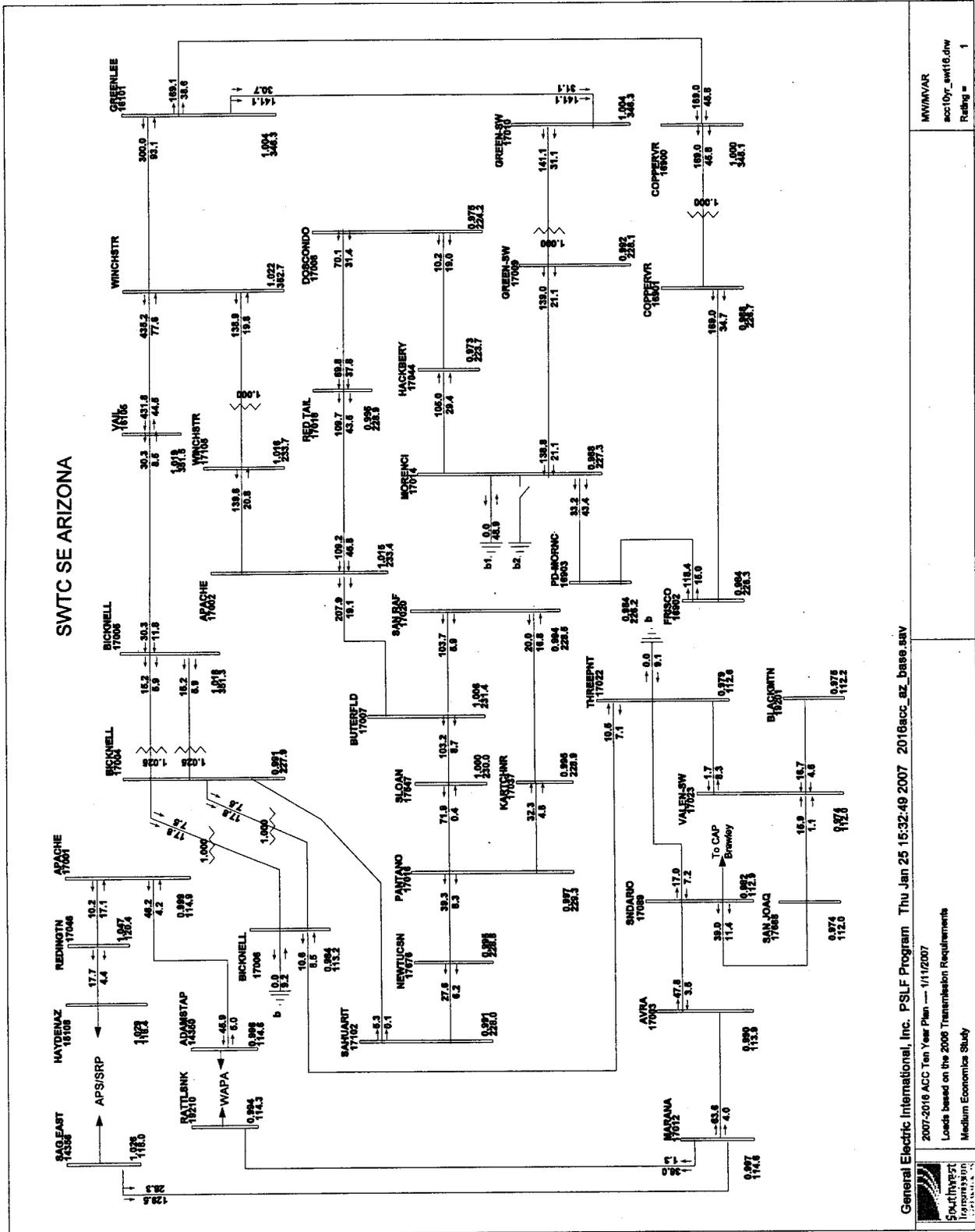


General Electric International, Inc. PSLF Program Thu Jan 25 15:11:16 2007 2015acc_az_base.sav

2007-2016 ACC Ten Year Plan - 1/11/2007
 Loads based on the 2006 Transmission Requirements
 Medium Economic Study - (N-1 San Rafael-Kartchner 230 kV out of service)

MW/MVAR
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 Rating = 2

2016 Southwest Transmission Cooperative Base System with all planned projects



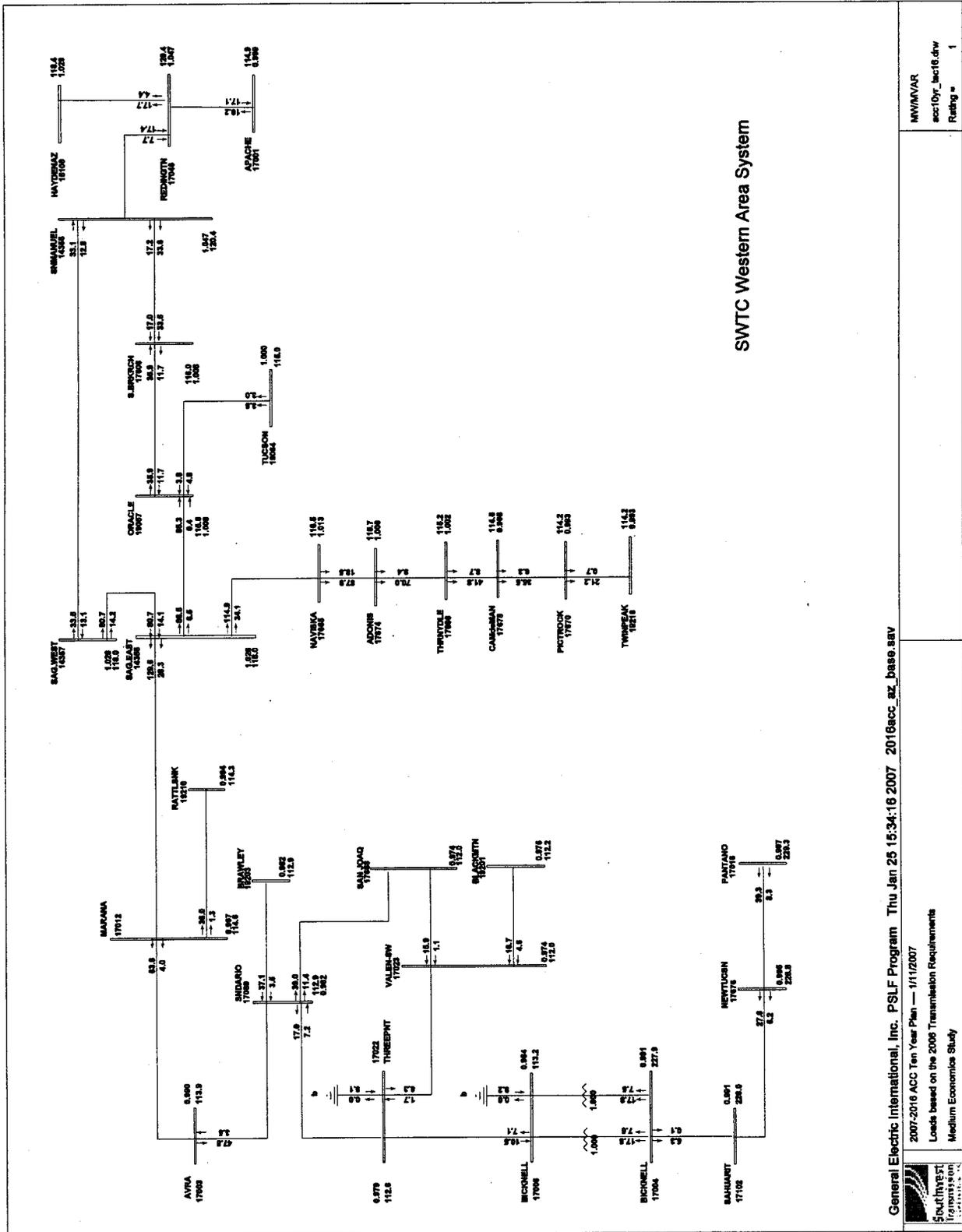
General Electric International, Inc. PSLF Program Thu Jan 25 15:32:49 2007 2016acc_az_base.sav

2007-2016 ACC Ten Year Plan - 1/11/2007
 Loads based on the 2006 Transmission Requirements
 Medium Economics Study



MW/MVAR
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 Rating = 1

2016 Southwest Transmission Cooperative detail of SWTC's Western Area with all planned projects

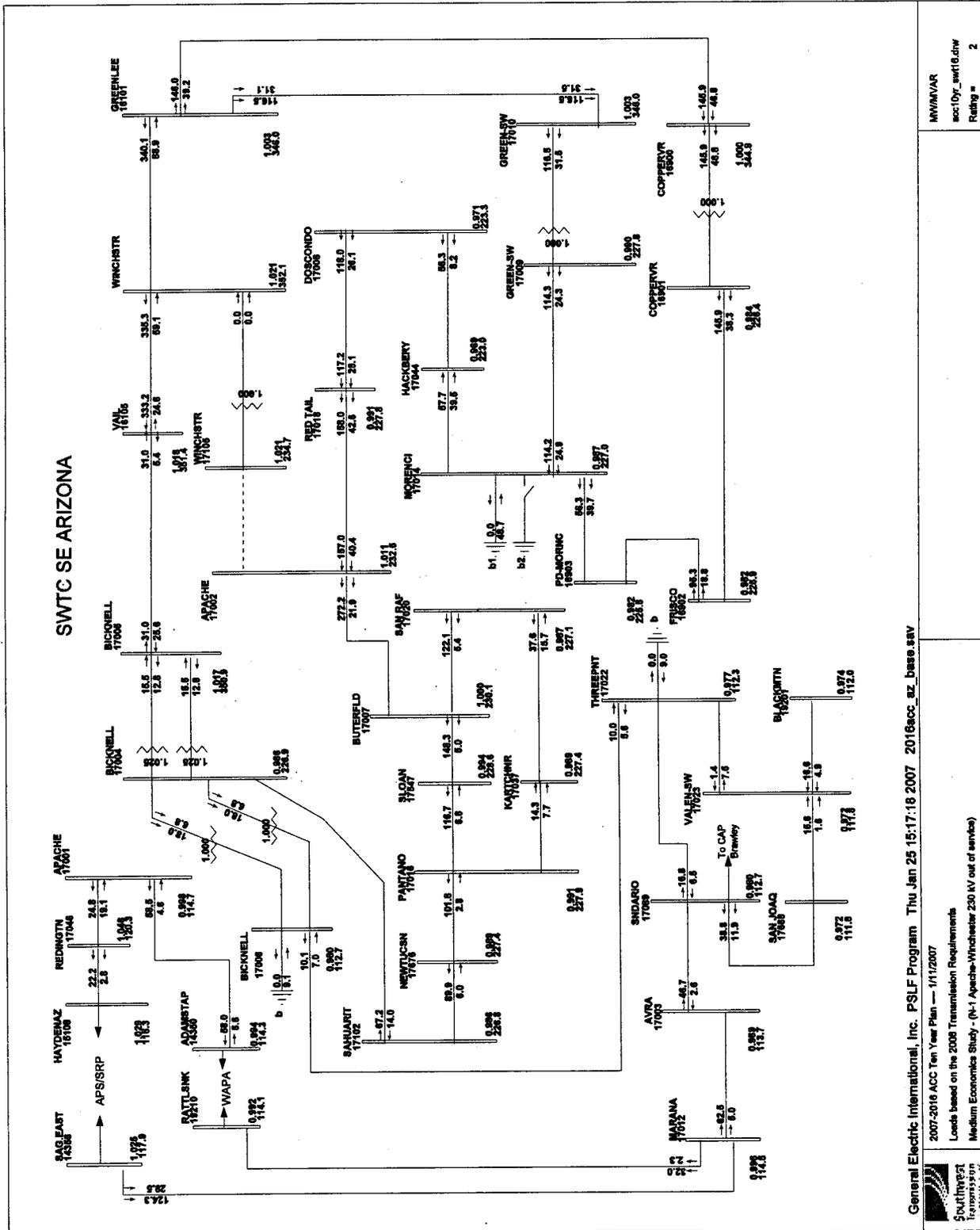


General Electric International, Inc. PSLF Program Thu Jan 25 15:34:16 2007 2016acc_wz_base.sav

2007-2016 ACC Ten Year Plan - 1/11/2007
 Loads based on the 2008 Transmission Requirements
 Medium Economic Study

MW/MVAR
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 Rating = 1

2016 Southwest Transmission Cooperative Base System with Apache-Winchester 230 kV out of service



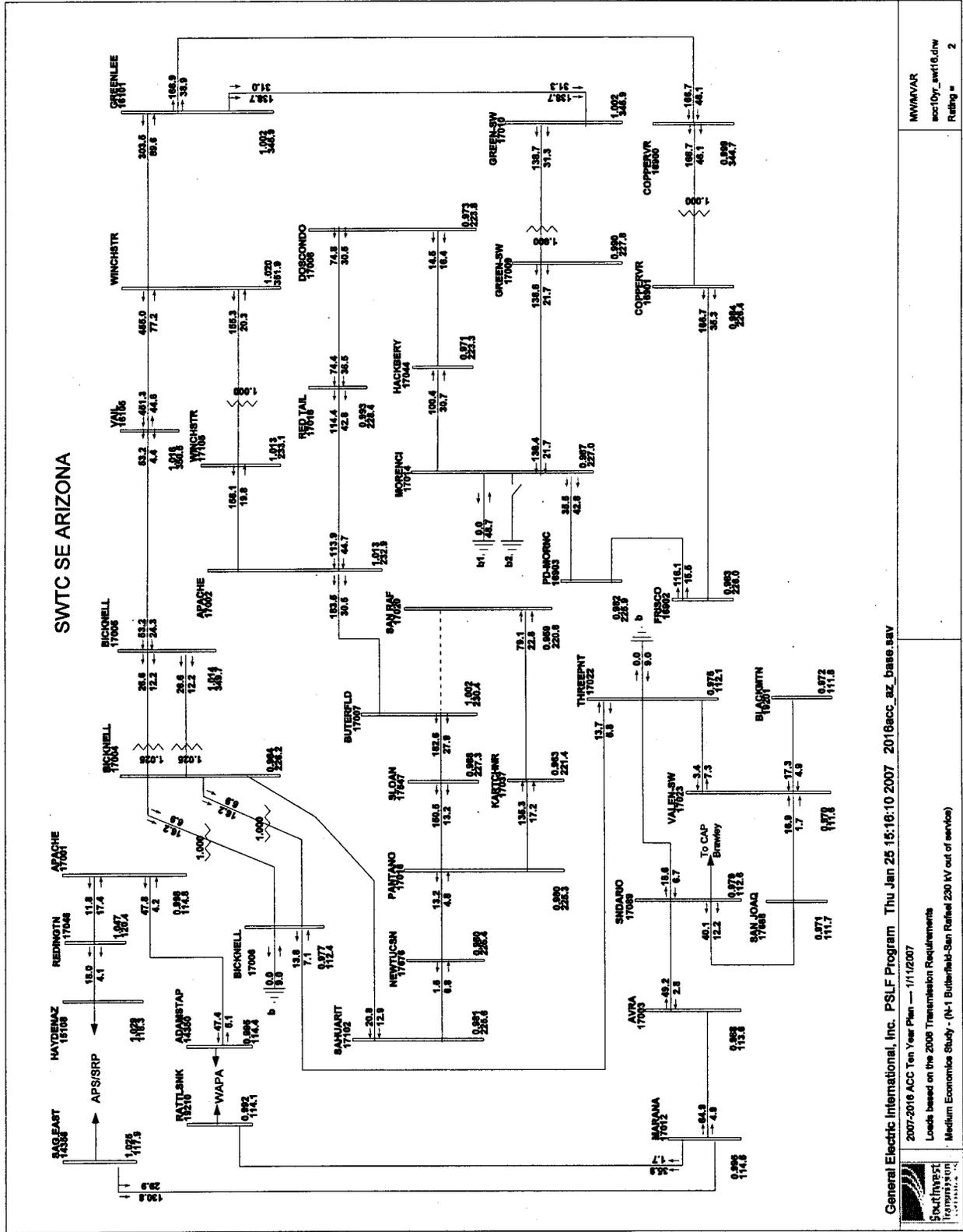
General Electric International, Inc. PSLF Program Thu Jan 25 15:17:18 2007 2016acc_az_base.sav

2007-2016 ACC Ten Year Plan - 1/11/2007
 Loads based on the 2008 Transmission Requirements
 Medium Economics Study - (N-1 Apache-Winchester 230 kV out of service)



M/M/VAR
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 Rating = 2

2016 Southwest Transmission Cooperative Base System with Butterfield-San Rafael 230 kV out of service



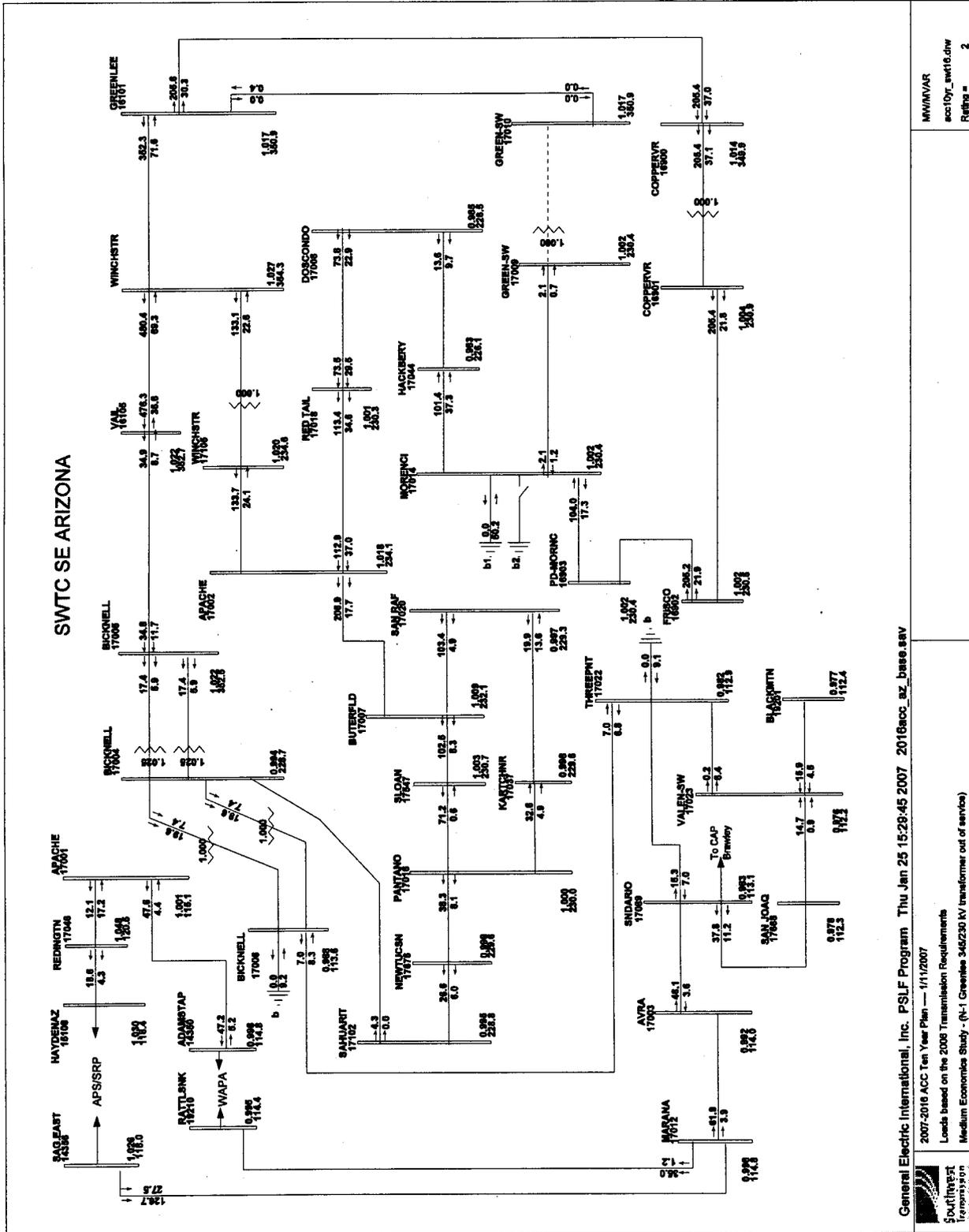
General Electric International, Inc. PSLE Program Thu Jan 25 16:16:10 2007 2016acc_az_base.sav

2007-2016 ACC Ten Year Plan - 1/11/2007
 Loads based on the 2008 Transmission Requirements
 Medium Economics Study - (N-1 Butterfield-San Rafael 230 kV out of service)



MVA/VAR
 acc10yr_wat16.drw
 Rating = 2

2016 Southwest Transmission Cooperative Base System with Greenlee 345/ 230 kV transformer out of service



General Electric International, Inc. PSLF Program Thu Jan 25 15:28:45 2007 2016acc_sz_base.sav

2007-2016 ACC Ten Year Plan - 1/11/2007
 Loads based on the 2008 Transmission Requirements
 Medium Economics Study - (N-1 Greenlee 345/230 kV transformer out of service)



MM/MVAR
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 Rtg = 2

