



January 29, 2009

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

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AZ CORP COMMISSION
DOCKET CONTROL

RE: Docket No. E-00000D-09-0020

Dear Mr. Johnson:

Enclosed is the Southwest Transmission Cooperative, Inc. ("SWTC") Ten Year Plan for the period 2009 – 2018. 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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TEN-YEAR PLAN

2009 – 2018

JANUARY 29, 2009

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

TEN-YEAR PLAN

2009 – 2018

Prepared for the

ARIZONA CORPORATION COMMISSION

TRANSMISSION PLANNING

JANUARY 29, 2009

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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 load growth of its Distribution Cooperative Members (Member).

This report contains transmission 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). (Included in this section are line loop-in projects for load-serving substations for SWTC’s Member Owners that are planned for service off of the SWTC transmission system. Some of these potential line loop-in projects will not require line siting, but have been listed in case the preferred substation location changes, necessitating transmission line extensions to provide service.) 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 maintain system reliability and 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 participates in Regional Planning efforts through its involvement in the Southwest Area Transmission (“SWAT”) Planning Group. SWTC is involved in the following subcommittees of SWAT:

- Arizona-New Mexico Regional Transmission Subcommittee (“AZNM”)
- Central Arizona Transmission EHV (“CATS-EHV”)
- Central Arizona Transmission HV (“CATS-HV”)
- Colorado River Transmission Subcommittee (“CRT”)
- Renewable Transmission Task Force (“RTTF”)
- Southeast Arizona Transmission Study (“SATS”)
- Short-circuit Working Group (“SCWG”)

In addition, SWTC continues to monitor the efforts of the Transmission Expansion Planning Policy Committee (“TEPPC”) of the Western Electricity Coordination Council (“WECC”) and is active within the following subcommittees of WECC: the Operations Committee (“OC”), the Planning Coordination Committee (“PCC”) and the Technical Studies Subcommittee (“TSS”).

SWTC is also an active participant in WestConnect and was one of the original twelve signatories to the WestConnect Project Agreement for Subregional Transmission Planning (“STP Agreement”). A Planning Management Committee (“PMC”), made up of one representative from each of the signatories to the STP Agreement is tasked with implementation of the subregional planning process. SWTC participates regularly in the PMC meetings or conference calls.

At the WestConnect Annual Planning Workshop and Stakeholder Meeting, that was held on

November 13, 2008, SWTC presented its 2009-2018 Ten-Year Transmission Plan for inclusion into the 2008 WestConnect Transmission Plan. This plan was subsequently approved at the January 14th WestConnect Annual Planning Meeting. The projects that make up this ten year plan filing to the Commission bear no change from those submitted at the WestConnect Annual Planning Workshop and Stakeholder Meeting.

SATS STUDY REPORT

SWTC is one of the initiating founders of SATS and has therefore been very active in the SATS study effort. The goal of SATS is to have a 20 year transmission plan covering the entire SATS area assuming transmission and distribution facilities are owned and operated as a “single system.” With this goal in mind, the SATS participants throughout 2008 began development of a Draft SATS Study Report. Power flow base cases for 2010, 2016, 2026 and 2028 were prepared and strategies were developed to increase local area load serving capability. The study recognized the importance of actively evaluating the impacts of potential EHV transmission to bring in remote resources into the area to serve the growing loads of Southeast Arizona and study participants acknowledge that Renewables are likely to be an important part of those resources.

The SATS Study Report also contains information of several coordinated studies that were conducted in sub-areas within the SATS footprint, such as Cochise County and the Tucson metropolitan area. Assumptions used in these studies were tailored to the needs of the load-serving entities and impacted stakeholders in the areas. Further coordinated studies such as these will continue throughout 2009 and beyond.

The final draft of the SATS Report was approved, with minor changes, by the SATS participants on a conference call held on December 5, 2008. On December 12, 2008, the Final SATS Study Report was provided via e-mail to the SATS participants and was posted on the WestConnect website (www.westconnect.com) for all interested stakeholders within SWAT and WestConnect. It was then approved by the SWAT Oversight Committee on January 13th and will be docketed with the Commission as part of TEP’s 2009-2018 Ten Year Plan Filing. Pages 177 to 188 of the Report contain easy reference tables that document projects under consideration by SWTC and

TEP for the ten and twenty year planning horizon. Hence, the SATS Study Report is an important part of the overall Regional Study Process within SWAT and WestConnect and forms the basis for the projects that are provided in this ten year plan filing.

The following is a brief description of the EHV 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 Ten-Year Plan Filing (2009-2018) timeframe:

Hassayampa to Pinal West 500 kV Line

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. The first parallel single circuit 500 kV line was placed into commercial operation on October 15, 2008. SWTC is a joint participant in the project and Salt River Project (SRP) is the project manager.

Pinal West to Southeast Valley/Browning 500 kV Line

A CEC (Case No. 126) for this project was issued in August 2005, with an amendment to the CEC 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 Central Substation being proposed as a double-circuit 500/230 kV line, as is a segment of the Pinal Central to the Southeast Valley Substation line. SWTC is a participant in the 500 kV segment from Pinal West to Pinal Central. SRP is the project manager for this project, which has an anticipated in-service date of 2013.

Pinal Central to Tortolita 500 kV Line

This project contemplates construction of a 500 kV line from the proposed Pinal Central Substation to the TEP Tortolita Substation. SWTC is a participant in this project. TEP is the project manager for this project, which has an anticipated in-service date of 2013.

Winchester to Vail Double-circuit 345 kV Line

This project contemplates construction of a double-circuit 345 kV line from Winchester Substation to Vail Substation, following the route of the existing Winchester to Vail 345 kV line. SWTC is evaluating possible participation in this project, as an alternative to the rebuild of the Apache to Butterfield and Butterfield to Bicknell 230 kV lines, in 2014 and 2015, respectively. TEP is the project manager for this project, which has an anticipated in-service date of 2014.

Other Projects

In addition, SWTC is evaluating potential joint participation in several EHV projects whose in-service dates have not yet been established and lie outside of this ten year planning horizon. Additional details regarding these potential projects will come about through the SATS 2009 Study Plan effort, and will be presented in the next Ten Year Plan filing.

CHANGES FROM 2008 TEN-YEAR PLAN FILING

SWTC notes several changes in this Ten-Year Plan Filing over its Ten-Year Plan Filing dated January 2008. These are mostly due to SWTC's involvement in the SATS study effort. Several new projects have been added to this year's filing and several in-service dates have been changed to better reflect project scheduling needs. The changes are noted below:

Apache/Hayden to San Manuel 115 kV Line. The in-service date for this project has changed from 2008 to 2010. Construction is scheduled to start in 2009, but in anticipation of certain potential environmental issues, 2010 is a more realistic in-service date for this project.

Western 115 kV Line Loop-in to Pantano. This project has been cancelled. It will be analyzed as part of the ongoing Cochise County Study Group work that is explained in more detail in the Technical Study Report.

Saguaro to Naviska 115 kV line. This project has been renamed to the Saguaro to Northloop

115 kV Line. It is part of a 138 kV quad circuit that is a joint project with TEP and the Central Arizona Project (CAP). It replaces the Naviska to Thornydale 115 kV Line. In addition, it will be constructed in connection with the North Loop to Rattlesnake 115 kV line, which replaces the Thornydale to Rattlesnake 115 kV line. The in-service date for this project is now 2010.

Valencia to CAP Black Mountain 115 kV line. The in-service date for this project has changed from 2009 to 2010. Construction is scheduled to start in 2009, but to better coordinate the project schedule with other ongoing work, 2010 is a more realistic in-service date for this project.

CAP 115 kV Line Loop-in to SWTC Sandario. The in-service date for this project has changed from 2009 to 2010. Construction is scheduled to start in 2009, but to better coordinate the project schedule with other ongoing work, 2010 is a more realistic in-service date for this project.

Naviska to Thornydale 115 kV line. This project, as noted earlier, has been replaced by the Saguro to North Loop 115 kV line project with an in-service date of 2010.

Thornydale to Rattlesnake 115 kV line. This project, as noted earlier, has been replaced by the North Loop to Rattlesnake 115 kV line project with an in-service date of 2010.

North Loop to Rattlesnake 115 kV Line. This is a new project that replaces the Thornydale to Rattlesnake 115 kV line project with an in-service date of 2010.

Hassayampa to Pinal West. As noted above, this project is now in-service.

Pinal West to Santa Rosa. This project, along with the Santa Rosa to Pinal South project, has been combined into the Pinal West to SEV Project, of which SWTC is a participant. Pinal South has been renamed to Pinal Central. SRP is the Project Manager. The Pinal West to SEV Project in-service date, specifically for the 500 kV line from Pinal West to Santa Rosa to Pinal Central, has changed from 2011 to 2013.

Santa Rosa to Pinal South. This project, along with the Pinal West to Santa Rosa Project, has been combined into the Pinal West to SEV Project, of which SWTC is a participant. Pinal South has been renamed to Pinal Central. SRP is the Project Manager. The Pinal West to SEV Project in-service date, specifically for the 500 kV line from Pinal West to Santa Rosa to Pinal Central, has changed from 2011 to 2013.

Pinal West 500/345 kV Project. This project is now in-service. It was placed into service on October 11, 2008.

Pinal South to Tortolita 500 kV Line. This project has been renamed as the Pinal Central to Tortolita 500 kV Line Project. As noted earlier, it now has an in-service date of 2013.

CS1 to Three Points 115 kV Line. This project has been cancelled. The need for the project is not as critical as other projects within this ten year plan horizon but will be reviewed in the SATS study effort for 2009.

CS1 to Bicknell 230 kV Line. This project has been cancelled. The need for the project is not as critical as other projects within this ten year plan horizon but will be reviewed in the SATS study effort for 2009.

Upgrade of Apache to Butterfield 230 kV line. This project now has a tentative in-service date of 2014. It has also been renamed as the Apache to Butterfield 230 kV Line Upgrade Project.

Sloan to Huachuca 230 kV line. This project has been cancelled. However, it will be analyzed as part of the ongoing Cochise County Study Group work contemplated for 2009 and explained in more detail in Technical Study Report.

CAP 115 kV Line Loop-in to San Joaquin. This is a reinstated substation project that may or may not require a transmission line extension. It is a planned project and has an in-service date of 2010.

Pantano to Sahuarita 230 kV Line Loop-in to New Tucson. This is a substation project that may or may not require a transmission line extension. It is a planned project and has an in-service date of 2010

San Rafael 2nd 230/69 kV Transformer. This is a new project that was proposed as part of the ongoing Cochise County Study Group work. It is a planned project and has an in-service date of 2011.

Bicknell 345/230 kV Transformer Replacement. This is a new project. It has an in-service date of 2012.

Greenlee 2nd 345/230 kV Transformer. This is a new project. It has an in-service date of 2012.

Pinal Central 230/115 kV Transformer. This is a new project. The Southwest Public Power Resources Group ("SPPR") is the project sponsor and SWTC is a participant in the project. It is a conceptual project and has an in-service date of 2013. However, in the event that SPPR does not move forward with this project, SWTC would likely sponsor a different 230/115 kV project.

Three Terminal Plan Circuit 1. This is a new project. SPPR is the project sponsor and SWTC is a participant in the project. It is a conceptual project and has an in-service date of 2014.

Three Terminal Plan Circuit 2. This is a new project. SPPR is the project sponsor and SWTC is a participant in the project. It is a conceptual project and has an in-service date of 2014.

Three Terminal Plan Circuit 3. This is a new project. SPPR is the project sponsor and SWTC is a participant in the project. It is a conceptual project and has an in-service date of 2014.

Winchester to Vail Double Circuit 345 kV Line. This is a new project. TEP is the project sponsor and SWTC is evaluating possible participation in this project, as an alternative to the rebuild of the Apache to Butterfield and Butterfield to Bicknell 230 kV lines, as noted earlier.

Butterfield to Bicknell 230 kV Line Upgrade. This is a new project. It is a conceptual project and has a tentative in-service date of 2015.

Sagauro to Adonis 115 kV Line Loop-in to Naviska. This is a new substation project that may or may not require a transmission line extension. It is a conceptual project and has a tentative in-service date of 2015.

CAP 115 kV Line Loop-in to Picture Rocks. This is a new substation project that may or may not require a transmission line extension. It is a conceptual project and has a tentative in-service date of 2018.

CS2 Substation. This is a new project that was proposed as a placeholder for the additional study work that is contemplated within the Cochise County Study Group for 2009 and explained in more detail in the Technical Study Report. It is a conceptual project and has a tentative in-service date of 2018.

Kartchner to CS2 230 kV Line. This is a new project that was proposed as a placeholder for the additional study work that is contemplated within the Cochise County Study Group for 2009 and explained in more detail in the Technical Study Report. It is a conceptual project and has a tentative in-service date of 2018.

Pantano to Kartchner 115 kV Line Upgrade. This project has been reinstated as a placeholder for the additional study work that is contemplated within the Cochise County Study Group for 2009 and explained in more detail in the Technical Study Report. It is a conceptual project and has a tentative in-service date of 2018.

San Rafael to CS2 230 kV Line. This is a new project that was proposed as a placeholder for the additional study work that is contemplated within the Cochise County Study Group for 2009 and explained in more detail in the Technical Study Report. It is a conceptual project and has a tentative in-service date of 2018.

SECTION I

SWTC PLANNED TRANSMISSION LINES

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Hassayampa to Pinal West 500 kV line

Size:

- a) Voltage 500 kV
- b) Capacity 1500 MVA
- c) Point of Origin Hassayampa Switchyard
Sec. 15 T1S R6W
- d) Point of Termination Pinal West Substation
Sec. 18 T5S R2E
- e) Length Approximately 51 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: 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.

Dates:

- a) Construction Start 2007
- b) In-Service Date 2008 (1st line)
To be determined (2nd line)

Notes: CEC for Case No. 124 was awarded in May 2004 (ACC Decision # 67012). SRP is lead and project manager for development of this project. Participants include SRP, Tucson Electric Power, Southwest Transmission Cooperative, and Electric Districts 2, 3, and 4. The first of the two permitted transmission lines was placed in service in October 2008

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Apache/Hayden to San Manuel 115 kV line

Size:

- a) Voltage 115 kV
- b) Capacity 123 MVA
- c) Point of Origin Apache/Hayden 115 kV line near San Manuel
Sec. 19 T9S R18E
- d) Point of Termination APS San Manuel Substation
Sec. 29 T9S R17E
- e) Length Approximately 4.5 miles

Routing: Apache/Hayden 115 kV line, heading generally west then southwest to San Manuel Substation.

Purpose: To provide system reliability, increased transfer capability and voltage support for the SWTC system and to provide for anticipated Member load growth.

Dates:

- a) Construction Start 2009
- b) In-Service Date 2010

Notes: This is an approved, planned project. SWTC contemplates filing a CEC application for this project in the 1st Quarter of 2009.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: CAP 115 kV Line Loop-in to San Joaquin

Size:

- a) Voltage 115 kV
- b) Capacity 50 MVA
- c) Point of Origin CAP's Brawley to San Xavier 115 kV line near proposed San Joaquin Substation location
Sec. 25 T14S R11E
- d) Point of Termination San Joaquin Substation
Sec. 25 T14S R11E
- e) Length 0 miles

Routing: CAP's Brawley to San Xavier 115 kV line approximately 2.5 miles northwest of San Xavier Substation.

Purpose: To provide a new delivery point for Trico and provide for anticipated load growth in the area. The project also increases the reliability of the CAP and SWTC systems.

Dates:

- a) Construction Start 2009
- b) In-Service Date 2010

Notes: This is an approved, planned project. It is included in this plan in case the preferred substation location changes, necessitating the filing of a CEC application for a transmission extension to serve the substation.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation:	CAP 115 kV Line Loop-in to SWTC Sandario
Size:	
a) Voltage	115 kV
b) Capacity	219 MVA
c) Point of Origin	CAP Sandario to Brawley 115 kV line near SWTC Sandario Substation Sec. 33 T13S R11E
d) Point of Termination	Sandario Substation Sec. 32 T13S R11E
e) Length	Approximately 0.6 miles
Routing:	CAP Sandario to Brawley 115 kV line near Sandario Substation, heading southwest into the Sandario Substation
Purpose:	Reinforce the existing SWTC 115 kV system, provide for increased transfer capability, and provide for anticipated SWTC Member System load growth in SWTC's Western Area. The project also increases the reliability of the CAP system.
Dates:	
a) Construction Start	2009
b) In-Service Date	2010
Notes:	This is an approved, planned project. SWTC contemplates filing a CEC application for this project in the 2 nd Quarter of 2009.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation:	Marana to Avra Valley 115 kV Line Upgrade
Size:	
a) Voltage	115 kV
b) Capacity	219 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:	Marana Substation, south to Avra Valley Substation, following the existing Marana to Avra Valley ROW.
Purpose:	Reinforce the existing SWTC 115 kV system, provide for increased transfer capability, and provide for anticipated SWTC Member System load growth in SWTC's Western Area.
Dates:	
a) Construction Start	2009
b) In-Service Date	2010
Notes:	This is an approved, planned project. SWTC contemplates filing a CEC application for this project in the 4 th Quarter of 2009.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: North Loop to Rattlesnake 115 kV Line

Size:

- a) Voltage 115 kV
- b) Capacity 219 MVA
- c) Point of Origin Vicinity of North Loop Substation
Sec. 9 T12S R12E
- d) Point of Termination Rattlesnake Substation
Sec. 14 T12S R11E
- e) Length Approximately 5.0 miles

Routing: Starting in the vicinity of North Loop Substation, crossing I-10 and then heading west then south and then west along Western's 115 kV line ROW to the Rattlesnake Substation.

Purpose: Reinforce the existing SWTC 115 kV system, provide for increased transfer capability, and provide for anticipated SWTC Member System load growth in SWTC's Western Area. The project also increases the reliability of the CAP system.

Dates:

- a) Construction Start 2010
- b) In-Service Date 2010

Notes: This is an approved, planned project. SWTC contemplates filing a CEC application for this project in the 2nd Quarter of 2009.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Pantano to Sahuarita 230 kV Line Loop-in to New Tucson

Size:

- a) Voltage 230 kV
- b) Capacity 50 MVA
- c) Point of Origin Pantano to Sahuarita 230 kV Line near the proposed New Tucson Substation
Sec. 34 T16S R16E
- d) Point of Termination New Tucson Substation
Sec. 34 T16S R16E
- e) Length 0 miles

Routing: Pantano to Sahuarita 230 kV line ROW, approximately 8.5 miles west of Pantano Substation.

Purpose: To provide an additional delivery point for Trico and provide for anticipated load growth in the area.

Dates:

- a) Construction Start 2010
- b) In-Service Date 2010

Notes: This is an approved, planned project. It is included in this plan in case the preferred substation location changes, necessitating the filing of a CEC application for a transmission extension to serve the substation.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation:	Saguaro to North Loop 115 kV line
Size:	
a) Voltage	115 kV
b) Capacity	219 MVA
c) Point of Origin	Saguaro Substation Sec. 15 T10S R10E
d) Point of Termination	Vicinity of North Loop Substation Sec. 9 T12S R12E
e) Length	Approximately 15.0 miles
Routing:	Southeast of the Saguaro Substation along the east side of I-10, following the existing 138 kV line ROW to Tangerine Road and then turning south to North Loop Substation.
Purpose:	Reinforce the existing SWTC 115 kV system, provide for increased transfer capability, and provide for anticipated SWTC Member System load growth in SWTC's Western Area.
Dates:	
a) Construction Start	2010
b) In-Service Date	2010
Notes:	This is an approved, planned project which is part of the joint TEP/SWTC Tortolita to North Loop 138 kV Quad Circuit. SWTC contemplates that a filing for a CEC application for this project will occur in the 2 nd Quarter of 2009.

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	219 MVA
c) Point of Origin	Valencia Substation Sec. 17 T15S R12E
d) Point of Termination	CAP Black Mountain 115 kV line, 2 miles South of Black Mountain Substation Sec. 11 T15S R12E
e) Length	Approximately 2.6 miles
Routing:	Directly east of the Valencia Substation to the turning structure of the 115 kV CAP line that heads directly north 2 miles to the CAP Black Mountain Substation.
Purpose:	Reinforce the existing SWTC 115 kV system, provide for increased transfer capability, and provide for anticipated SWTC Member System load growth in SWTC's Western Area. The project also increases the reliability of the CAP system.
Dates:	
a) Construction Start	2009
b) In-Service Date	2010
Notes:	This is an approved, planned project. SWTC contemplates filing a CEC application for this project in the 2 nd Quarter of 2009.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Avra Valley to Sandario Tap 115 kV Line Upgrade

Size:

- a) Voltage 115 kV
- b) Capacity 219 MVA
- c) Point of Origin Avra Valley Substation
Sec. 11 T13S R10E
- d) Point of Termination Sandario Tap
Sec. 23 T13S R10E
- e) Length Approximately 2.8 miles

Routing: Avra Valley Substation, south to the Sandario Tap turning structure, following the existing Avra Valley to Sandario Tap ROW.

Purpose: Reinforce the existing SWTC 115 kV system, provide for increased transfer capability, and provide for anticipated SWTC Member System load growth in SWTC's Western Area.

Dates:

- a) Construction Start 2011
- b) In-Service Date 2011

Notes: This is a conceptual project that is slated for SWTC approval in 2009. A certificate will be needed to site this project.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: San Rafael 2nd 230/69 kV Transformer

Size:

- a) Voltage 230 kV
- b) Capacity TBD
- c) Point of Origin San Rafael Substation
Sec. 17 T22S R21E
- d) Point of Termination San Rafael Substation
Sec. 17 T22S R21E
- e) Length 0 miles

Routing: None

Purpose: Provide continuous reliable service to SSVEC under certain N-1 outage conditions in the Sierra Vista area. Note: This project is part of the ongoing Cochise County Study efforts.

Dates:

- a) Construction Start 2011
- b) In-Service Date 2011

Notes: This is a planned project that has been studied as part of the Cochise County Study Group efforts. No certificate is necessary for the project.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Sandario Tap to Three Points 115 kV Line Upgrade

Size:

- a) Voltage 115 kV
- b) Capacity 219 MVA
- c) Point of Origin Sandario Tap
Sec. 23 T13S R10E
- d) Point of Termination Three Points Substation
Sec. 25 T15S R10E
- e) Length Approximately 13.71 miles

Routing: Sandario Tap turning structure, south to the existing Three Points Substation, following the existing Sandario Tap to Three Points ROW.

Purpose: Reinforce the existing SWTC 115 kV system, provide for increased transfer capability, and provide for anticipated SWTC Member System load growth in SWTC's Western Area

Dates:

- a) Construction Start 2011
- b) In-Service Date 2011

Notes: This is a conceptual project that is slated for SWTC approval in 2009. A certificate will be needed to site this project.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Bicknell 345/230 kV Transformer Replacement

Size:

- a) Voltage 345 kV
- b) Capacity 420 MVA
- c) Point of Origin Bicknell Substation
Sec. 30 T17S R13E
- d) Point of Termination Bicknell Substation
Sec. 30 T17S R13E
- e) Length 0 miles

Routing: None

Purpose: Provide increased import capability into the SWTC transmission system.

Dates:

- a) Construction Start 2012
- b) In-Service Date 2012

Notes: This is a conceptual project that is slated for SWTC approval in 2009. No certificate is necessary for the project.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Greenlee 2nd 345/230 kV Transformer

Size:

- a) Voltage 345 kV
- b) Capacity 193 MVA
- c) Point of Origin SWTC Greenlee Substation
Sec. 29 T5S R31E
- d) Point of Termination SWTC Greenlee Substation
Sec. 29 T5S R31E
- e) Length 0 miles

Routing: None

Purpose: Provide increased import capability into the SWTC transmission system.

Dates:

- a) Construction Start 2012
- b) In-Service Date 2012

Notes: This is a conceptual project that is slated for SWTC approval in 2009. No certificate is necessary for the project.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Marana Tap to Marana 115 kV Line Upgrade

Size:

- a) Voltage 115 kV
- b) Capacity 219 MVA
- 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

Routing: Western's Marana Tap, west to the SWTC Marana Substation.

Purpose: Reinforce the existing SWTC 115 kV system, provide for increased transfer capability, and provide for anticipated SWTC Member System load growth in SWTC's Western Area.

Dates:

- a) Construction Start 2012
- b) In-Service Date 2012

Notes: This is a conceptual project that is slated for SWTC approval in 2009. A certificate will be needed to site this project.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Pinal Central 230/115 kV Transformer

Size:

- a) Voltage 230 kV
- b) Capacity 300 MVA
- c) Point of Origin Pinal Central 230 kV Bus
Sec. 6 T7S R8E
- d) Point of Termination Western 115 kV Bus at ED2 Substation
Sec. 6 T7S R8E
- e) Length 0 miles

Routing: None. Pinal Central will be located adjacent to ED2 Substation.

Purpose: ED connection to Pinal Central.

Dates:

- a) Construction Start 2012 (tentative)
- b) In-Service Date 2013 (tentative)

Notes: SWTC is a participant; SPPR is the project sponsor. (In the event that SPPR does not move forward with this project, SWTC would likely sponsor a different 230/115 kV project.)

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Pinal West to Abel (Southeast Valley)/Browning

Size:

- a) Voltage 500 kV
- b) Capacity 1500 MVA
- c) Point of Origin Pinal West Substation
Sec. 18 T5S R2E
- d) Intermediate Point Pinal Central Substation (formerly Pinal South)
Sec. 25 T6S R7E
- e) Intermediate Point Abel Substation (formerly Southeast Valley and RS22)
Sec. 19 T3S R9E
- f) Intermediate Point Dinosaur Substation
Sec. 10 T2S R8E
- e) Point of Termination Browning Substation
Sec. 12 T1S R7E
- f) Length Approximately 100 miles

Routing: South and east from the Pinal West substation to approximately Teel Road, then east to the Santa Rosa substation. 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 again. Then it runs easterly to about the location of the ED2 substation (Sec 25, T6S, R7E). From that point the line continues east to the Union Pacific Railroad, where it turns north. It generally runs north from this point to the Abel (formerly Southeast Valley) substation in the vicinity of the Magma Railroad and the CAP (approximate location of SEV), then north along the CAP to the existing 500 kV corridor between Elliot and Guadalupe Roads. At that point it turns west into the Browning Substation.

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 the second segment 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 and central Arizona areas, and to accommodate the growth in development and population in Pinal County.

Dates:

- | | | |
|----|---|------------------|
| a) | Right of Way/Property Acquisition | 2005 |
| b) | Construction to Start for Remainder of Project | 2009 |
| c) | Est. In-Service for Pinal West to Pinal Central 500 kV: | 2013 |
| d) | Est. In-Service for Pinal Central: | 2011 |
| e) | Est. In-Service for Pinal Central to Abel 500 kV: | 2011 |
| f) | Est. In-Service for Abel 500 kV: | To be determined |
| g) | Est. In-Service for Abel 230 kV: | 2011 |
| h) | Est. In-service for Abel to Dinosaur 230 kV: | 2011 |
| i) | Est. In-Service for Abel to Dinosaur 500 kV: | 2011 |
| j) | Actual In-service for Dinosaur: | 2007 |
| k) | Actual In-Service for Dinosaur to Browning 230 kV: | 2007 |
| l) | Est. In-Service for Dinosaur to Browning 500 kV: | 2011 |

Notes: CEC for Case 126 was awarded in 2005 (ACC Decision # 68093 and # 68291)

SRP is lead and project manager for the development of this project. Participants include SRP, Tucson Electric Power, Southwest Transmission Cooperative, and Electric Districts 2, 3, and 4.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Pinal Central to Tortolita 500 kV Line

Size:

- a) Voltage 500 kV
- b) Capacity 1732 MVA
- c) Point of Origin Pinal Central Substation
Sec. 25 T6S R7E
- e) Point of Termination Tortolita Substation
Sec. 23 T10S R10E
- f) Length Approximately 38.0 miles

Routing: From Pinal Central Substation to Tortolita Substation following the CAP facilities.

Purpose: Identified by TEP as necessary to increase TEP System Load Serving Capability from removed resources. The project provides for increased transfer capability to SWTC loads in Southeast AZ

Dates:

- a) Construction Start 2009
- b) In-Service Date 2013

Notes: RFP for Siting Study in progress, not released for bids. SWTC is a participant in the project; TEP is the project manager

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Apache to Butterfield 230 kV Line Upgrade

Size:

- a) Voltage 230 kV
- b) Capacity TBD
- 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: Along the existing SWTC Apache to Butterfield 230 kV line ROW.

Purpose: Reinforce the existing SWTC 230 kV backbone system to provide continuous reliable service under certain N-1 outage conditions and provide for anticipated SWTC Member System load growth.

Date:

- a) Construction Start 2014 (tentative)
- b) In-Service Date 2014 (tentative)

Notes: This is a conceptual project. A certificate will be needed to site this project.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation:	Three Terminal Plan Circuit 1
Size:	
a) Voltage	230 kV
b) Capacity	TBD
c) Point of Origin	Santa Rosa/Test Track Substation Sec. 30 T5S R4E
d) Point of Termination	New ED5 230 kV Switching Station Sec. 25 T9S R8E
e) Length	Approximately 23.0 miles
Routing:	The line will consist of two contiguous segments: Segment one will be routed from the Santa Rosa/Test Track to Thornton Road. Segment two will be routed from Thornton Road to a new ED5 230 kV Switching Station.
Purpose:	Identified by SPPR as needed to deliver project power to SPPR members and to enhance the reliability for the region as a whole. The project provides for increased transfer capability to SWTC loads in Southeast Arizona.
Date:	
a) Construction Start	TBD
b) In-Service Date	2014 (tentative)
Notes:	SWTC is a participant in the project; SPPR is the project sponsor.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Three Terminal Plan Circuit 2

Size:

- a) Voltage 230 kV
- b) Capacity TBD
- c) Point of Origin New ED5 230 kV Switching Station
Sec. 25 T9S R8E
- d) Point of Termination New SWTC 230 kV Marana Substation
Sec. 26 T11S R10E
- e) Length Approximately 31.0 miles

Routing: The line will follow the existing Western 115 kV line from Empire to Saguaro and the Western 115 kV line route from Saguaro to Marana Tap.

Purpose: Identified by SPPR as needed to deliver project power to SPPR members and to enhance the reliability for the region as a whole. The project provides for increased transfer capability to SWTC loads in Southeast Arizona.

Date:

- a) Construction Start TBD
- b) In-Service Date 2014 (tentative)

Notes: SWTC is a participant in the project; SPPR is the project sponsor.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Three Terminal Plan Circuit 3

Size:

- a) Voltage 230 kV
- b) Capacity TBD
- c) Point of Origin New ED5 230 kV Switching Station
Sec. 25 T9S R8E
- d) Point of Termination New Pinal Central Substation
Sec. 25 T6S R7E
- e) Length Approximately 19.0 miles

Routing: From the new ED5 Switching Station to Pinal Central. The line will follow the existing Western 115 kV line route from ED5 to ED4 to ED2.

Purpose: Identified by SPPR as needed to deliver project power to SPPR members and to enhance the reliability for the region as a whole. The project provides for increased transfer capability to SWTC loads in Southeast Arizona.

Date:

- a) Construction Start TBD
- b) In-Service Date 2014 (tentative)

Notes: SWTC is a participant in the project; SPPR is the project sponsor.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Winchester to Vail Double Circuit 345 kV Line

Size:

- a) Voltage 345 kV
- b) Capacity 1195 MVA
- c) Point of Origin Winchester 345 kV Bus
Sec. 28 T14S R21E
- d) Point of Termination Vail 345 kV Bus
Sec. 4 T16S R15E
- e) Length Approximately 41.0 miles

Routing: Parallel to the existing Winchester – Vail 345 kV line

Purpose: Identified by TEP as being needed to increase load serving capability into the SATS area. The project provides for increased transfer capability and reliability to SWTC loads in Southeast Arizona.

Date:

- a) Construction Start 2013
- b) In-Service Date 2014

Notes: SWTC is evaluating participation in this project as an alternative to the Apache to Butterfield to Bicknell 230 kV Upgrade Projects. TEP is the Project Manager.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Butterfield to Bicknell 230 kV Line Upgrade

Size:

- a) Voltage 230 kV
- b) Capacity TBD
- c) Point of Origin Butterfield Substation
Sec. 31 T16S R22E
- d) Point of Termination Bicknell Substation
Sec. 30 T17S R13E
- e) Length Approximately 68.7 miles

Routing: Along the existing SWTC Butterfield to Bicknell 230 kV line ROW

Purpose: Reinforce the existing SWTC 230 kV backbone system to provide continuous reliable service under certain N-1 outage conditions and provide for anticipated SWTC Member System load growth.

Date:

- a) Construction Start 2015 (tentative)
- b) In-Service Date 2015 (tentative)

Notes: This is a conceptual project. A certificate will be needed to site this project.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Saguario to Adonis 115 kV Line Loop-in to Naviska

Size:

- a) Voltage 115 kV
- b) Capacity 50 MVA
- c) Point of Origin Saguario to Adonis 115 kV Line near the proposed Naviska Substation
Sec. 25 T10S R10E
- d) Point of Termination Naviska Substation
Sec. 25 T10S R10E
- e) Length 0 miles

Routing: Saguario to Adonis 115 kV line near the proposed Naviska Substation, approximately 3.4 miles southeast of the Saguario Substation.

Purpose: To provide an additional delivery point for Trico and provide for anticipated load growth in the area.

Date:

- a) Construction Start 2015 (tentative)
- b) In-Service Date 2015 (tentative)

Notes: This is a conceptual project. It is included in this plan in case the preferred substation location changes, necessitating the filing of a CEC application for a transmission extension to serve the substation.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: CAP 115 kV Line Loop-in to Picture Rocks

Size:

- a) Voltage 115 kV
- b) Capacity 50 MVA
- c) Point of Origin CAP's Twin Peaks to Sandario 115 kV line near proposed Picture Rocks Substation location
Sec. 28 T12S R11E
- d) Point of Termination Picture Rocks Substation
Sec. 28 T12S R11E
- e) Length 0 miles

Routing: CAP's Twin Peaks to Sandario 115 kV line approximately 2 miles southwest of Twin Peaks Substation.

Purpose: To provide a new delivery point for Trico and provide for anticipated load growth in the area. The project also increases the reliability of the CAP and SWTC systems.

Dates:

- a) Construction Start 2018 (tentative)
- b) In-Service Date 2018 (tentative)

Notes: This is a conceptual project. It is included in this plan in case the preferred substation location changes, necessitating the filing of a CEC application for a transmission extension to serve the substation.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation:	CS2 Substation
Size:	
a) Voltage	230 kV
b) Capacity	TBD
c) Point of Origin	Tap of proposed Kartchner to CS2 230 kV line Sec. 25 T21S R20E
d) Point of Termination	CS2 Substation Sec. 25 T21S R20E (Location could change)
e) Length	0 miles
Routing:	Approximately 2.4 miles west of Kartchner Substation.
Purpose:	Provide continuous reliable service to SSVEC under N-1 outage conditions in the Sierra Vista area. Note: this project will be studied in detail as part of the SATS 2009 Study Plan and as per the 5 th BTA Order.
Dates:	
a) Construction Start	2018 (tentative)
b) In-Service Date	2018 (tentative)
Notes:	This is a conceptual project that is being studied in the Cochise County Study Group to ensure continuity of service in Cochise County. Refinements to the project arising out of the Study Group work will be made in the next Ten Year Plan Filing.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Kartchner to CS2 230 kV Line

Size:

- a) Voltage 230 kV
- b) Capacity TBD
- c) Point of Origin Kartchner Substation
Sec. 33 T21S R20E
- d) Point of Termination CS2 Substation
Sec. 25 T21S R20E
(Location could change)
- e) Length 2.0 miles

Routing: Initially north of the Kartchner Substation then east to CS2 Substation.

Purpose: Provide continuous reliable service to SSVEC under N-1 outage conditions in the Sierra Vista area. Note: this project will be studied in detail as part of the SATS 2009 Study Plan and as per the 5th BTA Order.

Dates:

- a) Construction Start 2018 (tentative)
- b) In-Service Date 2018 (tentative)

Notes: This is a conceptual project that is being studied in the Cochise County Study Group to ensure continuity of service in Cochise County. Refinements to the project arising out of the Study Group work will be made in the next Ten Year Plan Filing. A certificate will be needed to site this project.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation: Pantano to Kartchner 115 kV Line Upgrade

Size:

- a) Voltage 230 kV
- b) Capacity TBD
- c) Point of Origin Pantano Substation
Sec. 12 T17S R17E
- d) Point of Termination Kartchner Substation
Sec. 33 T21S R20E
- e) Length 36.0 miles

Routing: Along the existing Pantano to Kartchner 115 kV line ROW.

Purpose: Provide continuous reliable service to SSVEC under N-1 outage conditions in the Sierra Vista area. Note: this project will be studied in detail as part of the SATS 2009 Study Plan and as per the 5th BTA Order.

Dates:

- a) Construction Start 2018 (tentative)
- b) In-Service Date 2018 (tentative)

Notes: This is a conceptual project that is being studied in the Cochise County Study Group to ensure continuity of service in Cochise County. Refinements to the project arising out of the Study Group work will be made in the next Ten Year Plan Filing. A certificate will be needed to site this project.

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

10 YEAR PLAN

PLANNED TRANSMISSION FACILITIES

Line Designation:	San Rafael to CS2 230 kV Line
Size:	
a) Voltage	230 kV
b) Capacity	TBD
c) Point of Origin	San Rafael Substation Sec. 17 T22S R21E
d) Point of Termination	CS2 Substation Sec. 25 T21S R20E (Location could change)
e) Length	Approximately 8.0 miles
Routing:	San Rafael Substation, north approximately 5 miles and then west to CS2 Substation.
Purpose:	Provide continuous reliable service to SSVEC under N-1 outage conditions in the Sierra Vista area. Note: this project will be studied in detail as part of the SATS 2009 Study Plan and as per the 5 th BTA Order.
Dates:	
a) Construction Start	2018 (tentative)
b) In-Service Date	2018 (tentative)
Notes:	This is a conceptual project that is being studied in the Cochise County Study Group to ensure continuity of service in Cochise County. Refinements to the project arising out of the Study Group work will be made in the next Ten Year Plan Filing. A certificate will be needed to site this project.

SECTION II

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

INTERNAL PLANNING CRITERIA AND FACILITY RATINGS

The purpose of this document is to identify the assumptions and methodologies used by Southwest Transmission Cooperative, Inc. (SWTC) to determine electrical facility ratings. The document also describes the electrical load limits for SWTC on the various power system transmission lines, power transformers, and other facility equipment under nominal and emergency operating conditions.

The assumptions used to determine equipment ratings are outlined below. They represent criteria that SWTC has used for a number of years, to meet requirements of the North American Electric Reliability Corporation (NERC), the Federal Energy Regulatory Commission (FERC) and the Western Electricity Coordinating Council (WECC).

The following represents SWTC's reliability criteria assumptions as published in the FERC FORM #715 filing:

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.

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.

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 (Western).

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) The following table 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.

Station A	Station B	Voltage	Normal Limit	Emergency Limit	Normal Limit	Emergency Limit	Limiting
From	To	KV	Amps	Amps	MVA	MVA	Equipment
BICKNELL	VAIL	345	281	310	168	193	Transformer
VAIL	BICKNELL	345	1372	1509	819	901	Conductor
GREEN-SW	GREENLEE	345	281	310	168	193	Transformer
GREENLEE	GREEN-SW	345	1372	1509	818	901	Conductor

APACHE	BUTERFLD	230	841	925	335	368	Conductor
BUTERFLD	APACHE	230	841	925	335	368	Conductor
APACHE	RED TAIL	230	1101	1211	438	482	Conductor
RED TAIL	APACHE	230	1101	1211	438	482	Conductor
APACHE	WINCHESTER	230	1101	1211	438	482	Conductor
WINCHESTER	APACHE	230	1101	1211	438	482	Conductor
BUTERFLD	PANTANO	230	841	925	335	368	Conductor
PANTANO	BUTERFLD	230	251	276	100	112	Transformer
BUTERFLD	SAN RAF	230	921	1013	367	403	Conductor
MORENCI	GREEN-SW	230	1101	1211	438	482	Conductor
GREEN-SW	MORENCI	230	422	464	168	193	Transformer
DOSCONDO	HACKBERRY	230	1101	1211	438	482	Conductor
HACKBERRY	DOSCONDO	230	1101	1211	438	482	Conductor
HACKBERRY	MORENCI	230	1101	1211	438	482	Conductor
MORENCI	HACKBERRY	230	1101	1211	438	482	Conductor
MORENCI	PD-MORNC	230	921	1013	367	403	Conductor
PD-MORNC	MORENCI	230	754	829	300	336	Transformer
PANTANO	SAHUARITA	230	841	925	335	368	Conductor
SAHUARITA	PANTANO	230	841	925	335	368	Conductor
SAHUARITA	BICKNELL	230	841	925	335	368	Conductor
BICKNELL	SAHUARITA	230	422	464	168	193	Transformer
RED TAIL	DOSCONDO	230	1101	1211	438	482	Conductor
DOSCONDO	RED TAIL	230	1101	1211	438	482	Conductor
DAVIS	RIVIERA	230	1101	1211	438	482	Conductor
APACHE	WINCHESTER	115	1101	1211	219	241	Conductor
WINCHESTER	APACHE	115	621	683	124	136	Conductor
APACHE	HAYDENAZ	115	621	683	124	136	Conductor
HAYDENAZ	APACHE	115	621	683	124	136	Conductor
AVRA	MARANA	115	360	396	72	79	Conductor
MARANA	AVRA	115	360	396	72	79	Conductor
BICKNELL	THREEPNT	115	503	553	100	112	Transformer
THREEPNT	BICKNELL	115	621	683	124	136	Conductor
MARANA	MARANATP	115	503	553	100	110	Jumpers
MARANATP	MARANA	115	503	553	100	110	Jumpers
PANTANO	KARTCHNR	115	503	553	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	621	683	124	136	Conductor

SECTION III

SOUTHWEST TRANSMISSION COOPERATIVE, INC.

TEN-YEAR PLAN

2009 – 2018

TECHNICAL STUDY REPORT

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

**TRANSMISSION PLANNING
JANUARY 29, 2009**

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SOUTHWEST TRANSMISSION COOPERATIVE, INC.
TEN-YEAR PLAN
2009 – 2018
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 used for this report were performed in accordance with the NERC criteria for Planning Standards TPL-001-0 through TPL-004-0, such that the reliability of the SWTC transmission system was analyzed within the near-term planning horizon (2009-2013) and the long-term planning horizon (2013-2018). 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 outage conditions, the system performed with minimal violations of the NERC criteria. Mitigation Plans, however, are in place to resolve these minor violations, as noted below.

Post-transient Stability Analyses were recently performed on the summer of 2013 conditions, and the results are reported in detail below. SWTC has not performed any post-transient stability analyses on its system since 2004, and the results of the 2013 studies, while not exhaustive, show that the system continues to perform well. It should be noted that there are currently no plans to install generation on the SWTC transmission system, throughout the study period. Impacts to the SWTC transmission system through the addition of planned third-party generation, are unknown at this time, as the studies performed by the third-party entities contemplating the generation, have not been shared with SWTC.

SWTC’s current and planned transmission system maps are included in Appendix A, which starts on page 57. The 2009-2018 Contingency Lists are included in Appendix B, which starts on page 62. Selective power flow one-line diagrams are included in Appendix C, which starts on page 69. The power flow diagrams show the entire SWTC system under N-0 conditions for the years 2009, 2013, and 2018 of the Ten-Year Plan. Selective Extra-High Voltage (EHV) and High Voltage (HV) N-1 and N-2 outage simulations for the years 2009, 2013 & 2018 are also shown. Stability plots are included in Appendix D, which starts on page 125.

POWER FLOW ANALYSES

Power flow studies were performed using General Electric’s Positive Sequence Load Flow (“PSLF”) program. The Power flow and stability cases that were created for the 2009-2018 study period, using the latest base cases from the Western Electricity Coordinating Council (“WECC”) are listed below:

2009HS (created from the WECC 08HS4A1 case) – Load Flow
2013HS (created from WECC 13HS1A1 case) – Load Flow & Stability
2018HS (created from CATSHV_2018HS_1a case) – Load Flow

The base cases from WECC and CATS-HV were updated with the latest load projections of SWTC, with representations of the sub-transmission systems of SWTC's member-owners 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 2009, 2013 and 2018. Contingency lists of these outage simulations can be found in Appendix B. The analyses looked at the impact of the most recent projected member system load growth to the interconnected transmission system. The analyses determined where facilities would be placed to most economically serve this projected member system load. It should be noted that the various outage scenarios that were conducted throughout the study period were not performed on existing radial transmission lines in Cochise County. These are being studied in detail as part of the Cochise County Study Group, noted below.

Near Term Assessment (2009-2013)

The previous (2008-2017) Technical Study Report noted that certain Category B (N-1) outages will overload the Greenlee 345/230 kV transformer. This is resolved through operator instructions that have been in place for many years on the SWTC transmission system, to alert a large mine to drop load to protect this transformer, if it begins to overload. However, as noted in this Ten Year Plan filing, a second 345/230 kV transformer is scheduled to be placed at Greenlee in 2012, which resolves this problem for the foreseeable future.

An additional problem detected in this near term analysis is that the Marana Tap to Marana 115 kV line now overloads upon loss of the Marana Tap to Rattlesnake 115 kV line. In the event of a thermal overload of this line, SWTC will open the 115 kV line between Avra Valley and Marana to mitigate this overload condition. The upgrade of the Marana Tap to Marana 115 kV line, which is scheduled for 2012, resolves this problem for the foreseeable future.

In addition, certain Category B outages show overloads on portions of the Western 115 kV system in Southeast Arizona. These are due to various limiting elements currently existing on Western's 115 kV system. SWTC is working with Western to ensure that these limiting elements are resolved before the 115 kV additions to the SWTC 115 kV system occur, in 2010.

It should also be noted that studies conducted at SATS have shown that various EHV contingencies (mostly Category C) on the interconnected transmission system create high flows on the Winchester 345/230 kV transformer, the Bicknell 345/230 kV transformer and create high flows on the Apache to Bicknell 230 kV line. SATS will investigate alternative configurations to mitigate these high flows as part of its 2009 Study Plan. However, as noted in this Ten Year Plan filing, a larger 345/230 kV transformer is scheduled to be placed at Bicknell in 2012, and

the Apache to Butterfield 230 kV line and the Butterfield to Bicknell 230 kV line are scheduled to be upgraded in 2014 and 2015, respectively.

Long Term Assessment (2013-2018)

All Category B outages performed on the 2013 and 2018 systems solved with minor exceptions. These are the same exceptions that were noted in the Near Term Assessment, that pertain to various limiting elements currently existing on Western's 115 kV system. Again, SWTC is working with Western to ensure that these limiting elements are resolved before the 115 kV additions to the SWTC 115 kV system occur, in 2010.

These results of these power flow studies show that the efforts taken by SWTC to add system facilities and upgrade older existing facilities, as outlined in this Ten Year Plan filing, show a robust system that will maintain reliability and quality of service for all of its customers throughout the study period.

The list of contingencies used for the 2009-2018 study period are found in Appendix B and the power flow diagrams are found in Appendix C.

FULFILLMENT OF BTA REQUIREMENT

As noted in the Technical Study Report of the SWTC 2008-2017 Ten Year Plan filing, a sub-regional group of SATS was formed to address specific transmission issues in Cochise County. This was done to comply with the recommendation of the Commission's Fourth Biennial Transmission Assessment ("BTA") for 2006-2015 to resolve certain N-1 contingency violations identified in SWTC's 2015 planning studies. Participants in this study included Arizona Public Service Company ("APS"), Ft. Huachuca, SWTC, Sulphur Springs Valley Electric Cooperative, Inc. ("SSVEC"), TEP and Western. The Technical Study Report stated that "the consensus of the Cochise Study Group was that Option 3, a third 230 kV injection (Sloan to Huachuca East 230 kV Line) into the Sierra Vista area, would be the most economical, feasible and robust plan for the area in eliminating any future N-1 violations. Option 3 would sustain the SSVEC loads in Sierra Vista past the 2026 project load levels."

The Fifth BTA for 2008-2017 ordered that "Staff concludes this proposed new line (Sloan to Huachuca East 230 kV Line) is not an adequate transmission solution for the N-1 contingencies because it perpetuates radial transmission service and 'restoration of service' practices in Cochise County through at least 2026."

The Fifth BTA also ordered that "APS, SSVEC, and TEP shall perform collaborative studies and shall file a report of those studies for the next BTA that establishes a long range system plan for Cochise County that is founded on the principle of continuity of service following a transmission line outage. SWTC shall participate in the study effort as SSVEC's current sole transmission service provider. Relevant elements of that plan shall be incorporated in each transmission service providers respective ten year plans with defined in-service dates and shall be filed with the Commission in January 2010." SWTC is committed to working with, and has been working

with, the study participants to come up with the most viable and economic solution for Cochise County that will assure continuity of service, as ordered by the Commission.

As noted in the SATS Final Study Report, "There was agreement by the subcommittee (Cochise County Study Group) that a 230 kV loop through the Sierra Vista area would be the preferred long term solution." Discussions with SSVEC between the time of SWTC's 2008 ten year plan filing and the 5th BTA Order, have yielded the need and benefit to begin right away to add an additional 230/69 kV transformer at the San Rafael Substation in 2011. The addition of this transformer will resolve four of six critical N-1 outages that affect the Sierra Vista area. SWTC also proposes, as placeholders, for the filing of this 2009-2018 Ten-Year Plan, four additional projects which are listed below. SWTC considers that these projects will be fairly similar to what is decided in the Cochise County Study Group Meetings for 2009. In any case, these four projects can be easily modified for the 2010 SWTC ten year plan filing once the Cochise County Study effort has concluded its study efforts and determined the optimal solution for the Sierra Vista area:

- CS2 Substation. This is a conceptual 230 kV substation project with a tentative in-service date of 2018 to complete a 230 kV loop between Kartchner and San Rafael Substations in the Sierra Vista area
- Kartchner to CS2 230 kV Line. This is a conceptual 230 kV line project between Kartchner and CS2 Substations with a tentative in-service date of 2018 that is part of a 230 kV loop between Kartchner and San Rafael Substations in the Sierra Vista area.
- Kartchner to Pantano 115 kV Line Upgrade. This is a conceptual project to upgrade the existing Kartchner to Pantano 115 kV line to 230 kV with a tentative in-service date of 2018 that is part of a 230 kV loop between Kartchner and San Rafael Substations in the Sierra Vista area.
- San Rafael to CS2 230 kV line. This is a conceptual 230 kV line project between San Rafael and CS2 Substation with a tentative in-service date of 2018 that is part of a 230 kV loop between Kartchner and San Rafael Substations in the Sierra Vista area.

On March 13, 2008, the SWTC Board of Directors approved the hiring of a consultant to conduct a routing feasibility study to place high voltage transmission lines in southern Cochise County. This routing study will provide valuable information to the Cochise County Study Group for the identification of potential transmission path routes for the preferred 230 kV solution that is developed by the group to ensure continuity of service in fulfillment of the 5th BTA Order.

The Cochise County Study Group held a kick-off meeting on December 4, 2008 with APS, Ft. Huachuca, SSVEC, SWTC, TEP and other interested parties to start the process of meeting the requirements for continuity of service, as ordered by the 5th BTA. The group is working towards a technical solution to the problem, and will also be working towards resolving other important issues, such as participation agreements which will outline cost responsibility for the transmission upgrades, as well as contract arrangements for the scheduling of energy into the area.

STABILITY ANALYSIS

Since its last ten year plan filing, SWTC has performed post transient stability analyses for its transmission system, using summer of 2013 conditions. The results of this study were not exhaustive, but were performed to ensure that system conditions which are proposed for the near-term (2013) time frame do not degrade system performance under various outage conditions. No new generation is proposed to be added to the SWTC system in the 2009-2018 time frame, however, additional generation that is planned for the area, such as the proposed Bowie Project or the SPPR proposed Sawtooth Generation Station, will be studied in detail by the entities that have expressed interest in those projects and will be reported on in future ten year plan filings. In addition, future ten year plan filings will include stability analyses for generation that may be planned for location on the SWTC transmission system.

This recent post-transient stability study revealed that with any disturbance in the SWTC transmission system or in the neighboring interconnected transmission system, the Apache CT1 unit does not damp. SWTC has been in contact with GE representatives regarding this unit and it has been indentified that the Transducer modeling parameter is incorrect, leading to a non-damped solution. GE and SWTC therefore consider this result to be a modeling issue, and GE has committed to providing SWTC with a more accurate model for future studies.

The Stability Plots for the 2013 analyses are included in Appendix D.

APPENDIX A

CURRENT AND PLANNED TRANSMISSION SYSTEM MAPS

SWTC CURRENT & PLANNED SYSTEM SOUTHERN AREA 2009-2018

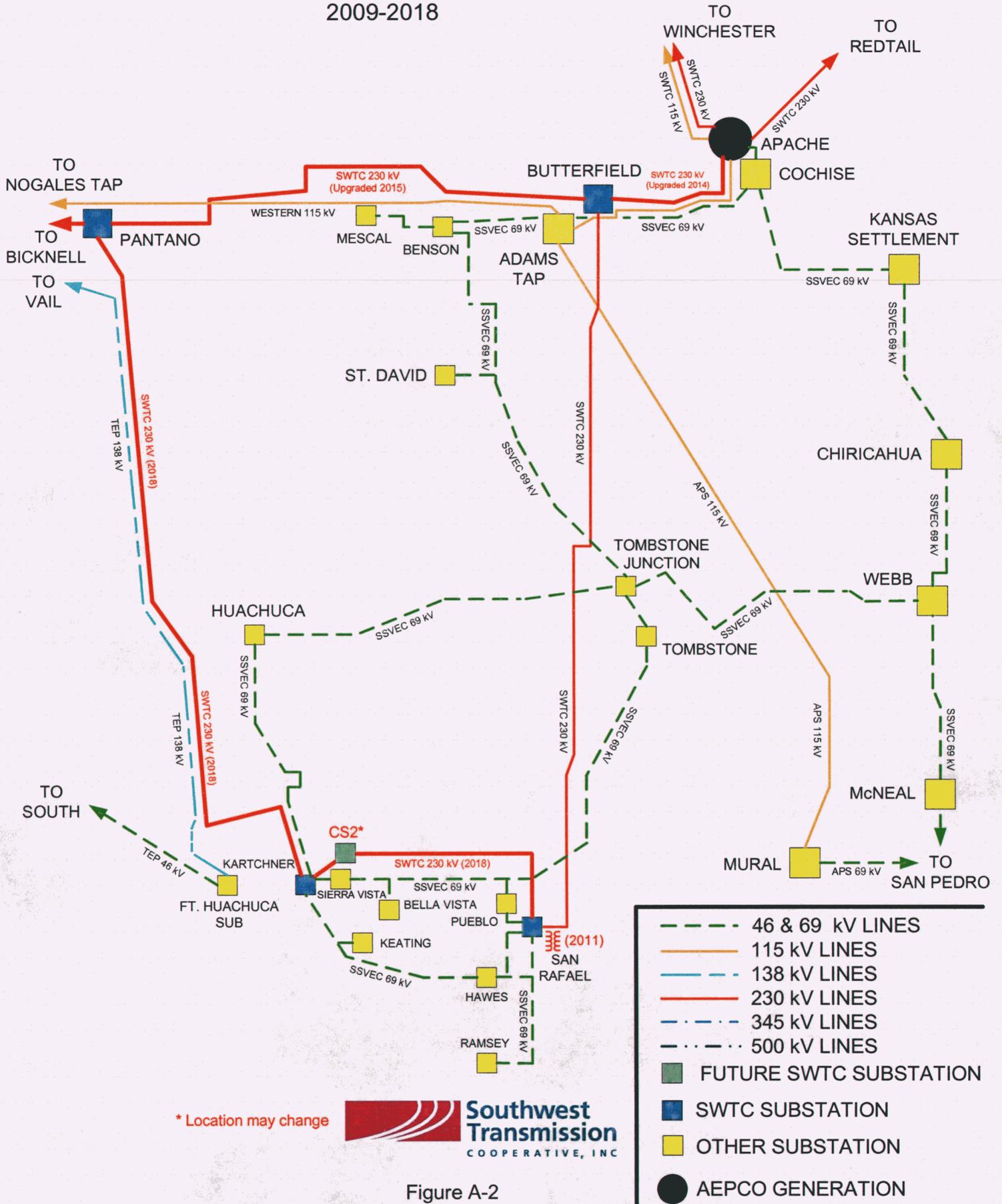


Figure A-2

SWTC CURRENT & PLANNED SYSTEM WESTERN AREA 2009-2018

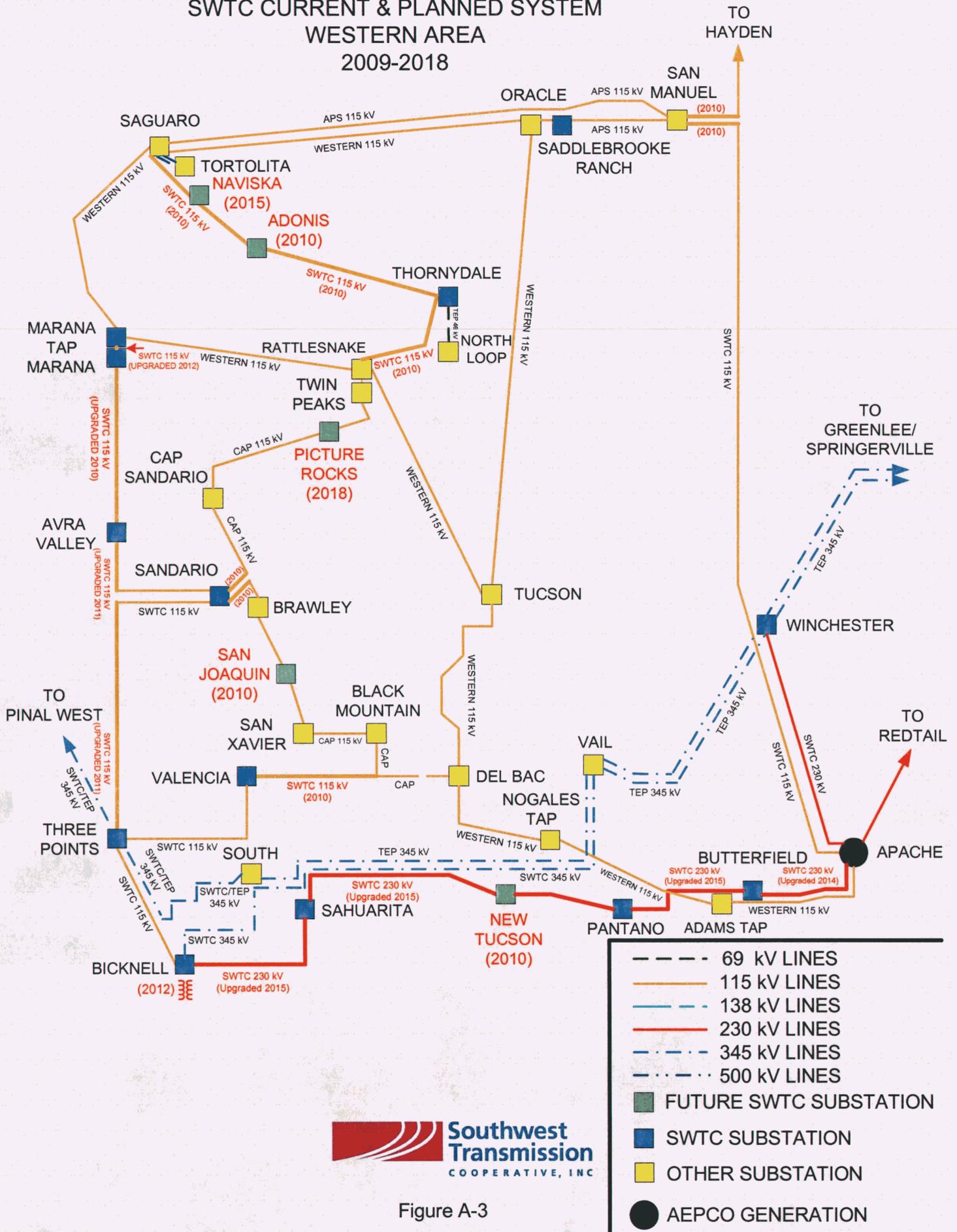


Figure A-3



APPENDIX B

2009-2018 POWER FLOW CONTINGENCY LISTS

2009 CONTINGENCY LIST

Name	Contingency_Description
base	Base system (n-0)
line_1	Line ADAMS 115.0 to APACHE 115.0 Circuit 1
line_2	Line ADAMS 115.0 to PANTANO 115.0 Circuit 1
line_3	Line SAG.EAST 115.0 to MARANATP 115.0 Circuit 1
line_4	Line SAG.EAST 115.0 to ADONIS 115.0 Circuit 1
line_5	Line SNMANUEL 115.0 to HAYDENAZ 115.0 Circuit 1
line_6	Line APACHE 115.0 to SNMANUEL 115.0 Circuit 1
line_7	Line APACHE 230.0 to BUTERFLD 230.0 Circuit 1
line_8	Line APACHE 230.0 to RED TAIL 230.0 Circuit 1
line_9	Line APACHE 230.0 to WINCHSTR 230.0 Circuit 1
line_10	Line AVRA 115.0 to MARANA 115.0 Circuit 1
line_11	Line AVRA 115.0 to SNDARIO 115.0 Circuit 1
line_12	Line BICKNELL 345.0 to VAIL 345.0 Circuit 1
line_13	Line THREEPNT 115.0 to VALEN-SW 115.0 Circuit 1
line_14	Line BICKNELL 115.0 to THREEPNT 115.0 Circuit 1
line_15	Line BUTERFLD 230.0 to PANTANO 230.0 Circuit 1
line_16	Line BUTERFLD 230.0 to SAN RAF 230.0 Circuit 1
line_17	Line DOSCONDO 230.0 to HACKBERY 230.0 Circuit 1
line_18	Line MARANATP 115.0 to MARANA 115.0 Circuit 1
line_19	Line MARANATP 115.0 to RATTLSENK 115.0 Circuit 1
line_20	Line MORENCI 230.0 to PD-MORNC 230.0 Circuit 1
line_21	Line MORENCI 230.0 to GREEN-AE 230.0 Circuit 1
line_22	Line PANTANO 115.0 to KARTCHNR 115.0 Circuit 1
line_23	Line PANTANO 115.0 to NOGALES 115.0 Circuit 1
line_24	Line PANTANO 230.0 to SAHUARIT 230.0 Circuit 1
line_25	Line RED TAIL 230.0 to DOSCONDO 230.0 Circuit 1
line_26	Line THREEPNT 115.0 to SNDARIO 115.0 Circuit 1
line_27	Line HACKBERY 230.0 to MORENCI 230.0 Circuit 1
line_28	Line SAHUARIT 230.0 to BICKNELL 230.0 Circuit 1
line_29	Line S.BRKRCH 115.0 to SNMANUEL 115.0 Circuit 1
line_30	Line DAVIS 230.0 to RIVIERA 230.0 Circuit 1
line_31	Line ORACLE 115.0 to S.BRKRCH 115.0 Circuit 1
line_32	Line BLACKMTN 115.0 to VALEN-SW 115.0 Circuit 1
line_33	Line SNDARIO 115.0 to BRAWLEY 115.0 Circuit 1
line_34	Line SANDARIO 115.0 to SNDARIO 115.0 Circuit 1
tran_35	Tran WINCHSTR 345.00 to WINCHSTR 230.00 Circuit 1
tran_36	Tran APACHE 230.00 to APACHE 115.00 Circuit 1
tran_37	Tran APACHE 230.00 to APACHE 115.00 Circuit 2
tran_38	Tran BICKNELL 230.00 to BICKNELL 115.00 Circuit 1
tran_39	Tran BICKNELL 230.00 to BICKNELL 115.00 Circuit 2

tran_40	Tran BICKNELL 345.00 to BICKNELL 230.00 Circuit 1
tran_41	Tran GREEN-AE 345.00 to GREEN-AE 230.00 Circuit 1
tran_42	Tran PANTANO 230.00 to PANTANO 115.00 Circuit 1
line_43	Line HIDALGO 345.0 to GREENLEE 345.0 Circuit 1
line_44	Line SAGUARO 500.0 to TORTOLIT 500.0 Circuit 1
line_45	Line SAGUARO 500.0 to TORTOLIT 500.0 Circuit 2
line_46	Line SAGUARO 500.0 to TORTLIT2 500.0 Circuit 1
line_47	Line GREENLEE 345.0 to WINCHSTR 345.0 Circuit 1
line_48	Line GREENLEE 345.0 to WILLOW 345.0 Circuit 1
line_49	Line GREENLEE 345.0 to COPPERVR 345.0 Circuit 1
line_50	Line SPRINGR 345.0 to GREENLEE 345.0 Circuit 1
line_51	Line SPRINGR 345.0 to VAIL2 345.0 Circuit 1
line_52	Line VAIL 345.0 to SOUTH 345.0 Circuit 1
line_53	Line WINCHSTR 345.0 to VAIL 345.0 Circuit 1
line_54	Line WINCHSTR 345.0 to WILLOW 345.0 Circuit 1
line_55	Line WILLOW 345.0 to BOWIE 345.0 Circuit 1
line_56	Line WILLOW 345.0 to BOWIE 345.0 Circuit 2
line_57	Line PINALWES 345.0 to SOUTH 345.0 Circuit 1
line_58	Line SAG.EAST 115.0 to ORACLE 115.0 Circuit 1
line_59	Line ADAMS 115.0 to NOGALES 115.0 Circuit 1
line_60	Line DEL BAC 115.0 to NOGALES 115.0 Circuit 1
line_61	Line TUCSON 115.0 to DEL BAC 115.0 Circuit 1
line_62	Line TUCSON 115.0 to ORACLE 115.0 Circuit 1
line_63	Line BLACKMTN 115.0 to DEL BAC 115.0 Circuit 1
line_64	Line BLACKMTN 115.0 to SNYDHILL 115.0 Circuit 1
line_65	Line BRAWLEY 115.0 to SANXAVER 115.0 Circuit 1
line_66	Line RATTLSENK 115.0 to TUCSON 115.0 Circuit 1
line_67	Line RATTLSENK 115.0 to TWINPEAK 115.0 Circuit 1
line_68	Line SANDARIO 115.0 to BRAWLEY 115.0 Circuit 1
line_69	Line SANXAVER 115.0 to SNYDHILL 115.0 Circuit 1
line_70	Line TWINPEAK 115.0 to SANDARIO 115.0 Circuit 1
tran_67	Tran COPPERVR 345.00 to COPPERVR 230.00 Circuit 1
line_71	N-2:Line APACHE-BUTERFLD 230kV & MARANA TAP-MARANA 115kV
line_72	N-2:Line APACHE-BUTERFLD 230kV & APACHE-WINCHESTER 230kV
line_73	N-2:Line APACHE-BUTERFLD 230kV & GREENLEE XFMR 345/230
line_74	N-2:Line AVRA-MARANA 115kV & APACHE-WINCHSTR 230kV
line_75	N-2:Line AVRA-MARANA 115kV & BICKNELL-VAIL 345kV
line_76	N-2:Line APACHE-WINCHSTR 230kV & APACHE-RED TAIL 230kV
line_77	N-2:Line SPRINGR-VAIL2 345kV & WINCSTR VAIL 345kV
tran_78	N-2:Tran RIVIERA-RIVIERA 230kV & TOPOCK XFMR 230/69kV
line_79	N-2:Line WINCHSTR-VAIL 345kV & PINALWES-SOUTH 345kV
line_80	N-2:Line AVRA-SANDARIO 115kV & THREEPNT-SANDARIO 115kV
line_81	N-2:Line MARANATP-MARANA 115kV & MARANATP-RATTLSENK 115kV
line_82	N-n:Line APACHE-BUTERFLD/RED TAIL230&AVRA-MARANA115
line_83	N-n:Line APACHE-BUTERFLD/RED TAIL230&APACHE-WINCHSTR345
line_84	N-n:Line APACHE-BUTERFLD/RED TAIL230&BICKNELL-VAIL345
line_85	N-n:Line APACHE-BUTERFLD230&AVRA-MARANA115&BICKNELL-VAIL345

2013 CONTINGENCY LIST

Name	Contingency_Description
base	Base system (n-0)
line_01	Line APACHE 230.0 to BUTERFLD 230.0 Circuit 1
line_02	Line APACHE 230.0 to RED TAIL 230.0 Circuit 1
line_03	Line APACHE 230.0 to WINCHSTR 230.0 Circuit 1
line_04	Line AVRA 115.0 to MARANA 115.0 Circuit 1
line_05	Line AVRA 115.0 to SNDARIO 115.0 Circuit 1
line_06	Line BICKNELL 345.0 to VAIL 345.0 Circuit 1
line_07	Line BICKNELL 115.0 to THREEPNT 115.0 Circuit 1
line_08	Line BUTERFLD 230.0 to SAN RAF 230.0 Circuit 1
line_09	Line MORENCI 230.0 to GREEN-SW 230.0 Circuit 1
line_10	Line RED TAIL 230.0 to DOSCONDO 230.0 Circuit 1
line_11	Line THREEPNT 115.0 to SNDARIO 115.0 Circuit 1
line_12	Line SAHUARIT 230.0 to BICKNELL 230.0 Circuit 1
line_13	Line DAVIS 230.0 to RIVIERA 230.0 Circuit 1
line_14	Line BUTERFLD 230.0 to SLOAN 230.0 Circuit 1
line_15	Line BUTERFLD 230.0 to PANTANO 230.0 Circuit 1
line_16	Line DOSCONDO 230.0 to HACKBERY 230.0 Circuit 1
line_17	Line HACKBERY 230.0 to MORENCI 230.0 Circuit 1
line_18	Line SLOAN 230.0 to PANTANO 230.0 Circuit 1
line_19	Line S.BRKRCH 115.0 to SNMANUEL 115.0 Circuit 1
line_20	Line ORACLE 115.0 to S.BRKRCH 115.0 Circuit 1
line_21	Line THREEPNT 115.0 to VALEN-SW 115.0 Circuit 1
line_22	Line SNMANUEL 115.0 to HAYDENAZ 115.0 Circuit 1
line_23	Line APACHE 115.0 to SNMANUEL 115.0 Circuit 1
line_24	Line MORENCI 230.0 to PD-MORNC 230.0 Circuit 1
line_25	Line PANTANO 115.0 to KARTCHNR 115.0 Circuit 1
line_26	Line PANTANO 115.0 to NOGALES 115.0 Circuit 1
line_27	Line PANTANO 230.0 to NEWTUCSN 230.0 Circuit 1
line_28	Line VALEN-SW 115.0 to BLACKMTN 115.0 Circuit 1
line_29	Line SNDARIO 115.0 to BRAWLEY 115.0 Circuit 1
line_30	Line SAN JOAQ 115.0 to SANXAVER 115.0 Circuit 1
line_31	Line NEWTUCSN 230.0 to SAHUARIT 230.0 Circuit 1
line_32	Line BRAWLEY 115.0 to SAN JOAQ 115.0 Circuit 1
line_33	Line SANDARIO 115.0 to SNDARIO 115.0 Circuit 1
line_34	Line SAG.EAST 115.0 to MARANATP 115.0 Circuit 1
line_35	Line SAG.EAST 115.0 to ADONIS 115.0 Circuit 1
line_36	Line MARANATP 115.0 to MARANA 115.0 Circuit 1
line_37	Line MARANATP 115.0 to RATTLSNK 115.0 Circuit 1
line_38	Line ADONIS 115.0 to RATTLSNK 115.0 Circuit 1
line_39	Line ADAMSTAP 115.0 to APACHE 115.0 Circuit 1
line_40	Line ADAMSTAP 115.0 to PANTANO 115.0 Circuit 1
tran_41	Tran WINCHSTR 345.00 to WINCHSTR 230.00 Circuit 1
tran_42	Tran APACHE 230.00 to APACHE 115.00 Circuit 1
tran_43	Tran APACHE 230.00 to APACHE 115.00 Circuit 2
tran_44	Tran BICKNELL 230.00 to BICKNELL 115.00 Circuit 1
tran_45	Tran BICKNELL 345.00 to BICKNELL 230.00 Circuit 1

tran_46	Tran GREEN-SW 345.00 to GREEN-SW 230.00 Circuit 1
tran_47	Tran BICKNELL 230.00 to BICKNELL 115.00 Circuit 2
tran_48	Tran PANTANO 230.00 to PANTANO 115.00 Circuit 1
tran_49	Tran GREEN-SW 345.00 to GREEN-SW 230.00 Circuit 2
line_50	Line SAGUARO 500.0 to TORTOLIT 500.0 Circuit 1
line_51	Line SAGUARO 500.0 to TORTLIT2 500.0 Circuit 1
line_52	Line GREENLEE 345.0 to WINCHSTR 345.0 Circuit 1
line_53	Line GREENLEE 345.0 to COPPERVR 345.0 Circuit 1
line_54	Line MCKINLEY 345.0 to SPRINGR 345.0 Circuit 1
line_55	Line MCKINLEY 345.0 to SPRINGR 345.0 Circuit 2
line_56	Line SPRINGR 345.0 to CORONADO 345.0 Circuit 1
line_57	Line SPRINGR 345.0 to GREENLEE 345.0 Circuit 1
line_58	Line SPRINGR 345.0 to VAIL2 345.0 Circuit 1
line_59	Line VAIL 345.0 to SOUTH 345.0 Circuit 1
line_60	Line WESTWING 345.0 to SOUTH 345.0 Circuit 1
line_61	Line WESTWING 345.0 to PINALWES 345.0 Circuit 1
line_62	Line WINCHSTR 345.0 to VAIL 345.0 Circuit 1
line_63	Line PINALWES 345.0 to SOUTH 345.0 Circuit 1
line_64	Line BICKNELL 345.0 to VAIL 345.0 Circuit 1
line_65	Line PINALSTH 500.0 to SES 500.0 Circuit 1
line_66	Line SNTAROSA 500.0 to PINALSTH 500.0 Circuit 1
line_67	Line SAGUARO 500.0 to TORTOLIT 500.0 Circuit 2
line_68	Line PINALSTH 500.0 to TORTOLIT 500.0 Circuit 1
line_69	Line GREENLEE 345.0 to WILLOW 345.0 Circuit 1
line_70	Line WINCHSTR 345.0 to WILLOW 345.0 Circuit 1
line_71	Line WILLOW 345.0 to BOWIE 345.0 Circuit 1
line_72	Line WILLOW 345.0 to BOWIE 345.0 Circuit 2
line_73	Line HIDALGO 345.0 to GREENLEE 345.0 Circuit 1
line_74	Line SPRINGR 345.0 to LUNA 345.0 Circuit 1
line_75	Line SAN_JUAN 345.0 to MCKINLEY 345.0 Circuit 1
line_76	Line SAN_JUAN 345.0 to MCKINLEY 345.0 Circuit 2
tran_77	Tran WESTWING 500.00 to WESTWING 345.00 Circuit 1
tran_78	Tran CORONADO 500.00 to CORONADO 345.00 Circuit 1
tran_79	Tran CORONADO 500.00 to CORONADO 345.00 Circuit 2
tran_80	Tran PINAL_W 500.00 to PINALWES 345.00 Circuit 1
line_81	Line SAG.EAST 115.0 to ORACLE 115.0 Circuit 1
line_82	Line DEL BAC 115.0 to NOGALES 115.0 Circuit 1
line_83	Line TUCSON 115.0 to DEL BAC 115.0 Circuit 1
line_84	Line TUCSON 115.0 to ORACLE 115.0 Circuit 1
line_85	Line BLACKMTN 115.0 to DEL BAC 115.0 Circuit 1
line_86	Line BLACKMTN 115.0 to SNYDHILL 115.0 Circuit 1
line_87	Line RATTLSNK 115.0 to TUCSON 115.0 Circuit 1
line_88	Line RATTLSNK 115.0 to TWINPEAK 115.0 Circuit 1
line_89	Line SANXAVER 115.0 to SNYDHILL 115.0 Circuit 1
line_90	Line TWINPEAK 115.0 to SANDARIO 115.0 Circuit 1
line_91	Line ADAMS 115.0 to ADAMSTAP 115.0 Circuit 1
line_92	Line ADAMSTAP 115.0 to NOGALES 115.0 Circuit 1
line_93	N-2:APACHE-BUTERFLD 230kV & APACHE-RED TAIL 230kV

line_94	N-2:Line APACHE-BUTERFLD 230kV & AVRA-MARANA 115kV
line_95	N-2:Line APACHE-BUTERFLD 230kV & BICKNELL-VAIL 345kV
line_96	N-2:Line APACHE-BUTERFLD 230kV & MARANA TAP-MARANA 115kV
line_97	N-2:Line APACHE-BUTERFLD 230kV & APACHE-WINCHESTER 230kV
line_98	N-2:Line APACHE-BUTERFLD 230kV & GREENLEE XFMR 345/230
line_99	N-2:Line AVRA-MARANA 115kV & APACHE-WINCHSTR 230kV
line_100	N-2:Line AVRA-MARANA 115kV & BICKNELL-VAIL 345kV
line_101	N-2:Line APACHE-WINCHSTR 230kV & APACHE-RED TAIL 230kV
line_102	N-2:Line SPRINGR-VAIL2 345kV & WINCSTR VAIL 345kV
tran_103	N-2:Tran RIVIERA-RIVIERA 230kV & TOPOCK XFMR 230/69kV
line_104	N-2:Line WINCHSTR-VAIL 345kV & PINALWES-SOUTH 345kV
line_105	N-2:Line AVRA-SNDARIO 115kV & THREEPNT-SNDARIO 115kV
line_106	N-2:Line MARANATP-MARANA 115kV & MARANATP-RATTLSNK 115kV
line_107	N-n:Line APACHE-BUTERFLD/RED TAIL230&AVRA-MARANA115
line_108	N-n:Line APACHE-BUTERFLD/RED TAIL230&APACHE-WINCHSTR345
line_109	N-n:Line APACHE-BUTERFLD/RED TAIL230&BICKNELL-VAIL345
line_110	N-n:Line APACHE-BUTERFLD230&AVRA-MARANA115&BICKNELL-VAIL345

2018 CONTINGENCY LIST

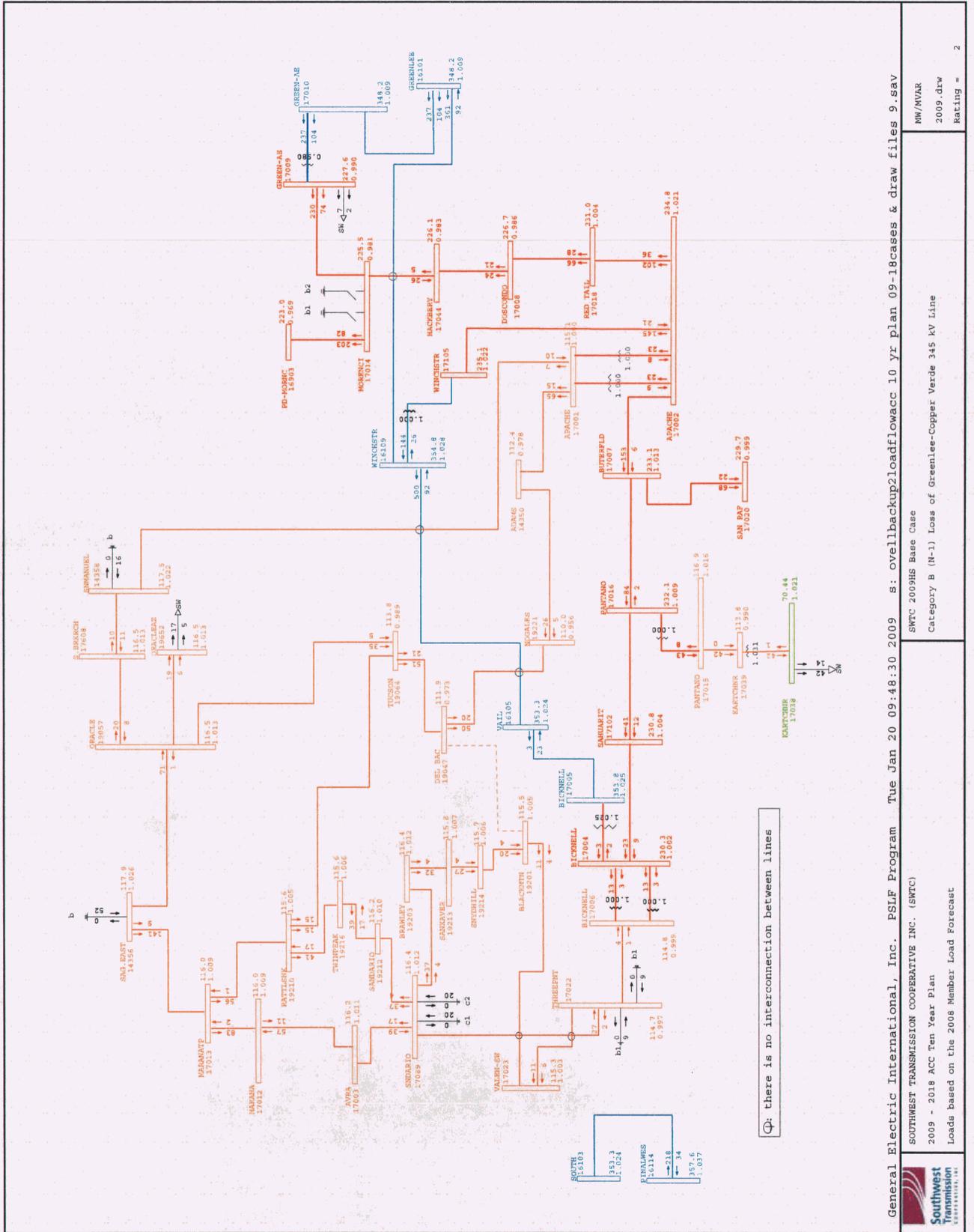
Name	Contingency_Description
base	Base system (n-0)
line_01	Line ADAMS TP 115.0 to APACHE 115.0 Circuit 1
line_02	Line SAG.EAST 115.0 to MARANA 115.0 Circuit 1
line_03	Line SAG.EAST 115.0 to NAVISKA 115.0 Circuit 1
line_04	Line SNMANUEL 115.0 to HAYDENAZ 115.0 Circuit 1
line_05	Line APACHE 115.0 to SNMANUEL 115.0 Circuit 1
line_06	Line APACHE 230.0 to BUTERFLD 230.0 Circuit 1
line_07	Line APACHE 230.0 to RED TAIL 230.0 Circuit 1
line_08	Line APACHE 230.0 to WINCHSTR 230.0 Circuit 1
line_09	Line AVRA 115.0 to MARANA 115.0 Circuit 1
line_10	Line AVRA 115.0 to SNDARIO 115.0 Circuit 1
line_11	Line BICKNELL 230.0 to CS1 230.0 Circuit 1
line_12	Line BICKNELL 345.0 to VAIL 345.0 Circuit 1
line_13	Line BUTERFLD 230.0 to SAN RAF 230.0 Circuit 1
line_14	Line BUTERFLD 230.0 to SLOAN 230.0 Circuit 1
line_15	Line DOSCONDO 230.0 to HACKBERY 230.0 Circuit 1
line_16	Line MARANA 115.0 to RATTLSNK 115.0 Circuit 1
line_17	Line MORENCI 230.0 to PD-MORNC 230.0 Circuit 1
line_18	Line MORENCI 230.0 to GREEN-SW 230.0 Circuit 1
line_19	Line PANTANO 115.0 to KARTCHNR 115.0 Circuit 1
line_20	Line PANTANO 115.0 to NOGALES 115.0 Circuit 1
line_21	Line PANTANO 230.0 to NEWTUCSN 230.0 Circuit 1
line_22	Line RED TAIL 230.0 to DOSCONDO 230.0 Circuit 1
line_23	Line THREEPNT 115.0 to SNDARIO 115.0 Circuit 1
line_24	Line VALEN-SW 115.0 to BLACKMTN 115.0 Circuit 1
line_25	Line HACKBERY 230.0 to MORENCI 230.0 Circuit 1
line_26	Line CS1 345.0 to SOUTH 345.0 Circuit 1
line_27	Line BICKNELL 115.0 to THREEPNT 115.0 Circuit 1

line_28	Line BICKNELL 115.0 to THREEPNT 115.0 Circuit 2
line_29	Line THREEPNT 115.0 to VALEN-SW 115.0 Circuit 1
line_30	Line SNDARIO 115.0 to BRAWLEY 115.0 Circuit 1
line_31	Line SNDARIO 115.0 to SANDARIO 115.0 Circuit 1
line_32	Line SAHUARIT 230.0 to BICKNELL 230.0 Circuit 1
line_33	Line SLOAN 230.0 to PANTANO 230.0 Circuit 1
line_34	Line S.BRKRCH 115.0 to SNMANUEL 115.0 Circuit 1
line_35	Line NAVISKA 115.0 to ADONIS 115.0 Circuit 1
line_36	Line THRYNDLE 115.0 to CAMdeMAN 115.0 Circuit 1
line_37	Line SAN JOAQ 115.0 to SANXAVER 115.0 Circuit 1
line_38	Line TWINPEAK 115.0 to PICTROCK 115.0 Circuit 1
line_39	Line ADONIS 115.0 to THRYNDLE 115.0 Circuit 1
line_40	Line NEWTUCSN 230.0 to SAHUARIT 230.0 Circuit 1
line_41	Line CAMdeMAN 115.0 to RATTLSNK 115.0 Circuit 1
line_42	Line DAVIS 230.0 to RIVIERA 230.0 Circuit 1
line_43	Line ORACLE 115.0 to S.BRKRCH 115.0 Circuit 1
line_44	Line ADAMS TP 115.0 to PANTANO 115.0 Circuit 1
line_45	Line BRAWLEY 115.0 to SAN JOAQ 115.0 Circuit 1
line_46	Line PICTROCK 115.0 to SANDARIO 115.0 Circuit 1
tran_47	Tran WINCHSTR 345.00 to WINCHSTR 230.00 Circuit 1
tran_48	Tran APACHE 230.00 to APACHE 115.00 Circuit 1
tran_49	Tran APACHE 230.00 to APACHE 115.00 Circuit 2
tran_50	Tran BICKNELL 230.00 to BICKNELL 115.00 Circuit 1
tran_51	Tran BICKNELL 230.00 to BICKNELL 115.00 Circuit 2
tran_52	Tran BICKNELL 345.00 to BICKNELL 230.00 Circuit 1
tran_53	Tran GREEN-SW 345.00 to GREEN-SW 230.00 Circuit 1
tran_54	Tran GREEN-SW 345.00 to GREEN-SW 230.00 Circuit 2
tran_55	Tran PANTANO 230.00 to PANTANO 115.00 Circuit 1
line_56	Line SAN_JUAN 345.0 to MCKINLEY 345.0 Circuit 1
line_57	Line SAN_JUAN 345.0 to MCKINLEY 345.0 Circuit 2
line_58	Line HIDALGO 345.0 to GREENLEE 345.0 Circuit 1
line_59	Line SAGUARO 500.0 to TORTOLIT 500.0 Circuit 1
line_60	Line SAGUARO 500.0 to TORTOLIT 500.0 Circuit 2
line_61	Line SAGUARO 500.0 to TORTLIT2 500.0 Circuit 1
line_62	Line PINAL_S 500.0 to TORTOLIT 500.0 Circuit 1
line_63	Line GREENLEE 345.0 to WINCHSTR 345.0 Circuit 1
line_64	Line GREENLEE 345.0 to WILLOW 345.0 Circuit 1
line_65	Line GREENLEE 345.0 to COPPERVR 345.0 Circuit 1
line_66	Line MCKINLEY 345.0 to SPRINGR 345.0 Circuit 1
line_67	Line MCKINLEY 345.0 to SPRINGR 345.0 Circuit 2
line_68	Line SOUTH 345.0 to GATEWAY 345.0 Circuit 1
line_69	Line SOUTH 345.0 to GATEWAY 345.0 Circuit 2
line_70	Line SPRINGR 345.0 to LUNA 345.0 Circuit 1
line_71	Line SPRINGR 345.0 to CORONADO 345.0 Circuit 1
line_72	Line SPRINGR 345.0 to GREENLEE 345.0 Circuit 1
line_73	Line SPRINGR 345.0 to VAIL2 345.0 Circuit 1
line_74	Line VAIL 345.0 to SOUTH 345.0 Circuit 1
line_75	Line WESTWING 345.0 to SOUTH 345.0 Circuit 1
line_76	Line WESTWING 345.0 to PINALWES 345.0 Circuit 1
line_77	Line WINCHSTR 345.0 to VAIL 345.0 Circuit 1

line_78	Line WINCHSTR 345.0 to WILLOW 345.0 Circuit 1
line_79	Line WILLOW 345.0 to BOWIE 345.0 Circuit 1
line_80	Line WILLOW 345.0 to BOWIE 345.0 Circuit 2
line_81	Line PINALWES 345.0 to SOUTH 345.0 Circuit 1
tran_82	Tran WESTWING 500.00 to WESTWING 345.00 Circuit 1
tran_83	Tran CORONADO 500.00 to CORONADO 345.00 Circuit 1
tran_84	Tran CORONADO 500.00 to CORONADO 345.00 Circuit 2
tran_85	Tran PINAL_W 500.00 to PINALWES 345.00 Circuit 1
line_86	Line ADAMS 115.0 to ADAMS TP 115.0 Circuit 1
line_87	Line SAG.EAST 115.0 to ORACLE 115.0 Circuit 1
line_88	Line TWINPEAK 115.0 to PICTROCK 115.0 Circuit 1
line_89	Line CAMdeMAN 115.0 to RATTLSNK 115.0 Circuit 1
line_90	Line DEL BAC 115.0 to NOGALES 115.0 Circuit 1
line_91	Line ORACLE 115.0 to SNMANUEL 115.0 Circuit 1
line_92	Line ADAMS TP 115.0 to NOGALES 115.0 Circuit 1
line_93	Line TUCSON 115.0 to DEL BAC 115.0 Circuit 1
line_94	Line TUCSON 115.0 to ORACLE 115.0 Circuit 1
line_95	Line BLACKMTN 115.0 to DEL BAC 115.0 Circuit 1
line_96	Line BLACKMTN 115.0 to SNYDHILL 115.0 Circuit 1
line_97	Line RATTLSNK 115.0 to TUCSON 115.0 Circuit 1
line_98	Line RATTLSNK 115.0 to TWINPEAK 115.0 Circuit 1
line_99	Line SANXAVER 115.0 to SNYDHILL 115.0 Circuit 1
line_100	Line PICTROCK 115.0 to SANDARIO 115.0 Circuit 1
line_101	Line TWINPEAK 115.0 to SANDARIO 115.0 Circuit 1
line_102	N-2:APACHE-BUTERFLD 230kV & APACHE-RED TAIL 230kV
line_103	N-2:Line APACHE-BUTERFLD 230kV & AVRA-MARANA 115kV
line_104	N-2:Line APACHE-BUTERFLD 230kV & BICKNELL-VAIL 345kV
line_105	N-2:Line APACHE-BUTERFLD 230kV & SAGUARO.E -MARANA 115kV
line_106	N-2:Line APACHE-BUTERFLD 230kV & APACHE-WINCHESTER 230kV
line_107	N-2:Line APACHE-BUTERFLD 230kV & GREENLEE XFMR 345/230
line_108	N-2:Line AVRA-MARANA 115kV & APACHE-WINCHSTR 230kV
line_109	N-2:Line AVRA-MARANA 115kV & BICKNELL-VAIL 345kV
line_110	N-2:Line APACHE-WINCHSTR 230kV & APACHE-RED TAIL 230kV
line_111	N-2:Line SPRINGR-VAIL2 345kV & WINCSTR VAIL 345kV
tran_112	N-2:Tran RIVIERA-RIVIERA 230kV & TOPOCK XFMR 230/69kV
line_113	N-2:Line WINCHSTR-VAIL 345kV & PINALWES-SOUTH 345kV
line_114	N-2:Line AVRA-SNDARIO 115kV & THREEPNT-SNDARIO 115kV
line_115	N-2:Line SAG.EAST-MARANA 115kV & MARANA-RATTLSNK 115kV
line_116	N-n:Line APACHE-BUTERFLD/RED TAIL230&AVRA-MARANA115
line_117	N-n:Line APACHE-BUTERFLD/RED TAIL230&APACHE-WINCHSTR345
line_118	N-n:Line APACHE-BUTERFLD/RED TAIL230&BICKNELL-VAIL345
line_119	N-n:Line APACHE-BUTERFLD230&AVRA-MARANA115&BICKNELL-VAIL345
line_120	N-n: ALL APACHE SUBSTATION OUT OF SERVICE

APPENDIX C
POWER FLOW ONE LINE DIAGRAMS

2009HS Southwest Transmission Cooperative Base System with Greenlee to Copper Verde 345 kV Line out of service



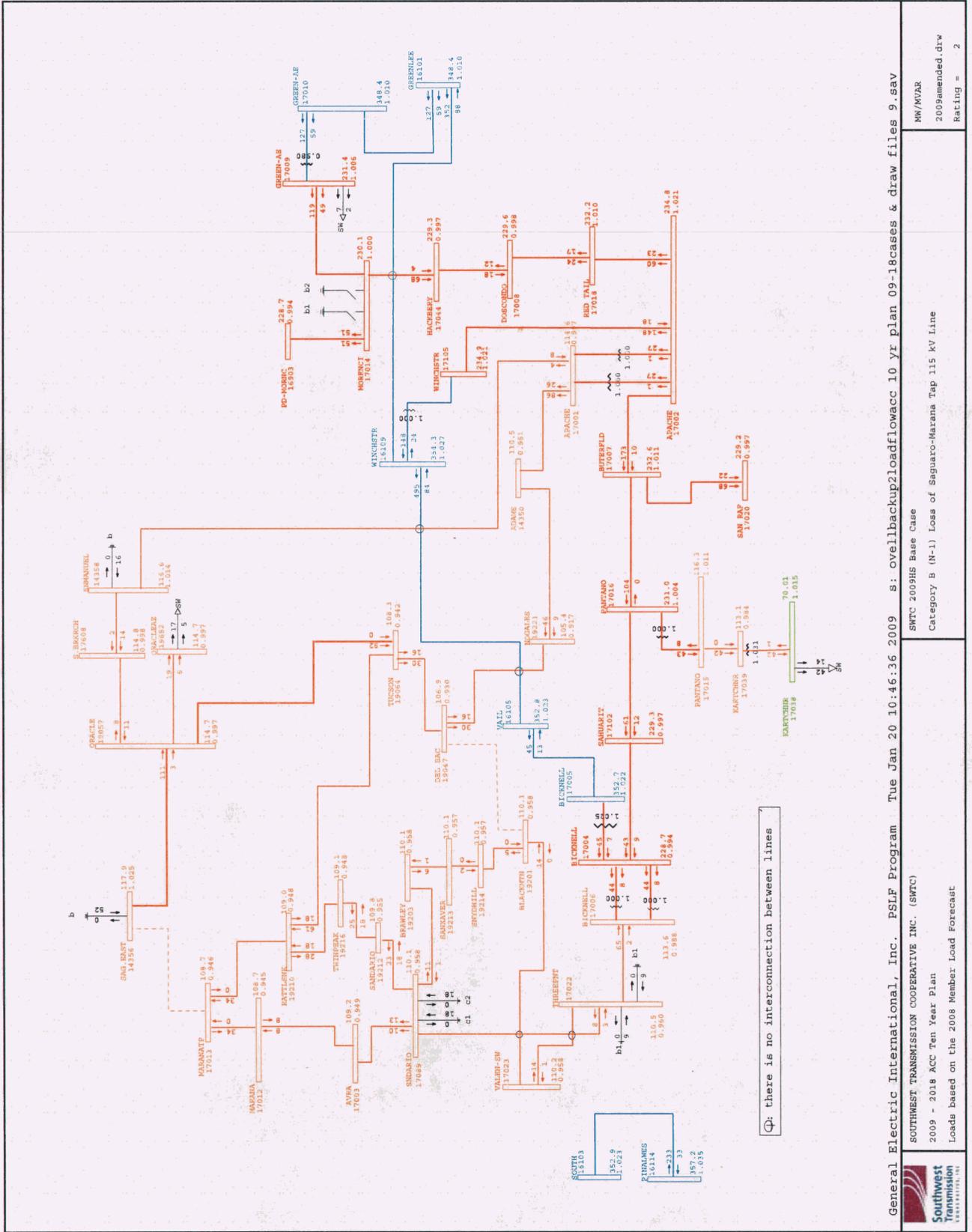
General Electric International, Inc. PSDF Program Tue Jan 20 09:48:30 2009 s: ovelbackup2loadflowacc 10 yr plan 09-18cases & draw files 9.sav

SOUTHWEST TRANSMISSION COOPERATIVE INC. (SMTCC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on the 2008 Member Load Forecast

SMTCC 2009HS Base Case
 Category B (N-1) Loss of Greenlee-Copper Verde 345 kV Line

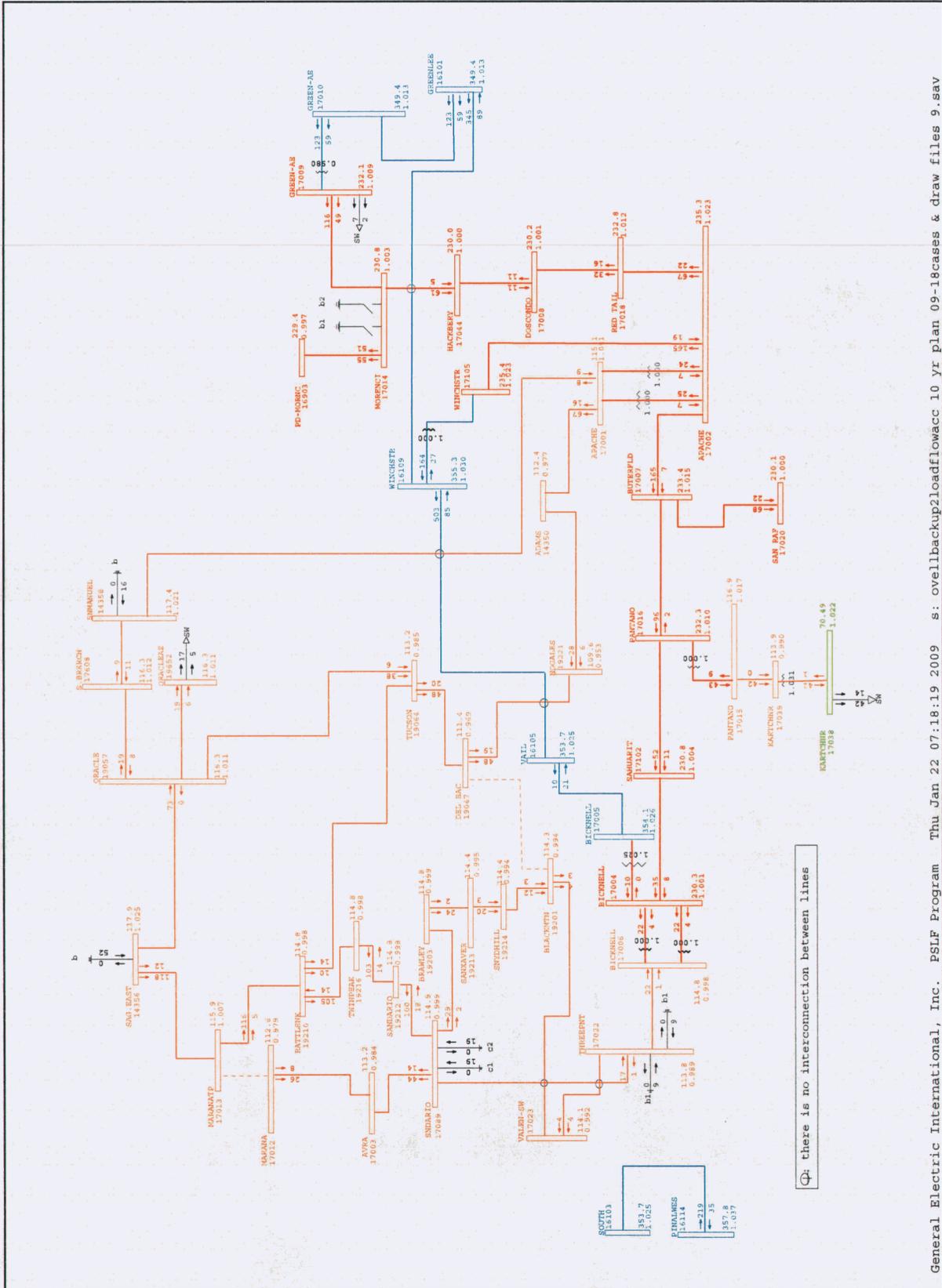
MW/MVAR
 2009.drw
 Rating = 2

2009HS Southwest Transmission Cooperative base system with Saguaro to Marana Tap 115 kV Line out of service



General Electric International, Inc. PSLF Program Tue Jan 20 10:46:36 2009 s: ovelbackup2loadflowacc 10_yr plan 09-18cases & draw files 9.sav
 SOUTHWEST TRANSMISSION COOPERATIVE INC. (SUTC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on the 2008 Member Load Forecast
 SUTC 2009HS Base Case
 Category B (N-1) Loss of Saguaro-Marana Tap 115 KV Line
 MW/MVAR
 2009amended.drw
 Rating = 2

2009HS Southwest Transmission Cooperative Base System with Marana Tap to Marana 115 kV Line out of service



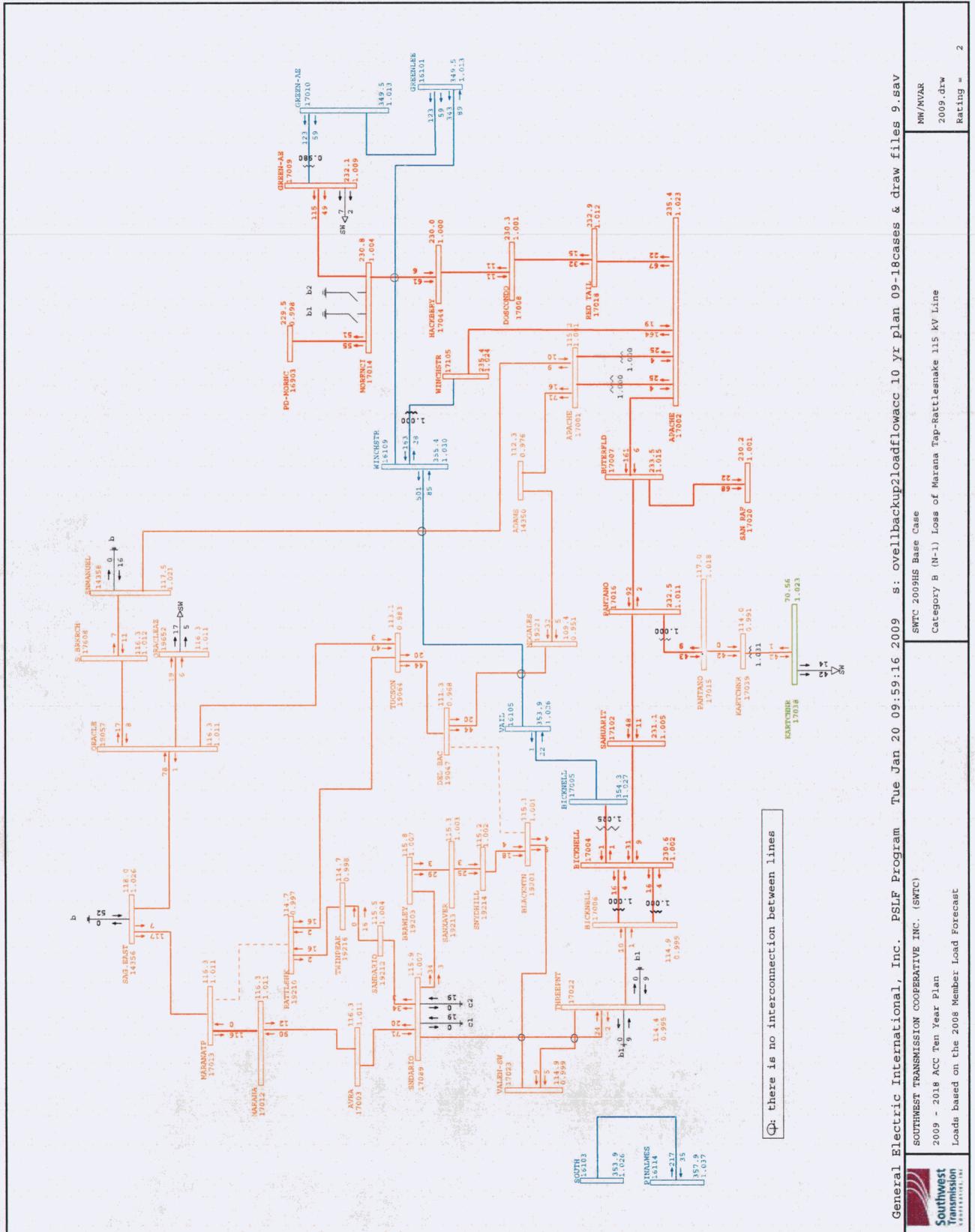
General Electric International, Inc. PSLF Program Thu Jan 22 07:18:19 2009 s: ovelbackup2loadflowacc 10 yr plan 09-18cass & draw files 9_sav

SWTC 2009HS Base Case
 Category B (N-1) Loss of Marana Tap-Marana 115 kV Line
 Rating = 2

Southwest Transmission Cooperative Inc. (SWTC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on the 2008 Member Load Forecast

KW/MVAR
 2009amended.drw

2009HS Southwest Transmission Cooperative Base System with Marana Tap to Rattlesnake 115 kV Line out of service



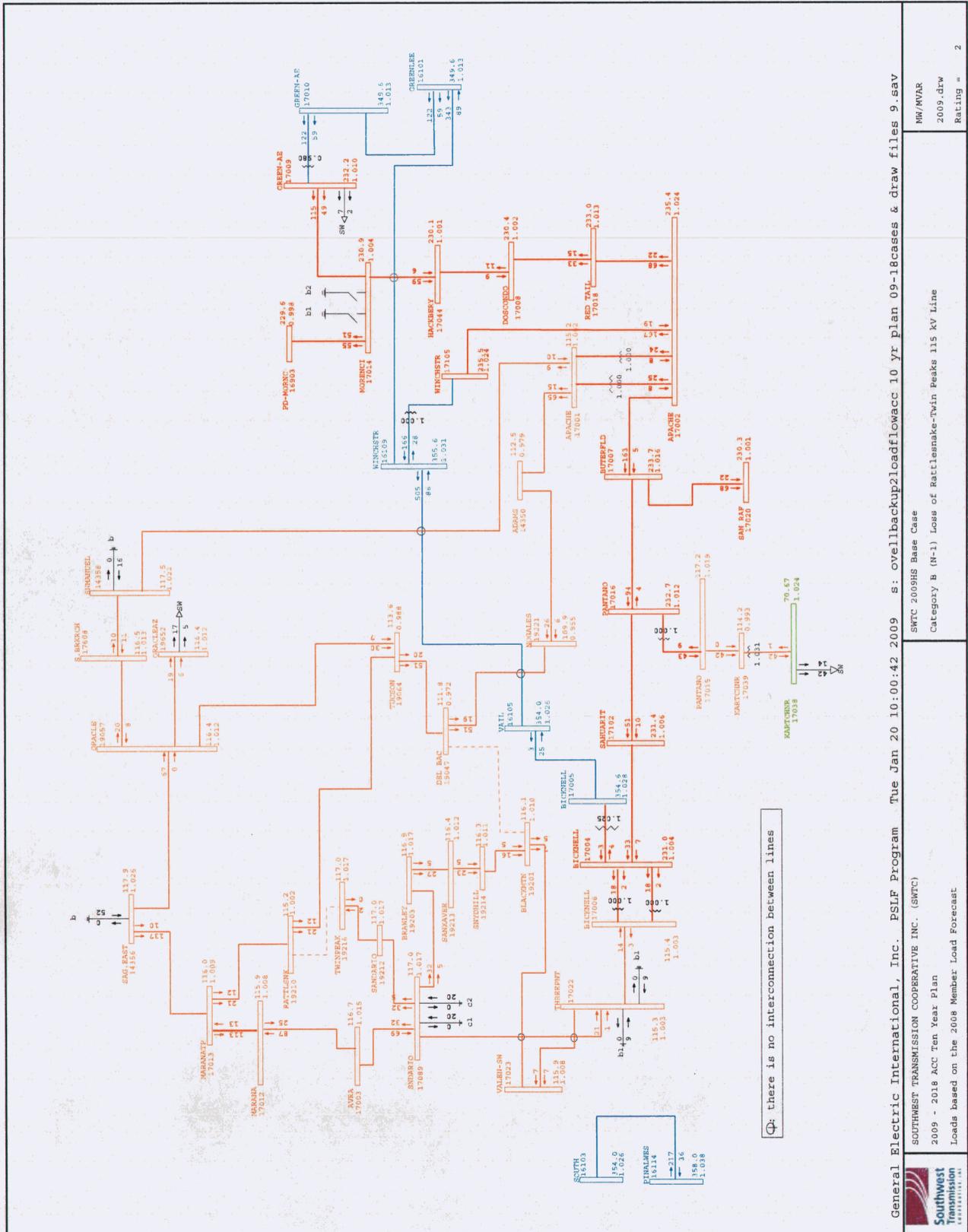
General Electric International, Inc. PSLF Program Tue Jan 20 09:59:16 2009 s:\ovellbackup2loadflowacc 10 yr plan 09-18cases & draw files 9.sav

SOUTHWEST TRANSMISSION COOPERATIVE INC. (SWTC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on the 2008 Member Load Forecast

SWTC 2009HS Base Case
 Category B (N-1) Loss of Marana Tap-Rattlesnake 115 KV Line
 MW/MVAR
 2009.drw
 Rating = 2



2009HS Southwest Transmission Cooperative base system with Rattlesnake to Twin Peaks 115 kV Line out of service



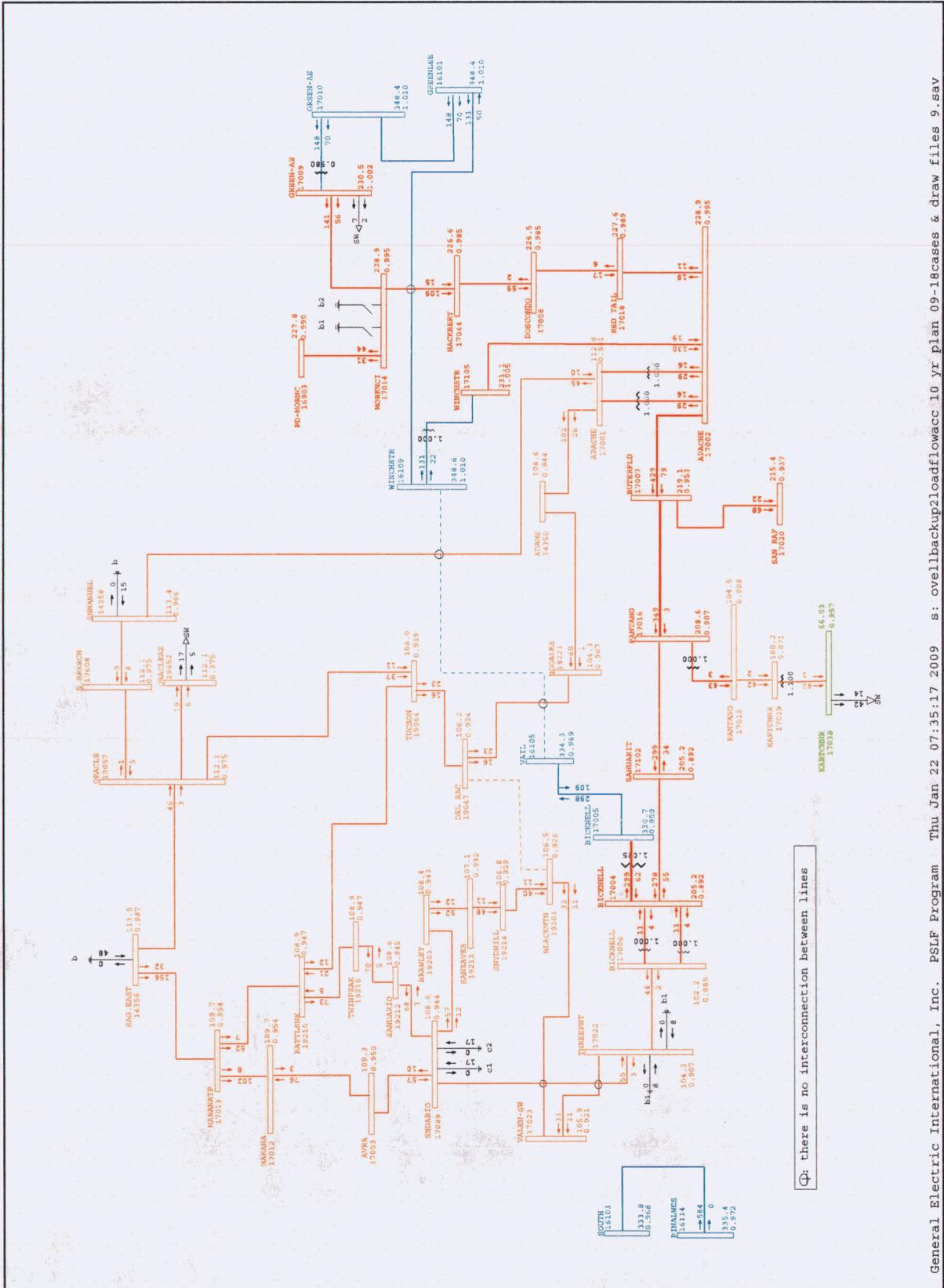
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SOUTHWEST TRANSMISSION COOPERATIVE INC. (SWTC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on the 2008 Member Load Forecast

SWTC 2009HS Base Case
 Category B (N-1) Loss of Rattlesnake-Twin Peaks 115 kV Line

MW/MVAR
 2009.drw
 Rating = 2

2009HS Southwest Transmission Cooperative Base System with Springerville to Vail 2 & Winchester to Vail 345 kV Lines out of service



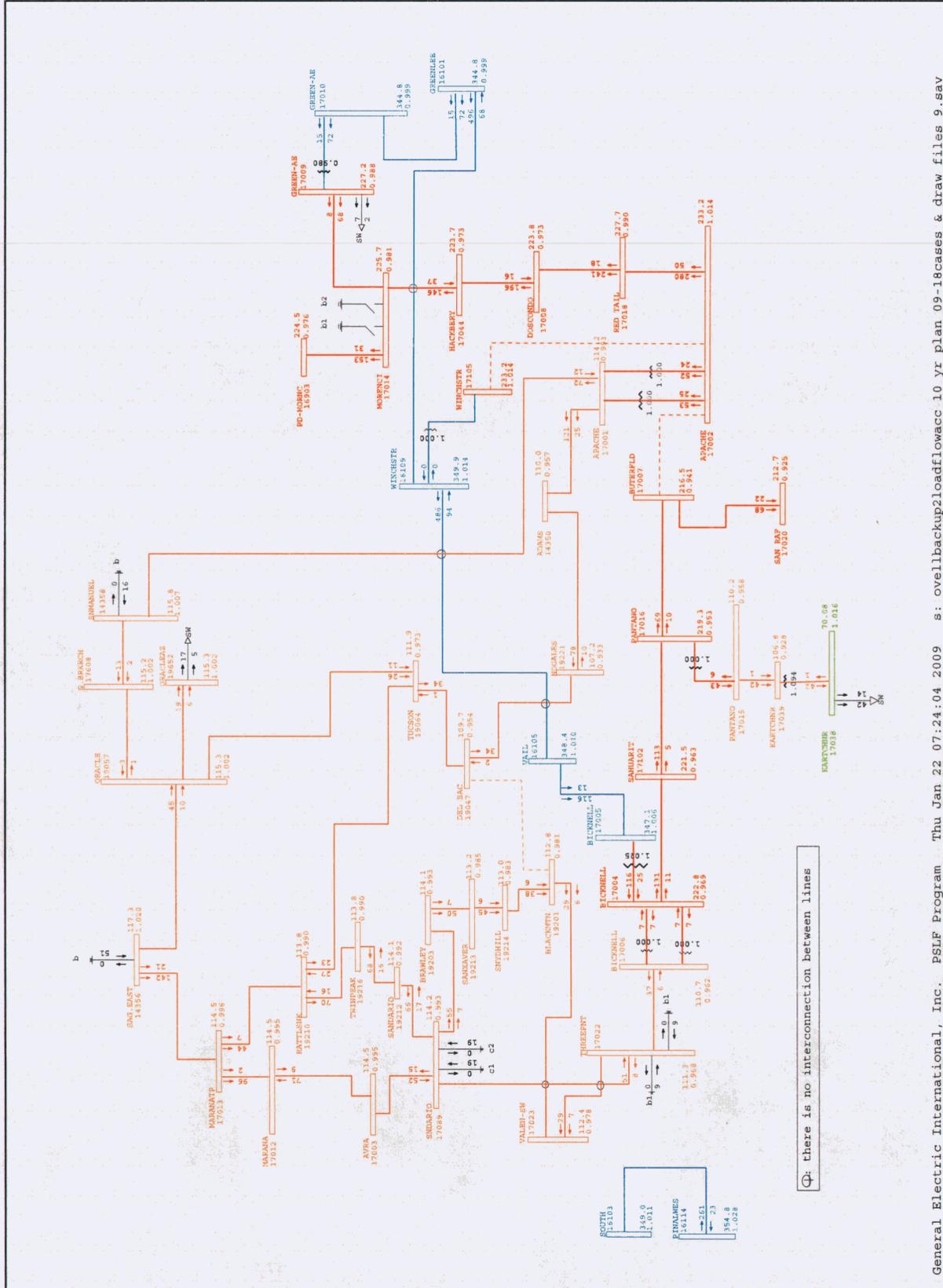
General Electric International, Inc. PSLF Program Thu Jan 22 07:35:17 2009 s: ovelbackup2loadflowacc 10 yr pian 09-18cases & draw files 9 .sav

SOUTHWEST TRANSMISSION COOPERATIVE INC. (SWTC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on the 2008 Member Load Forecast

SWTC 2009HS Base Case
 Category C (N-2) Loss of Spring-Vail2 & Win-Vail 345 kV Lines

MW/MVAR
 2009amended.drw
 Rating = 2

2009HS Southwest Transmission Cooperative Base System with Apache to Butterfield & Apache to Winchester 230 kV Lines out of service



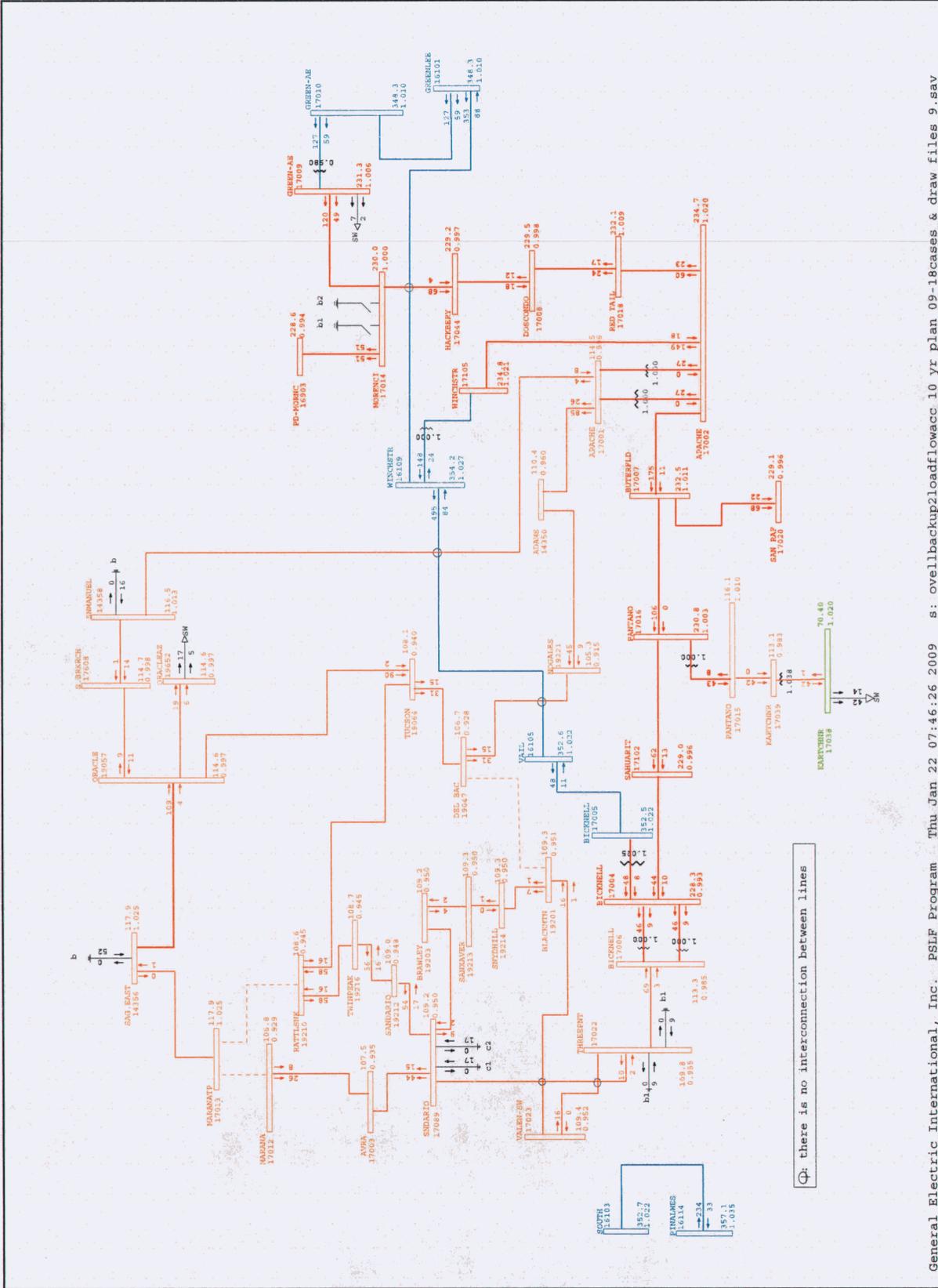
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SOUTHWEST TRANSMISSION COOPERATIVE INC. (SWTC) 2009HS Base Case MW/KVAR 2009amended.drw

2009 - 2018 ACC Ten Year Plan Category C (N-2) Loss of Apa-Butt & Apa-Min 230 KV Lines Rating = 2

Loads based on the 2008 Member Load Forecast

2009HS Southwest Transmission Cooperative Base System with Marana Tap to Marana & Marana Tap to Rattlesnake 115 kV Lines out of service



General Electric International, Inc. PSLF Program Thu Jan 22 07:46:26 2009 s: ovelbackup2loadflowacc 10 yr plan 09-18cases & draw files 9.sav

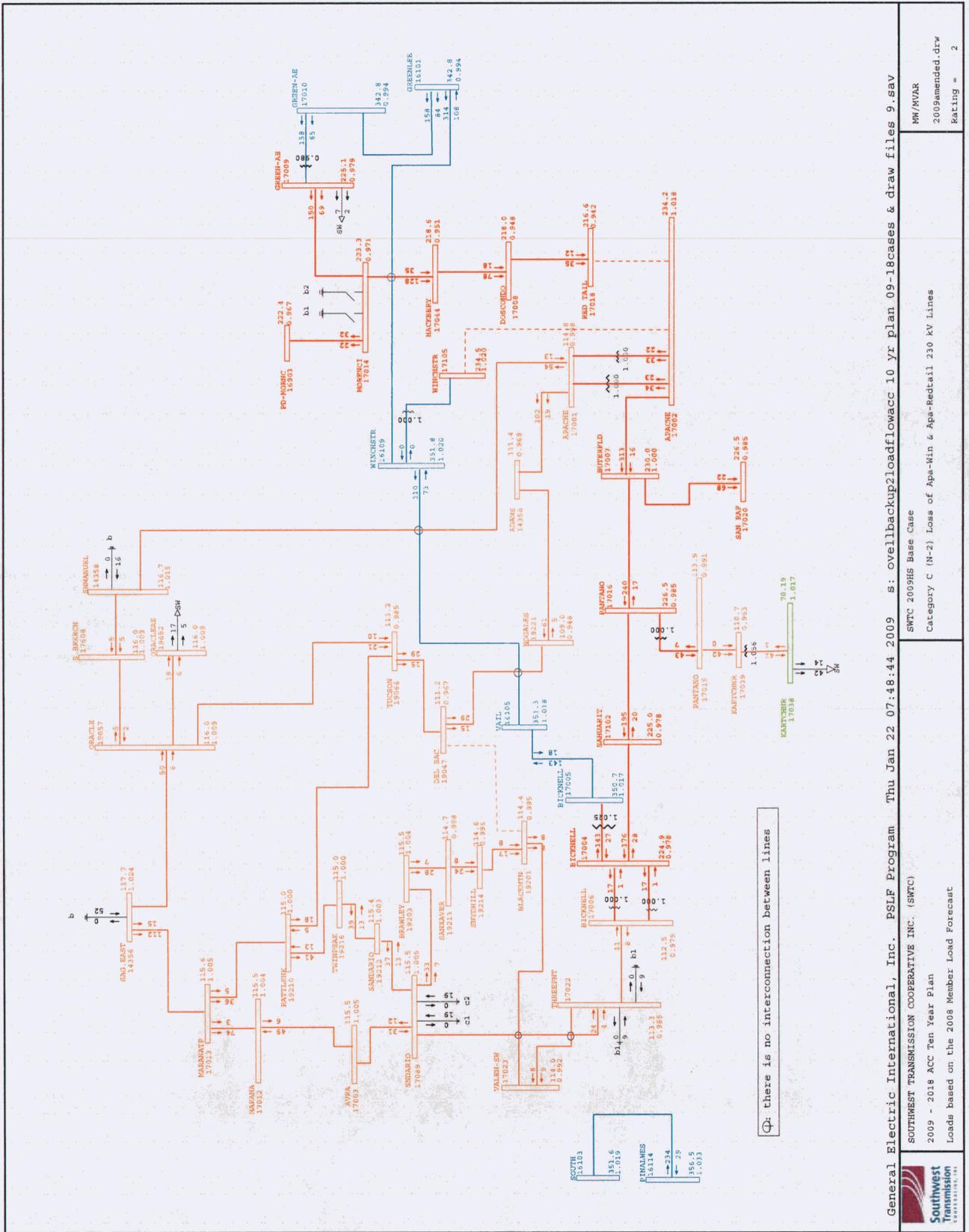
SWTC 2009HS Base Case
 Category C (N-2) Loss of MaranTap-Marana & MaranTap-Rattl 115 kV Lines
 MW/MVAR
 2009amended.dtw
 Rating = 2

SWTC 2009HS Base Case
 Category C (N-2) Loss of MaranTap-Marana & MaranTap-Rattl 115 kV Lines
 Loads based on the 2008 Member Load Forecast

General Electric International, Inc. PSLF Program Thu Jan 22 07:46:26 2009 s: ovelbackup2loadflowacc 10 yr plan 09-18cases & draw files 9.sav
 SWTC 2009HS Base Case
 Category C (N-2) Loss of MaranTap-Marana & MaranTap-Rattl 115 kV Lines
 Loads based on the 2008 Member Load Forecast



2009HS Southwest Transmission Cooperative Base System with Apache to Winchester & Apache to Redtail 230 kV Lines out of service



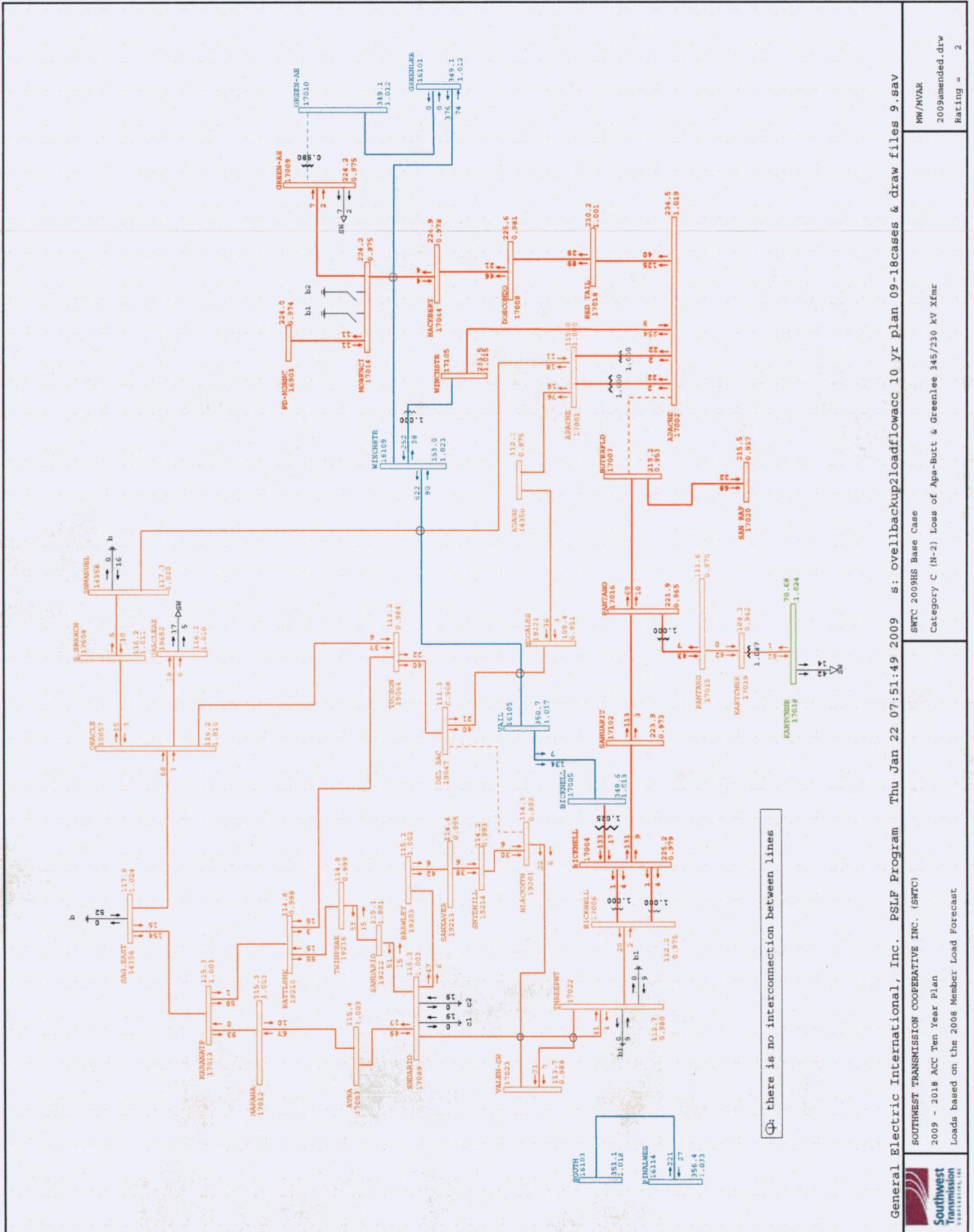
General Electric International, Inc. PSLF Program Thu Jan 22 07:48:44 2009 s: ovelbackup2loadflowacc 10 yr plan 09-18cases & draw files 9.sav

SOUTHWEST TRANSMISSION COOPERATIVE INC. (SMTCC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on the 2008 Member Load Forecast

SMTCC 2009HS Base Case
 Category C (N-2) Loss of Apa-Win & Apa-Redtail 230 kV Lines

MW/MVAR
 2009amended.drw
 Rating = 2

2009HS Southwest Transmission Cooperative Base System with Apache to Butterfield 230 kV Line and Greenlee 345/230 kV Transformer out of service



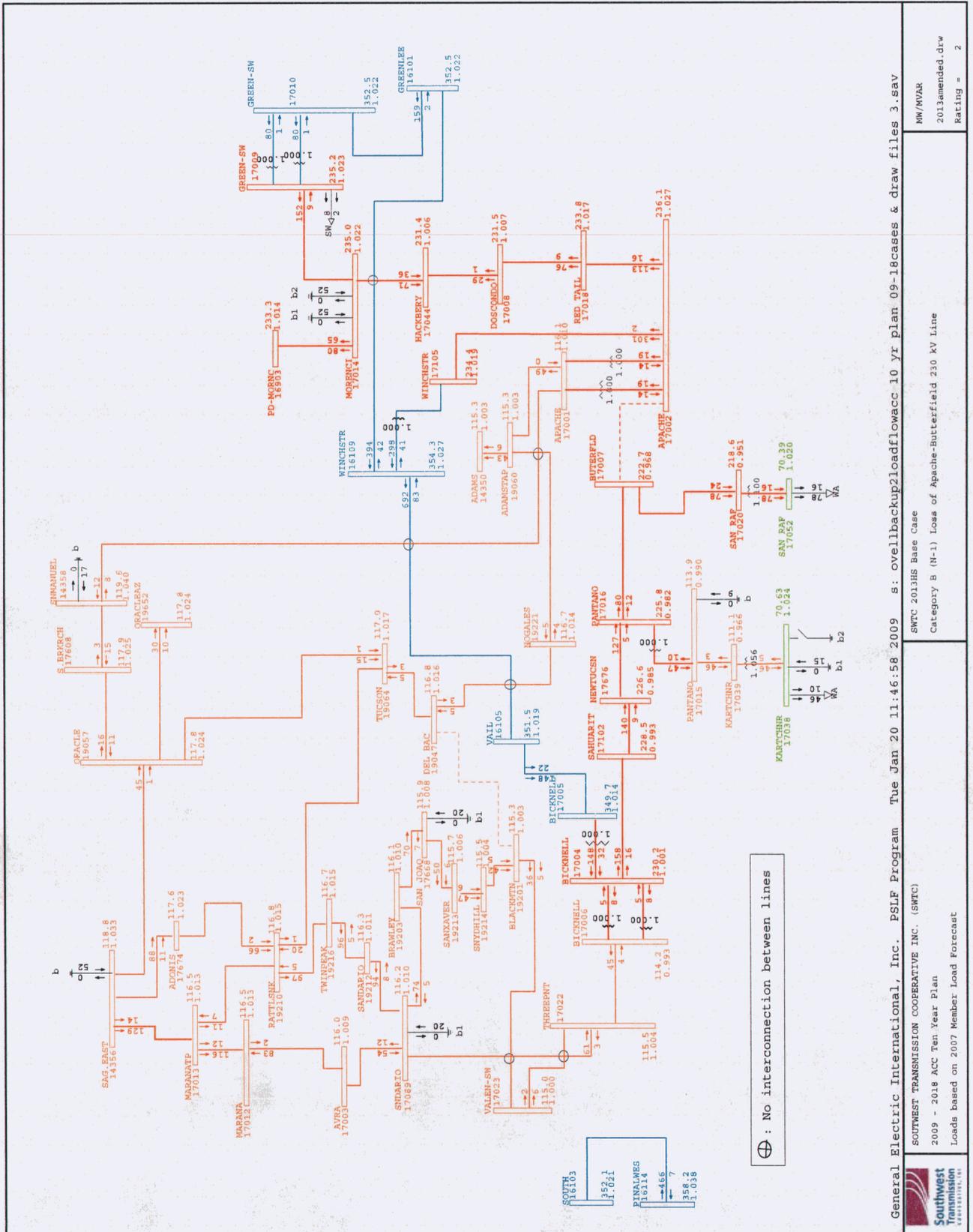
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SOUTHWEST TRANSMISSION COOPERATIVE INC. (SWTC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on the 2008 Member Load Forecast

SWTC 2009HS Base Case
 Category C (N-2) Loss of Apa-Butt & Greenlee 345/230 kV Xfmr

MW/MVAR
 2009amended.drw
 Rating = 2

2013HS Southwest Transmission Cooperative Base System with Apache to Butterfield 230 kV Line out of service



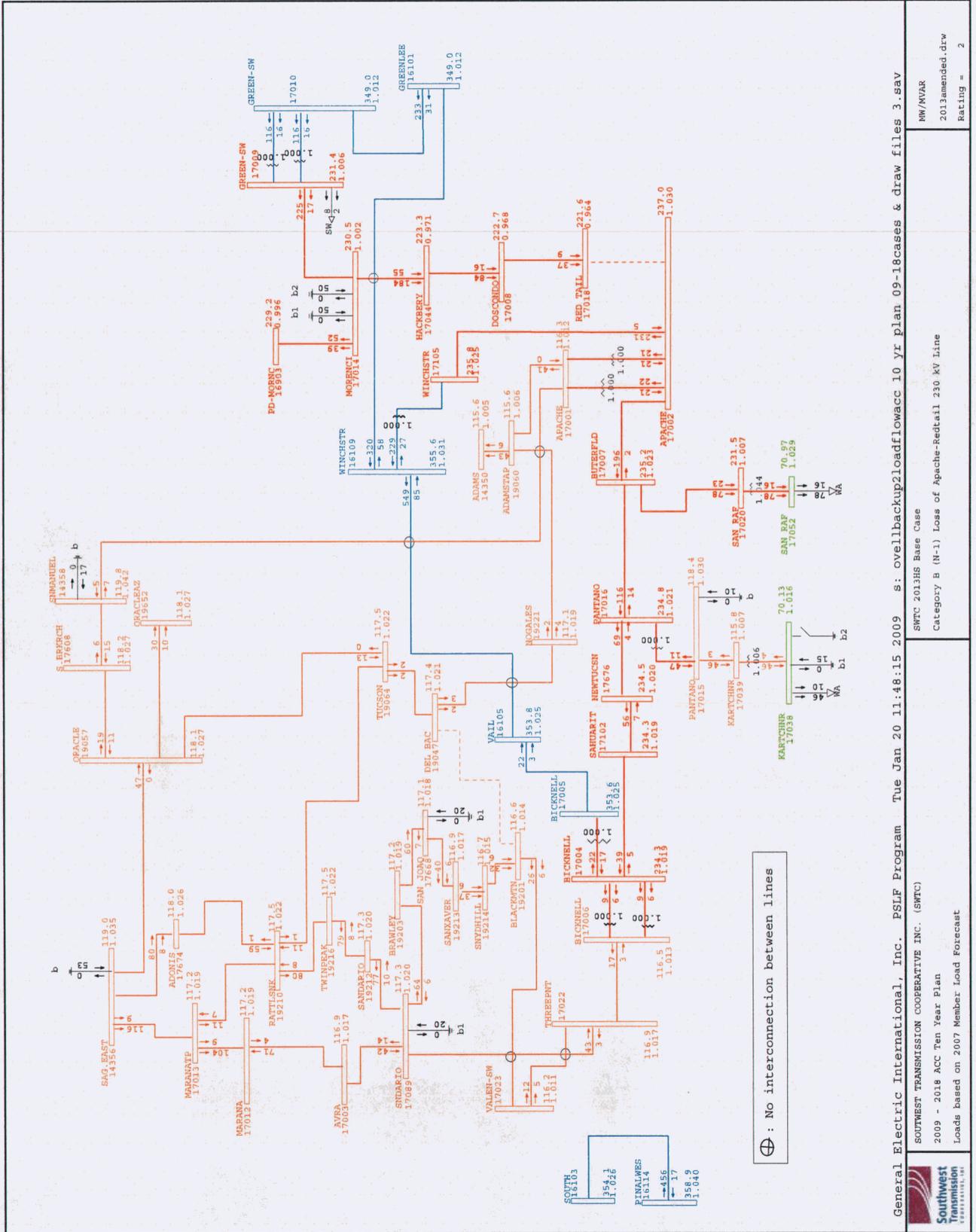
General Electric International, Inc. PSLF Program Tue Jan 20 11:46:58 2009 s: ovelbackuploadflowacc 10 yr plan 09-18cases & draw files 3.sav

SWTC 2013HS Base Case
 Category B (N-1) Loss of Apache-Butterfield 230 KV Line
 Rating = 2

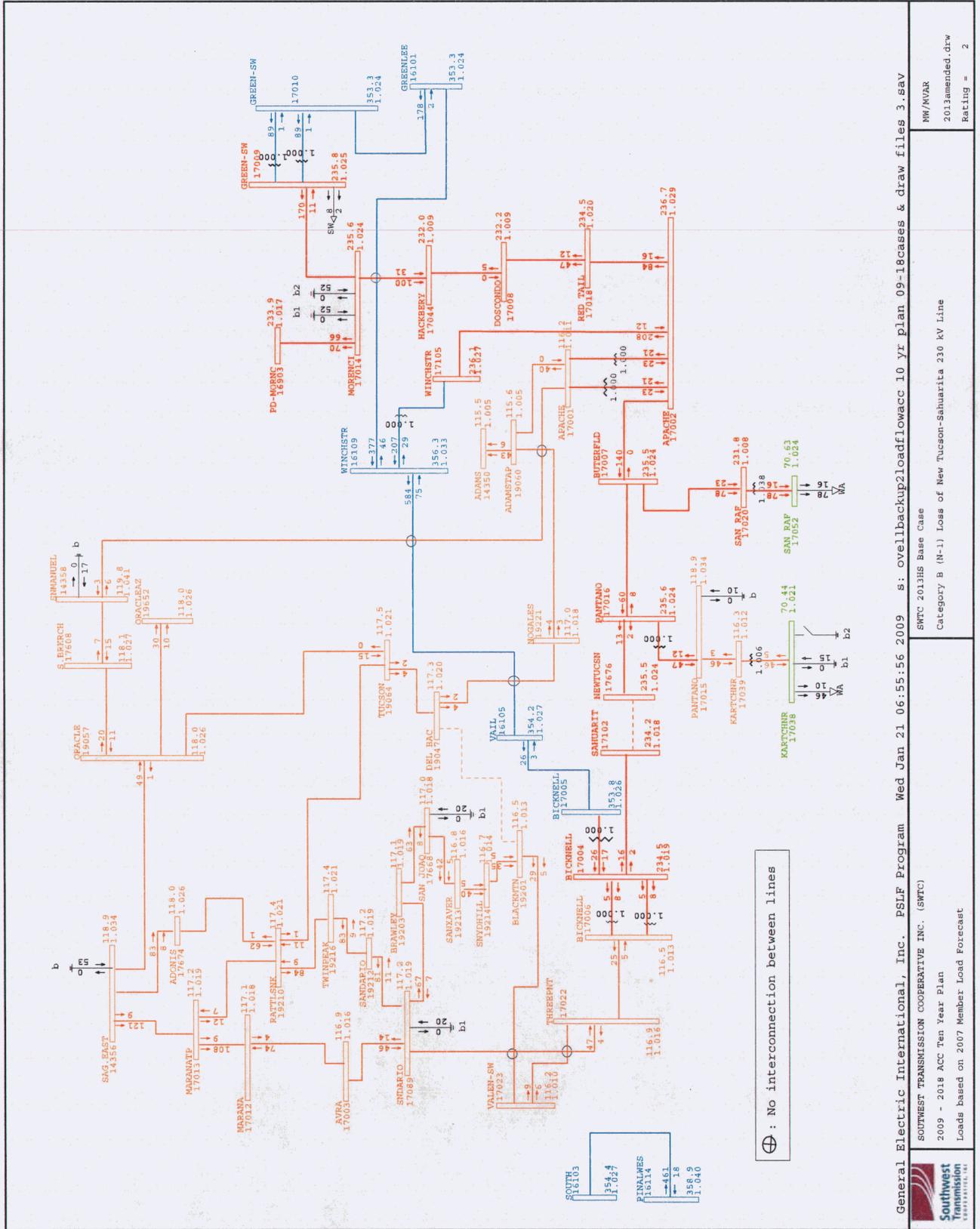
Southwest Transmission Cooperative Inc. (SWTC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on 2007 Member Load Forecast

NW/MVAR
 2013amended.drw
 Rating = 2

2013HS Southwest Transmission Cooperative Base System with Apache to Redtail 230 kV Line out of service



2013HS Southwest Transmission Cooperative Base System with New Tucson to Sahuarita 230 kV Line out



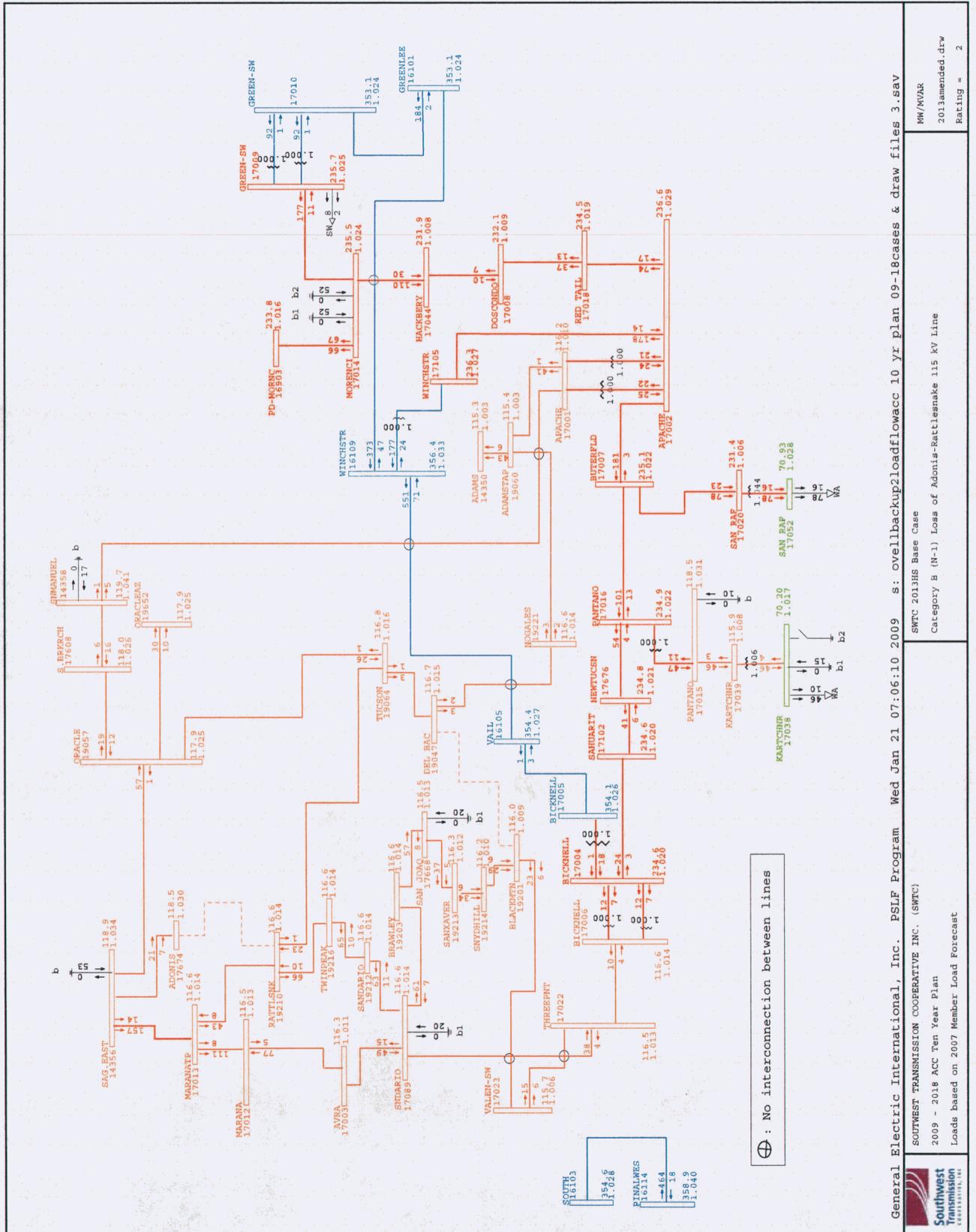
General Electric International, Inc. PSLF Program Wed Jan 21 06:55:56 2009 s: ovelbackup2loadflowacc 10 yr plan 09-18cases & draw files 3.sav

SOUTHWEST TRANSMISSION COOPERATIVE INC. (SWTC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on 2007 Member Load Forecast

SWTC 2013HS Base Case
 Category B (N-1) Loss of New Tucson-Sahuarita 230 kV Line

RW/WVAR
 2013amended.drw
 Rating = 2

2013HS Southwest Transmission Cooperative Base System with Adonis to Rattlesnake 115 kV Line out of service



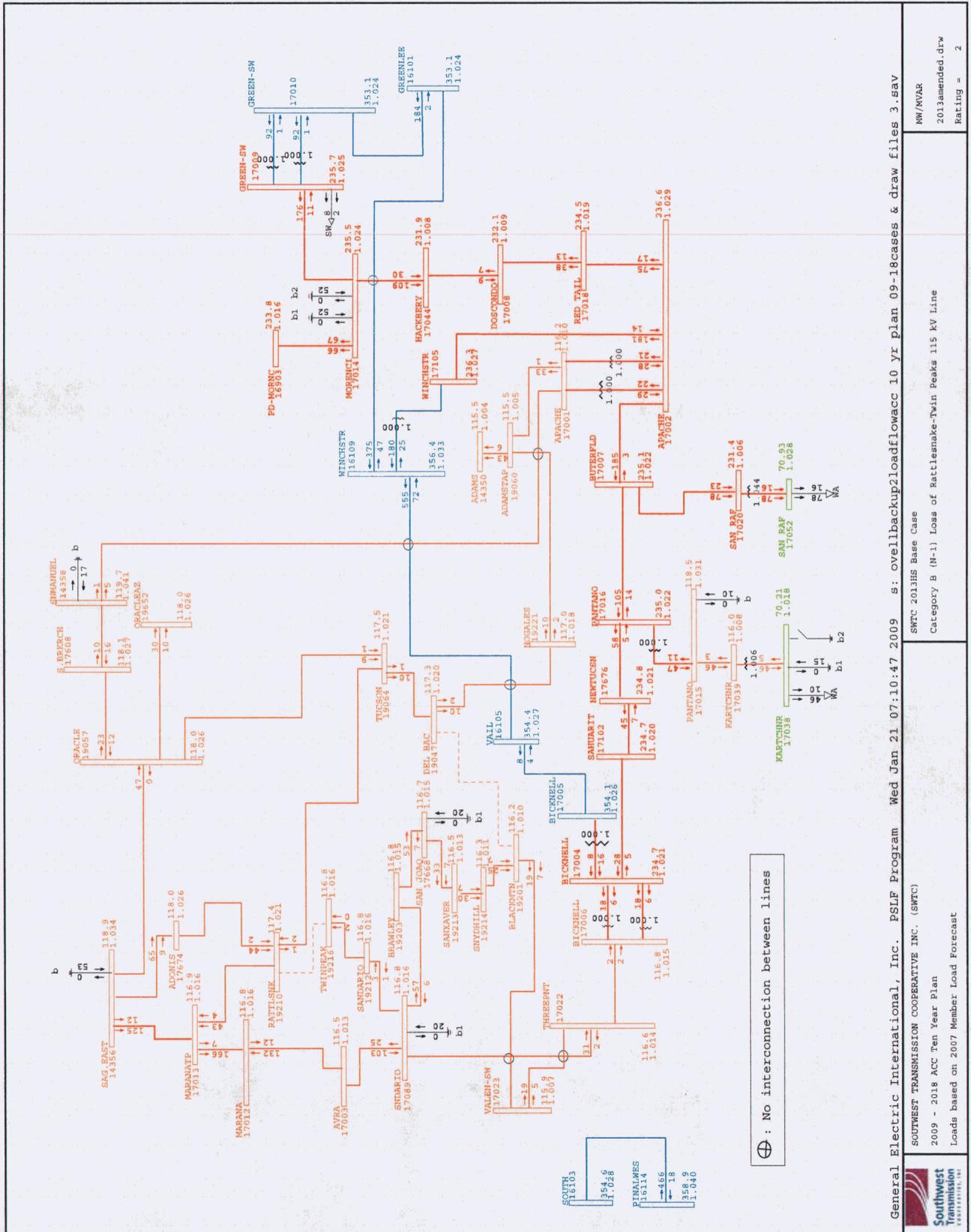
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SOUTHWEST TRANSMISSION COOPERATIVE INC. (SWTC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on 2007 Member Load Forecast

SWTC 2013HS Base Case
 Category B (N-1) Loss of Adonis-Rattlesnake 115 KV Line
 Rating = 2

NW/MVAR
 2013amended.drw

2013HS Southwest Transmission Cooperative Base System with Rattlesnake to Twin Peaks 115 kV Line out of service



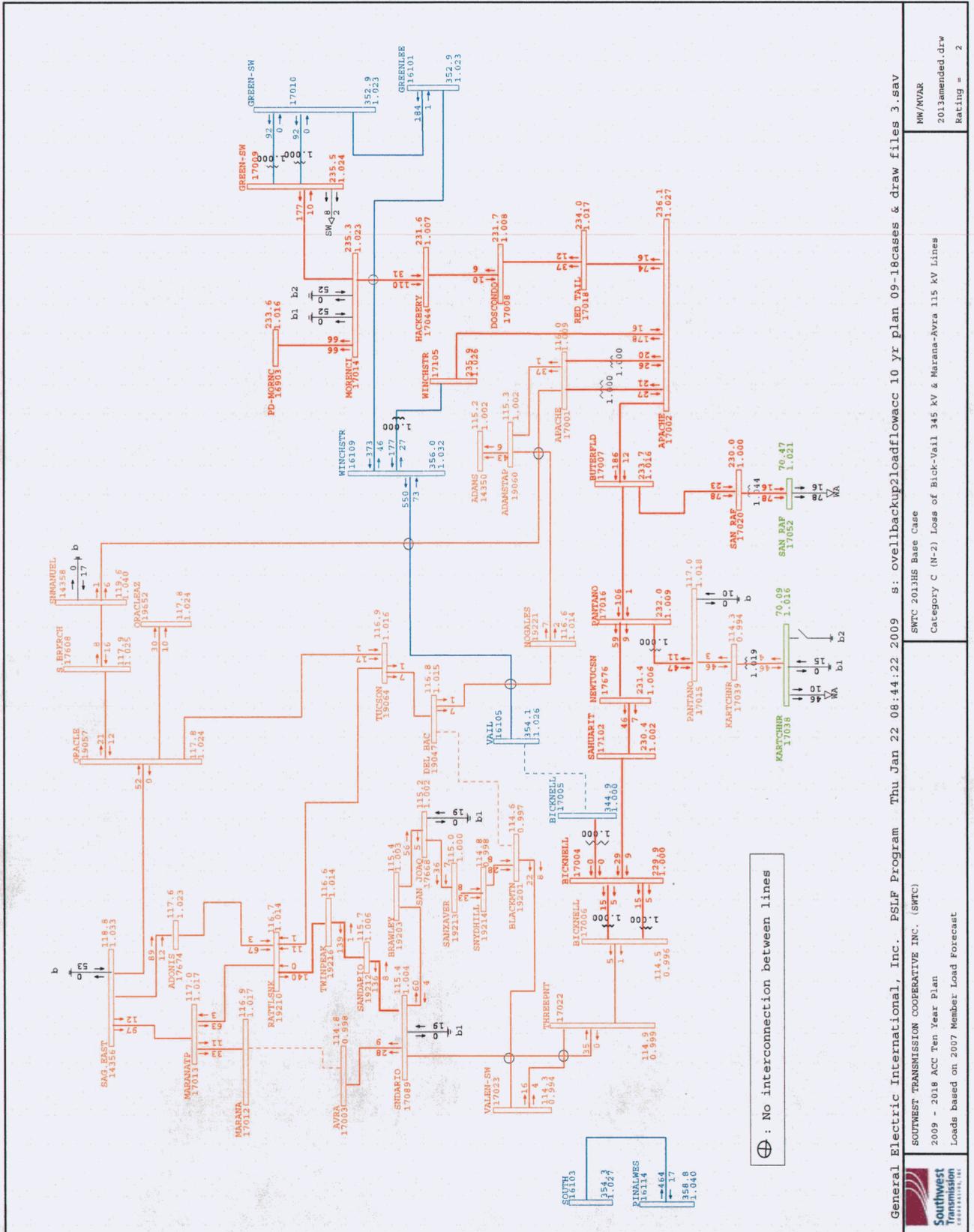
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SOUTHWEST TRANSMISSION COOPERATIVE INC. (SWTC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on 2007 Member Load Forecast

SWTC 2013HS Base Case
 Category B (N-1) Loss of Rattlesnake-Twin Peaks 115 kV Line

NW/MVAR
 2013amended.drw
 Rating = 2

2013HS Southwest Transmission Cooperative Base System with Bicknell to Vail 345 kV & Marana to Avra 115 kV Lines out of service



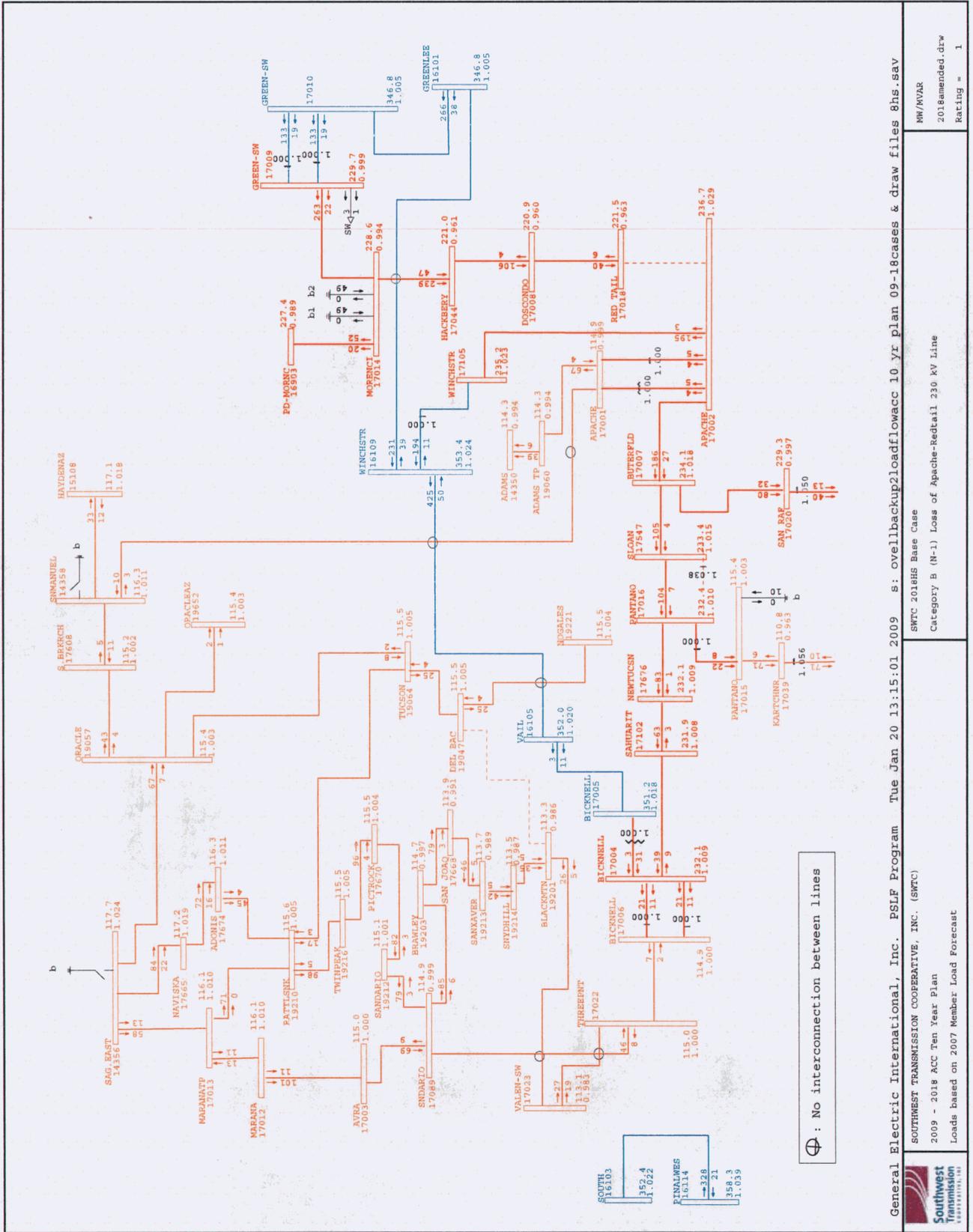
General Electric International, Inc. PSLF Program Thu Jan 22 08:44:22 2009 s: ovelbackup2loadflowacc 10 yr plan 09-18cases & draw files 3.sav

SOUTHWEST TRANSMISSION COOPERATIVE INC. (SMTCC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on 2007 Member Load Forecast

SMTCC 2013HS Base Case
 Category C (N-2) Loss of Bick-Vail 345 kV & Marana-Avra 115 kV Lines

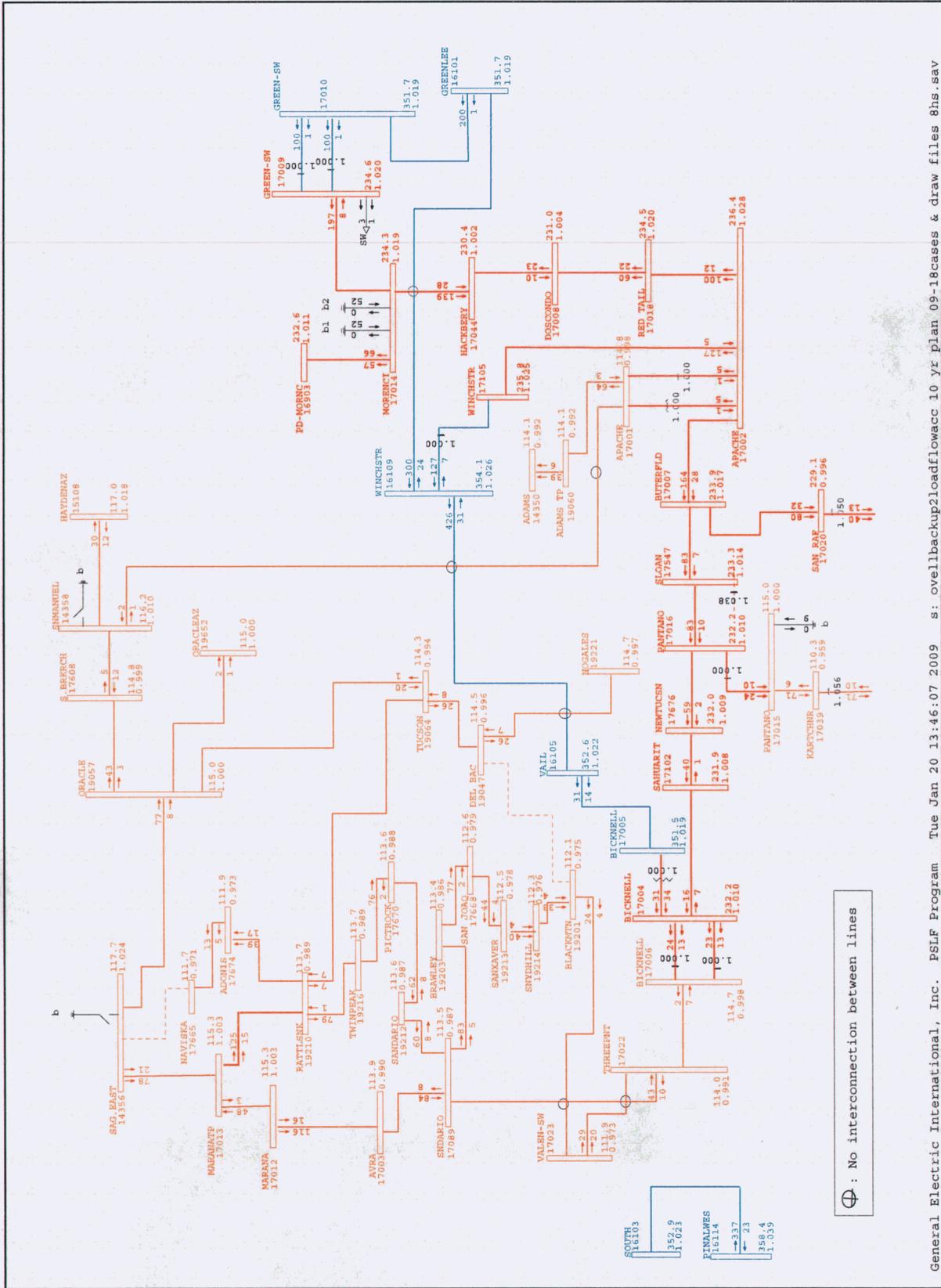
NW/MVAR
 2013amended.drw
 Rating = 2

2018HS Southwest Transmission Cooperative Base System with Apache to Redtail 230 kV Line out of service



General Electric International, Inc. PSLF Program Tue Jan 20 13:15:01 2009 s: ovelbackup2loadflowacc 10 yr plan 09-18cases & draw files 8hs.sav
 SOUTHWEST TRANSMISSION COOPERATIVE, INC. (SWTC) MW/MVAR 2018amended.dwg
 2009 - 2018 ACC Ten Year Plan Category B (N-1) Loss of Apache-Redtail 230 kV Line Rating = 1
 Loads based on 2007 Member Load Forecast

2018HS Southwest Transmission Cooperative Base System with Saguardo to Naviska 115 kV Line out of service

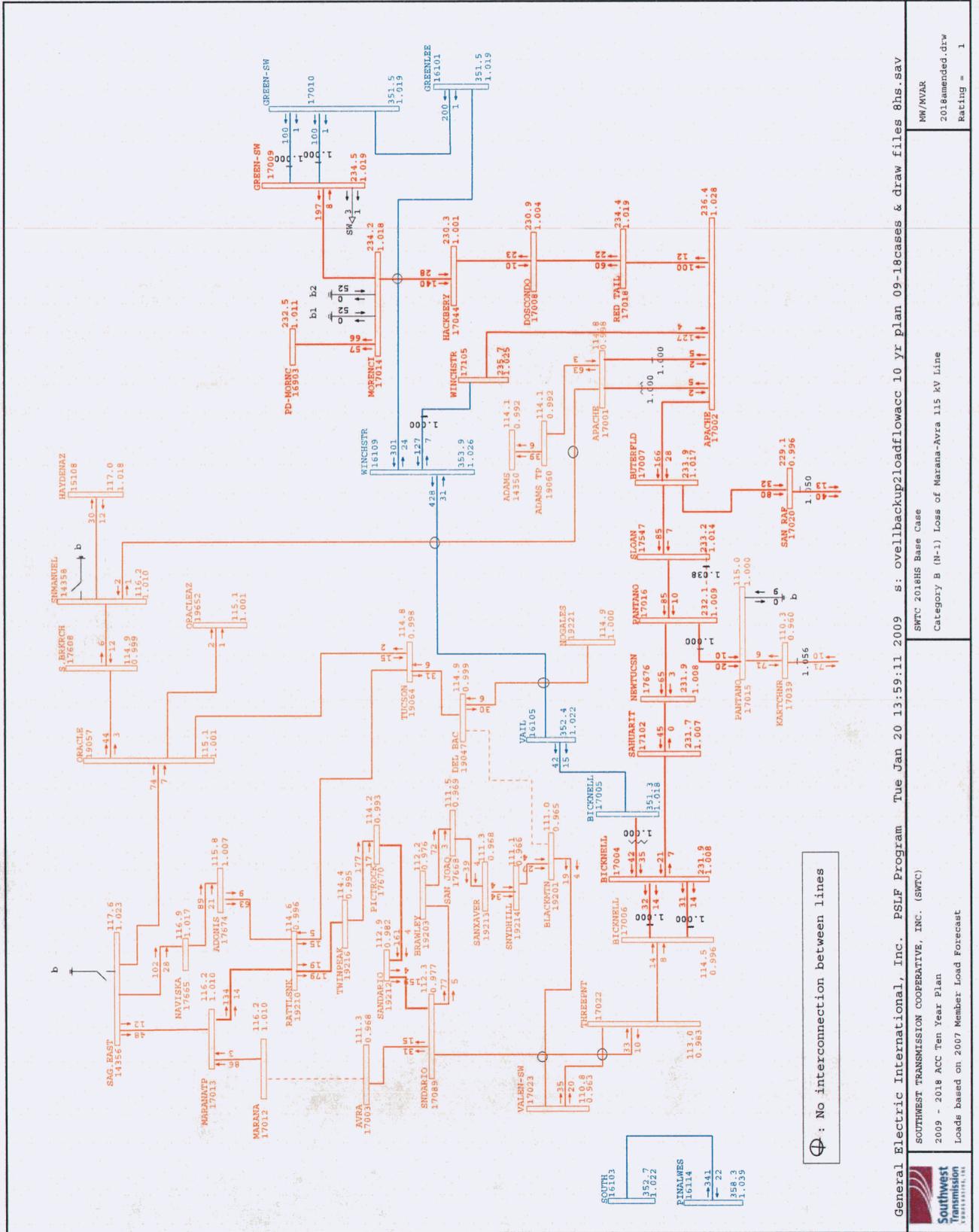


General Electric International, Inc. PSLF Program Tue Jan 20 13:46:07 2009 s: ovelbackup2loadflowacc 10 yr pian 09-18cases & draw files 8hs.sav
 SOUTHWEST TRANSMISSION COOPERATIVE, INC. (SMTCC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on 2007 Member Load Forecast

SMTCC 2018HS Base Case
 Category B (N-1) Loss of Saguardo-Naviska 115 kV Line

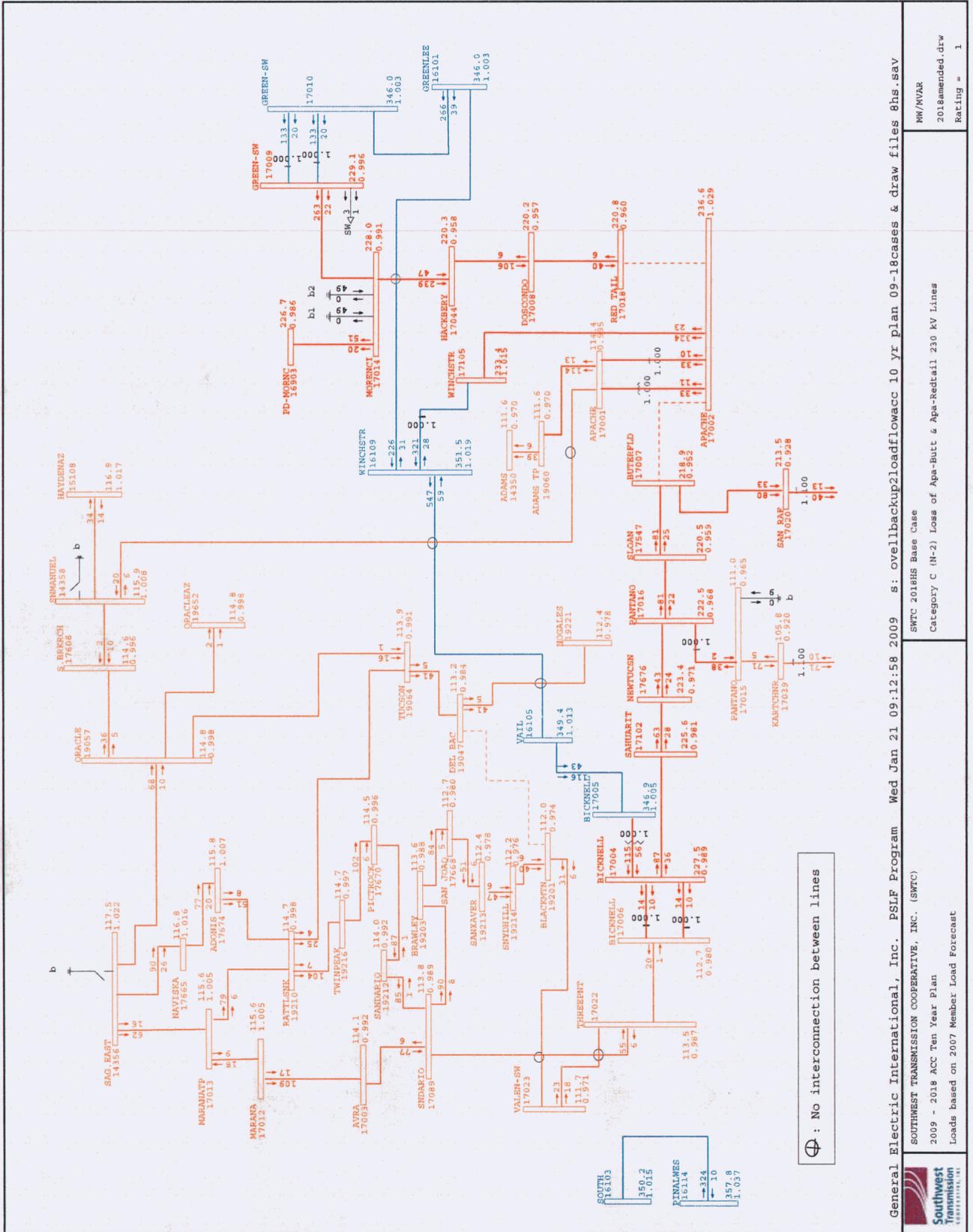
MW/MVAR
 2018amended.drw
 Rating = 1

2018HS Southwest Transmission Cooperative Base System with Marana to Avra 115 kV Line out of service



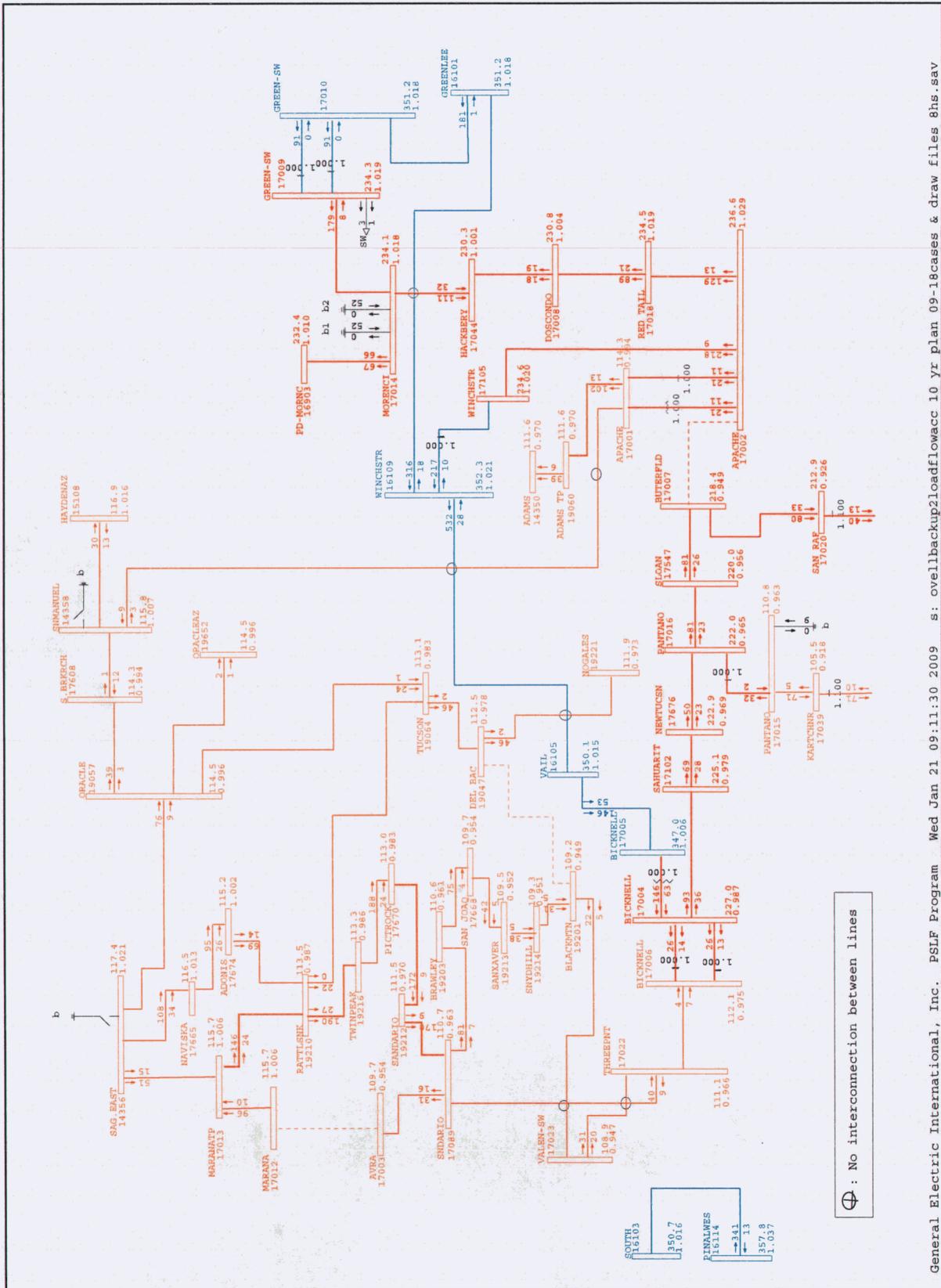
General Electric International, Inc. PSLF Program Tue Jan 20 13:59:11 2009 s: ovelbackup2loadflowacc 10 yr plan 09-18cases & draw files 8hs.sav
 SOUTH WEST TRANSMISSION COOPERATIVE, INC. (SWTC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on 2007 Member Load Forecast
 SWTC 2018HS Base Case
 Category B (N-1) Loss of Marana-Avra 115 KV Line
 MW/MVAR
 2018amended.dwg
 Rating = 1

2018HS Southwest Transmission Cooperative Base System with Apache to Butterfield & Apache to Redtail 230 kV Lines out of service



General Electric International, Inc. PSLF Program Wed Jan 21 09:12:58 2009 s: ovelbackup2loadflowacc 10 yr plan 09-18cases & draw files 8hs.sav
 SOUTHWEST TRANSMISSION COOPERATIVE, INC. (SWTC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on 2007 Member Load Forecast
 SWTC 2018HS Base Case
 Category C (N-2) Loss of Apa-Butt & Apa-Redtail 230 kV Lines
 MW/MVAR
 2018amended.drw
 Rating = 1

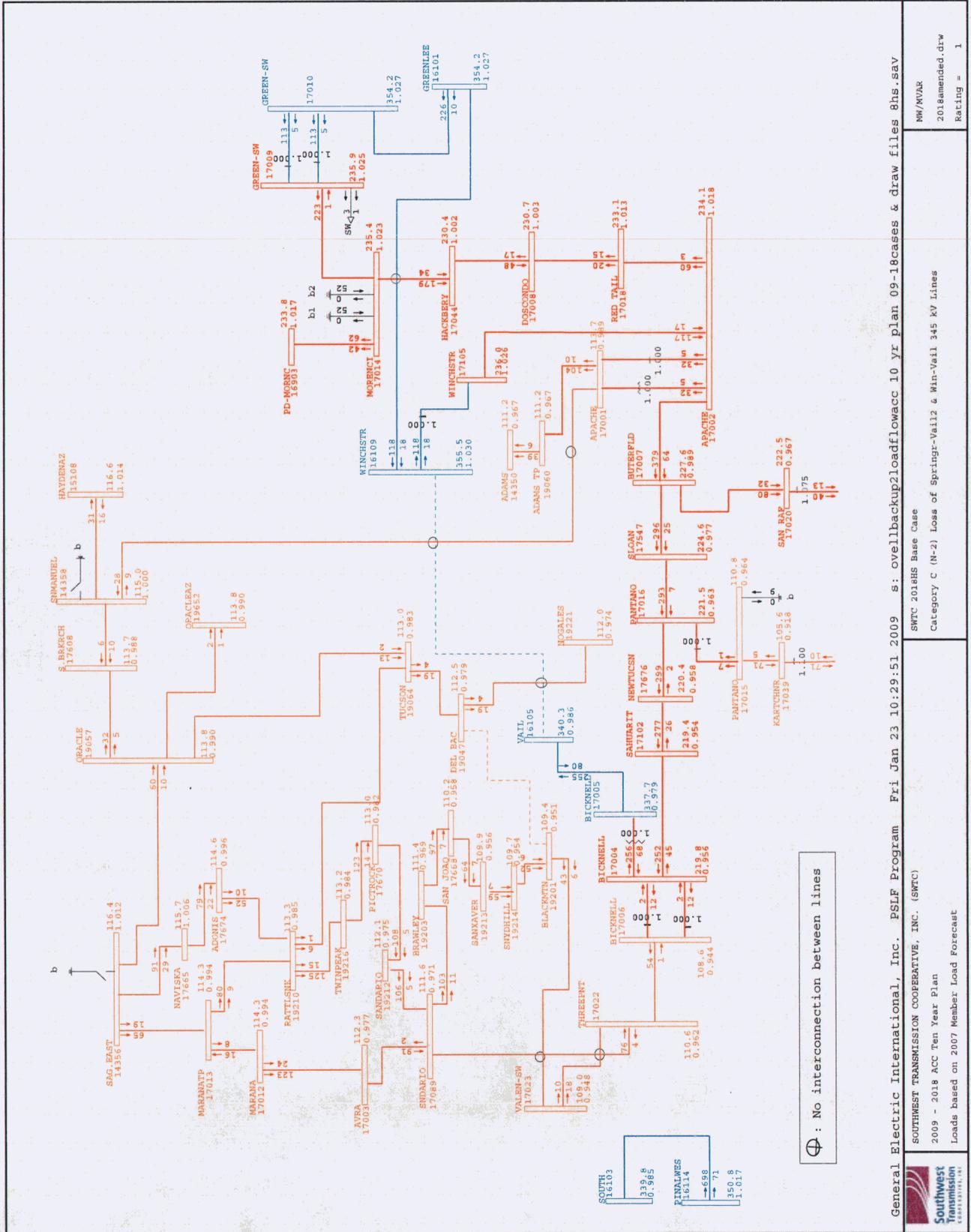
2018HS Southwest Transmission Cooperative Base System with Apache to Butterfield 230 kV & Marana to Avra 115 kV Lines out of service



⊘ : No interconnection between lines

General Electric International, Inc. PSLF Program Wed Jan 21 09:11:30 2009 s: ovelbackup2loadflowacc 10 yr plan 09-18cases & draw files 8hs.sav
 SOUTHWEST TRANSMISSION COOPERATIVE, INC. (SWTC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on 2007 Member Load Forecast
 SWTC 2018HS Base Case
 Category C (N-2) Loss of Apa-Butt 230 kV & Marana-Avra 115 kV Lines
 MW/MVAR
 2018amended.drw
 Rating = 1

2018HS Southwest Transmission Cooperative Base System with Springerville to Vail2 & Winchester to Vail 345 kV Lines out of service



General Electric International, Inc. PSIF Program Fri Jan 23 10:29:51 2009 s:\ovellbackup2\loadflowacc 10 yr plan 09-18cases & draw files 8hs.sav

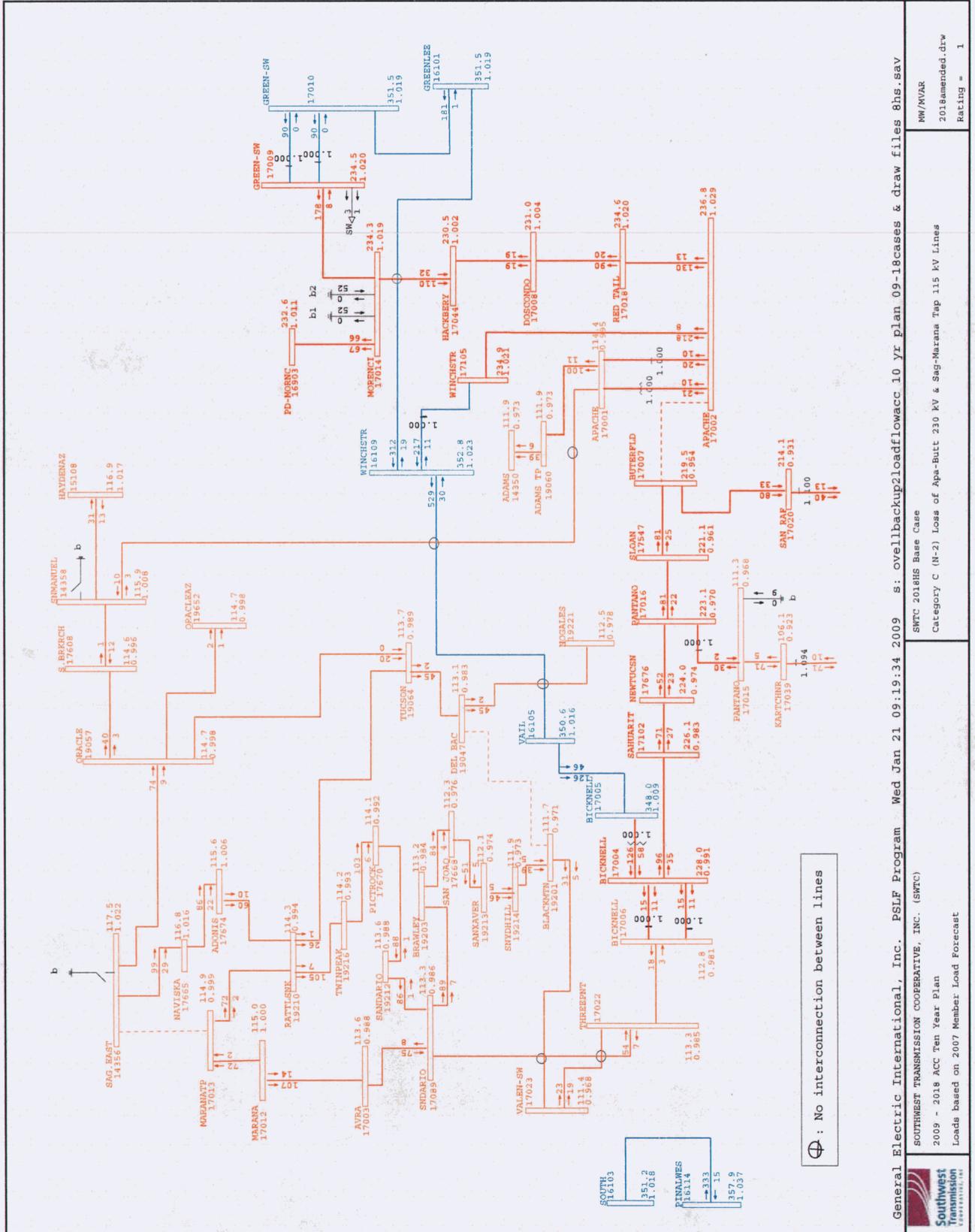
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2018amended.dwg
Rating = 1

SWTC 2018HS Base Case
Category C (N-2) Loss of Spring-Vail12 & Win-Vail 345 kV Lines

SOUTHWEST TRANSMISSION COOPERATIVE, INC. (SWTC)
2009 - 2018 ACC Ten Year Plan
Loads based on 2007 Member Load Forecast

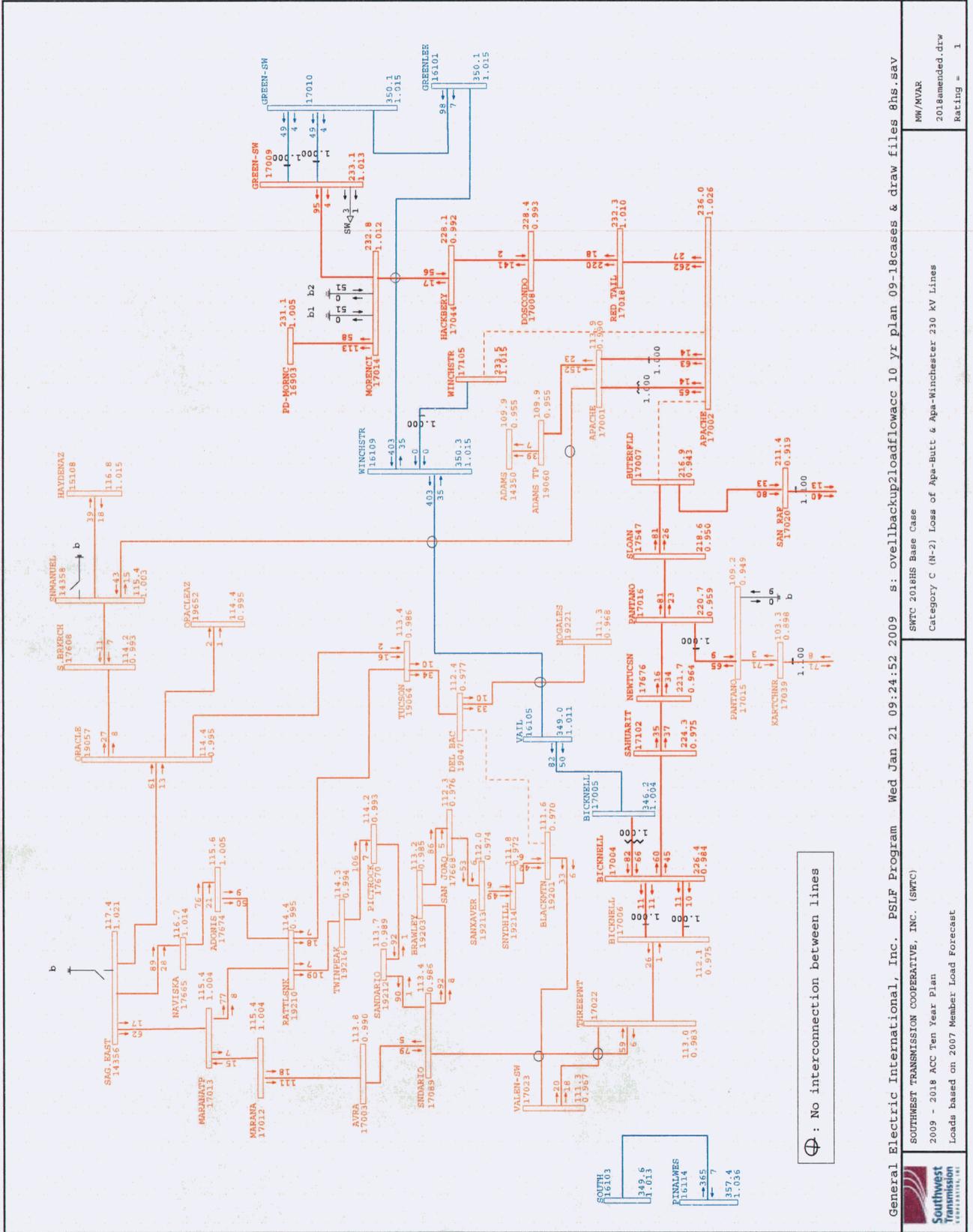


2018HS Southwest Transmission Cooperative Base System with Apache to Butterfield 230 kV & Saguaro to Marana 115 kV Lines out of service



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 SOUTHWEST TRANSMISSION COOPERATIVE, INC. (SUTC)
 2009 - 2018 ACC Ten Year Plan
 Loads based on 2007 Member Load Forecast
 SUTC 2018HS Base Case
 Category C (N-2) Loss of Apa-Butt 230 kV & Sag-Marana Tap 115 kV Lines
 MW/MVAR
 2018amended.drw
 Rating = 1

2018HS Southwest Transmission Cooperative Base System with Apache to Butterfield & Apache to Winchester 230 kV Lines out of service



General Electric International, Inc. PSLF Program Wed Jan 21 09:24:52 2009 s: ovelbackup2loadflowacc 10 yr plan 09-18cases & draw files 8hs.sav

SOUTHWEST TRANSMISSION COOPERATIVE, INC. (SWTC)

2009 - 2018 ACC Ten Year Plan

Loads based on 2007 Member Load Forecast

SWTC 2018HS Base Case

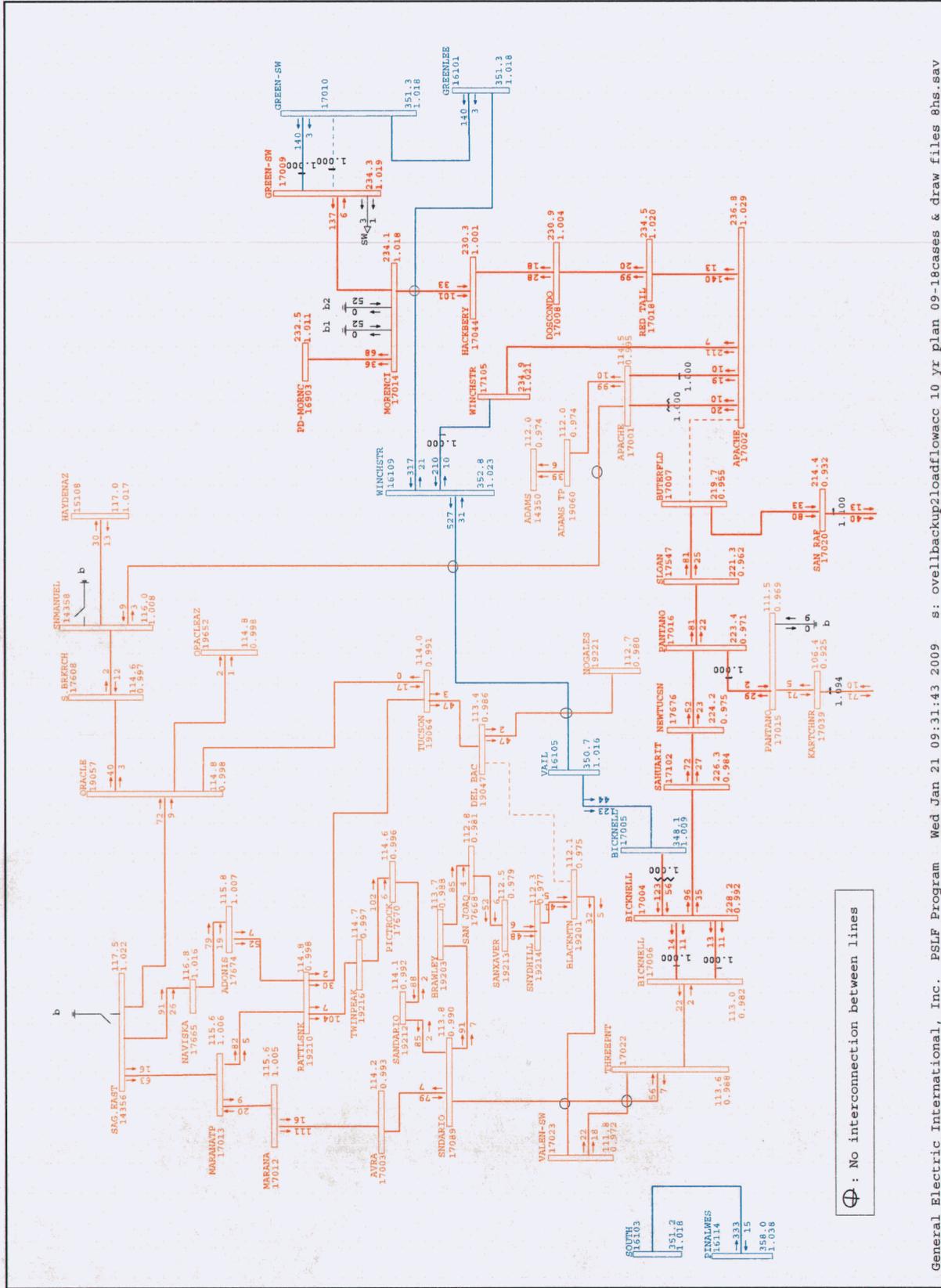
Category C (N-2) Loss of Apa-Butt & Apa-Winchester 230 kV Lines

MW/MVAR

2018amended.drw

Rating = 1

2018HS Southwest Transmission Cooperative Base System with Apache to Butterfield 230 kV Line & one Greenlee 345/230 kV Transformer out of service



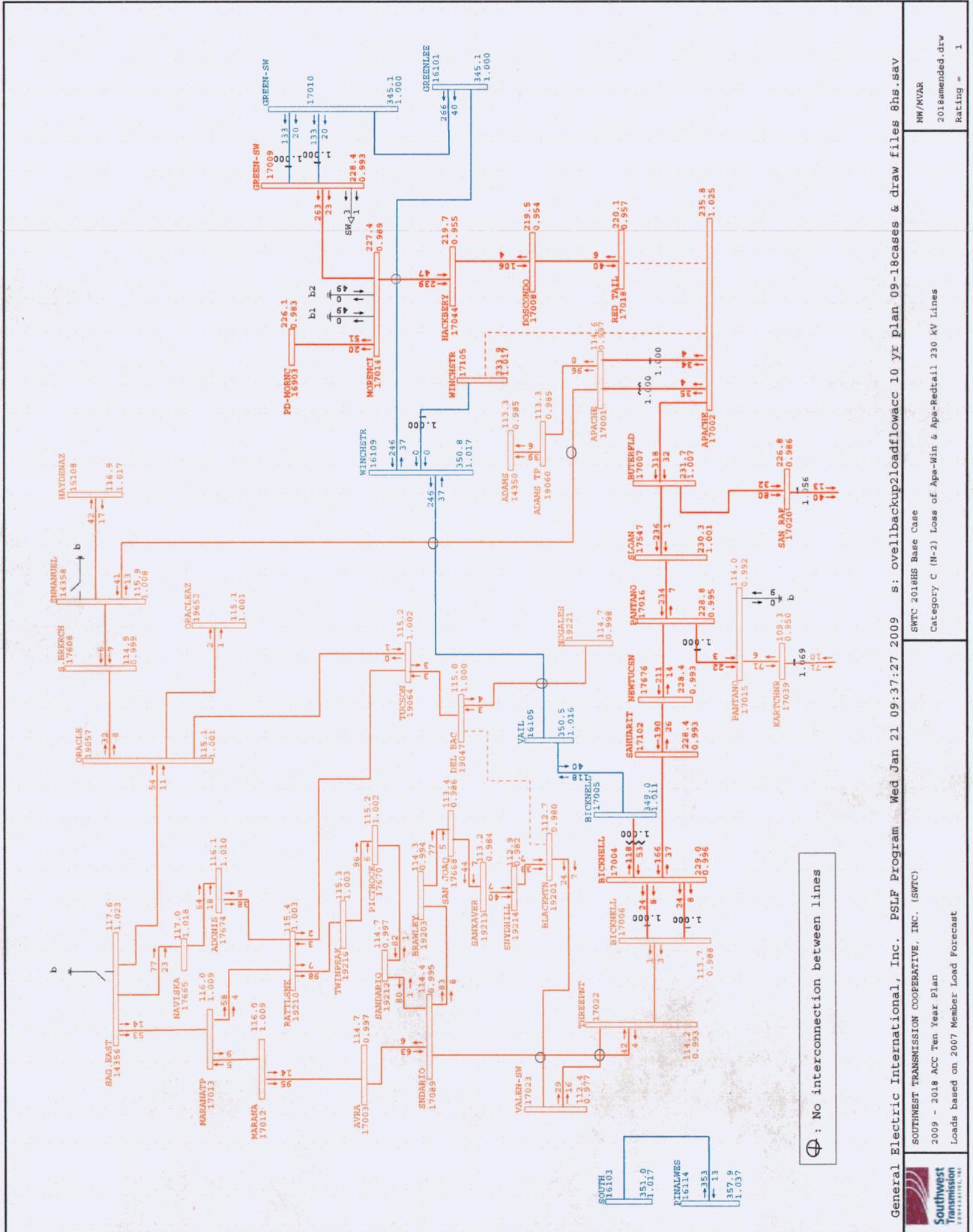
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SWTC 2018HS Base Case
 Category C (N-2) Loss of Apa-Butt & one Greenlee Xfmr
 NW/MV2E
 2018amended.drw
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SWTC 2018HS Base Case
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 2009 - 2018 ACC Ten Year Plan
 Loads based on 2007 Member Load Forecast

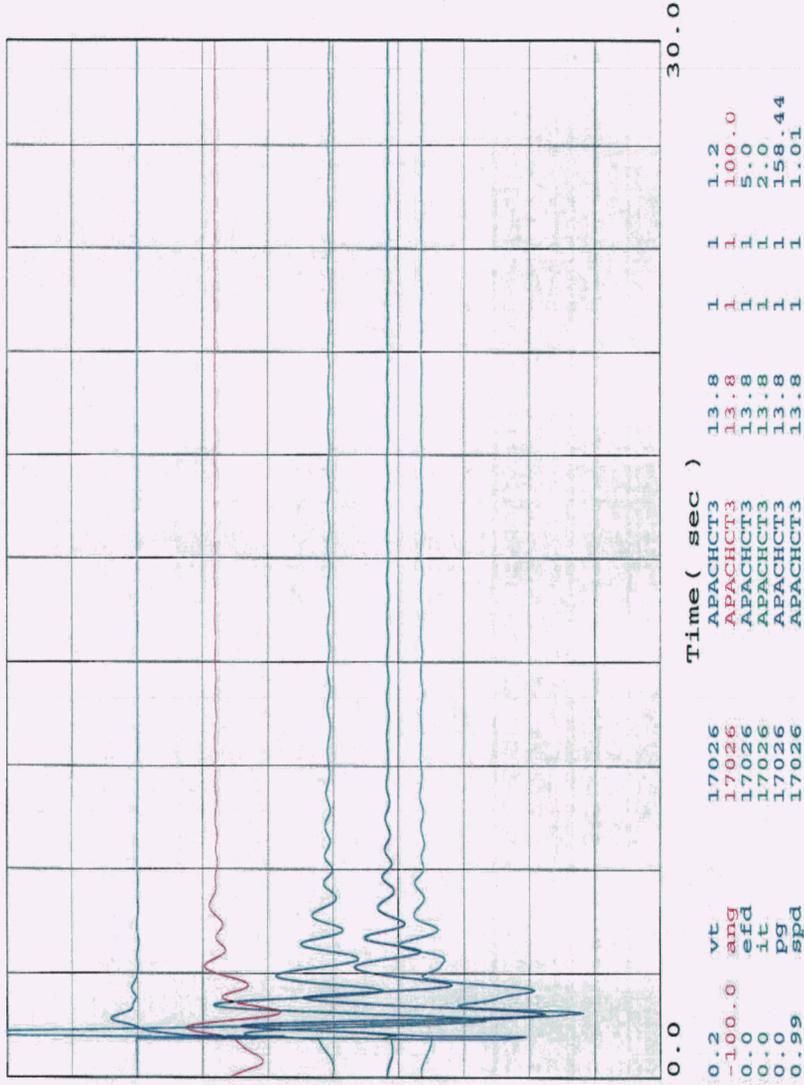


2018HS Southwest Transmission Cooperative Base System with Apache to Winchester & Apache to Redtail 230 kV Lines out of service



APPENDIX D
STABILITY PLOTS

Bicknell - Vail 345 kV Outage

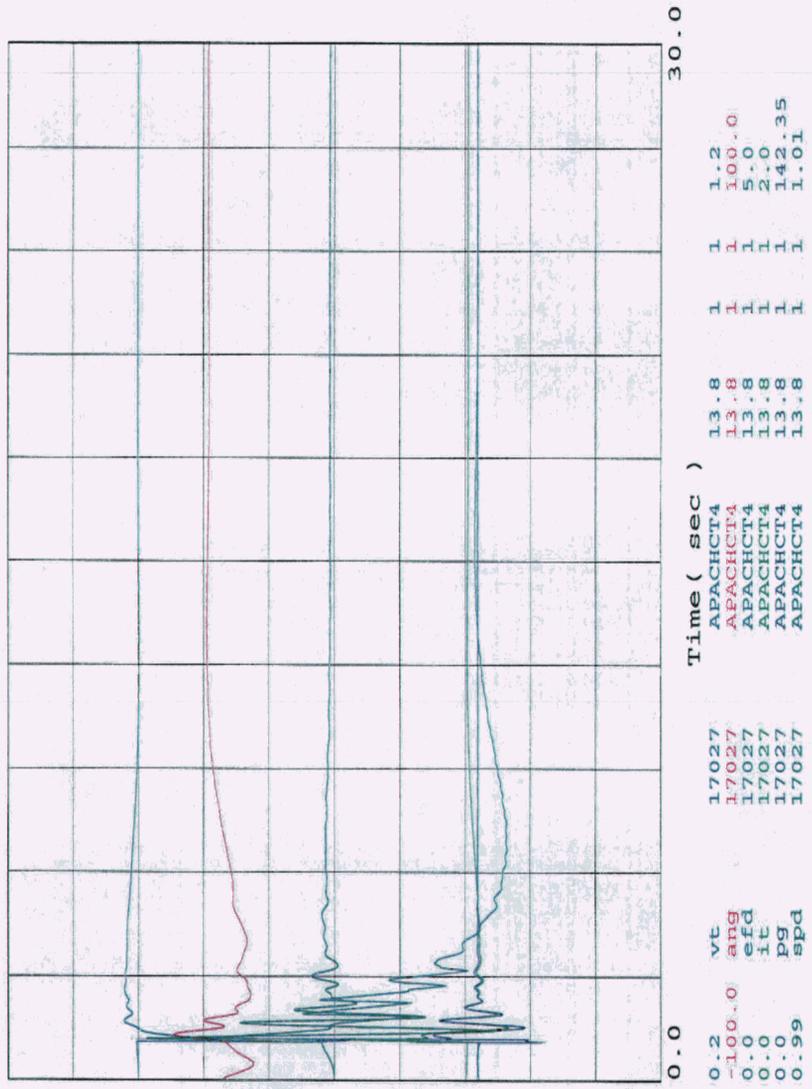


SOUTHWEST TRANSMISSION COOPERATIVE INC.
 2013 HS1A BASE CASE WECC APPROVED
 WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
 ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.



2013HS Southwest Transmission Cooperative Base System with Bicknell to Vail 345 kV Line out of service - Apache CT4 Plots

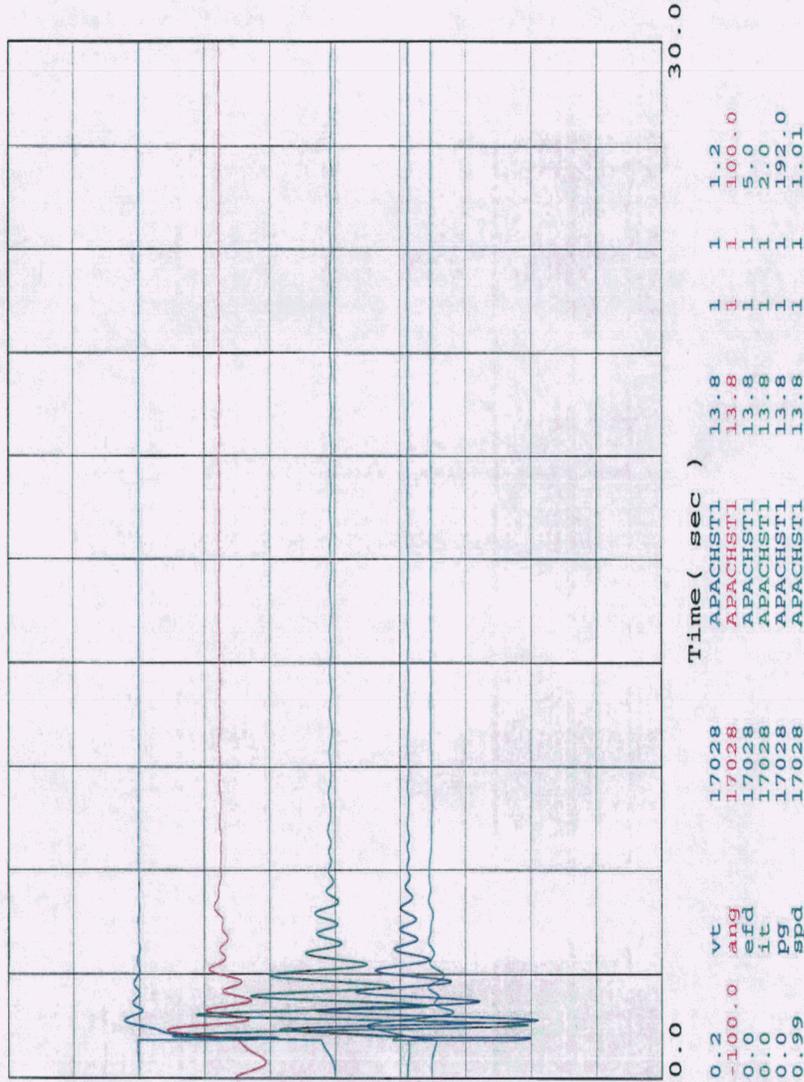
Bicknell - Vail 345 kV Outage



SOUTHWEST TRANSMISSION COOPERATIVE INC.
 2013 HSLA BASE CASE WECC APPROVED
 WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
 ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.

2013HS Southwest Transmission Cooperative Base System with Bicknell to Vail 345 kV Line out of service - Apache ST1 Plots

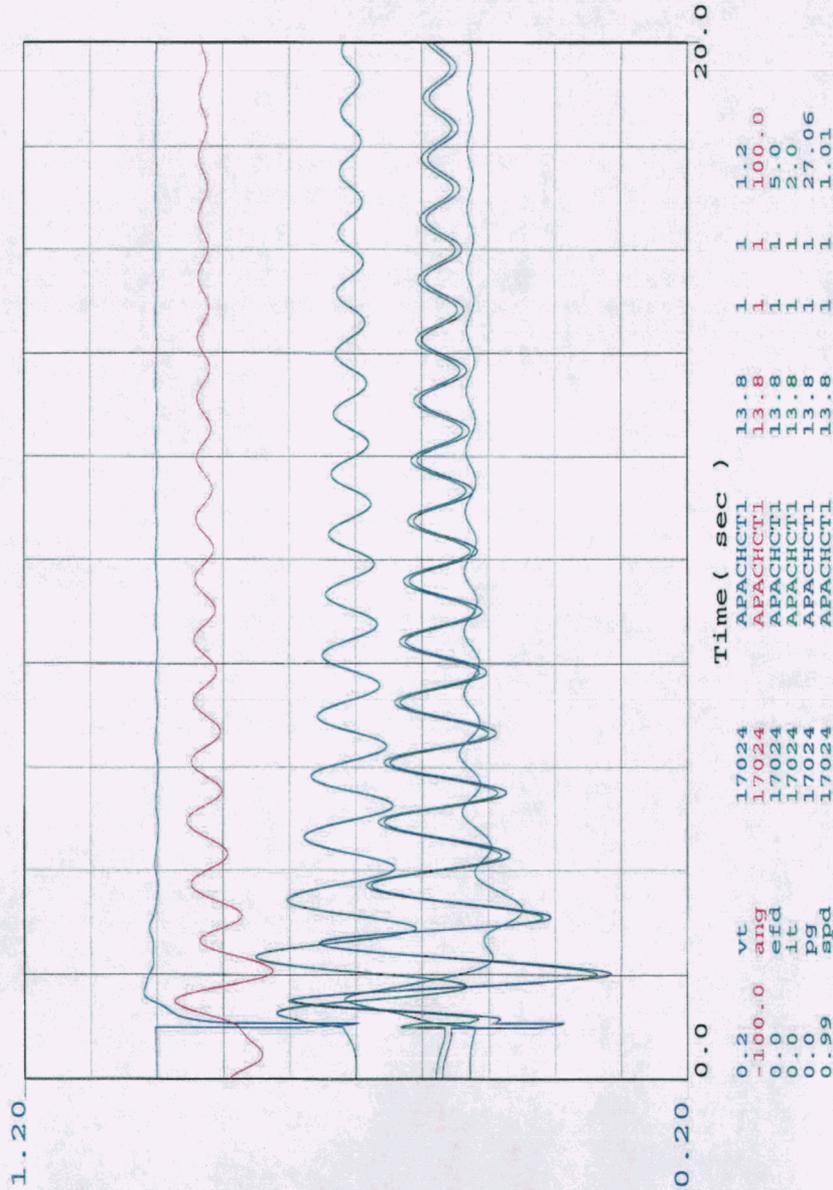
Bicknell - Vail 345 kV Outage



SOUTHWEST TRANSMISSION COOPERATIVE INC.
 2013 HS1A BASE CASE WECC APPROVED
 WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
 ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.

2013HS Southwest Transmission Cooperative Base System with Apache to Butterfield 230 kV
Line out of service - Apache CTI Plots

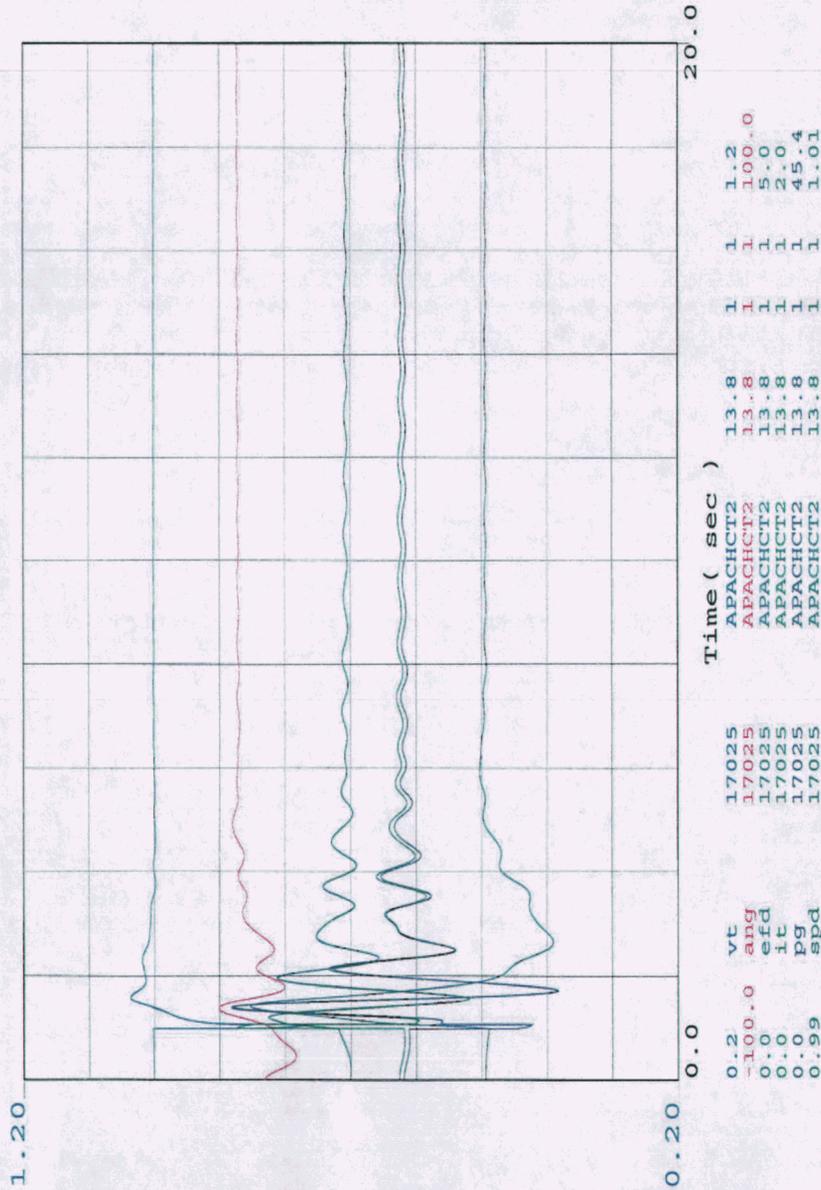
Outage of Apache-Butterfield 230 kV



SOUTHWEST TRANSMISSION COOPERATIVE INC.
2013 HSLA BASE CASE WECC APPROVED
WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.

2013HS Southwest Transmission Cooperative Base System with Apache to Butterfield 230 kV
Line out of service - Apache CT2 Plots

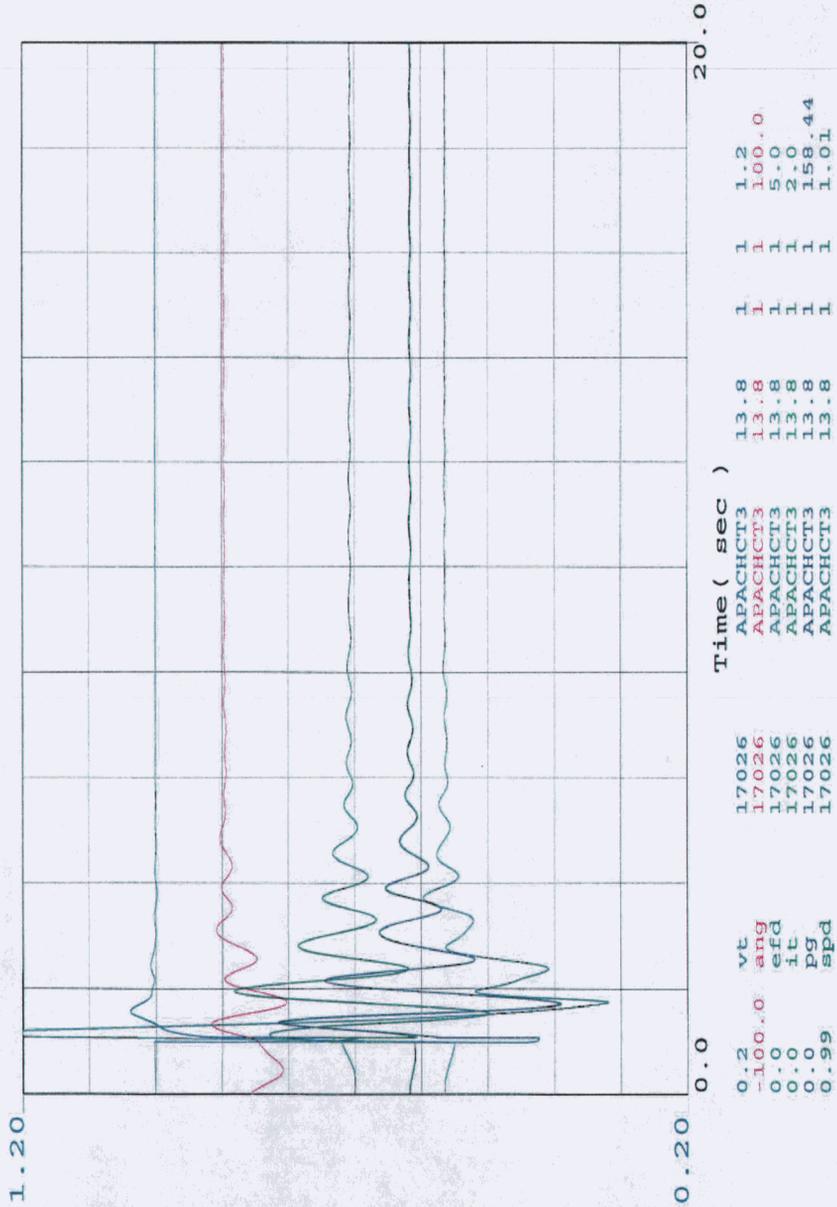
Outage of Apache-Butterfield 230 kv



SOUTHWEST TRANSMISSION COOPERATIVE INC.
2013 HSLA BASE CASE WECC APPROVED
WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.

2013HS Southwest Transmission Cooperative Base System with Apache to Butterfield 230 kV
Line out of service - Apache CT3 Plots

Outage of Apache-Butterfield 230 kV

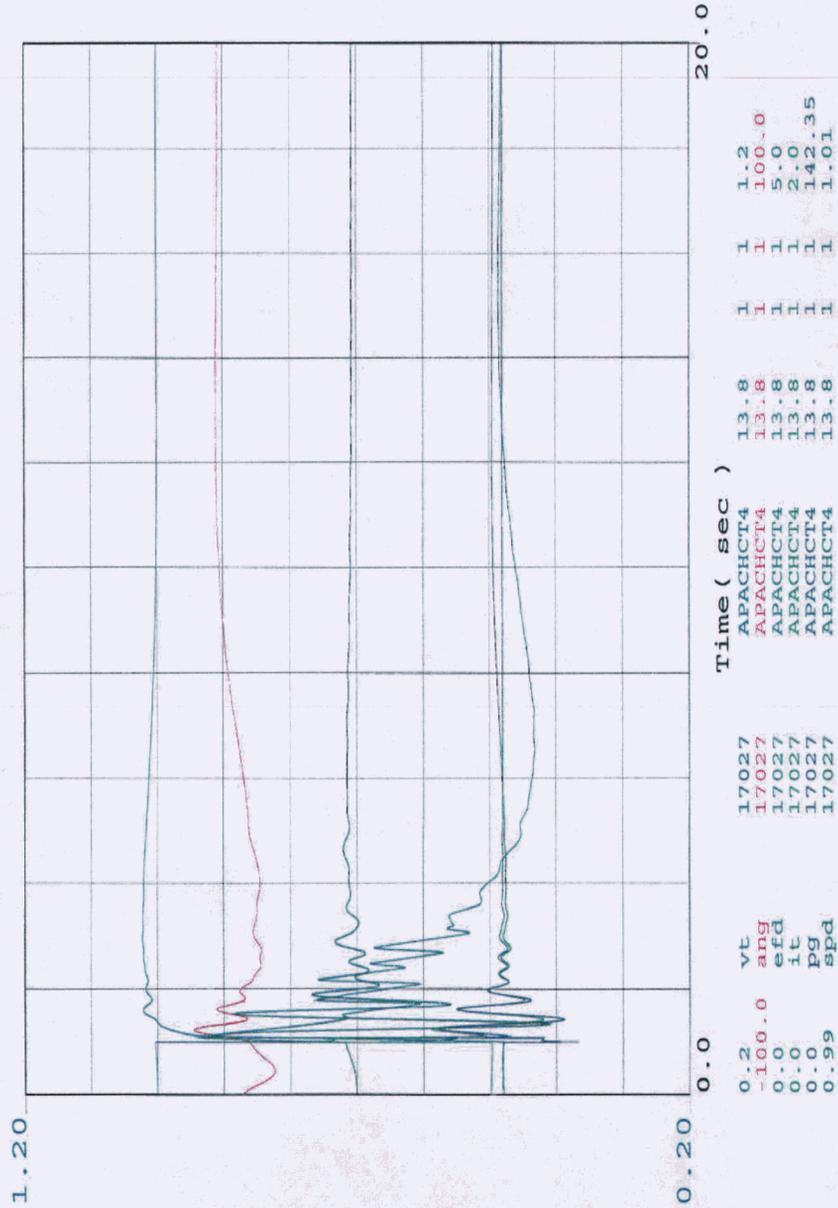


SOUTWEST TRANSMISSION COOPERATIVE INC.
2013 HS1A BASE CASE WECC APPROVED
WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.



2013HS Southwest Transmission Cooperative Base System with Apache to Butterfield 230 kV
Line out of service - Apache CT4 Plots

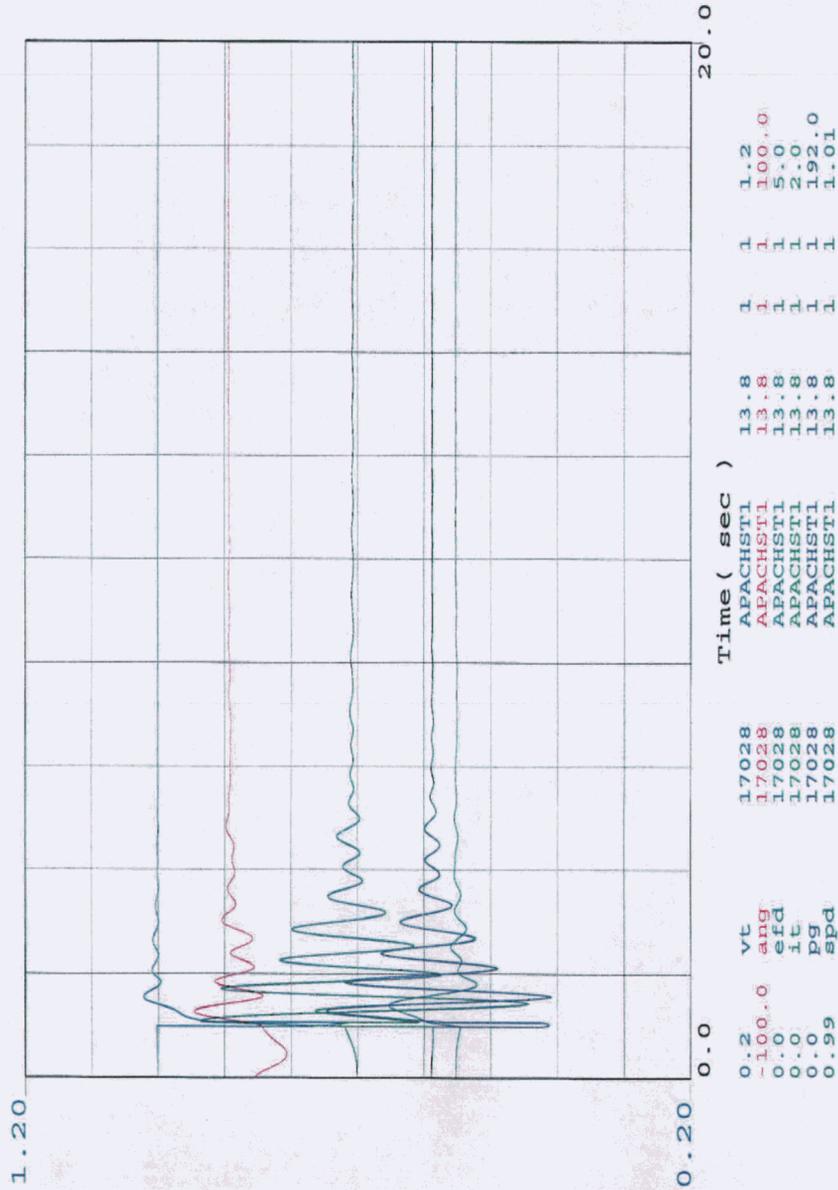
Outage of Apache-Butterfield 230 kV



SOUTHWEST TRANSMISSION COOPERATIVE INC.
2013 HS1A BASE CASE WECC APPROVED
WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.

2013HS Southwest Transmission Cooperative Base System with Apache to Butterfield 230 kV
Line out of service - Apache ST1 Plots

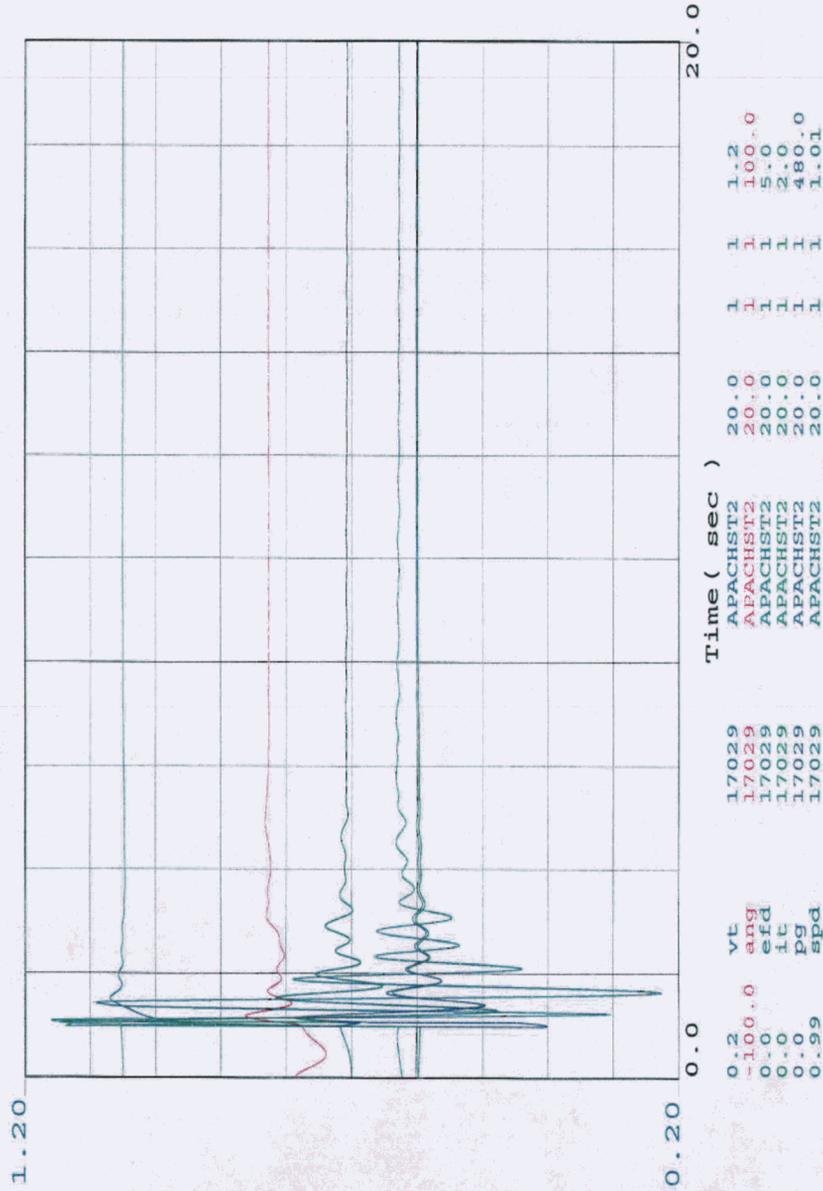
Outage of Apache-Butterfield 230 kV



SOUTHWEST TRANSMISSION COOPERATIVE INC.
2013 HSI A BASE CASE WECC APPROVED
WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.

2013HS Southwest Transmission Cooperative Base System with Apache to Butterfield 230 kV
Line out of service - Apache ST2 Plots

Outage of Apache-Butterfield 230 kV

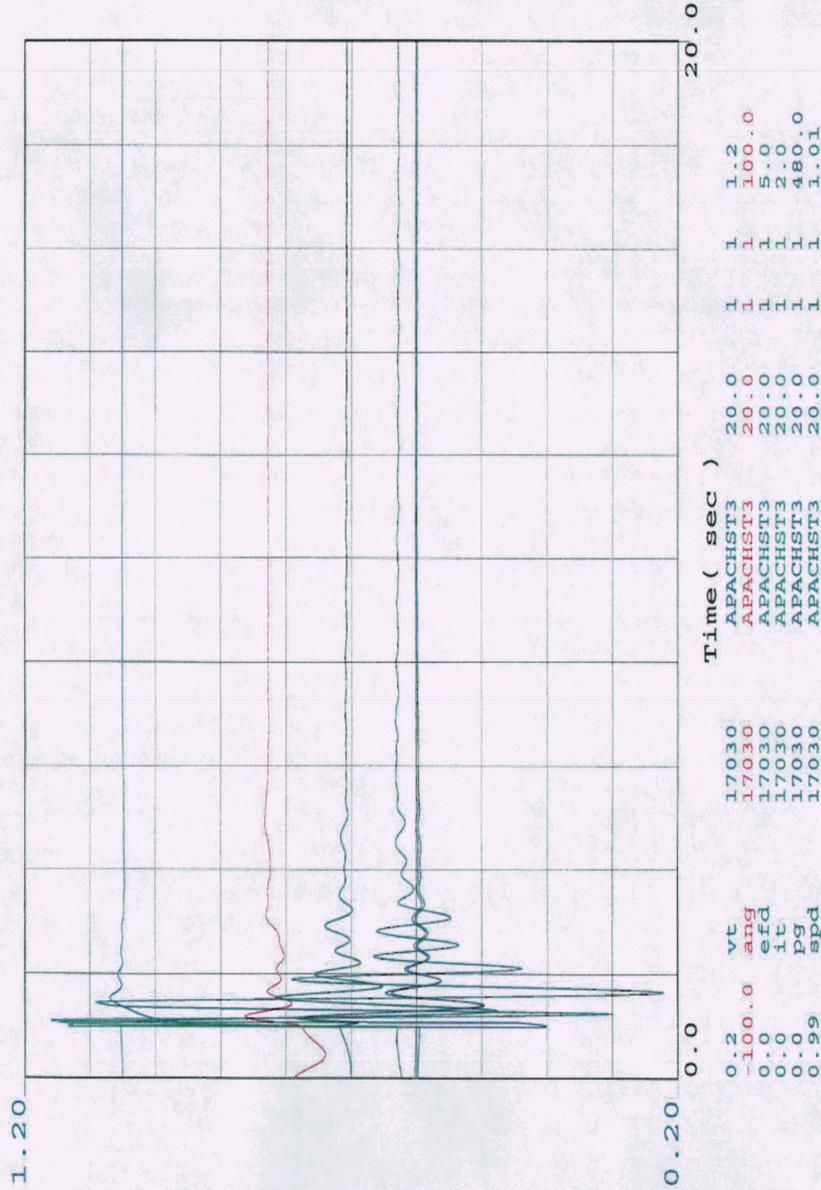


SOUTHWEST TRANSMISSION COOPERATIVE INC.
2013 HSLA BASE CASE WECC APPROVED
WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.



2013HS Southwest Transmission Cooperative Base System with Apache to Butterfield 230 kV Line out of service - Apache ST3 Plots

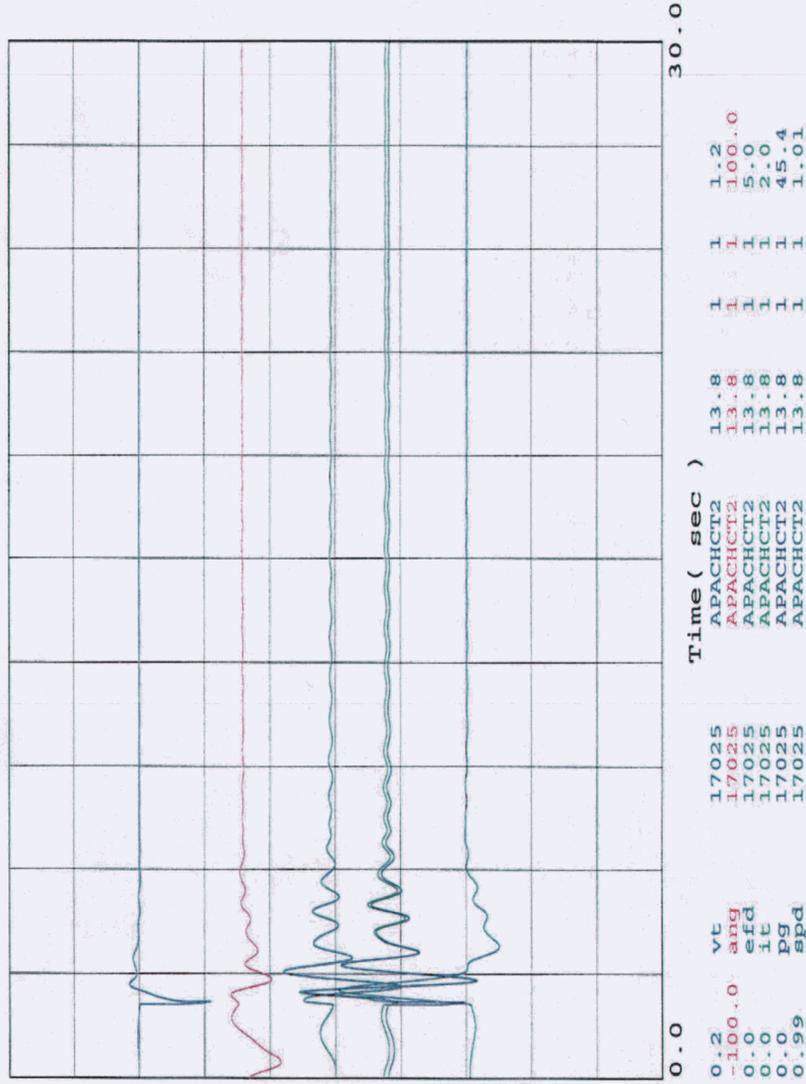
Outage of Apache-Butterfield 230 kV



SOUTHWEST TRANSMISSION COOPERATIVE INC.
 2013 HS1A BASE CASE WECC APPROVED
 WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
 ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.

2013HS Southwest Transmission Cooperative Base System with Hackberry to Morenci 230 kV Line out of service - Apache CT2 Plots

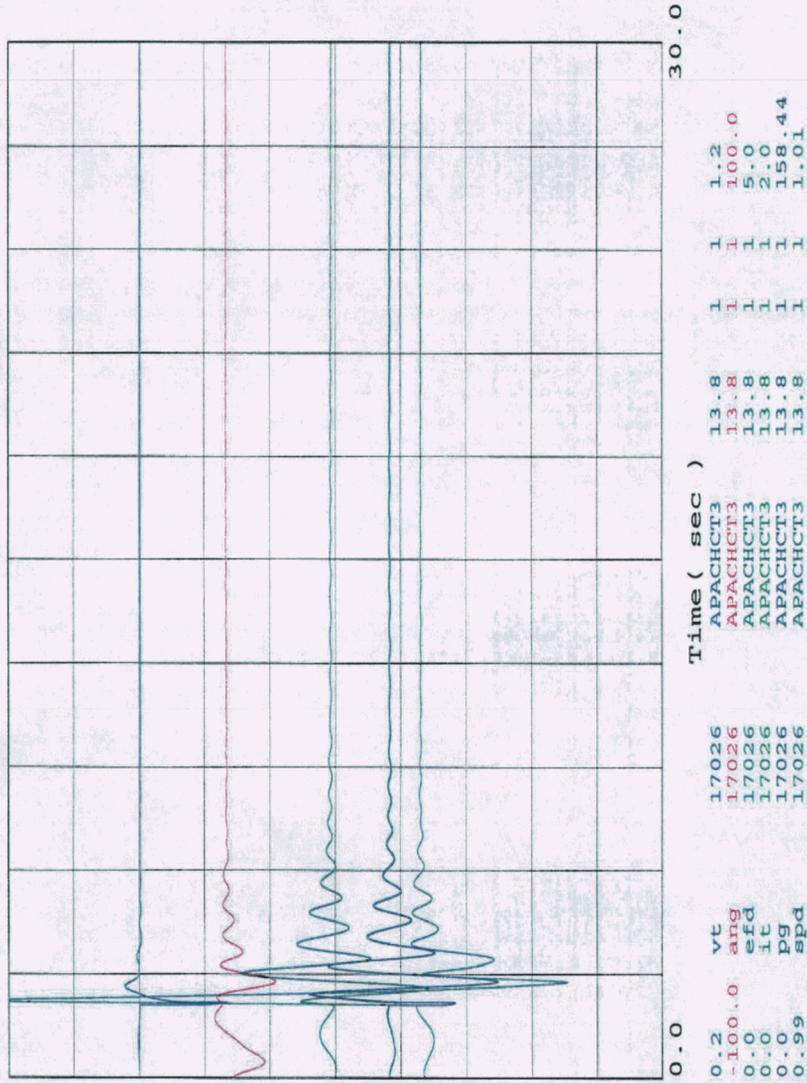
Hackberry - Morenci 230 kV Outage



SOUTHWEST TRANSMISSION COOPERATIVE INC.
 2013 HS1A BASE CASE WECC APPROVED
 WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
 ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.

2013HS Southwest Transmission Cooperative Base System with Hackberry to Morenci 230 kV Line out of service - Apache CT3 Plots

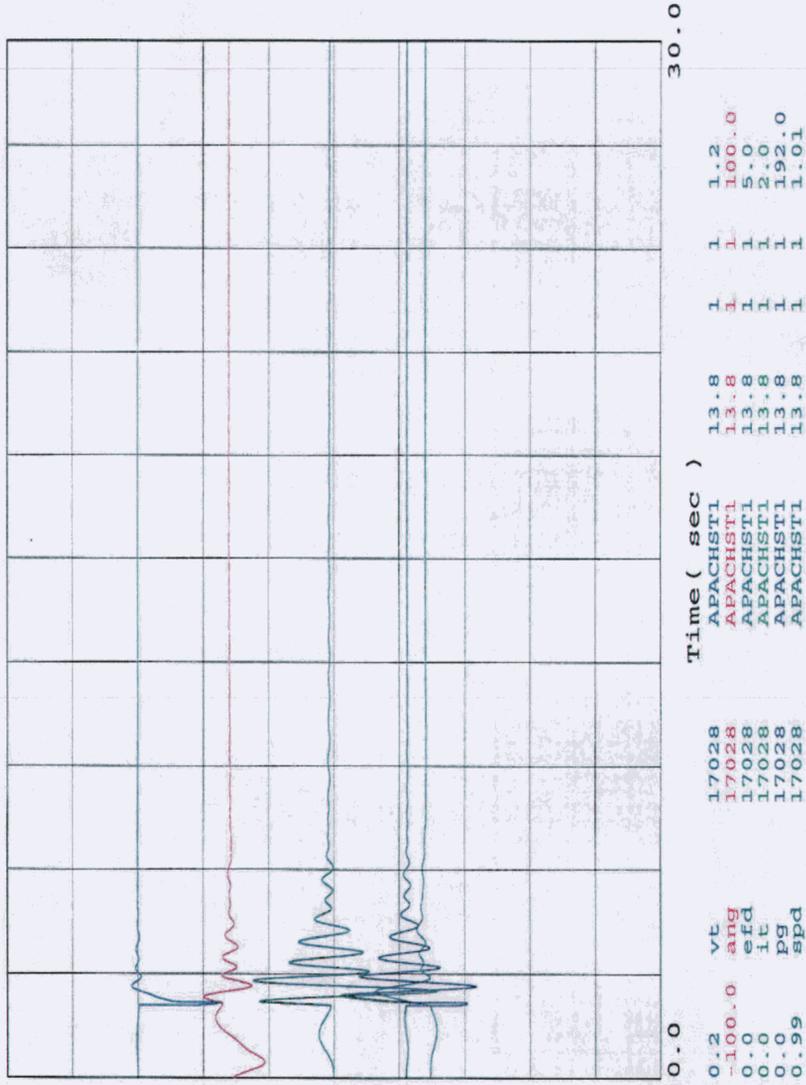
Hackberry - Morenci 230 kV Outage



SOUTHWEST TRANSMISSION COOPERATIVE INC.
 2013 HSLA BASE CASE WECC APPROVED (%RATE IS BASED ON AMPS)
 WECC/NERC COMPLIANCE 2008 (ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.)



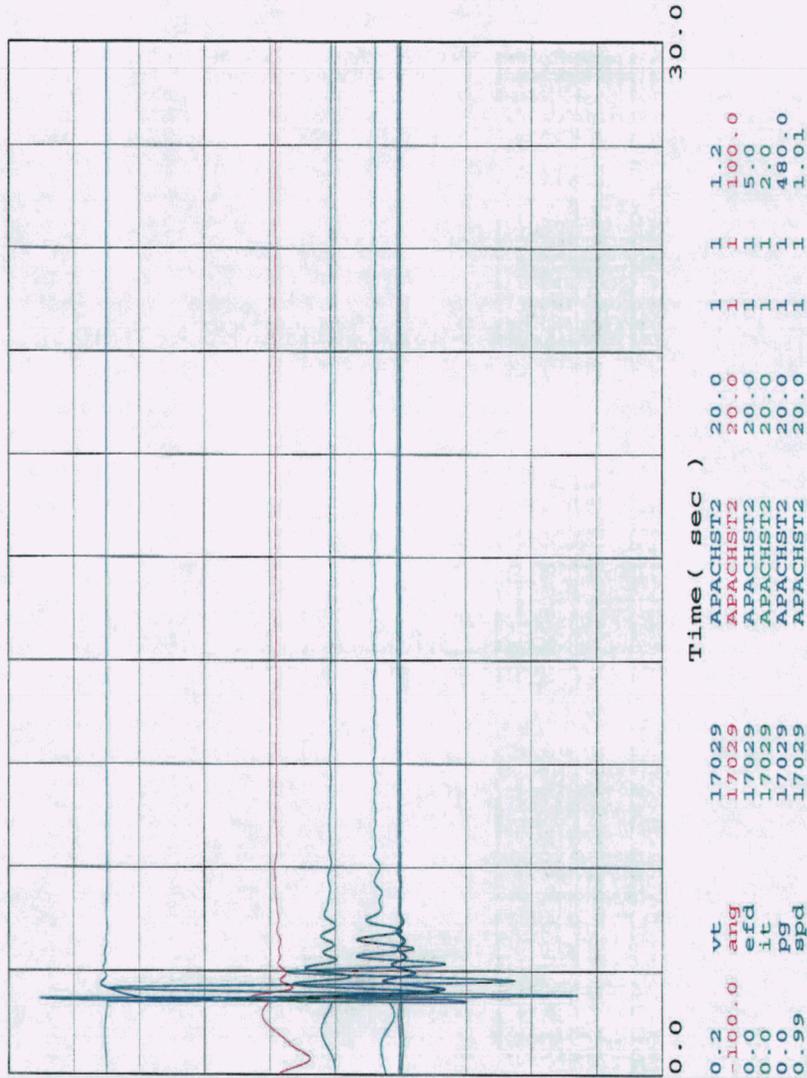
Hackberry - Morenci 230 kV Outage



SOUTHWEST TRANSMISSION COOPERATIVE INC.
 2013 HSLA BASE CASE WECC APPROVED
 WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
 ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.

2013HS Southwest Transmission Cooperative Base System with Hackberry to Morenci 230 kV Line out of service - Apache ST2 Plots

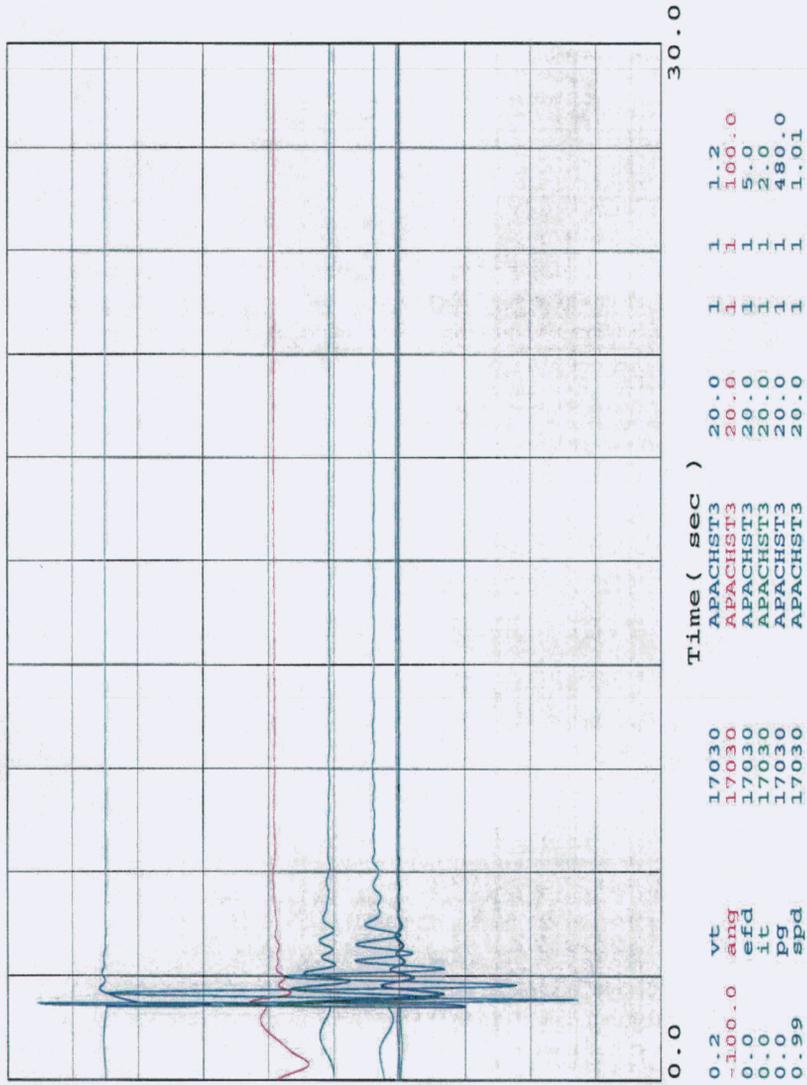
Hackberry - Morenci 230 kV Outage



SOUTHWEST TRANSMISSION COOPERATIVE INC.
 2013 HSLA BASE CASE WECC APPROVED
 WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
 ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.

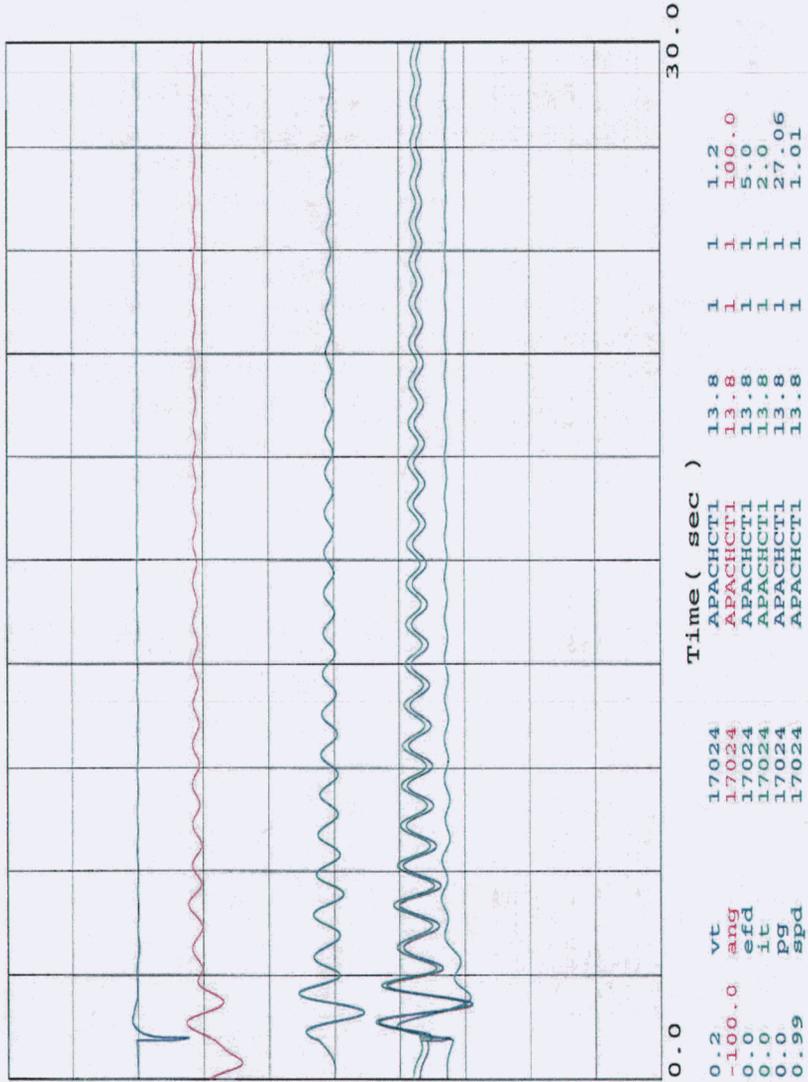
2013HS Southwest Transmission Cooperative Base System with Hackberry to Morenci 230 kV Line out of service - Apache ST3 Plots

Hackberry - Morenci 230 kV Outage



SOUTHWEST TRANSMISSION COOPERATIVE INC.
 2013 HSLA BASE CASE WECC APPROVED
 WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
 ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.

Marana to Marana Tap 115 kV Outage

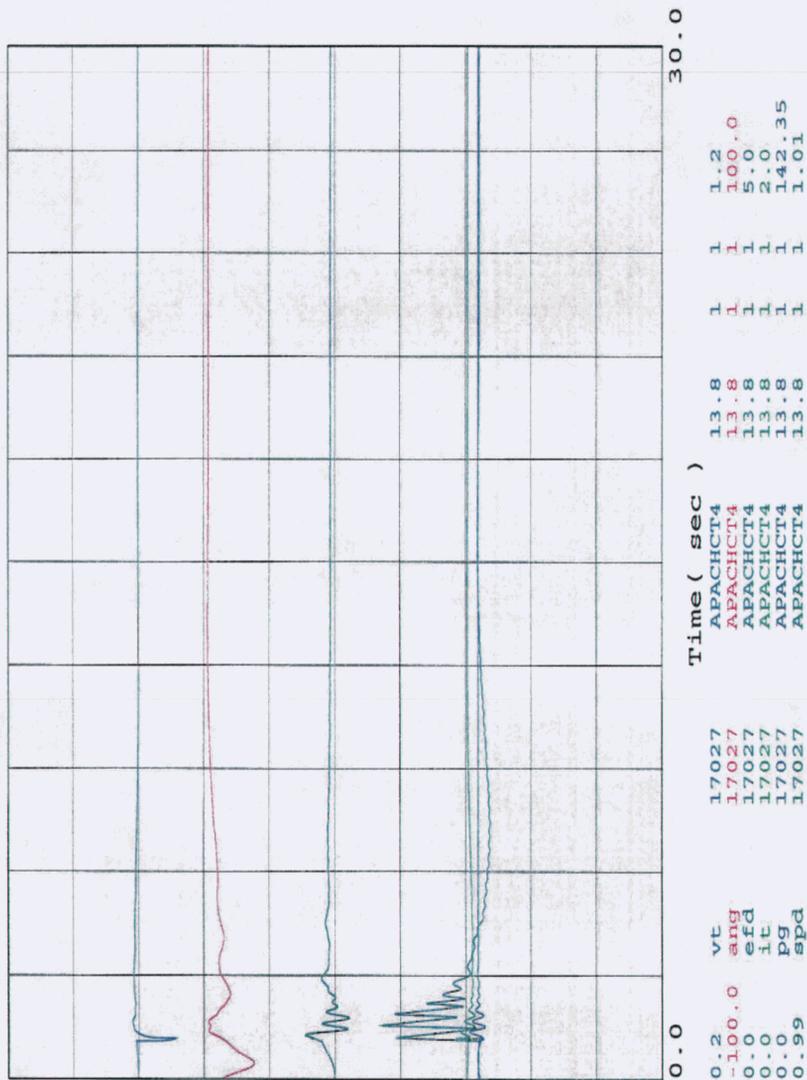


SOUTHWEST TRANSMISSION COOPERATIVE INC.
 2013 HS1A BASE CASE WECC APPROVED
 WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
 ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.



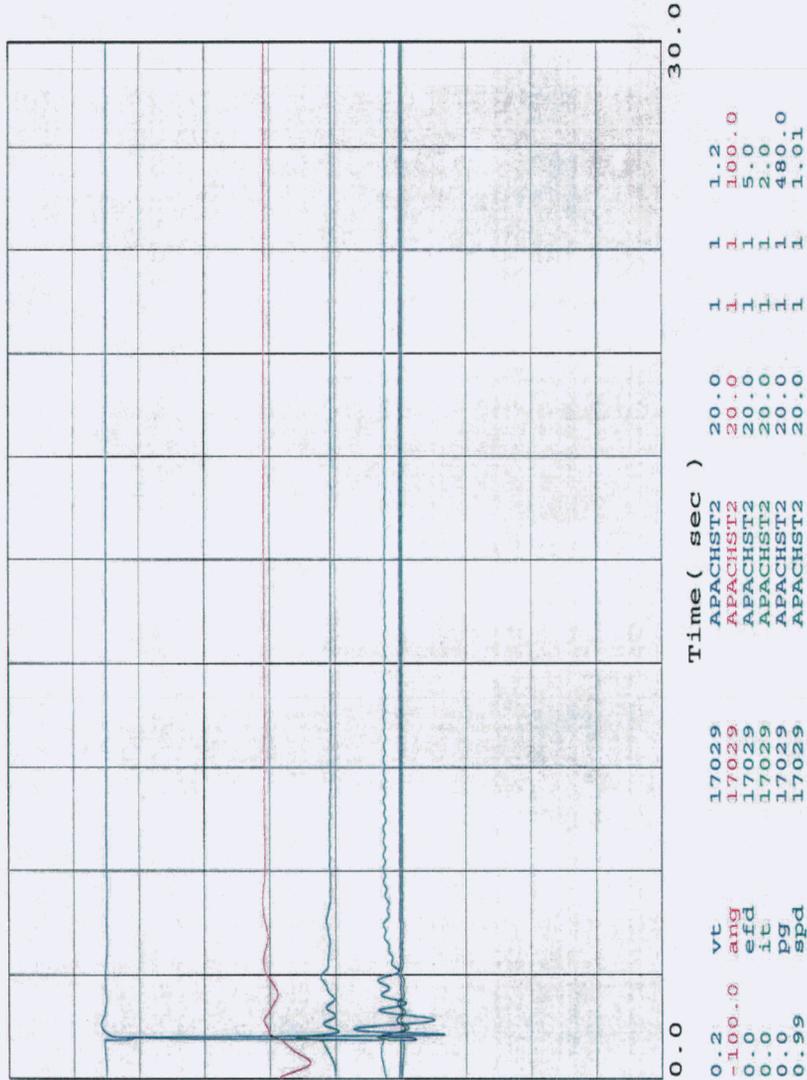
2013HS Southwest Transmission Cooperative Base System with Marana to Marana Tap 115 kV Line out of service - Apache CT4 Plots

Marana to Marana Tap 115 kV Outage



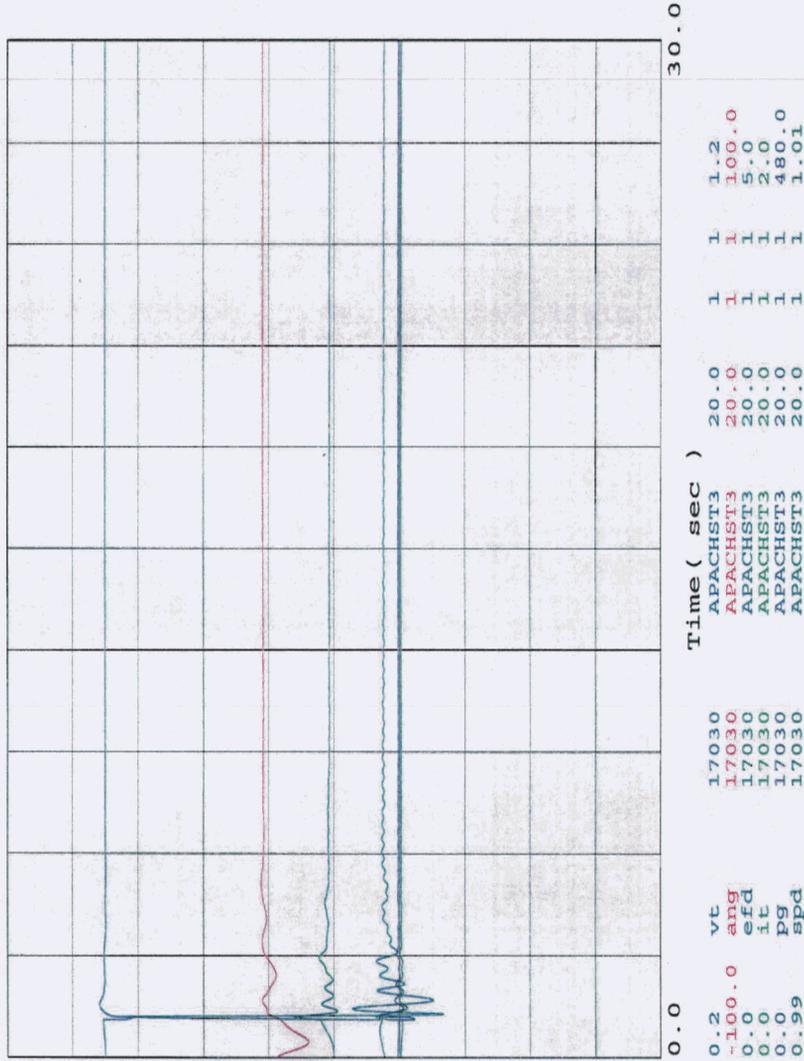
SOUTHWEST TRANSMISSION COOPERATIVE INC.
 2013 HS1A BASE CASE WECC APPROVED
 WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
 ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.

Marana to Marana Tap 115 kV Outage



SOUTHWEST TRANSMISSION COOPERATIVE INC.
 2013 HSLA BASE CASE WECC APPROVED
 WECC/NERC COMPLIANCE 2008 (%RATE IS BASED ON AMPS)
 ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.

Marana to Marana Tap 115 kV Outage



SOUTHWEST TRANSMISSION COOPERATIVE INC.

2013 HS1A BASE CASE WECC APPROVED

WECC/NERC COMPLIANCE 2008

ALL COMMENTS FROM THE TSS REVIEW ARE INCLUDED.

(%RATE IS BASED ON AMPS)

