



# **SPP** *Southwest Power Pool*

***System Impact Study  
SPP-2004-029-1  
For The Designation of a New  
Network Resource  
Requested By  
Kansas Electric Power Cooperative  
From WERE to WERE  
  
For a Reserved Amount Of 51 MW  
From 6/1/2005  
To 6/1/2008***

***SPP Engineering, Tariff Studies***

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**ATTACHMENT: *SPP-2004-029-1 Tables***

## **1. Executive Summary**

Kansas Electric Power Cooperative requested a system impact study to designate a New Network Resource in the WERE Control Area for 51 MW to serve network load. The period of the service requested is from 6/1/2005 to 6/1/2008. The OASIS reservation number is 651874.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 51 MW request while maintaining system reliability. The service was modeled by a transfer from the new designated network resource in the WERE Control Area to the Network Load in the WERE Control Area. The three scenarios were studied to capture worst case system limitations dependent on the bias of the transmission system. Analysis was conducted for the requested service period above and for the remaining planning horizon from 1/1/2010 to 10/1/2015. The additional evaluation of the planning horizon was conducted to determine any future constraints that may limit the future renewal of service.

Tables 1.1, 1.2, and 1.3 list the SPP facility overloads caused or impacted by the transfer modeled, using Scenarios 1, 2, and 3, respectively. Tables 2.1, 2.2, and 2.3 list the SPP voltage violations caused or impacted by the transfer modeled, using Scenarios 1, 2, and 3, respectively. Tables 3.1, 3.2, and 3.3 list the Non - SPP facility overloads caused or impacted by the transfer modeled, using Scenarios 1, 2, and 3, respectively. Tables 4.1, 4.2, and 4.3 list the Non - SPP voltage violations caused or impacted by the transfer modeled, using Scenarios 1, 2, and 3, respectively.

The study results of the WERE to WERE 51 MW request show that limiting constraints exist. Due to the limiting constraints identified, the Transmission Service Request cannot be granted. Any solutions, upgrades, and costs provided in the System Impact Study are planning estimates only. The final ATC and upgrades required may vary from these results due to unknown facility upgrades and proposed transmission plans that will be identified during the facility study process.

Facilities were identified that limit the ATC to 0MW for the requested period of service. For some facilities, implementing the upgrade is not possible to accommodate the requested term of service. SPP will review the possibility of curtailment of previously confirmed service and/or the redispatch of units as an option for relieving the additional impacts on these facilities. These options will be evaluated as part of the Facility Study. If no redispatch or curtailment of service option is identified for the facilities with an ATC of 0MW, the start date of the requested service may be delayed until the upgrade of the limiting facility is completed. Execution of a Facility Study Agreement is now required to maintain queue position. The final ATC, upgrade solutions, cost assignments, complete evaluation of renewal rights, and available redispatch and curtailment options will be determined upon the completion of the facility study.

## **2. Introduction**

Kansas Electric Power Cooperative requested a system impact study to designate a New Network Resource in the WERE Control Area for 51 MW to serve network load. The principal objective of this study is to identify the restraints on the SPP Regional Tariff System that may limit the requested service and determine the least cost solutions required to alleviate the limiting facilities.

This study includes steady-state contingency analyses (PSS/E function ACCC) and Available Transfer Capability (ATC) analyses. The steady-state analyses consider the impact of the request on transmission line and transformer loadings, and bus voltages for outages of single transmission lines, transformers, and generating units, and selected multiple transmission lines and transformers on the SPP system and first tier Non - SPP systems.

The WERE to WERE 51 MW request was studied using three System Scenarios. The service was modeled from the new designated network resource in the WERE Control Area to the Network Load in the WERE Control Area. The three scenarios were studied to capture worst case system limitations dependent on the bias of the transmission system.

### **3. Study Methodology**

#### **A. Description**

The system impact analysis was conducted to determine the steady-state impact of the requested service on the SPP and first tier Non - SPP control area systems. The steady-state analysis was done to ensure current SPP Criteria and NERC Planning Standards requirements are fulfilled. The Southwest Power Pool conforms to the NERC Planning Standards, which provide the strictest requirements, related to voltage violations and thermal overloads during normal conditions and during a contingency. It requires that all facilities be within normal operating ratings for normal system conditions and within emergency ratings after a contingency. Normal operating ratings and emergency operating ratings monitored are Rate A and B in the SPP MDWG models, respectively. The upper bound and lower bound of the normal voltage range monitored is 105% and 95%. The upper bound and lower bound of the emergency voltage range monitored is 110% and 90%. The SPS Tuco 230 kV bus voltage is monitored at 92.5% due to pre-determined system stability limitations.

The contingency set includes all SPP control area branches and ties 69kV and above, first tier Non - SPP control area branches and ties 115 kV and above, any defined contingencies for these control areas, and generation unit outages for the SPP control areas, AECl, and ENTR with SPP reserve share program redispatch. The monitor elements include all SPP control area branches, ties, and buses 69 kV and above, and all first tier Non – SPP control area branches and ties 69 kV and above. Voltage monitoring was performed for SPP control area buses 69 kV and above.

A 3 % transfer distribution factor (TDF) cutoff was applied to all SPP control area facilities. For first tier Non – SPP control area facilities, a 3 % TDF cutoff was applied to AECl, AMRN, and ENTR and a 2 % TDF cutoff was applied to MEC, NPPD, and OPPD. For voltage monitoring, a 0.02 per unit change in voltage must occur due to the transfer to be considered a valid limit to the transfer.

#### **B. Model Updates**

SPP used fourteen seasonal models to study the WERE to WERE 51 MW request for the requested service period. The SPP 2005 Series Cases Update 2 2005 Summer Peak (05SP), 2005 Summer 2005 Fall Peak (05FA), 2005 Winter Peak (05WP), 2006 April Minimum (06AP), 2006 Spring Peak (06G), 2006 Summer Peak (06SP), 2006 Summer Shoulder (06SH), 2006 Fall Peak (06FA), 2006 Winter Peak (06WP), 2007 Summer Peak (07SP), 2007/08 Winter Peak (07WP), were used to study the impact of the 51 MW transfer on the system during the requested service period of 6/1/2005 to 6/1/2008. 2010 Summer Peak (10SP), 2010/11 Winter Peak (10WP), and 2015 Summer Peak (15SP) were used to evaluate renewal rights of the requested service. The Spring Peak models apply to April and May, the Summer Peak models apply to June through September, the Fall Peak models apply to October and November, and the Winter Peak models apply to December through March.

The chosen base case models were modified to reflect the most current modeling information. The cases were modified to reflect firm transfers during the requested service period that were not already included in the SPP 2005 Series Cases. From the fourteen seasonal models, three system scenarios were developed. Scenario 1 includes confirmed West to East transfers not already included in the January 2005 base case series models, SPS exporting, and the Lamar HVDC Tie flowing from SPS to Lamar, and ERCOT exporting. Scenario 2 includes confirmed East to West transfers not already included in the January 2005 base case series models, SPS

importing, and the Lamar HVDC Tie flowing from Lamar to SPS, and ERCOT importing. Scenario 3 includes confirmed West to East transfers not already included in the January 2005 base case series models, SPS importing, the Lamar HVDC Tie flowing from Lamar to SPS, and ERCOT importing

The Network load amount for the 2005 and 2006 Summer Peaks was forecasted to be a maximum of 42 MW. The Network load amount for the 2005 and 2006 Summer Shoulders was forecasted to be a maximum of 34 MW. The Network load amount for the 2005 and 2006 Fall Peaks was forecasted to be a maximum of 26 MW. The Network load amount for the 2005, 2006, 2007, and 2010 Winter Peaks was forecasted to be a maximum of 27 MW. The Network load amount for the 2006 April Peak was forecasted to be a maximum of 13 MW. The Network load amount for the 2006 Spring Peak was forecasted to be a maximum of 31 MW. The Network load amount for the 2007 Summer Peak was forecasted to be a maximum of 43 MW. The Network load amount for the 2010 Summer Peak was forecasted to be a maximum of 44 MW. The Network load amount for the 2015 Summer Peak was forecasted to be a maximum of 45 MW.

### **C. Transfer Analysis**

Using the selected cases both with and without the requested transfer modeled, the PSS/E Activity ACCC was run on the cases and compared to determine the facility thermal overloads and voltage violations caused or impacted by the transfer. The PSS/E options chosen to conduct the analysis can be found in Appendix A.

### **D. Upgrade Analysis**

This system impact study does not include analysis with the assigned upgrades modeled. To determine the final cost and possible start date of the requested service, additional analysis will be performed to determine the impact of modeling the assigned upgrades for the request.

## **4. Study Results**

### **A. Study Analysis Results**

Tables 1 through 4 contain the initial steady-state analysis results of the System Impact Study. The Tables are in the attached workbook *SPP-2004-029-1 Tables*. The tables identify the seasonal case in which the event occurred, the facility control area location, applicable ratings of the overloaded facility, the loading percentage or voltage with and without the transfer and upgrades, the percent transfer distribution factor (TDF) if applicable, and the estimated ATC value using interpolation if calculated. Comments are provided in the tables to document any SPP or Non - SPP identification or assignment of the event, existing mitigations plans or criteria to disregard the event as a limiting constraint, upgrades and costs to mitigate a limiting constraint, or any specific study procedures associated with modeling an event.

Table 1.1 lists the SPP Facility Overloads caused or impacted by the 51 MW transfer for Scenario 1. Solutions with engineering and construction costs are provided in the tables.

Table 2.1 lists voltage violations on first tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 51 MW transfer for Scenario 1.

Table 3.1 lists overloads on first tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 51 MW transfer for Scenario 1.

Table 1.2 lists the SPP Facility Overloads caused or impacted by the 51 MW transfer for Scenario 2. Solutions with engineering and construction costs are provided in the tables.

Table 2.2 lists voltage violations on first tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 51 MW transfer for Scenario 2.

Table 3.2 lists overloads on first tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 51 MW transfer for Scenario 2.

Table 1.3 lists the SPP Facility Overloads caused or impacted by the 51 MW transfer for Scenario 3. Solutions with engineering and construction costs are provided in the tables.

Table 2.3 lists voltage violations on first tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 51 MW transfer for Scenario 3.

Table 3.3 lists overloads on first tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 51 MW transfer for Scenario 3.

Tables 1.1a, 1.2a and 1.3a document the modeling representation of the events identified in Tables 1.1, 1.2 and 1.3 respectively to include bus numbers and bus names.

## **5. Conclusion**

The study results of the WERE to WERE 51 MW request show that limiting constraints exist. Due to the limiting constraints identified, the Transmission Service Request cannot be granted. Any solutions, upgrades, and costs provided in the System Impact Study are planning estimates only. The final ATC and upgrades required may vary from these results due to unknown facility upgrades and proposed transmission plans that will be identified during the facility study process.

Facilities were identified that limit the ATC to 0MW for the requested period of service. For some facilities, implementing the upgrade is not possible to accommodate the requested term of service. SPP will review the possibility of curtailment of previously confirmed service and/or the redispatch of units as an option for relieving the additional impacts on these facilities. These options will be evaluated as part of the Facility Study. If no redispatch or curtailment of service option is identified for the facilities with an ATC of 0MW, the start date of the requested service may be delayed until the upgrade of the limiting facility is completed. Execution of a Facility Study Agreement is now required to maintain queue position. The final ATC, upgrade solutions, cost assignments, complete evaluation of renewal rights, and available redispatch and curtailment options will be determined upon the completion of the facility study.



## Appendix A

### PSS/E CHOICES IN RUNNING LOAD FLOW PROGRAM AND ACCC

#### BASE CASES:

Solutions - Fixed slope decoupled Newton-Raphson solution (FDNS)

1. Tap adjustment – Stepping
2. Area interchange control – Tie lines only
3. Var limits – Apply immediately
4. Solution options -  Phase shift adjustment
  - Flat start
  - Lock DC taps
  - Lock switched shunts

#### ACCC CASES:

Solutions – AC contingency checking (ACCC)

1. MW mismatch tolerance – 0.5
2. Contingency case rating – Rate B
3. Percent of rating – 100
4. Output code – Summary
5. Min flow change in overload report – 1mw
6. Excl'd cases w/ no overloads form report – YES
7. Exclude interfaces from report – NO
8. Perform voltage limit check – YES
9. Elements in available capacity table – 60000
10. Cutoff threshold for available capacity table – 99999.0
11. Min. contng. case Vltg chng for report – 0.02
12. Sorted output – None

Newton Solution:

1. Tap adjustment – Stepping
2. Area interchange control – Tie lines only
3. Var limits - Apply automatically
4. Solution options -  Phase shift adjustment
  - Flat start
  - Lock DC taps
  - Lock switched shunts

SPP-2004-029-1  
 Table 1.1 - SPP Facility Overloads  
 Caused or Impacted by Transfer Using Scenario 1

Southwest Power Pool  
 System Impact Study

Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
05SP	42	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	101.7	103.6	3.038	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
05SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	99.4	100.9	3.3	IATAN - ST JOE 345KV	5	Rebuild 15.50-mile line (1192.5 kcmil 45/7 ACSR, 223 MVA, 245 MVA). Replace CTs and Wave Trap (2000 A.)	\$5,800,000
05SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	95.4	100.3	11.5	CONCORDIA - EAST MANHATTAN 230KV	12	See Previous Upgrade Specified for Facility	
05SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	95.3	100.3	11.5	CONCORDIA 230/115KV TRANSFORMER	12	See Previous Upgrade Specified for Facility	
05SP	42	WERE	WERE	WEST EMPORIA - EAST STREET 115KV	92	102.3	104.7	5.2	MORRIS COUNTY 230/115/13.8KV TRANSFORMER	0	May be relieved due to Westar Operating Procedure 625 - Outage of the Morris County Transformer	
05SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	99.2	100.4	3.5	IATAN - ST JOE 345KV	9	See Previous Upgrade Specified for Facility	
05FA	26	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	120.1	121.7	6.0	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05FA	26	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	112.0	113.9	6.5	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05FA	26	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	109.9	111.8	6.5	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05WP	27	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	121.9	122.7	3.043	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05WP	27	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	100.0	101.1	4.0	IATAN - ST JOE 345KV	0	See Previous Upgrade Specified for Facility	
06G	31	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	102.4	103.6	3.7	IATAN - ST JOE 345KV	0	See Previous Upgrade Specified for Facility	
06G	31	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	98.0	100.8	9.0	CONCORDIA - EAST MANHATTAN 230KV	9	See Previous Upgrade Specified for Facility	
06G	31	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	97.9	100.8	9.0	CONCORDIA 230/115KV TRANSFORMER	9	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	103.1	105.8	4.3	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
06SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	127.1	129.4	5.3	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	109.8	111.8	4.5	IATAN - ST JOE 345KV	0	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	104.3	109.6	12.2	CONCORDIA - EAST MANHATTAN 230KV	0	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	112.5	115.0	5.6	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SP	42	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	109.5	112.1	5.6	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06FA	26	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	121.1	122.1	3.6	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06FA	26	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	104.2	105.1	3.7	IATAN - ST JOE 345KV	0	See Previous Upgrade Specified for Facility	
06FA	26	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	112.5	113.6	4.1	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06FA	26	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	110.3	111.4	4.2	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	99.5	101.4	3.8	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	3	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
06SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	125.4	127.1	4.9	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	110.8	112.3	4.4	IATAN - ST JOE 345KV	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	108.2	112.2	11.4	CONCORDIA - EAST MANHATTAN 230KV	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	108.2	112.2	11.4	CONCORDIA 230/115KV TRANSFORMER	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	103.1	104.8	5.1	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	114.5	116.4	5.2	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	96.8	100.9	11.3	CONCORDIA - EAST MANHATTAN 230KV	10	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	96.7	100.9	11.3	CONCORDIA 230/115KV TRANSFORMER	10	Rebuild 15.15 mile line with 1192.5 kcmil ACSR.	\$3,200,000
06SH	34	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	99.2	100.8	4.2	IATAN - ST JOE 345KV	7	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	112.0	113.9	5.3	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06WP	27	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	122.6	123.5	3.3	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06WP	27	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	115.9	117.0	3.7	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06WP	27	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	114.0	115.1	3.7	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	127.7	130.8	10.0	CIRCLE - DAVIS 115KV	0	May be relieved due to Westar Operating Procedure 1205 - Outage of the Circle to Davis 115kV line	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	111.3	114.3	10.0	HUTCHINSON ENERGY CENTER - HUTCHINSON GAS TURBINE STATION 69KV	0	May be relieved due to Westar Operating Procedure 1306 - Outage of the HEC to HEC GT 69kV Line	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	108.0	111.0	9.8	REMOVE UNIT 1 FROM BUS 56693 [HEC U3 14.400] DISPATCH	0	Solution Undetermined	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	106.9	110.2	10.9	SEWARD - ST JOHN 115KV	0	Solution Undetermined	
07SP	43	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	128.7	130.5	4.1	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	

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 Table 1.1 - SPP Facility Overloads  
 Caused or Impacted by Transfer Using Scenario 1

Southwest Power Pool  
 System Impact Study

Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
07SP	43	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	110.0	111.8	4.0	IATAN - ST JOE 345KV	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	104.3	109.5	11.8	CONCORDIA - EAST MANHATTAN 230KV	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	104.3	109.5	11.7	CONCORDIA 230/115KV TRANSFORMER	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	113.5	115.6	4.4	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07SP	43	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	110.6	112.7	4.5	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	119.2	120.6	4.9	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	100.2	101.9	6.1	IATAN - ST JOE 345KV	0	See Previous Upgrade Specified for Facility	
07WP	27	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	112.0	113.5	4.8	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	110.1	111.5	4.8	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	105.3	106.9	3.5	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	COUNTY LINE - HOOK JCT 115KV	92	119.7	123.4	7.6	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	COUNTY LINE - TECUMSEH HILL 115KV	106	104.3	106.7	5.8	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	GILL ENERGY CENTER EAST - MACARTHUR 69KV	68	117.9	119.9	3.1	GILL ENERGY CENTER EAST - OATVILLE 69KV	0	Replace substation bus and jumpers at MacArthur 69 kV.	\$98,000
10SP	44	WERE	WERE	GILL ENERGY CENTER EAST - OATVILLE 69KV	72	127.0	129.2	3.6	GILL ENERGY CENTER EAST - MACARTHUR 69KV	0	Replace disconnect switches at Gill 69 kV (use 800 A.), Replace line switch at Oatville 69 kV (use 800 A.).	\$45,000
10SP	44	WERE	WERE	GILL ENERGY CENTER EAST - OATVILLE 69KV	72	111.2	113.0	3.1	GILL ENERGY CENTER WEST - HAYSVILLE JUNCTION 69KV	0	See Previous Upgrade Specified for Facility	
10SP	44	WERE	WERE	HOOK JCT - TECUMSEH ENERGY CENTER 115KV	160	123.1	126.8	13.7	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	112.0	114.3	12.0	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	102.3	105.2	4.6	HOYT - HOYT HTI SWITCHING JUNCTION 115KV	0	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Transformer	
10SP	44	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	102.0	104.9	4.6	HOYT - HOYT HTI SWITCHING JUNCTION 115KV	0	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Transformer	
10SP	44	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	102.7	104.8	3.3	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	102.3	104.4	3.3	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	99.5	102.5	4.6	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	2	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Transformer	
10WP	27	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	97.8	100.2	6.0	CONCORDIA 230/115KV TRANSFORMER	12	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Transformer	
10WP	27	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	97.8	100.1	6.0	EAST MANHATTAN - CONCORDIA 230KV	12	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Transformer	
15SP	45	WERE	WERE	54TH & MERIDEN - HOYT 115KV	179	110.1	111.6	6.1	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	100.3	101.3	13.6	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Auburn Road to Jeffrey Energy Center 345kV Line	
15SP	45	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	117.3	120.4	6.8	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	Contingency Solution Not Converged					HOYT - JEFFREY ENERGY CENTER 345KV			
15SP	45	WERE	WERE	GOODYEAR JUNCTION - NORTHLAND 115KV	175	110.4	111.7	5.2	HOYT - STRANGER CREEK 345KV	0	Rebuild 3.44-mile line	\$940,000
15SP	45	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	111.4	113.2	43.2	JEFFREY ENERGY CENTER - MORRIS COUNTY 345KV	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center - Morris County 345KV	
15SP	45	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	111.2	112.7	37.2	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
15SP	45	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	100.4	102.0	38.3	LANG - MORRIS COUNTY 345KV	0	Solution Undetermined	
15SP	45	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	100.2	101.9	39.3	JEFFREY ENERGY CENTER - SUMMIT 345KV	0	May be relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345kV Line	

SPP-2004-029-1  
 Table 1.1 - SPP Facility Overloads  
 Caused or Impacted by Transfer Using Scenario 1

Southwest Power Pool  
 System Impact Study

Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
15SP	45	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	100.1	101.6	37.8	SUMMIT 345/230/14.4KV TRANSFORMER	0	May be relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230kV Transformer	
15SP	45	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	100.3	101.5	28.7	REMOVE UNIT 1 FROM BUS 57957 [IAT G1 124.000] DISPATCH	0	Solution Undetermined	
15SP	45	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	99.5	101.4	45.1	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	3	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	123.7	124.5	4.1	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	102.5	103.3	4.2	JEFFREY ENERGY CENTER - MORRIS COUNTY 345KV	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center - Morris County 345KV	
15SP	45	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	105.4	108.6	4.9	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	104.5	107.7	4.9	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	101.0	105.0	6.1	HOYT - HOYT HTI SWITCHING JUNCTION 115KV	0	Solution Undetermined	
15SP	45	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	100.6	104.3	5.7	HOYT - HOYT HTI SWITCHING JUNCTION 115KV	0	Solution Undetermined	
15SP	45	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	97.9	101.4	5.4	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	8	Solution Undetermined	
15SP	45	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	97.3	100.8	5.3	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	10	Solution Undetermined	
Total Estimated Engineering and Construction Cost											\$10,083,000	

Table 2.1 - SPP Voltage Violations  
Caused or Impacted by Transfer Using Scenario 1

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	ATC (MW)	Solution	Estimated Cost
05SP	42	MIDW	56551 SALINE 3 115	0.8355	0.7906	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56551 SALINE 3 115	0.8343	0.7863	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56551 SALINE 3 115	0.8194	0.6366	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56552 GORHAM 3 115	0.8531	0.8149	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56552 GORHAM 3 115	0.8519	0.8106	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56553 S HAYS 3 115	0.8570	0.8190	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56553 S HAYS 3 115	0.8558	0.8148	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56556 HOXIE 3 115	0.8823	0.8571	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56556 HOXIE 3 115	0.8814	0.8544	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56557 BEACH 3 115	0.8497	0.8159	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56557 BEACH 3 115	0.8486	0.8124	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56558 KNOLL 6 230	0.7598	0.7189	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56560 WKNNY 3 115	0.8237	0.7809	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56560 WKNNY 3 115	0.8224	0.7764	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56561 KNOLL 3 115	0.8370	0.7951	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56561 KNOLL 3 115	0.8358	0.7908	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56562 HAYS 3 115	0.8300	0.7874	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56562 HAYS 3 115	0.8287	0.7830	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56590 BEMIS 3 115	0.8340	0.7890	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56590 BEMIS 3 115	0.8327	0.7846	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56590 BEMIS 3 115	0.8179	0.6346	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56591 VINE 3 115	0.8305	0.7879	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56591 VINE 3 115	0.8292	0.7835	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56605 REDLIN 3 115	0.8448	0.8088	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56605 REDLIN 3 115	0.8437	0.8050	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	WERE	58776 MILAN 4 138	0.9585	0.8985	57413 CIRCLE 3115 57429 MOUNDRG3115 CKT 158775 MILANTP4138 57045 GILL W 4138 CKT 1 58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	41		
05SP	42	WERE	58801 RUSSELL3 115	0.9245	0.8937	158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	33		
05SH	34	MIDW	56551 SALINE 3 115	0.9333	0.8816	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	22		
05SH	34	MIDW	56590 BEMIS 3 115	0.9323	0.8805	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	21		
05FA	26	MIDW	56558 KNOLL 6 230	1.0385	0.8955	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	26		
05FA	26	WERE	57322 BAILEYV3 115	0.8979	0.8613	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Not a Load Serving Bus	
05FA	26	WERE	57332 KNOB HL3 115	0.9113	0.8754	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	14	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
05FA	26	WERE	57337 SENECA 3 115	0.8948	0.8581	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
05FA	26	WERE	57338 SMITTYV3 115	0.9023	0.8659	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	14	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
05WP	27	MIDW	56558 KNOLL 6 230	1.0643	0.8963	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	26	Not a Load Serving Bus	
06AP	13		None Identified				13		
06G	31	WERE	57322 BAILEYV3 115	0.9045	0.8617	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	14	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
06G	31	WERE	57332 KNOB HL3 115	0.9183	0.8763	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	15	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
06G	31	WERE	57337 SENECA 3 115	0.9013	0.8584	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	14	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
06G	31	WERE	57338 SMITTYV3 115	0.9090	0.8664	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	15	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
06SP	42	MIDW	56551 SALINE 3 115	0.8407	0.8048	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56551 SALINE 3 115	0.8398	0.8033	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
06SP	42	MIDW	56551 SALINE 3 115	0.8223	0.6690	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56552 GORHAM 3 115	0.8586	0.8284	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56552 GORHAM 3 115	0.8577	0.8271	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
06SP	42	MIDW	56553 S HAYS 3 115	0.8624	0.8325	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56553 S HAYS 3 115	0.8616	0.8311	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
06SP	42	MIDW	56557 BEACH 3 115	0.8545	0.8288	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56557 BEACH 3 115	0.8537	0.8276	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		

Table 2.1 - SPP Voltage Violations  
Caused or Impacted by Transfer Using Scenario 1

06SP	42	MIDW	56558 KNOLL 6 230	0.7654	0.7348	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56560 WKNNY 3 115	0.8297	0.7959	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56560 WKNNY 3 115	0.8288	0.7944	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56561 KNOLL 3 115	0.8429	0.8098	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56561 KNOLL 3 115	0.8420	0.8083	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56562 HAYS 3 115	0.8360	0.8023	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56562 HAYS 3 115	0.8350	0.8009	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56590 BEMIS 3 115	0.8392	0.8032	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56590 BEMIS 3 115	0.8382	0.8017	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56590 BEMIS 3 115	0.8207	0.6670	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56591 VINE 3 115	0.8364	0.8028	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56591 VINE 3 115	0.8355	0.8013	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56605 REDLIN 3 115	0.8501	0.8224	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56605 REDLIN 3 115	0.8493	0.8211	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	WERE	57036 CLEARWT4 138	0.9177	0.8335	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	10	
06SP	42	WERE	58801 RUSSELL3 115	0.9233	0.8950	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	37	
06SH	34	MIDW	56551 SALINE 3 115	0.9265	0.8861	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	22	
06SH	34	MIDW	56590 BEMIS 3 115	0.9254	0.8850	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	21	
06FA	26	MIDW	56558 KNOLL 6 230	1.0550	0.8975	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	26	Not a Load Serving Bus
06FA	26	WERE	57322 BAILEYV3 115	0.8950	0.8577	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06FA	26	WERE	57332 KNOB HL3 115	0.9089	0.8723	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	14	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06FA	26	WERE	57337 SENECA 3 115	0.8919	0.8544	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06FA	26	WERE	57338 SMITTYV3 115	0.8996	0.8624	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06WP	27	WERE	57322 BAILEYV3 115	0.9196	0.8874	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	17	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06WP	27	WERE	57332 KNOB HL3 115	0.9310	0.8994	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	26	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06WP	27	WERE	57337 SENECA 3 115	0.9170	0.8846	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	17	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06WP	27	WERE	57338 SMITTYV3 115	0.9234	0.8913	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	20	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
07SP	43	MIDW	56551 SALINE 3 115	0.8769	0.8468	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56551 SALINE 3 115	0.8761	0.8456	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56551 SALINE 3 115	0.8218	0.6543	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56552 GORHAM 3 115	0.8913	0.8666	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56552 GORHAM 3 115	0.8904	0.8655	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56553 S HAYS 3 115	0.8949	0.8704	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56553 S HAYS 3 115	0.8941	0.8693	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56557 BEACH 3 115	0.9128	0.8916	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	41	
07SP	43	MIDW	56557 BEACH 3 115	0.9121	0.8906	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	40	
07SP	43	MIDW	56558 KNOLL 6 230	0.8001	0.7749	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	43	Not a Load Serving Bus
07SP	43	MIDW	56560 WKNNY 3 115	0.8686	0.8406	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56560 WKNNY 3 115	0.8677	0.8394	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56561 KNOLL 3 115	0.8810	0.8536	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56561 KNOLL 3 115	0.8801	0.8524	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56562 HAYS 3 115	0.8746	0.8468	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56562 HAYS 3 115	0.8737	0.8456	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56590 BEMIS 3 115	0.8754	0.8453	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56590 BEMIS 3 115	0.8746	0.8441	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56590 BEMIS 3 115	0.8202	0.6523	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56591 VINE 3 115	0.8750	0.8473	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56591 VINE 3 115	0.8741	0.8461	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56605 REDLIN 3 115	0.9035	0.8806	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	38	
07SP	43	MIDW	56605 REDLIN 3 115	0.9028	0.8797	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	37	
07SP	43	WERE	57036 CLEARWT4 138	0.9099	0.8206	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	10	
07SP	43	WERE	58801 RUSSELL3 115	0.9247	0.8943	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	35	

SPP-2004-029-1  
Table 2.1 - SPP Voltage Violations  
Caused or Impacted by Transfer Using Scenario 1

Southwest Power Pool  
System Impact Study

07WP	27		None Identified				27	
10SP	44	MIDW	56551 SALINE 3 115	0.8717	0.8391	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56551 SALINE 3 115	0.8709	0.8380	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56551 SALINE 3 115	0.7551	0.5864	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56552 GORHAM 3 115	0.8926	0.8658	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56552 GORHAM 3 115	0.8918	0.8648	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56553 S HAYS 3 115	0.8964	0.8698	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56553 S HAYS 3 115	0.8957	0.8688	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56557 BEACH 3 115	0.9130	0.8900	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	38	
10SP	44	MIDW	56557 BEACH 3 115	0.9124	0.8892	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	38	
10SP	44	MIDW	56558 KNOLL 6 230	0.7980	0.7707	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56560 WKNNY 3 115	0.8652	0.8348	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56560 WKNNY 3 115	0.8645	0.8338	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56561 KNOLL 3 115	0.8785	0.8488	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56561 KNOLL 3 115	0.8778	0.8477	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56562 HAYS 3 115	0.8715	0.8413	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56562 HAYS 3 115	0.8707	0.8402	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56590 BEMIS 3 115	0.8701	0.8374	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56590 BEMIS 3 115	0.8694	0.8364	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56590 BEMIS 3 115	0.7532	0.5841	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56591 VINE 3 115	0.8720	0.8418	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56591 VINE 3 115	0.8712	0.8407	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56605 REDLIN 3 115	0.9030	0.8781	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	35	
10SP	44	MIDW	56605 REDLIN 3 115	0.9024	0.8773	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	35	
10SP	44	WERE	58801 RUSSELL3 115	0.9195	0.8877	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	28	
10WP	27	WERE	57322 BAILEYV3 115	0.9272	0.8941	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	22	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
10WP	27	WERE	57337 SENECA 3 115	0.9244	0.8912	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	20	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
10WP	27	WERE	57338 SMITTYV3 115	0.9312	0.8983	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	26	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
15SP	45	MIDW	56551 SALINE 3 115	0.8428	0.8016	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56551 SALINE 3 115	0.8415	0.7980	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56551 SALINE 3 115	0.7149	0.5449	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56552 GORHAM 3 115	0.8670	0.8324	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56552 GORHAM 3 115	0.8658	0.8288	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56553 S HAYS 3 115	0.8712	0.8368	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56553 S HAYS 3 115	0.8701	0.8334	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56556 HOXIE 3 115	0.9132	0.8908	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	40	
15SP	45	MIDW	56556 HOXIE 3 115	0.9124	0.8887	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	38	
15SP	45	MIDW	56557 BEACH 3 115	0.8830	0.8525	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56557 BEACH 3 115	0.8819	0.8497	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56558 KNOLL 6 230	0.7709	0.7339	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56560 WKNNY 3 115	0.8346	0.7953	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56560 WKNNY 3 115	0.8333	0.7916	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56561 KNOLL 3 115	0.8492	0.8109	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56561 KNOLL 3 115	0.8479	0.8073	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56562 HAYS 3 115	0.8413	0.8023	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56562 HAYS 3 115	0.8400	0.7987	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56590 BEMIS 3 115	0.8411	0.7998	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56590 BEMIS 3 115	0.8398	0.7962	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56590 BEMIS 3 115	0.7128	0.5425	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56591 VINE 3 115	0.8418	0.8029	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56591 VINE 3 115	0.8405	0.7992	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56605 REDLIN 3 115	0.8728	0.8402	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56605 REDLIN 3 115	0.8717	0.8371	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
							Total Estimated Engineering and Construction Cost	\$0

Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	Comments
05SP	42			NONE IDENTIFIED						
05SH	34			NONE IDENTIFIED						
05FA	26			NONE IDENTIFIED						
05WP	27			NONE IDENTIFIED						
06AP	13			NONE IDENTIFIED						
06FA	31			NONE IDENTIFIED						
06G	42			NONE IDENTIFIED						
06SH	34			NONE IDENTIFIED						
06SP	26			NONE IDENTIFIED						
06WP	27			NONE IDENTIFIED						
07SP	43			NONE IDENTIFIED						
07WP	27			NONE IDENTIFIED						
10SP	44			NONE IDENTIFIED						
10WP	27			NONE IDENTIFIED						
15SP	45			NONE IDENTIFIED						



Table 4.1 - Non-SPP Voltage Violations

Caused or Impacted by Transfer Using Scenario 1

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
05SP	42	SUNC	56364 ATWODSW3 115	0.8830	0.8573	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56364 ATWODSW3 115	0.8821	0.8546	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56366 CNORTON3 115	0.8512	0.8187	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56366 CNORTON3 115	0.8501	0.8153	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56367 HERNDON3 115	0.8738	0.8465	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56367 HERNDON3 115	0.8729	0.8437	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56369 NATWOOD3 115	0.8829	0.8573	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56369 NATWOOD3 115	0.8821	0.8546	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56371 JOHNSON3 115	0.8652	0.8364	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56371 JOHNSON3 115	0.8642	0.8334	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56372 NORCATR3 115	0.8573	0.8265	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56372 NORCATR3 115	0.8563	0.8233	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56373 RHOADES3 115	0.8512	0.8187	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56373 RHOADES3 115	0.8501	0.8153	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56386 GRHMSUB3 115	0.8492	0.8156	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56386 GRHMSUB3 115	0.8482	0.8121	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56387 HILLCTY3 115	0.8492	0.8156	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56387 HILLCTY3 115	0.8482	0.8121	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56457 OBER T 3 115	0.8636	0.8346	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56457 OBER T 3 115	0.8627	0.8315	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56458 OBERLIN3 115	0.8632	0.8341	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56458 OBERLIN3 115	0.8622	0.8310	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58750 BELOIT 3 115	0.9658	0.8987	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58750 BELOIT 3 115	0.9261	0.8928	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
05SP	42	WEPL	58760 EHALLTP3 115	0.8769	0.7443	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58762 ELLSWTH3 115	0.8782	0.7311	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58763 GLENELD3 115	0.9534	0.8749	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58775 MILANTP4 138	0.9588	0.8994	OPEN LINE FROM BUS 57045 GILL W 4 138 TO BUS 58775 MILANTP4 138 CKT1	
05SP	42	WEPL	58776 MILAN 4 138	0.9579	0.8975	OPEN LINE FROM BUS 57045 GILL W 4 138 TO BUS 58775 MILANTP4 138 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.9217	0.8547	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.8671	0.8200	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.8660	0.8162	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.8601	0.7138	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58786 PLAINVL3 115	0.9053	0.8274	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
05SP	42	WEPL	58786 PLAINVL3 115	0.8374	0.7902	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58786 PLAINVL3 115	0.8361	0.7858	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58786 PLAINVL3 115	0.8229	0.6411	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58793 SMITH-C3 115	0.9571	0.8923	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58793 SMITH-C3 115	0.9267	0.8856	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58793 SMITH-C3 115	0.9258	0.8827	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58793 SMITH-C3 115	0.9262	0.8295	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58798 WALDO 3 115	0.9346	0.8964	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58798 WALDO 3 115	0.9336	0.8934	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58798 WALDO 3 115	0.9420	0.8759	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58798 WALDO 3 115	0.8963	0.7815	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58801 RUSSELL3 115	0.9492	0.8953	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58801 RUSSELL3 115	0.9244	0.8943	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
05SP	42	WEPL	58801 RUSSELL3 115	0.8784	0.7496	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	

Table 4.1 - Non-SPP Voltage Violations  
Caused or Impacted by Transfer Using Scenario 1

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
05SH	34	WEPL	58760 EHALLTP3 115	0.9444	0.8793	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SH	34	WEPL	58762 ELLSWTH3 115	0.9496	0.8782	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SH	34	WEPL	58786 PLAINVL3 115	0.9354	0.8838	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SH	34	WEPL	58798 WALDO 3 115	0.9563	0.8992	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SH	34	WEPL	58801 RUSSELL3 115	0.9449	0.8815	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06AP	13		None Identified				
06G	31		None Identified				
06SP	42	SUNC	56366 CNORTON3 115	0.8557	0.8311	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56366 CNORTON3 115	0.8550	0.8299	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56367 HERNDON3 115	0.8782	0.8579	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56367 HERNDON3 115	0.8776	0.8569	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56371 JOHNSON3 115	0.8696	0.8481	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56371 JOHNSON3 115	0.8690	0.8471	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56372 NORCATR3 115	0.8619	0.8387	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56372 NORCATR3 115	0.8611	0.8376	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56373 RHOADES3 115	0.8557	0.8311	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56373 RHOADES3 115	0.8550	0.8299	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56386 GRHMSUB3 115	0.8538	0.8282	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56386 GRHMSUB3 115	0.8530	0.8270	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56387 HILLCTY3 115	0.8538	0.8282	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56387 HILLCTY3 115	0.8530	0.8270	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56457 OBER T 3 115	0.8681	0.8464	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56457 OBER T 3 115	0.8675	0.8453	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56458 OBERLIN3 115	0.8676	0.8459	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56458 OBERLIN3 115	0.8670	0.8448	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	WEPL	58750 BELOIT 3 115	0.9285	0.8955	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
06SP	42	WEPL	58760 EHALLTP3 115	0.8780	0.7566	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SP	42	WEPL	58762 ELLSWTH3 115	0.8794	0.7446	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SP	42	WEPL	58763 GLENEL3 115	0.9541	0.8889	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58768 HARPER 4 138	0.9262	0.8464	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58773 MED-LDG3 115	0.9403	0.8877	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58774 MED-LDG4 138	0.9429	0.8821	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58775 MILANTP4 138	0.9205	0.8367	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58776 MILAN 4 138	0.9195	0.8339	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58785 PHLBURG3 115	0.9233	0.8579	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
06SP	42	WEPL	58785 PHLBURG3 115	0.8692	0.8301	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58785 PHLBURG3 115	0.8683	0.8286	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	WEPL	58785 PHLBURG3 115	0.8624	0.7396	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58786 PLAINVL3 115	0.9071	0.8311	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
06SP	42	WEPL	58786 PLAINVL3 115	0.8419	0.8037	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58786 PLAINVL3 115	0.8409	0.8022	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	WEPL	58786 PLAINVL3 115	0.8257	0.6733	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58787 PRATT 3 115	0.9391	0.8985	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58793 SMITH-C3 115	0.9573	0.8986	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SP	42	WEPL	58793 SMITH-C3 115	0.9277	0.8923	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58793 SMITH-C3 115	0.9268	0.8911	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	WEPL	58793 SMITH-C3 115	0.9276	0.8464	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58798 WALDO 3 115	0.9445	0.8877	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	

Table 4.1 - Non-SPP Voltage Violations

Caused or Impacted by Transfer Using Scenario 1

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
06SP	42	WEPL	58798 WALDO 3 115	0.8972	0.7922	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SP	42	WEPL	58801 RUSSELL3 115	0.9233	0.8945	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
06SP	42	WEPL	58801 RUSSELL3 115	0.8795	0.7615	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SH	34	WEPL	58760 EHALLTP3 115	0.9414	0.8671	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SH	34	WEPL	58762 ELLSWTH3 115	0.9467	0.8657	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SH	34	WEPL	58786 PLAINVL3 115	0.9286	0.8884	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SH	34	WEPL	58798 WALDO 3 115	0.9532	0.8875	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SH	34	WEPL	58801 RUSSELL3 115	0.9419	0.8694	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06WP	27		None Identified				
07SP	43	SUNC	56386 GRHMSUB3 115	0.9156	0.8945	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	SUNC	56386 GRHMSUB3 115	0.9149	0.8936	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
07SP	43	SUNC	56387 HILLCTY3 115	0.9156	0.8945	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	SUNC	56387 HILLCTY3 115	0.9149	0.8936	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
07SP	43	WEPL	58750 BELOIT 3 115	0.9284	0.8944	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
07SP	43	WEPL	58760 EHALLTP3 115	0.8787	0.7511	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07SP	43	WEPL	58762 ELLSWTH3 115	0.8802	0.7384	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07SP	43	WEPL	58763 GLENEL3 115	0.9549	0.8848	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58768 HARPER 4 138	0.9192	0.8346	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58773 MED-LDG3 115	0.9353	0.8793	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58774 MED-LDG4 138	0.9373	0.8727	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58775 MILANTP4 138	0.9584	0.8985	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 58775 MILANTP4 138 CKT1	
07SP	43	WEPL	58775 MILANTP4 138	0.9130	0.8240	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58776 MILAN 4 138	0.9575	0.8966	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 58775 MILANTP4 138 CKT1	
07SP	43	WEPL	58776 MILAN 4 138	0.9118	0.8211	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58785 PHLBURG3 115	0.8938	0.8598	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58785 PHLBURG3 115	0.8931	0.8586	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
07SP	43	WEPL	58785 PHLBURG3 115	0.9234	0.8560	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
07SP	43	WEPL	58785 PHLBURG3 115	0.8622	0.7287	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58786 PLAINVL3 115	0.8763	0.8440	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58786 PLAINVL3 115	0.8754	0.8428	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
07SP	43	WEPL	58786 PLAINVL3 115	0.9070	0.8287	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
07SP	43	WEPL	58786 PLAINVL3 115	0.8252	0.6587	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58787 PRATT 3 115	0.9346	0.8916	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58793 SMITH-C3 115	0.9583	0.8969	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07SP	43	WEPL	58793 SMITH-C3 115	0.9280	0.8404	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58798 WALDO 3 115	0.9444	0.8835	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58798 WALDO 3 115	0.8980	0.7878	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07SP	43	WEPL	58801 RUSSELL3 115	0.9241	0.8932	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
07SP	43	WEPL	58801 RUSSELL3 115	0.8803	0.7563	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07WP	27		None Identified				
10SP	44	SUNC	56386 GRHMSUB3 115	0.9159	0.8930	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	SUNC	56386 GRHMSUB3 115	0.9153	0.8922	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
10SP	44	SUNC	56387 HILLCTY3 115	0.9159	0.8930	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	SUNC	56387 HILLCTY3 115	0.9153	0.8922	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
10SP	44	WEPL	58750 BELOIT 3 115	0.9521	0.8911	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58750 BELOIT 3 115	0.9250	0.8903	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
10SP	44	WEPL	58760 EHALLTP3 115	0.8699	0.7289	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10SP	44	WEPL	58762 ELLSWTH3 115	0.8709	0.7140	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	

Table 4.1 - Non-SPP Voltage Violations  
Caused or Impacted by Transfer Using Scenario 1

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
10SP	44	WEPL	58763 GLENELD3 115	0.9372	0.8649	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58769 JEWELL 3 115	0.9524	0.8930	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58785 PHLBURG3 115	0.8907	0.8537	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58785 PHLBURG3 115	0.8901	0.8528	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
10SP	44	WEPL	58785 PHLBURG3 115	0.8927	0.8186	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
10SP	44	WEPL	58785 PHLBURG3 115	0.8167	0.6803	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58786 PLAINVL3 115	0.8689	0.8340	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58786 PLAINVL3 115	0.8681	0.8329	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
10SP	44	WEPL	58786 PLAINVL3 115	0.8602	0.7739	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
10SP	44	WEPL	58786 PLAINVL3 115	0.7591	0.5914	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58793 SMITH-C3 115	0.9467	0.8927	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
10SP	44	WEPL	58793 SMITH-C3 115	0.9528	0.8859	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10SP	44	WEPL	58793 SMITH-C3 115	0.9035	0.8135	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58798 WALDO 3 115	0.9316	0.8994	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
10SP	44	WEPL	58798 WALDO 3 115	0.9322	0.8698	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58798 WALDO 3 115	0.8900	0.7685	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10SP	44	WEPL	58801 RUSSELL3 115	0.9443	0.8932	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58801 RUSSELL3 115	0.9192	0.8865	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
10SP	44	WEPL	58801 RUSSELL3 115	0.8716	0.7346	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10WP	27		None Identified				
15SP	45	SUNC	56366 CNORTON3 115	0.9073	0.8782	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56366 CNORTON3 115	0.9063	0.8755	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56367 HERNDON3 115	0.9216	0.8973	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56367 HERNDON3 115	0.9207	0.8950	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56371 JOHNSON3 115	0.9146	0.8890	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56371 JOHNSON3 115	0.9137	0.8866	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56372 NORCATR3 115	0.9101	0.8826	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56372 NORCATR3 115	0.9091	0.8800	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56373 RHOADES3 115	0.9073	0.8782	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56373 RHOADES3 115	0.9063	0.8755	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56386 GRHMSUB3 115	0.8855	0.8552	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56386 GRHMSUB3 115	0.8845	0.8524	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56387 HILLCTY3 115	0.8855	0.8552	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56387 HILLCTY3 115	0.8845	0.8524	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56457 OBER T 3 115	0.9135	0.8875	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56457 OBER T 3 115	0.9126	0.8851	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56458 OBERLIN3 115	0.9129	0.8870	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56458 OBERLIN3 115	0.9120	0.8846	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58750 BELOIT 3 115	0.9184	0.8792	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
15SP	45	WEPL	58750 BELOIT 3 115	0.9367	0.8718	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58760 EHALLTP3 115	0.9414	0.8924	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58760 EHALLTP3 115	0.8590	0.6718	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58762 ELLSWTH3 115	0.9424	0.8980	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58762 ELLSWTH3 115	0.9445	0.8877	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58762 ELLSWTH3 115	0.8595	0.6503	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58763 GLENELD3 115	0.9648	0.8935	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58763 GLENELD3 115	0.9310	0.8926	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
15SP	45	WEPL	58763 GLENELD3 115	0.9201	0.8435	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	

Table 4.1 - Non-SPP Voltage Violations  
Caused or Impacted by Transfer Using Scenario 1

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
15SP	45	WEPL	58769 JEWELL 3 115	0.9375	0.8745	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.9474	0.8806	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.8683	0.8242	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.8670	0.8209	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.8790	0.8017	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.7847	0.6451	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58786 PLAINVL3 115	0.8408	0.7973	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58786 PLAINVL3 115	0.8395	0.7937	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58786 PLAINVL3 115	0.8447	0.7539	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
15SP	45	WEPL	58786 PLAINVL3 115	0.7194	0.5502	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.9249	0.8858	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.9239	0.8832	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.9365	0.8807	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.9455	0.8576	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.8827	0.7889	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.9308	0.8933	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.9249	0.8906	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.9300	0.8905	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.9180	0.8532	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.8800	0.7192	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9347	0.8991	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9340	0.8962	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9326	0.8795	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9122	0.8773	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.8608	0.6790	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.9253	0.8910	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9127	0.8778	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	

Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
05SP	42	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	106.9	111.0	6.7	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
05SP	42	WERE	WERE	EAST STREET - WEST EMPORIA 115KV	92	109.0	110.3	3.0	MORRIS COUNTY - WEST EMPORIA 115KV	0	May be relieved due to Westar Operating Procedure 1209 - Outage of the Morris to West Emporia 115kV Line	
05SP	42	WERE	WERE	KEENE - SOUTH ALMA 115KV	68	99.0	103.0	6.5	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	3	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
05SP	42	WERE	WERE	WEST EMPORIA - EAST STREET 115KV	92	105.8	108.3	5.4	MORRIS COUNTY 230/115/13.8KV TRANSFORMER	0	May be relieved due to Westar Operating Procedure 625 - Outage of the Morris County Transformer	
05SH	34	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	102.0	104.0	4.0	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
05SH	34	WERE	WERE	NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115KV	160	109.1	111.3	10.5	EAST MCPHERSON - SUMMIT 230KV	0	Rebuild 0.88 miles and reconductor with 1192.5 ACSR.	\$417,200
05SH	34	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV	68	117.7	120.1	4.8	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Specified for Facility	
05SH	34	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV CKT 2	92	102.7	104.8	5.7	EAST MCPHERSON - SUMMIT 230KV	0	Tear down double circuit, build single circuit with 1192.5 ACSR.	\$7,800,000
05FA	26	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	110.9	112.3	5.1	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05FA	26	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	102.5	103.9	5.2	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05FA	26	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	100.4	101.8	5.2	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05WP	27	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	113.3	114.1	3.0	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06G	31	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	102.2	104.7	5.6	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
06G	31	WERE	WERE	NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115KV	160	102.7	104.5	9.7	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Specified for Facility	
06G	31	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV	68	110.8	112.9	4.5	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	109.6	112.2	4.2	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
06SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	119.2	121.2	4.8	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	102.5	107.8	12.0	CONCORDIA - EAST MANHATTAN 230KV	0	Rebuild 15.50-mile line (1192.5 kmil 45/7 ACSR, 223 MVA, 245 MVA), Replace CTs and Wave Trap (2000 A.)	\$5,800,000
06SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	102.5	107.7	12.0	CONCORDIA 230/115KV TRANSFORMER	0	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	104.1	106.0	4.5	IATAN - ST JOE 345KV	0	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	101.3	103.9	5.9	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	104.3	106.4	4.7	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SP	42	WERE	WERE	KEENE - SOUTH ALMA 115KV	68	101.3	103.8	4.0	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
06SP	42	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	101.3	103.5	4.7	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	106.7	108.6	3.7	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
06SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	117.6	119.0	4.2	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	106.8	110.7	11.0	CONCORDIA - EAST MANHATTAN 230KV	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	106.8	110.6	11.0	CONCORDIA 230/115KV TRANSFORMER	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	105.0	106.5	4.3	IATAN - ST JOE 345KV	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	101.2	103.0	5.2	COOPER 345/161KV TRANSFORMER	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	106.4	107.9	4.1	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	KEENE - SOUTH ALMA 115KV	68	100.0	101.8	3.6	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
06SH	34	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	103.9	105.4	4.1	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	KELLY - SOUTH SENECA 115KV	92	94.0	104.7	29.0	CONCORDIA - EAST MANHATTAN 230KV	7	Solution Undetermined	
06SH	34	WERE	WERE	KELLY - SOUTH SENECA 115KV	92	93.9	104.6	29.1	CONCORDIA 230/115KV TRANSFORMER	7	Solution Undetermined	
06FA	26	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	100.9	103.1	5.9	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
06FA	26	WERE	WERE	NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115KV	160	101.3	102.7	8.7	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Specified for Facility	
06FA	26	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV	68	109.3	110.8	4.0	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Specified for Facility	
06WP	27	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV	68	104.4	106.0	4.2	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	132.5	135.6	10.1	CIRCLE - DAVIS 115KV	0	May be relieved due to Westar Operating Procedure 1205 - Outage of the Circle to Davis 115kV Line	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	116.1	119.2	10.1	HUTCHINSON ENERGY CENTER - HUTCHINSON GAS TURBINE STATION 69KV	0	May be relieved due to Westar Operating Procedure 1306 - Outage of the HEC to HEC GT 69kV Line	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	113.9	118.3	14.5	CIRCLE - MULLERGREEN 230KV	0	Solution Undetermined	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	112.8	115.8	9.8	REMOVE UNIT 1 FROM BUS 56693 [HEC U3 14.400] DISPATCH	0	Solution Undetermined	
07SP	43	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	119.8	121.5	3.7	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07SP	43	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	101.8	107.0	11.6	CONCORDIA - EAST MANHATTAN 230KV	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	101.8	106.9	11.6	CONCORDIA 230/115KV TRANSFORMER	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	102.9	104.7	4.0	IATAN - ST JOE 345KV	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	101.3	103.3	4.6	COOPER 345/161KV TRANSFORMER	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	104.4	106.1	3.6	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	

07SP	43	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	101.5	103.2	3.6	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line
07WP	27	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	110.8	112.2	5.0	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line
07WP	27	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	103.3	104.7	4.9	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line
07WP	27	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	101.4	102.8	4.9	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line
07WP	27	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV	68	105.6	107.7	5.4	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Specified for Facility
10SP	44	WERE	WERE	COUNTY LINE - HOOK JCT 115KV	92	119.3	123.0	7.6	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line
10SP	44	WERE	WERE	COUNTY LINE - TECUMSEH HILL 115KV	106	108.5	110.9	5.8	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line
10SP	44	WERE	WERE	GILL ENERGY CENTER EAST - MACARTHUR 69KV	68	115.9	117.9	3.1	GILL ENERGY CENTER EAST - OATVILLE 69KV	0	See Previous Upgrade Specified for Facility
10SP	44	WERE	WERE	GILL ENERGY CENTER EAST - OATVILLE 69KV	72	124.8	127.0	3.6	GILL ENERGY CENTER EAST - MACARTHUR 69KV	0	See Previous Upgrade Specified for Facility
10SP	44	WERE	WERE	GILL ENERGY CENTER EAST - OATVILLE 69KV	72	109.2	111.1	3.1	GILL ENERGY CENTER WEST - HAYSVILLE JUNCTION 69KV	0	See Previous Upgrade Specified for Facility
10SP	44	WERE	WERE	HOOK JCT - TECUMSEH ENERGY CENTER 115KV	160	122.7	126.4	13.7	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line
10SP	44	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	110.3	112.5	12.1	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line
10SP	44	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	98.9	101.8	4.6	HOYT - HOYT HTI SWITCHING JUNCTION 115KV	5	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115KV Transformer
10WP	27	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV	68	99.0	100.5	3.8	EAST MCPHERSON - SUMMIT 230KV	8	See Previous Upgrade Specified for Facility
10WP	27	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	98.0	100.4	6.3	CONCORDIA 230/115KV TRANSFORMER	11	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115KV Transformer
10WP	27	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	97.9	100.4	6.3	EAST MANHATTAN - CONCORDIA 230KV	11	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115KV Transformer
15SP	45	WERE	WERE	54TH & MERIDEN - HOYT 115KV	179	106.7	108.7	7.8	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line
15SP	45	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	106.9	110.4	7.6	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line
15SP	45			Contingency Solution Not Converged					HOYT - JEFFREY ENERGY CENTER 345KV		
15SP	45	WERE	WERE	COUNTY LINE - TECUMSEH HILL 115KV	106	114.9	116.3	3.2	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line
15SP	45	WERE	WERE	GOODYEAR JUNCTION - NORTHLAND 115KV	175	107.8	109.5	6.9	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line
15SP	45	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	106.7	108.6	46.9	JEFFREY ENERGY CENTER - MORRIS COUNTY 345KV	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center - Morris County 345kV Line
15SP	45	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	105.0	106.7	40.4	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 400 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line
15SP	45	WERE	WERE	MOCKINGBIRD HILL SWITCHING STATION - STULL SWITCHING STATION 115KV	92	114.6	116.1	3.1	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line
15SP	45	WERE	WERE	STULL SWITCHING STATION - TECUMSEH HILL 115KV	92	121.9	123.4	3.0	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	121.9	123.3	6.9	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	104.8	105.8	4.9	JEFFREY ENERGY CENTER - MORRIS COUNTY 345KV	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center - Morris County 345kV Line
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	103.2	103.9	3.6	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Auburn Road to Jeffrey Energy Center 345kV Line
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	100.5	101.1	3.4	COUNTY LINE - GOODYEAR JUNCTION 115KV	0	Solution Undetermined
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	99.9	100.5	3.1	REMOVE UNIT 1 FROM BUS 56663 (LEC US '24.000) DISPATCH	2	Solution Undetermined
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	99.8	100.4	3.1	CRAIG - STRANGER CREEK 345KV	4	May be relieved due to Westar Operating Procedure 401 - Outage of the Stranger Creek - Craig 345kV Line
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	100.1	100.7	3.3	COUNTY LINE 115/69/34.5KV TRANSFORMER	0	Solution Undetermined
15SP	45	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	100.5	103.9	5.2	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line
15SP	45	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	97.5	101.1	5.6	HOYT - HOYT HTI SWITCHING JUNCTION 115KV	9	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115KV Transformer
Total Estimated Engineering and Construction Cost											\$14,017,200

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	ATC (MW)	Solution	Estimated Cost
05SP	42	MIDW	56551 SALINE 3 115	0.8261	0.7769	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56551 SALINE 3 115	0.8261	0.7769	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56551 SALINE 3 115	0.8220	0.7745	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56551 SALINE 3 115	0.8150	0.6280	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56551 SALINE 3 115	0.8150	0.6280	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56552 GORHAM 3 115	0.8474	0.8053	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56552 GORHAM 3 115	0.8474	0.8053	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56552 GORHAM 3 115	0.8434	0.8032	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56553 S HAYS 3 115	0.8514	0.8096	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56553 S HAYS 3 115	0.8514	0.8096	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56553 S HAYS 3 115	0.8474	0.8074	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56556 HOXIE 3 115	0.8773	0.8495	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56556 HOXIE 3 115	0.8748	0.8481	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56557 BEACH 3 115	0.8437	0.8067	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56557 BEACH 3 115	0.8437	0.8067	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56557 BEACH 3 115	0.8405	0.8049	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56558 KNOLL 6 230	0.7506	0.7104	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56560 WKNNY 3 115	0.8163	0.7692	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56560 WKNNY 3 115	0.8163	0.7692	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56560 WKNNY 3 115	0.8121	0.7669	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56561 KNOLL 3 115	0.8298	0.7838	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56561 KNOLL 3 115	0.8298	0.7838	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56561 KNOLL 3 115	0.8257	0.7815	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56562 HAYS 3 115	0.8226	0.7759	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56562 HAYS 3 115	0.8226	0.7759	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56562 HAYS 3 115	0.8185	0.7736	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56590 BEMIS 3 115	0.8245	0.7752	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56590 BEMIS 3 115	0.8245	0.7752	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56590 BEMIS 3 115	0.8204	0.7728	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56590 BEMIS 3 115	0.8134	0.6260	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56590 BEMIS 3 115	0.8134	0.6260	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56591 VINE 3 115	0.8231	0.7764	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56591 VINE 3 115	0.8231	0.7764	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56591 VINE 3 115	0.8190	0.7741	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56605 REDLIN 3 115	0.8387	0.7992	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56605 REDLIN 3 115	0.8387	0.7992	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56605 REDLIN 3 115	0.8352	0.7972	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SH	34	MIDW	56551 SALINE 3 115	0.9299	0.8769	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	19		
05SH	34	MIDW	56590 BEMIS 3 115	0.9289	0.8758	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	19		
05FA	26	WERE	57322 BAILEYV3 115	0.8944	0.8570	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
05FA	26	WERE	57332 KNOB HL3 115	0.9079	0.8713	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	14	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
05FA	26	WERE	57337 SENECA 3 115	0.8914	0.8538	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
05FA	26	WERE	57338 SMITTYV3 115	0.8989	0.8617	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
05FA	26	WERE	58765 GRNLEAF3 115	0.9344	0.8993	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	25	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
05WP	27		None Identified				27		
06AP	13		None Identified				13		
06G	31	WERE	57322 BAILEYV3 115	0.9172	0.8735	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	14	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
06G	31	WERE	57332 KNOB HL3 115	0.9307	0.8879	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	22	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	



06G	31	WERE	57337 SENECA 3 115	0.9141	0.8703	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	14	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06G	31	WERE	57338 SMITTYV3 115	0.9216	0.8782	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	15	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06SP	42	MIDW	56551 SALINE 3 115	0.8336	0.7929	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56551 SALINE 3 115	0.8326	0.7920	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56551 SALINE 3 115	0.8183	0.6437	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56552 GORHAM 3 115	0.8547	0.8200	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56552 GORHAM 3 115	0.8537	0.8191	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56553 S HAYS 3 115	0.8586	0.8242	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56553 S HAYS 3 115	0.8576	0.8233	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56556 HOXIE 3 115	0.8850	0.8635	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56556 HOXIE 3 115	0.8843	0.8629	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56557 BEACH 3 115	0.8510	0.8217	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56557 BEACH 3 115	0.8502	0.8209	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56558 KNOLL 6 230	0.7607	0.7264	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56560 WKNNY 3 115	0.8245	0.7858	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56560 WKNNY 3 115	0.8234	0.7849	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56561 KNOLL 3 115	0.8378	0.8000	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56561 KNOLL 3 115	0.8367	0.7990	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56562 HAYS 3 115	0.8307	0.7924	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56562 HAYS 3 115	0.8297	0.7914	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56590 BEMIS 3 115	0.8321	0.7913	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56590 BEMIS 3 115	0.8310	0.7903	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56590 BEMIS 3 115	0.8167	0.6417	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56591 VINE 3 115	0.8312	0.7929	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56591 VINE 3 115	0.8302	0.7919	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	MIDW	56605 REDLIN 3 115	0.8463	0.8146	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
06SP	42	MIDW	56605 REDLIN 3 115	0.8454	0.8138	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
06SP	42	WERE	57036 CLEARWT4 138	0.9136	0.8301	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	10	
06SH	34	MIDW	56551 SALINE 3 115	0.9239	0.8701	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	15	
06SH	34	MIDW	56590 BEMIS 3 115	0.9228	0.8690	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	14	
06SH	34	WERE	57322 BAILEYV3 115	0.8565	0.7980	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06SH	34	WERE	57332 KNOB HL3 115	0.874	0.8172	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06SH	34	WERE	57337 SENECA 3 115	0.8526	0.7938	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06SH	34	WERE	57338 SMITTYV3 115	0.8621	0.8041	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06SH	34	WERE	58756 CLIFTON3 115	0.9377	0.8896	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	27	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06SH	34	WERE	58765 GRNLEAF3 115	0.9088	0.8554	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	13	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06FA	26	MIDW	56558 KNOLL 6 230	1.0508	0.8940	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	25	
06FA	26	WERE	57322 BAILEYV3 115	0.8914	0.8536	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06FA	26	WERE	57332 KNOB HL3 115	0.9054	0.8683	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	14	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06FA	26	WERE	57337 SENECA 3 115	0.8883	0.8503	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06FA	26	WERE	57338 SMITTYV3 115	0.896	0.8584	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	0	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06FA	26	WERE	58765 GRNLEAF3 115	0.9328	0.8974	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	24	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06WP	27	WERE	57322 BAILEYV3 115	0.9164	0.8840	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	17	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts

06WP	27	WERE	57332 KNOB HL3 115	0.9278	0.8960	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	24	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06WP	27	WERE	57337 SENECA 3 115	0.9138	0.8813	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	17	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
06WP	27	WERE	57338 SMITTYV3 115	0.9202	0.8880	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	17	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
07SP	43	MIDW	56551 SALINE 3 115	0.8709	0.8371	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56551 SALINE 3 115	0.8697	0.8359	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56551 SALINE 3 115	0.8185	0.6338	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56552 GORHAM 3 115	0.8882	0.8599	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56552 GORHAM 3 115	0.8871	0.8588	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56553 S HAYS 3 115	0.8919	0.8637	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56553 S HAYS 3 115	0.8908	0.8627	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56557 BEACH 3 115	0.9103	0.8860	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	35	
07SP	43	MIDW	56557 BEACH 3 115	0.9093	0.8852	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	36	
07SP	43	MIDW	56558 KNOLL 6 230	0.7960	0.7678	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56560 WKNNY 3 115	0.8643	0.8326	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56560 WKNNY 3 115	0.8631	0.8314	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56561 KNOLL 3 115	0.8768	0.8457	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56561 KNOLL 3 115	0.8756	0.8446	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56562 HAYS 3 115	0.8703	0.8388	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56562 HAYS 3 115	0.8691	0.8377	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56590 BEMIS 3 115	0.8694	0.8355	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56590 BEMIS 3 115	0.8682	0.8344	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56590 BEMIS 3 115	0.8169	0.6318	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56591 VINE 3 115	0.8707	0.8392	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56591 VINE 3 115	0.8695	0.8381	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56605 REDLIN 3 115	0.9006	0.8746	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	33	
07SP	43	MIDW	56605 REDLIN 3 115	0.8996	0.8736	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	WERE	57036 CLEARWT4 138	0.9060	0.8145	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	9	
07WP	27	WERE	57322 BAILEYV3 115	0.9314	0.8995	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	27	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
07WP	27	WERE	57337 SENECA 3 115	0.9288	0.8967	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	24	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
10SP	44	MIDW	56551 SALINE 3 115	0.8632	0.8270	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56551 SALINE 3 115	0.8616	0.8258	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56551 SALINE 3 115	0.7526	0.5746	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56552 GORHAM 3 115	0.8866	0.8564	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56552 GORHAM 3 115	0.8851	0.8553	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56553 S HAYS 3 115	0.8904	0.8605	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56553 S HAYS 3 115	0.8890	0.8594	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56557 BEACH 3 115	0.9068	0.8812	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	34	
10SP	44	MIDW	56557 BEACH 3 115	0.9057	0.8803	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	35	
10SP	44	MIDW	56558 KNOLL 6 230	0.7908	0.7609	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56560 WKNNY 3 115	0.8580	0.8240	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56560 WKNNY 3 115	0.8564	0.8228	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56561 KNOLL 3 115	0.8714	0.8382	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56561 KNOLL 3 115	0.8699	0.8370	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56562 HAYS 3 115	0.8643	0.8306	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56562 HAYS 3 115	0.8628	0.8293	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56590 BEMIS 3 115	0.8616	0.8253	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56590 BEMIS 3 115	0.8600	0.8241	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56590 BEMIS 3 115	0.7507	0.5724	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56591 VINE 3 115	0.8648	0.8311	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56591 VINE 3 115	0.8632	0.8298	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56605 REDLIN 3 115	0.8966	0.8689	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56605 REDLIN 3 115	0.8953	0.8679	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	

10WP	27	WERE	57322 BAILEYV3 115	0.9278	0.8947	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	23	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
10WP	27	WERE	57337 SENECA 3 115	0.925	0.8918	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	20	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
10WP	27	WERE	57338 SMITTYV3 115	0.9318	0.8989	OPEN LINE FROM BUS 57217 [KELLY 3115.00] TO BUS 57337 [SENECA 3115.00] CKT 1	26	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts	
15SP	45	MIDW	56551 SALINE 3 115	0.8326	0.7872	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
15SP	45	MIDW	56551 SALINE 3 115	0.8318	0.7858	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
15SP	45	MIDW	56551 SALINE 3 115	0.7123	0.5434	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0		
15SP	45	MIDW	56552 GORHAM 3 115	0.8594	0.8210	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
15SP	45	MIDW	56552 GORHAM 3 115	0.8586	0.8197	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
15SP	45	MIDW	56553 S HAYS 3 115	0.8637	0.8256	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
15SP	45	MIDW	56553 S HAYS 3 115	0.8629	0.8243	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
15SP	45	MIDW	56556 HOXIE 3 115	0.9072	0.8824	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	36		
15SP	45	MIDW	56556 HOXIE 3 115	0.9067	0.8816	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	36		
15SP	45	MIDW	56557 BEACH 3 115	0.8757	0.8421	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
15SP	45	MIDW	56557 BEACH 3 115	0.8750	0.8410	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
15SP	45	MIDW	56558 KNOLL 6 230	0.7633	0.7243	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
15SP	45	MIDW	56560 WKNY 3 115	0.8256	0.7822	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
15SP	45	MIDW	56560 WKNY 3 115	0.8248	0.7809	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
15SP	45	MIDW	56561 KNOLL 3 115	0.8404	0.7981	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
15SP	45	MIDW	56561 KNOLL 3 115	0.8396	0.7968	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
15SP	45	MIDW	56562 HAYS 3 115	0.8324	0.7894	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
15SP	45	MIDW	56562 HAYS 3 115	0.8315	0.7880	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
15SP	45	MIDW	56590 BEMIS 3 115	0.8309	0.7854	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
15SP	45	MIDW	56590 BEMIS 3 115	0.8300	0.7840	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
15SP	45	MIDW	56590 BEMIS 3 115	0.7103	0.5411	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0		
15SP	45	MIDW	56591 VINE 3 115	0.8329	0.7899	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
15SP	45	MIDW	56591 VINE 3 115	0.8321	0.7886	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
15SP	45	MIDW	56605 REDLIN 3 115	0.8652	0.8292	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
15SP	45	MIDW	56605 REDLIN 3 115	0.8645	0.8280	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
Total Estimated Engineering and Construction Cost									\$0

Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	Comments
05SH	42			NONE IDENTIFIED					
05SP	34			NONE IDENTIFIED					
05FA	26			NONE IDENTIFIED					
05WP	27			NONE IDENTIFIED					
06AP	13			NONE IDENTIFIED					
06G	31			NONE IDENTIFIED					
06SP	42			NONE IDENTIFIED					
06SH	34			NONE IDENTIFIED					
06FA	26			NONE IDENTIFIED					
06WP	27			NONE IDENTIFIED					
07SP	43			NONE IDENTIFIED					
07WP	27			NONE IDENTIFIED					
10SP	44			NONE IDENTIFIED					
10WP	27			NONE IDENTIFIED					
15SP	45			NONE IDENTIFIED					

Table 4.2 - Non-SPP Voltage Violations  
Caused or Impacted by Transfer Using Scenario 2

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
05SP	42	SUNC	56364 ATWODSW3 115	0.8750	0.8479	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56364 ATWODSW3 115	0.8775	0.8494	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56366 CNORTON3 115	0.8421	0.8078	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56366 CNORTON3 115	0.8453	0.8096	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56367 HERNDON3 115	0.8656	0.8368	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56367 HERNDON3 115	0.8683	0.8384	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56369 NATWOOD3 115	0.8750	0.8479	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56369 NATWOOD3 115	0.8775	0.8494	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56371 JOHNSON3 115	0.8568	0.8264	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56371 JOHNSON3 115	0.8596	0.8280	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56372 NORCATR3 115	0.8486	0.8161	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56372 NORCATR3 115	0.8516	0.8178	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56373 RHOADES3 115	0.8421	0.8078	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56373 RHOADES3 115	0.8453	0.8096	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56386 GRHMSUB3 115	0.8400	0.8046	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56386 GRHMSUB3 115	0.8433	0.8064	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56387 HILLCTY3 115	0.8400	0.8046	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56387 HILLCTY3 115	0.8433	0.8064	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56457 OBER T 3 115	0.8552	0.8245	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56457 OBER T 3 115	0.8580	0.8262	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56458 OBERLIN3 115	0.8547	0.8240	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56458 OBERLIN3 115	0.8575	0.8257	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58750 BELOIT 3 115	0.9205	0.8832	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
05SP	42	WEPL	58750 BELOIT 3 115	0.9623	0.8937	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58750 BELOIT 3 115	0.9623	0.8937	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58760 EHALLTP3 115	0.8705	0.7249	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58760 EHALLTP3 115	0.9356	0.8991	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58762 ELLSWTH3 115	0.8716	0.7100	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58762 ELLSWTH3 115	0.9388	0.8954	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58762 ELLSWTH3 115	0.9418	0.8973	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58762 ELLSWTH3 115	0.9418	0.8973	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58763 GLENELD3 115	0.9494	0.8691	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58763 GLENELD3 115	0.9494	0.8691	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58763 GLENELD3 115	0.9327	0.8960	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
05SP	42	WEPL	58768 HARPER 4 138	0.9575	0.8980	OPEN LINE FROM BUS 57045 GILL W 4 138 TO BUS 58775 MILANTP4 138 CKT1	
05SP	42	WEPL	58769 JEWELL 3 115	0.9620	0.8949	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58769 JEWELL 3 115	0.9620	0.8949	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58775 MILANTP4 138	0.9572	0.8957	OPEN LINE FROM BUS 57045 GILL W 4 138 TO BUS 58775 MILANTP4 138 CKT1	
05SP	42	WEPL	58776 MILAN 4 138	0.9564	0.8938	OPEN LINE FROM BUS 57045 GILL W 4 138 TO BUS 58775 MILANTP4 138 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.8562	0.7066	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.8562	0.7066	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.8483	0.7981	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.8519	0.8003	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.8519	0.8003	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.9188	0.8511	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.9188	0.8511	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.9539	0.8998	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58786 PLAINVL3 115	0.8185	0.6326	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	

Table 4.2 - Non-SPP Voltage Violations  
Caused or Impacted by Transfer Using Scenario 2

Southwest Power Pool  
System Impact Study

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
05SP	42	WEPL	58786 PLAINVL3 115	0.8185	0.6326	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58786 PLAINVL3 115	0.8219	0.7719	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58786 PLAINVL3 115	0.8260	0.7743	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58786 PLAINVL3 115	0.8260	0.7743	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58786 PLAINVL3 115	0.9022	0.8234	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
05SP	42	WEPL	58786 PLAINVL3 115	0.9022	0.8234	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
05SP	42	WEPL	58793 SMITH-C3 115	0.9230	0.8243	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58793 SMITH-C3 115	0.9230	0.8243	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58793 SMITH-C3 115	0.9120	0.8681	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58793 SMITH-C3 115	0.9148	0.8699	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58793 SMITH-C3 115	0.9148	0.8699	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58793 SMITH-C3 115	0.9521	0.8806	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58798 WALDO 3 115	0.8903	0.7642	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58798 WALDO 3 115	0.9415	0.8748	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58798 WALDO 3 115	0.9415	0.8748	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58798 WALDO 3 115	0.9242	0.8841	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58798 WALDO 3 115	0.9271	0.8859	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58798 WALDO 3 115	0.9271	0.8859	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58801 RUSSELL3 115	0.8721	0.7306	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58801 RUSSELL3 115	0.9178	0.8887	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
05SP	42	WEPL	58801 RUSSELL3 115	0.9299	0.8924	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58801 RUSSELL3 115	0.9329	0.8943	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58801 RUSSELL3 115	0.9329	0.8943	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58801 RUSSELL3 115	0.9494	0.8953	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58801 RUSSELL3 115	0.9494	0.8953	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58768 HARPER 4 138	0.9581	0.8995	57413 CIRCLE 3115 57429 MOUNDRG3115 CKT 158775 MILANTP4138 57045 GILL W 4138 CKT 1	
05SP	42	WEPL	58775 MILANTP4 138	0.9579	0.8972	57413 CIRCLE 3115 57429 MOUNDRG3115 CKT 158775 MILANTP4138 57045 GILL W 4138 CKT 1	
05SP	42	WEPL	58776 MILAN 4 138	0.9571	0.8953	57413 CIRCLE 3115 57429 MOUNDRG3115 CKT 158775 MILANTP4138 57045 GILL W 4138 CKT 1	
05SP	42	WEPL	58801 RUSSELL3 115	0.9182	0.8882	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	
05SH	34	WEPL	58760 EHALLTP3 115	0.9395	0.8729	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SH	34	WEPL	58760 EHALLTP3 115	0.9395	0.8729	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SH	34	WEPL	58762 ELLSWTH3 115	0.9447	0.8716	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SH	34	WEPL	58762 ELLSWTH3 115	0.9447	0.8716	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SH	34	WEPL	58786 PLAINVL3 115	0.9320	0.8792	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SH	34	WEPL	58786 PLAINVL3 115	0.9320	0.8792	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SH	34	WEPL	58798 WALDO 3 115	0.9515	0.8932	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SH	34	WEPL	58798 WALDO 3 115	0.9515	0.8932	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SH	34	WEPL	58801 RUSSELL3 115	0.9400	0.8752	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SH	34	WEPL	58801 RUSSELL3 115	0.9400	0.8752	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05FA	26		None Identified				
05WP	27		None Identified				
06AP	13		None Identified				
06G	31		None Identified				
06SP	42	SUNC	56364 ATWODSW3 115	0.8839	0.8622	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
06SP	42	SUNC	56364 ATWODSW3 115	0.8846	0.8628	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56366 CNORTON3 115	0.8516	0.8236	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56366 CNORTON3 115	0.8524	0.8244	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56367 HERNDON3 115	0.8747	0.8515	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56367 HERNDON3 115	0.8755	0.8522	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56369 NATWOOD3 115	0.8839	0.8622	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56369 NATWOOD3 115	0.8846	0.8628	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56371 JOHNSON3 115	0.8660	0.8415	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56371 JOHNSON3 115	0.8668	0.8421	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56372 NORCATR3 115	0.8580	0.8316	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56372 NORCATR3 115	0.8588	0.8323	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56373 RHOADES3 115	0.8516	0.8236	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56373 RHOADES3 115	0.8524	0.8244	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56386 GRHMSUB3 115	0.8495	0.8203	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56386 GRHMSUB3 115	0.8504	0.8211	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56387 HILLCTY3 115	0.8495	0.8203	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56387 HILLCTY3 115	0.8504	0.8211	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56457 OBER T 3 115	0.8645	0.8397	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56457 OBER T 3 115	0.8653	0.8404	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56458 OBERLIN3 115	0.8640	0.8392	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56458 OBERLIN3 115	0.8648	0.8398	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58750 BELOIT 3 115	0.9230	0.8902	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
06SP	42	WEPL	58750 BELOIT 3 115	0.9630	0.8985	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58760 EHALLTP3 115	0.8709	0.7458	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SP	42	WEPL	58762 ELLSWTH3 115	0.8720	0.7330	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SP	42	WEPL	58763 GLENELD3 115	0.9506	0.8752	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58768 HARPER 4 138	0.9222	0.8431	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58769 JEWELL 3 115	0.9626	0.8996	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58773 MED-LDG3 115	0.9369	0.8845	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58774 MED-LDG4 138	0.9394	0.8788	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58775 MILANTP4 138	0.9165	0.8333	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58776 MILAN 4 138	0.9154	0.8305	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58776 MILAN 4 138	0.9574	0.8991	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 58775 MILANTP4 138 CKT1	
06SP	42	WEPL	58785 PHLBURG3 115	0.8589	0.7190	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58785 PHLBURG3 115	0.8558	0.8122	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	WEPL	58785 PHLBURG3 115	0.8568	0.8131	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58785 PHLBURG3 115	0.9204	0.8548	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
06SP	42	WEPL	58786 PLAINVL3 115	0.8218	0.6482	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58786 PLAINVL3 115	0.8320	0.7891	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	WEPL	58786 PLAINVL3 115	0.8331	0.7901	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58786 PLAINVL3 115	0.9040	0.8278	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
06SP	42	WEPL	58787 PRATT 3 115	0.9347	0.8939	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58793 SMITH-C3 115	0.9247	0.8320	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58793 SMITH-C3 115	0.9170	0.8781	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	WEPL	58793 SMITH-C3 115	0.9179	0.8788	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58793 SMITH-C3 115	0.9516	0.8917	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SP	42	WEPL	58798 WALDO 3 115	0.8904	0.7825	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SP	42	WEPL	58798 WALDO 3 115	0.9436	0.8807	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	

Table 4.2 - Non-SPP Voltage Violations  
Caused or Impacted by Transfer Using Scenario 2

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
06SP	42	WEPL	58798 WALDO 3 115	0.9305	0.8945	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	WEPL	58798 WALDO 3 115	0.9312	0.8952	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58801 RUSSELL3 115	0.8725	0.7510	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SP	42	WEPL	58801 RUSSELL3 115	0.9188	0.8899	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
06SP	42	WEPL	58801 RUSSELL3 115	0.9184	0.8901	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	
06SH	34	WEPL	58760 EHALLTP3 115	0.9360	0.8704	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SH	34	WEPL	58762 ELLSWTH3 115	0.9413	0.8691	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SH	34	WEPL	58785 PHLBURG3 115	0.9436	0.8975	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SH	34	WEPL	58786 PLAINVL3 115	0.9260	0.8724	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SH	34	WEPL	58798 WALDO 3 115	0.9479	0.8906	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SH	34	WEPL	58801 RUSSELL3 115	0.9365	0.8727	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06FA	26		None Identified				
06WP	27		None Identified				
07SP	43	SUNC	56386 GRHMSUB3 115	0.9122	0.8882	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
07SP	43	SUNC	56386 GRHMSUB3 115	0.9131	0.8890	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	SUNC	56387 HILLCTY3 115	0.9122	0.8882	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
07SP	43	SUNC	56387 HILLCTY3 115	0.9131	0.8890	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58750 BELOIT 3 115	0.9219	0.8882	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
07SP	43	WEPL	58750 BELOIT 3 115	0.9645	0.8968	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58760 EHALLTP3 115	0.8735	0.7380	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07SP	43	WEPL	58762 ELLSWTH3 115	0.8747	0.7242	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07SP	43	WEPL	58763 GLENELD3 115	0.9519	0.8727	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58768 HARPER 4 138	0.9154	0.8288	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58768 HARPER 4 138	0.9564	0.8969	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 58775 MILANTP4 138 CKT1	
07SP	43	WEPL	58769 JEWELL 3 115	0.9642	0.8981	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58773 MED-LDG3 115	0.9320	0.8747	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58774 MED-LDG4 138	0.9339	0.8677	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58775 MILANTP4 138	0.9090	0.8179	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58775 MILANTP4 138	0.9562	0.8944	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 58775 MILANTP4 138 CKT1	
07SP	43	WEPL	58776 MILAN 4 138	0.9078	0.8148	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58776 MILAN 4 138	0.9554	0.8925	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 58775 MILANTP4 138 CKT1	
07SP	43	WEPL	58785 PHLBURG3 115	0.8593	0.7116	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58785 PHLBURG3 115	0.8815	0.8439	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
07SP	43	WEPL	58785 PHLBURG3 115	0.8825	0.8451	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58785 PHLBURG3 115	0.9208	0.8530	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
07SP	43	WEPL	58786 PLAINVL3 115	0.8219	0.6384	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58786 PLAINVL3 115	0.9042	0.8253	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
07SP	43	WEPL	58786 PLAINVL3 115	0.8674	0.8314	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
07SP	43	WEPL	58786 PLAINVL3 115	0.8686	0.8326	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58787 PRATT 3 115	0.9304	0.8861	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58793 SMITH-C3 115	0.9256	0.8281	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58793 SMITH-C3 115	0.9541	0.8888	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07SP	43	WEPL	58793 SMITH-C3 115	0.9325	0.8979	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
07SP	43	WEPL	58793 SMITH-C3 115	0.9332	0.8989	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58797 SUNCITY3 115	0.9474	0.8998	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58798 WALDO 3 115	0.8930	0.7760	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07SP	43	WEPL	58798 WALDO 3 115	0.9439	0.8778	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	



Table 4.2 - Non-SPP Voltage Violations  
Caused or Impacted by Transfer Using Scenario 2

Southwest Power Pool  
System Impact Study

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
07SP	43	WEPL	58801 RUSSELL3 115	0.8750	0.7434	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07SP	43	WEPL	58801 RUSSELL3 115	0.9208	0.8897	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
07SP	43	WEPL	58801 RUSSELL3 115	0.9517	0.8979	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58801 RUSSELL3 115	0.9207	0.8889	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	
07WP	27		None Identified				
10SP	44	SUNC	56386 GRHMSUB3 115	0.9085	0.8833	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
10SP	44	SUNC	56386 GRHMSUB3 115	0.9097	0.8842	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	SUNC	56387 HILLCTY3 115	0.9085	0.8833	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
10SP	44	SUNC	56387 HILLCTY3 115	0.9097	0.8842	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58750 BELOIT 3 115	0.9499	0.8827	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58750 BELOIT 3 115	0.9205	0.8846	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
10SP	44	WEPL	58760 EHALLTP3 115	0.8654	0.7112	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10SP	44	WEPL	58762 ELLSWTH3 115	0.8662	0.6944	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10SP	44	WEPL	58762 ELLSWTH3 115	0.9556	0.8996	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58763 GLENELD3 115	0.9348	0.8559	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58763 GLENELD3 115	0.9329	0.8977	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
10SP	44	WEPL	58769 JEWELL 3 115	0.9500	0.8847	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58785 PHLBURG3 115	0.8145	0.6698	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58785 PHLBURG3 115	0.8909	0.8164	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
10SP	44	WEPL	58785 PHLBURG3 115	0.8771	0.8368	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
10SP	44	WEPL	58785 PHLBURG3 115	0.8785	0.8380	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58785 PHLBURG3 115	0.9497	0.8972	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10SP	44	WEPL	58786 PLAINVL3 115	0.7566	0.5797	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58786 PLAINVL3 115	0.8583	0.7715	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
10SP	44	WEPL	58786 PLAINVL3 115	0.8576	0.8193	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
10SP	44	WEPL	58786 PLAINVL3 115	0.8591	0.8206	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58793 SMITH-C3 115	0.9018	0.8054	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58793 SMITH-C3 115	0.9492	0.8761	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10SP	44	WEPL	58793 SMITH-C3 115	0.9451	0.8909	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
10SP	44	WEPL	58793 SMITH-C3 115	0.9302	0.8930	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
10SP	44	WEPL	58793 SMITH-C3 115	0.9314	0.8941	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58798 WALDO 3 115	0.8857	0.7530	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10SP	44	WEPL	58798 WALDO 3 115	0.9323	0.8669	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58798 WALDO 3 115	0.9278	0.8962	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
10SP	44	WEPL	58801 RUSSELL3 115	0.8671	0.7173	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10SP	44	WEPL	58801 RUSSELL3 115	0.9153	0.8833	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
10SP	44	WEPL	58801 RUSSELL3 115	0.9446	0.8914	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58798 WALDO 3 115	0.9282	0.8956	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	
10SP	44	WEPL	58801 RUSSELL3 115	0.9157	0.8827	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	
10WP	27		None Identified				
15SP	45	SUNC	56364 ATWODSW3 115	0.9223	0.8968	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56364 ATWODSW3 115	0.9227	0.8976	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56366 CNORTON3 115	0.8995	0.8669	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56366 CNORTON3 115	0.9001	0.8679	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56367 HERNDON3 115	0.9145	0.8873	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
15SP	45	SUNC	56367 HERNDON3 115	0.9150	0.8882	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56369 NATWOOD3 115	0.9222	0.8968	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56369 NATWOOD3 115	0.9227	0.8975	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56371 JOHNSON3 115	0.9074	0.8787	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56371 JOHNSON3 115	0.9079	0.8795	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56372 NORCATR3 115	0.9026	0.8718	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56372 NORCATR3 115	0.9031	0.8727	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56373 RHOADES3 115	0.8995	0.8669	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56373 RHOADES3 115	0.9001	0.8679	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56386 GRHMSUB3 115	0.8776	0.8437	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56386 GRHMSUB3 115	0.8782	0.8447	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56387 HILLCTY3 115	0.8776	0.8437	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56387 HILLCTY3 115	0.8782	0.8447	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56457 OBER T 3 115	0.9062	0.8772	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56457 OBER T 3 115	0.9067	0.8781	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56458 OBERLIN3 115	0.9056	0.8766	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56458 OBERLIN3 115	0.9062	0.8775	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58750 БЕЛОIT 3 115	0.9345	0.8698	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58750 БЕЛОIT 3 115	0.9145	0.8727	OPEN LINE FROM BUS 58750 БЕЛОIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
15SP	45	WEPL	58760 EHALLTP3 115	0.8525	0.6511	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58760 EHALLTP3 115	0.9428	0.8944	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58760 EHALLTP3 115	0.9339	0.8960	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58760 EHALLTP3 115	0.9345	0.8970	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58762 ELLSWTH3 115	0.8528	0.6271	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58762 ELLSWTH3 115	0.9460	0.8897	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58762 ELLSWTH3 115	0.9371	0.8914	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58762 ELLSWTH3 115	0.9376	0.8924	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58763 GLENELD3 115	0.9176	0.8412	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58763 GLENELD3 115	0.9600	0.8838	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58763 GLENELD3 115	0.9272	0.8862	OPEN LINE FROM BUS 58750 БЕЛОIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
15SP	45	WEPL	58769 JEWELL 3 115	0.9351	0.8724	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.7826	0.6439	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.8775	0.8000	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.8536	0.8049	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.8544	0.8062	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.9426	0.8713	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58786 PLAINVL3 115	0.7169	0.5488	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58786 PLAINVL3 115	0.8431	0.7521	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
15SP	45	WEPL	58786 PLAINVL3 115	0.8284	0.7801	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58786 PLAINVL3 115	0.8292	0.7815	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.8812	0.7879	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.9405	0.8465	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.9137	0.8709	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.9144	0.8720	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.9352	0.8794	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.8739	0.7011	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.9191	0.8549	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.9233	0.8824	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	

Table 4.2 - Non-SPP Voltage Violations  
 Caused or Impacted by Transfer Using Scenario 2

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
15SP	45	WEPL	58798 WALDO 3 115	0.9240	0.8835	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.9203	0.8864	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.8544	0.6588	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9075	0.8730	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9340	0.8815	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9283	0.8895	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9290	0.8905	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.9207	0.8858	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9080	0.8725	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	

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 Table 1.3 - SPP Facility Overloads  
 Caused or Impacted by Transfer Using Scenario 3

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Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
05SP	42	WERE	WERE	WEST EMPORIA - EAST STREET 115KV	92	100.3	102.7	5.2	MORRIS COUNTY 230/115/13.8KV TRANSFORMER	0	May be relieved due to Westar Operating Procedure 625 - Outage of the Morris County Transformer	
05FA	26	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	115.0	116.4	5.0	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05FA	26	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	106.8	108.2	5.0	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05FA	26	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	104.7	106.1	5.0	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	100.7	102.6	3.8	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230KV Line	
06SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	121.4	122.9	4.3	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	106.3	110.3	11.4	CONCORDIA - EAST MANHATTAN 230KV	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	106.3	110.3	11.4	CONCORDIA 230/115KV TRANSFORMER	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	107.2	108.7	4.3	IATAN - ST JOE 345KV	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	110.3	111.9	4.2	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	107.8	109.4	4.2	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SP	42	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	106.4	107.0	8.1	HOYT - JEFFREY ENERGY CENTER 345KV	0	May be relieved due to Westar Operating Procedure 400 - Outage of the Jeffrey Energy Center to Hoyt 345KV Line	
06SP	42	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	104.4	107.0	4.2	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230KV Line	
06SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	123.6	125.6	4.8	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	107.1	109.1	4.5	IATAN - ST JOE 345KV	0	Rebuild 15.50-mile line (1192.5 kmil 45/7 ACSR, 223 MVA, 245 MVA), Replace CTs and Wave Trap (2000 A.)	\$5,800,000
06SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	102.8	108.0	12.0	CONCORDIA - EAST MANHATTAN 230KV	0	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	102.8	108.0	12.0	CONCORDIA 230/115KV TRANSFORMER	0	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	101.8	104.8	7.1	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	108.8	111.0	4.7	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SP	42	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	105.9	108.0	4.7	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06WP	27	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	119.1	120.0	3.1	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06WP	27	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	112.3	113.4	3.7	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06WP	27	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	110.3	111.4	3.8	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	128.5	131.5	10.0	CIRCLE - DAVIS 115KV	0	May be relieved due to Westar Operating Procedure 1205 - Outage of the Circle to Davis 115KV Line	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	112.0	115.1	9.9	HUTCHINSON ENERGY CENTER - HUTCHINSON GAS TURBINE STATION 69KV	0	May be relieved due to Westar Operating Procedure 1306 - Outage of the HEC to HEC GT 69KV Line	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	108.8	111.9	10.2	REMOVE UNIT 1 FROM BUS 56893 [HEC U3 14.400] DISPATCH	0	Solution Undetermined	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	108.5	111.7	10.8	SEWARD - ST JOHN 115KV	0	Solution Undetermined	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	101.7	104.7	9.9	HUTCHINSON ENERGY CENTER 115/69/34.5KV TRANSFORMER	0	May be relieved due to Westar Operating Procedure 626 - Outage of the HUTCHINSON ENERGY CENTER TRANSFORMER	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	98.1	102.5	14.4	CIRCLE 230/115/13.8KV TRANSFORMER	6	Solution Undetermined	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	99.0	102.0	9.7	SPEARVILLE 345/230/13.8KV TRANSFORMER	4	Solution Undetermined	
07SP	43	WERE	WERE	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	141	97.5	100.5	9.8	GILL ENERGY CENTER 138/69/14.4KV TRANSFORMER	11	Solution Undetermined	
07SP	43	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	124.5	126.2	3.7	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07SP	43	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	106.2	107.9	3.9	IATAN - ST JOE 345KV	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	102.2	107.4	11.6	CONCORDIA - EAST MANHATTAN 230KV	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	102.2	107.3	11.6	CONCORDIA 230/115KV TRANSFORMER	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	109.3	111.0	3.6	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07SP	43	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	106.3	108.0	3.6	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	115.7	117.0	4.7	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	108.3	109.7	4.7	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	106.4	107.7	4.7	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	99.5	101.1	3.5	HOYT - STRANGER CREEK 345KV	4	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	

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 Table 1.3 - SPP Facility Overloads  
 Caused or Impacted by Transfer Using Scenario 3

Southwest Power Pool  
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10SP	44	WERE	WERE	COUNTY LINE - HOOK JCT 115KV	92	119.6	123.2	7.6	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	COUNTY LINE - TECUMSEH HILL 115KV	106	107.3	109.7	5.8	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	GILL ENERGY CENTER EAST - MACARTHUR 69KV	68	117.0	119.0	3.1	GILL ENERGY CENTER EAST - OATVILLE 69KV	0	Replace substation bus and jumpers at MacArthur 69 kV.	\$98,000
10SP	44	WERE	WERE	GILL ENERGY CENTER EAST - OATVILLE 69KV	72	126.0	128.2	3.6	GILL ENERGY CENTER EAST - MACARTHUR 69KV	0	Replace disconnect switches at Gill 69 kV (use 800 A.), Replace line switch at Oatville 69 kV (use 800 A.).	\$45,000
10SP	44	WERE	WERE	GILL ENERGY CENTER EAST - OATVILLE 69KV	72	110.3	112.2	3.1	GILL ENERGY CENTER WEST - HAYSVILLE JUNCTION 69KV	0	See Previous Upgrade Specified for Facility	
10SP	44	WERE	WERE	GILL ENERGY CENTER EAST - OATVILLE 69KV	72	102.3	104.2	3.1	HAYSVILLE JUNCTION - MIDLAND 69KV	0	See Previous Upgrade Specified for Facility	
10SP	44	WERE	WERE	HOOK JCT - TECUMSEH ENERGY CENTER 115KV	160	122.9	126.7	13.7	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	111.9	114.1	12.0	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	100.4	103.4	4.6	HOYT - HOYT HTI SWITCHING JUNCTION 115KV	0	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115KV Transformer	
10SP	44	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	100.9	103.0	3.3	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115KV Transformer	
10SP	44	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	97.6	100.5	4.6	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	11	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115KV Transformer	
15SP	45	WERE	WERE	54TH & MERIDEN - HOYT 115KV	179	109.7	111.2	6.1	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	99.7	100.8	13.5	HOYT - STRANGER CREEK 345KV	3	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	111.5	114.6	6.7	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	GOODYEAR JUNCTION - NORTHLAND 115KV	175	110.2	111.5	5.1	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	110.1	112.0	46.6	JEFFREY ENERGY CENTER - MORRIS COUNTY 345KV	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center - Morris County 345KV	
15SP	45	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	108.4	110.9	59.8	LAWRENCE HILL - LAWRENCE ENERGY CENTER UNIT 5 230 KV	0	Solution Undetermined	
15SP	45	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	109.0	110.7	39.3	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
15SP	45	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	99.1	100.8	38.8	LANG - MORRIS COUNTY 345KV	7	Solution Undetermined	
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	123.7	124.5	4.1	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	106.2	107.4	6.3	LAWRENCE HILL - LAWRENCE ENERGY CENTER UNIT 5 230 KV	0	Solution Undetermined	
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	104.4	105.3	4.7	JEFFREY ENERGY CENTER - MORRIS COUNTY 345KV	0	May be relieved due to Westar Operating Procedure 401 - Outage of the JEFFREY ENERGY CENTER - MORRIS COUNTY 345KV	
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	103.2	103.8	3.3	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	100.1	100.7	3.2	COUNTY LINE - GOODYEAR JUNCTION 115KV	0	Solution Undetermined	
15SP	45	WERE	WERE	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV	236	100.0	100.6	3.2	COUNTY LINE 115/69/34.5KV TRANSFORMER	1	Solution Undetermined	
15SP	45	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	103.7	106.8	4.9	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115KV Transformer	
15SP	45	WERE	WERE	TECUMSEH HILL 161/115/13.8KV TRANSFORMER	69	99.1	103.0	6.1	HOYT - HOYT HTI SWITCHING JUNCTION 115KV	3	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115KV Transformer	
											Total Estimated Engineering and Construction Cost	\$5,943,000

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	ATC (MW)	Solution	Estimated Cost
05SP	42	MIDW	56551 SALINE 3 115	0.8403	0.7977	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56551 SALINE 3 115	0.8390	0.7955	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56551 SALINE 3 115	0.8204	0.8414	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56552 GORHAM 3 115	0.8584	0.8222	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56552 GORHAM 3 115	0.8572	0.8202	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56553 S HAYS 3 115	0.8622	0.8263	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56553 S HAYS 3 115	0.8610	0.8244	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56556 HOXIE 3 115	0.8874	0.8639	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56556 HOXIE 3 115	0.8867	0.8623	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56557 BEACH 3 115	0.8552	0.8235	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56557 BEACH 3 115	0.8542	0.8216	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56558 KNOLL 6 230	0.7645	0.7277	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56560 WKNNY 3 115	0.8290	0.7885	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56560 WKNNY 3 115	0.8277	0.7863	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56561 KNOLL 3 115	0.8422	0.8026	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56561 KNOLL 3 115	0.8410	0.8005	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56562 HAYS 3 115	0.8353	0.7950	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56562 HAYS 3 115	0.8340	0.7929	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56590 BEMIS 3 115	0.8387	0.7960	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56590 BEMIS 3 115	0.8374	0.7939	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56590 BEMIS 3 115	0.8188	0.6394	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56591 VINE 3 115	0.8357	0.7955	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56591 VINE 3 115	0.8344	0.7934	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SP	42	MIDW	56605 REDLIN 3 115	0.8503	0.8164	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
05SP	42	MIDW	56605 REDLIN 3 115	0.8492	0.8144	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
05SH	34	MIDW	56551 SALINE 3 115	0.9343	0.8819	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	22		
05SH	34	MIDW	56590 BEMIS 3 115	0.9333	0.8808	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	22		
05FA	26	MIDW	56558 KNOLL 6 230	1.0378	0.8948	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	26	Not a Load Serving Bus	
05WP	27	MIDW	56558 KNOLL 6 230	1.0637	0.8957	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	27	Not a Load Serving Bus	
06AP	13		NONE IDENTIFIED				13		
06G	31		NONE IDENTIFIED				31		
06SP	42	MIDW	56551 SALINE 3 115	0.8458	0.8133	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56551 SALINE 3 115	0.8448	0.8098	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
06SP	42	MIDW	56551 SALINE 3 115	0.8231	0.6501	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56552 GORHAM 3 115	0.8639	0.8371	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56552 GORHAM 3 115	0.8630	0.8337	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
06SP	42	MIDW	56553 S HAYS 3 115	0.8677	0.8412	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56553 S HAYS 3 115	0.8668	0.8377	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
06SP	42	MIDW	56557 BEACH 3 115	0.8601	0.8370	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56557 BEACH 3 115	0.8593	0.8342	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
06SP	42	MIDW	56558 KNOLL 6 230	0.7703	0.7410	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
06SP	42	MIDW	56560 WKNNY 3 115	0.8351	0.8049	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56560 WKNNY 3 115	0.8342	0.8013	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
06SP	42	MIDW	56561 KNOLL 3 115	0.8482	0.8186	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56561 KNOLL 3 115	0.8473	0.8151	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
06SP	42	MIDW	56562 HAYS 3 115	0.8413	0.8113	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56562 HAYS 3 115	0.8404	0.8077	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
06SP	42	MIDW	56590 BEMIS 3 115	0.8442	0.8117	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56590 BEMIS 3 115	0.8433	0.8082	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
06SP	42	MIDW	56590 BEMIS 3 115	0.8215	0.6481	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56591 VINE 3 115	0.8418	0.8118	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56591 VINE 3 115	0.8408	0.8082	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		
06SP	42	MIDW	56605 REDLIN 3 115	0.8556	0.8308	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0		
06SP	42	MIDW	56605 REDLIN 3 115	0.8548	0.8278	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0		

06SP	42	WERE	57036 CLEARWT4 138	0.9211	0.8383	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	11	
06SH	34	MIDW	56551 SALINE 3 115	0.9281	0.8746	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	18	
06SH	34	MIDW	56590 BEMIS 3 115	0.9271	0.8735	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	17	
06FA	26	MIDW	56558 KNOLL 6 230	1.0556	0.8980	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	26	Not a Load Serving Bus
06WP	27		NONE IDENTIFIED				27	
07SP	43	MIDW	56551 SALINE 3 115	0.8814	0.8526	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56551 SALINE 3 115	0.8810	0.8518	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56551 SALINE 3 115	0.8228	0.6555	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56552 GORHAM 3 115	0.8960	0.8725	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56552 GORHAM 3 115	0.8956	0.8717	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56553 S HAYS 3 115	0.8996	0.8763	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56553 S HAYS 3 115	0.8992	0.8755	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56557 BEACH 3 115	0.9178	0.8976	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	43	
07SP	43	MIDW	56557 BEACH 3 115	0.9176	0.8970	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	42	
07SP	43	MIDW	56558 KNOLL 6 230	0.8048	0.7807	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56560 WKNNY 3 115	0.8734	0.8467	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56560 WKNNY 3 115	0.8730	0.8459	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56561 KNOLL 3 115	0.8857	0.8596	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56561 KNOLL 3 115	0.8853	0.8587	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56562 HAYS 3 115	0.8794	0.8528	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56562 HAYS 3 115	0.8790	0.8520	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56590 BEMIS 3 115	0.8800	0.8511	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56590 BEMIS 3 115	0.8795	0.8502	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56590 BEMIS 3 115	0.8213	0.6535	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56591 VINE 3 115	0.8798	0.8533	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
07SP	43	MIDW	56591 VINE 3 115	0.8794	0.8525	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
07SP	43	MIDW	56605 REDLIN 3 115	0.9085	0.8867	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	39	
07SP	43	MIDW	56605 REDLIN 3 115	0.9082	0.8860	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	39	
07SP	43	WERE	57036 CLEARWT4 138	0.9120	0.8233	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	10	
10SP	44	MIDW	56551 SALINE 3 115	0.8688	0.8356	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56551 SALINE 3 115	0.8679	0.8347	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56551 SALINE 3 115	0.7535	0.5763	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56552 GORHAM 3 115	0.8902	0.8628	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56552 GORHAM 3 115	0.8893	0.8620	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56553 S HAYS 3 115	0.8940	0.8669	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56553 S HAYS 3 115	0.8932	0.8661	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56557 BEACH 3 115	0.9094	0.8858	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	37	
10SP	44	MIDW	56557 BEACH 3 115	0.9087	0.8852	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	37	
10SP	44	MIDW	56558 KNOLL 6 230	0.7953	0.7677	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56560 WKNNY 3 115	0.8623	0.8313	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56560 WKNNY 3 115	0.8614	0.8304	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56561 KNOLL 3 115	0.8757	0.8453	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56561 KNOLL 3 115	0.8748	0.8444	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56562 HAYS 3 115	0.8686	0.8378	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56562 HAYS 3 115	0.8677	0.8369	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56590 BEMIS 3 115	0.8673	0.8339	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56590 BEMIS 3 115	0.8664	0.8331	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56590 BEMIS 3 115	0.7517	0.5741	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56591 VINE 3 115	0.8691	0.8383	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56591 VINE 3 115	0.8682	0.8374	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10SP	44	MIDW	56605 REDLIN 3 115	0.8995	0.8741	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
10SP	44	MIDW	56605 REDLIN 3 115	0.8988	0.8734	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
10WP	27		NONE IDENTIFIED				27	
15SP	45	MIDW	56551 SALINE 3 115	0.8381	0.7958	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56551 SALINE 3 115	0.8370	0.7942	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56551 SALINE 3 115	0.7138	0.5436	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56552 GORHAM 3 115	0.8626	0.8271	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	

15SP	45	MIDW	56552 GORHAM 3 115	0.8616	0.8257	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56553 S HAYS 3 115	0.8669	0.8316	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56553 S HAYS 3 115	0.8659	0.8302	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56556 HOXIE 3 115	0.9085	0.8853	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	39	
15SP	45	MIDW	56556 HOXIE 3 115	0.9079	0.8845	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	39	
15SP	45	MIDW	56557 BEACH 3 115	0.8777	0.8463	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56557 BEACH 3 115	0.8769	0.8451	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56558 KNOLL 6 230	0.7666	0.7304	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	45	Not a Load Serving Bus
15SP	45	MIDW	56560 WKNNY 3 115	0.8296	0.7893	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56560 WKNNY 3 115	0.8285	0.7877	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56561 KNOLL 3 115	0.8443	0.8050	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56561 KNOLL 3 115	0.8433	0.8035	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56562 HAYS 3 115	0.8364	0.7963	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56562 HAYS 3 115	0.8353	0.7948	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56590 BEMIS 3 115	0.8364	0.7940	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56590 BEMIS 3 115	0.8353	0.7924	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56590 BEMIS 3 115	0.7118	0.5412	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56591 VINE 3 115	0.8369	0.7969	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56591 VINE 3 115	0.8358	0.7954	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
15SP	45	MIDW	56605 REDLIN 3 115	0.8676	0.8340	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	0	
15SP	45	MIDW	56605 REDLIN 3 115	0.8667	0.8327	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	0	
Total Estimated Engineering and Construction Cost								\$0



Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	Comments
05SP	42			NONE IDENTIFIED					
05SH	34			NONE IDENTIFIED					
05FA	26			NONE IDENTIFIED					
05WP	27			NONE IDENTIFIED					
06AP	13			NONE IDENTIFIED					
06G	31			NONE IDENTIFIED					
06SP	42			NONE IDENTIFIED					
06SH	34			NONE IDENTIFIED					
06FA	26			NONE IDENTIFIED					
06WP	27			NONE IDENTIFIED					
07SP	43			NONE IDENTIFIED					
07WP	27			NONE IDENTIFIED					
10SP	44			NONE IDENTIFIED					
10WP	27			NONE IDENTIFIED					
15SP	45			NONE IDENTIFIED					
15SP	45			NONE IDENTIFIED					
15SP	45			NONE IDENTIFIED					

Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	Comments
05SP	42			NONE IDENTIFIED						
05SH	34			NONE IDENTIFIED						
05FA	26			NONE IDENTIFIED						
05WP	27			NONE IDENTIFIED						
06AP	13			NONE IDENTIFIED						
06G	31			NONE IDENTIFIED						
06SP	42			NONE IDENTIFIED						
06SH	34			NONE IDENTIFIED						
06FA	26			NONE IDENTIFIED						
06WP	27			NONE IDENTIFIED						
07SP	43			NONE IDENTIFIED						
07WP	27			NONE IDENTIFIED						
10SP	44			NONE IDENTIFIED						
10WP	27			NONE IDENTIFIED						
15SP	45			NONE IDENTIFIED						
15SP	45			NONE IDENTIFIED						
15SP	45			NONE IDENTIFIED						

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
05SP	42	SUNC	56364 ATWODSW3 115	0.8875	0.8628	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56364 ATWODSW3 115	0.8883	0.8645	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56366 CNORTON3 115	0.8559	0.8245	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56366 CNORTON3 115	0.8569	0.8265	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56367 HERNDON3 115	0.8784	0.8521	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56367 HERNDON3 115	0.8792	0.8538	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56369 NATWOOD3 115	0.8875	0.8628	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56369 NATWOOD3 115	0.8883	0.8644	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56371 JOHNSON3 115	0.8698	0.8421	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56371 JOHNSON3 115	0.8707	0.8439	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56372 NORCATR3 115	0.8620	0.8323	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56372 NORCATR3 115	0.8629	0.8342	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56373 RHOADES3 115	0.8559	0.8245	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56373 RHOADES3 115	0.8569	0.8265	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56386 GRHMSUB3 115	0.8538	0.8213	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56386 GRHMSUB3 115	0.8548	0.8232	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56387 HILLCTY3 115	0.8538	0.8213	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56387 HILLCTY3 115	0.8548	0.8232	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56457 OBER T 3 115	0.8683	0.8403	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56457 OBER T 3 115	0.8692	0.8421	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	SUNC	56458 OBERLIN3 115	0.8679	0.8398	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	SUNC	56458 OBERLIN3 115	0.8687	0.8416	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58750 BELOIT 3 115	0.9273	0.8922	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
05SP	42	WEPL	58760 EHALLTP3 115	0.8755	0.7462	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58762 ELLSWTH3 115	0.8767	0.7333	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58763 GLENELD3 115	0.9537	0.8764	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.8610	0.7175	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.8683	0.8226	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.8696	0.8245	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58785 PHLBURG3 115	0.9224	0.8558	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
05SP	42	WEPL	58786 PLAINVL3 115	0.8239	0.6459	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58786 PLAINVL3 115	0.8403	0.7946	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58786 PLAINVL3 115	0.8416	0.7967	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58786 PLAINVL3 115	0.9060	0.8285	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
05SP	42	WEPL	58793 SMITH-C3 115	0.9269	0.8318	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58793 SMITH-C3 115	0.9271	0.8870	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58793 SMITH-C3 115	0.9282	0.8885	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58793 SMITH-C3 115	0.9560	0.8931	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58798 WALDO 3 115	0.8950	0.7831	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58798 WALDO 3 115	0.9434	0.8784	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58798 WALDO 3 115	0.9358	0.8988	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
05SP	42	WEPL	58801 RUSSELL3 115	0.8771	0.7514	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SP	42	WEPL	58801 RUSSELL3 115	0.9233	0.8931	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
05SP	42	WEPL	58801 RUSSELL3 115	0.9507	0.8977	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SP	42	WEPL	58801 RUSSELL3 115	0.9235	0.8938	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	
05SH	34	WEPL	58760 EHALLTP3 115	0.9439	0.8789	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SH	34	WEPL	58762 ELLSWTH3 115	0.9491	0.8778	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
05SH	34	WEPL	58786 PLAINVL3 115	0.9364	0.8842	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
05SH	34	WEPL	58798 WALDO 3 115	0.9558	0.8988	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05SH	34	WEPL	58801 RUSSELL3 115	0.9444	0.8811	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
05FA	26		NONE IDENTIFIED				
05WP	27		NONE IDENTIFIED				
06AP	13		NONE IDENTIFIED				
06G	31		NONE IDENTIFIED				
06SP	42	SUNC	56366 CNORTON3 115	0.8608	0.8368	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56366 CNORTON3 115	0.8615	0.8395	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56371 JOHNSON3 115	0.8746	0.8536	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56372 NORCATR3 115	0.8669	0.8443	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56372 NORCATR3 115	0.8676	0.8468	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56373 RHOADES3 115	0.8608	0.8368	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56373 RHOADES3 115	0.8615	0.8395	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56386 GRHMSUB3 115	0.8587	0.8337	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56386 GRHMSUB3 115	0.8594	0.8365	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56387 HILLCTY3 115	0.8587	0.8337	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56387 HILLCTY3 115	0.8594	0.8365	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	SUNC	56457 OBER T 3 115	0.8732	0.8519	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	SUNC	56458 OBERLIN3 115	0.8727	0.8514	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	WEPL	58750 БЕЛОIT 3 115	0.9280	0.8966	OPEN LINE FROM BUS 58750 БЕЛОIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
06SP	42	WEPL	58760 EHALLTP3 115	0.8770	0.7531	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SP	42	WEPL	58762 ELLSWTH3 115	0.8784	0.7407	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SP	42	WEPL	58763 GLENEL3 115	0.9543	0.8797	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58768 HARPER 4 138	0.9293	0.8509	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58773 MED-LDG3 115	0.9427	0.8907	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58774 MED-LDG4 138	0.9456	0.8856	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58775 MILANTP4 138	0.9239	0.8415	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58776 MILAN 4 138	0.9229	0.8389	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
06SP	42	WEPL	58785 PHLBURG3 115	0.8631	0.7244	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58785 PHLBURG3 115	0.8716	0.8335	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	WEPL	58785 PHLBURG3 115	0.8727	0.8365	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58785 PHLBURG3 115	0.9242	0.8592	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
06SP	42	WEPL	58786 PLAINVL3 115	0.8266	0.6545	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58786 PLAINVL3 115	0.8457	0.8085	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	WEPL	58786 PLAINVL3 115	0.8467	0.8120	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58786 PLAINVL3 115	0.9081	0.8326	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
06SP	42	WEPL	58793 SMITH-C3 115	0.9282	0.8362	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58793 SMITH-C3 115	0.9289	0.8944	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
06SP	42	WEPL	58793 SMITH-C3 115	0.9299	0.8967	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58793 SMITH-C3 115	0.9565	0.8969	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SP	42	WEPL	58798 WALDO 3 115	0.8963	0.7892	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SP	42	WEPL	58798 WALDO 3 115	0.9455	0.8823	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SP	42	WEPL	58801 RUSSELL3 115	0.8786	0.7581	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SP	42	WEPL	58801 RUSSELL3 115	0.9229	0.8936	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
06SP	42	WEPL	58801 RUSSELL3 115	0.9238	0.8942	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	
06SH	34	WEPL	58760 EHALLTP3 115	0.9417	0.8673	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	

Table 4.3 - Non-SPP Voltage Violations  
Caused or Impacted by Transfer Using Scenario 3

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
06SH	34	WEPL	58762 ELLSWTH3 115	0.9470	0.8658	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SH	34	WEPL	58786 PLAINVL3 115	0.9302	0.8768	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
06SH	34	WEPL	58798 WALDO 3 115	0.9534	0.8877	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06SH	34	WEPL	58801 RUSSELL3 115	0.9422	0.8696	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
06FA	26		NONE IDENTIFIED				
06WP	27		NONE IDENTIFIED				
07SP	43	WEPL	58750 BELOIT 3 115	0.9280	0.8954	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
07SP	43	WEPL	58760 EHALLTP3 115	0.8791	0.7494	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07SP	43	WEPL	58762 ELLSWTH3 115	0.8806	0.7366	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07SP	43	WEPL	58763 GLENELD3 115	0.9554	0.8855	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58768 HARPER 4 138	0.9212	0.8372	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58773 MED-LDG3 115	0.9370	0.8813	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58774 MED-LDG4 138	0.9392	0.8749	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58775 MILANTP4 138	0.9150	0.8267	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58776 MILAN 4 138	0.9138	0.8238	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58776 MILAN 4 138	0.9593	0.8992	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 58775 MILANTP4 138 CKT1	
07SP	43	WEPL	58785 PHLBURG3 115	0.8632	0.7298	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58785 PHLBURG3 115	0.9242	0.8571	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
07SP	43	WEPL	58785 PHLBURG3 115	0.8966	0.8632	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
07SP	43	WEPL	58785 PHLBURG3 115	0.8970	0.8641	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58786 PLAINVL3 115	0.8263	0.6599	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58786 PLAINVL3 115	0.9079	0.8299	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
07SP	43	WEPL	58786 PLAINVL3 115	0.8801	0.8487	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
07SP	43	WEPL	58786 PLAINVL3 115	0.8805	0.8496	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58787 PRATT 3 115	0.9361	0.8931	OPEN LINE FROM BUS 57036 CLEARWT4 138 TO BUS 57045 GILL W 4 138 CKT1	
07SP	43	WEPL	58793 SMITH-C3 115	0.9288	0.8413	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58793 SMITH-C3 115	0.9586	0.8959	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07SP	43	WEPL	58798 WALDO 3 115	0.8983	0.7863	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07SP	43	WEPL	58798 WALDO 3 115	0.9455	0.8847	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
07SP	43	WEPL	58801 RUSSELL3 115	0.8806	0.7546	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
07SP	43	WEPL	58801 RUSSELL3 115	0.9239	0.8944	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
07SP	43	WEPL	58801 RUSSELL3 115	0.9249	0.8936	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	
07WP	27	WEPL	58750 BELOIT 3 115	0.9420	0.8920	OPEN LINE FROM BUS 56861 [EMANHAT6230.00] TO BUS 58758 [CONCORD6230.00] CKT 1	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
07WP	27	WEPL	58757 CONCORD3 115	0.9425	0.8917	OPEN LINE FROM BUS 56861 [EMANHAT6230.00] TO BUS 58758 [CONCORD6230.00] CKT 1	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
07WP	27	WEPL	58758 CONCORD6 230	0.9425	0.8917	OPEN LINE FROM BUS 56861 [EMANHAT6230.00] TO BUS 58758 [CONCORD6230.00] CKT 1	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
07WP	27	WEPL	58763 GLENELD3 115	0.9438	0.8949	OPEN LINE FROM BUS 56861 [EMANHAT6230.00] TO BUS 58758 [CONCORD6230.00] CKT 1	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts
07WP	27	WEPL	58769 JEWELL 3 115	0.9452	0.8963	OPEN LINE FROM BUS 56861 [EMANHAT6230.00] TO BUS 58758 [CONCORD6230.00] CKT 1	Solved Using a 2.5 MVA Mismatch and Locked Switch Shunts

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
07WP	27		NONE IDENTIFIED				
10SP	44	SUNC	56386 GRHMSUB3 115	0.9115	0.8881	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
10SP	44	SUNC	56386 GRHMSUB3 115	0.9122	0.8887	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	SUNC	56387 HILLCTY3 115	0.9115	0.8881	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
10SP	44	SUNC	56387 HILLCTY3 115	0.9122	0.8887	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58750 BELOIT 3 115	0.9512	0.8844	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58750 BELOIT 3 115	0.9247	0.8888	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
10SP	44	WEPL	58760 EHALLTP3 115	0.8686	0.7262	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10SP	44	WEPL	58762 ELLSWTH3 115	0.8695	0.7110	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10SP	44	WEPL	58762 ELLSWTH3 115	0.9544	0.8980	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58763 GLAINEL3 115	0.9362	0.8579	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58769 JEWELL 3 115	0.9515	0.8865	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58785 PHLBURG3 115	0.8154	0.6713	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58785 PHLBURG3 115	0.8921	0.8177	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
10SP	44	WEPL	58785 PHLBURG3 115	0.8875	0.8500	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
10SP	44	WEPL	58785 PHLBURG3 115	0.8883	0.8507	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58786 PLAINVL3 115	0.7576	0.5814	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58786 PLAINVL3 115	0.8596	0.7728	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
10SP	44	WEPL	58786 PLAINVL3 115	0.8651	0.8297	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
10SP	44	WEPL	58786 PLAINVL3 115	0.8660	0.8305	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58793 SMITH-C3 115	0.9025	0.8065	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58793 SMITH-C3 115	0.9517	0.8842	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10SP	44	WEPL	58793 SMITH-C3 115	0.9462	0.8919	OPEN LINE FROM BUS 56561 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
10SP	44	WEPL	58798 WALDO 3 115	0.8887	0.7661	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10SP	44	WEPL	58798 WALDO 3 115	0.9313	0.8656	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58801 RUSSELL3 115	0.8702	0.7319	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
10SP	44	WEPL	58801 RUSSELL3 115	0.9179	0.8874	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
10SP	44	WEPL	58801 RUSSELL3 115	0.9434	0.8899	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
10SP	44	WEPL	58798 WALDO 3 115	0.9309	0.9006	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	
10SP	44	WEPL	58801 RUSSELL3 115	0.9185	0.8877	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	
10WP	27		NONE IDENTIFIED				
15SP	45	SUNC	56366 CNORTON3 115	0.9012	0.8708	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56366 CNORTON3 115	0.9019	0.8719	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56367 HERNDON3 115	0.9159	0.8906	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56367 HERNDON3 115	0.9166	0.8915	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56371 JOHNSON3 115	0.9088	0.8820	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56371 JOHNSON3 115	0.9095	0.8830	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56372 NORCATR3 115	0.9041	0.8754	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56372 NORCATR3 115	0.9048	0.8764	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56373 RHOADES3 115	0.9012	0.8708	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56373 RHOADES3 115	0.9019	0.8719	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56386 GRHMSUB3 115	0.8794	0.8478	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56386 GRHMSUB3 115	0.8802	0.8489	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56387 HILLCTY3 115	0.8794	0.8478	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56387 HILLCTY3 115	0.8802	0.8489	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56457 OBER T 3 115	0.9077	0.8806	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	

Study Case	Transfer Amount (MW)	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
15SP	45	SUNC	56457 OBER T 3 115	0.9083	0.8815	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	SUNC	56458 OBERLIN3 115	0.9071	0.8800	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	SUNC	56458 OBERLIN3 115	0.9078	0.8810	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58750 BELOIT 3 115	0.9361	0.8710	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58750 BELOIT 3 115	0.9182	0.8778	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
15SP	45	WEPL	58760 EHALLTP3 115	0.8576	0.6637	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58760 EHALLTP3 115	0.9409	0.8913	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58762 ELLSWTH3 115	0.8581	0.6411	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58762 ELLSWTH3 115	0.9440	0.8865	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58762 ELLSWTH3 115	0.9395	0.8964	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58762 ELLSWTH3 115	0.9404	0.8976	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58763 GLENELD3 115	0.9195	0.8426	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58763 GLENELD3 115	0.9639	0.8905	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58763 GLENELD3 115	0.9308	0.8911	OPEN LINE FROM BUS 58750 BELOIT 3 115 TO BUS 58757 CONCORD3 115 CKT1	
15SP	45	WEPL	58769 JEWELL 3 115	0.9368	0.8737	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.7838	0.6440	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.8783	0.8004	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.8635	0.8179	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.8645	0.8194	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58785 PHLBURG3 115	0.9463	0.8773	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58786 PLAINVL3 115	0.7183	0.5490	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58786 PLAINVL3 115	0.8439	0.7525	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
15SP	45	WEPL	58786 PLAINVL3 115	0.8351	0.7900	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58786 PLAINVL3 115	0.8362	0.7916	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.8820	0.7879	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.9445	0.8538	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.9359	0.8798	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 58786 PLAINVL3 115 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.9213	0.8812	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58793 SMITH-C3 115	0.9223	0.8824	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.8787	0.7123	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.9176	0.8522	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.9273	0.8888	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.9281	0.8899	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.9243	0.8905	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.8594	0.6712	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58778 MULGREN3 115 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9116	0.8772	OPEN LINE FROM BUS 58760 EHALLTP3 115 TO BUS 58801 RUSSELL3 115 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9322	0.8785	OPEN LINE FROM BUS 56551 SALINE 3 115 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9311	0.8947	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56873 SUMMIT 6 230 CKT1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9320	0.8958	OPEN LINE FROM BUS 56558 KNOLL 6 230 TO BUS 56561 KNOLL 3 115 CKT1	
15SP	45	WEPL	58798 WALDO 3 115	0.9245	0.8912	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	
15SP	45	WEPL	58801 RUSSELL3 115	0.9118	0.8779	58760 EHALLTP3115 58778 MULGREN3115 CKT 158760 EHALLTP3115 58762 ELLSWTH3115 CKT 158760 EHALLTP3115 58801 RUSSELL3115 CKT 1	

Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
05SP	42	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	101.7	103.6	3.038	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
05SP	42	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	99.4	100.9	3.3	57982 IATAN 7 345 to 59199 ST JOE 3 345 CKT 1	5	Rebuild 15.50-mile line (1192.5 kmil 45/7 ACSR, 223 MVA, 245 MVA), Replace CTs and Wave Trap (2000 A.)	\$5,800,000
05SP	42	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	95.4	100.3	11.5	56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT 1	12	See Previous Upgrade Specified for Facility	
05SP	42	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	95.3	100.3	11.5	58757 CONCORD3 115 to 58758 CONCORD6 230 CKT 1	12	See Previous Upgrade Specified for Facility	
05SP	42	WERE	WERE	57309 WEMPORI3 115 to 57301 EAST ST3 115 CKT 1	92	102.3	104.7	5.2	56863 MORRIS 6 230 to 57305 MORRIS 3 115 to 56890 MORRIS 113.8 CKT 1	0	May be relieved due to Westar Operating Procedure 625 - Outage of the Morris County Transformer	
05SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	99.2	100.4	3.5	57982 IATAN 7 345 to 59199 ST JOE 3 345 CKT 1	9	See Previous Upgrade Specified for Facility	
05FA	26	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	120.1	121.7	6.0	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05FA	26	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	112.0	113.9	6.5	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05FA	26	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	109.9	111.8	6.5	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05WP	27	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	121.9	122.7	3.043	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05WP	27	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	100.0	101.1	4.0	57982 IATAN 7 345 to 59199 ST JOE 3 345 CKT 1	0	See Previous Upgrade Specified for Facility	
06G	31	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	102.4	103.6	3.7	57982 IATAN 7 345 to 59199 ST JOE 3 345 CKT 1	0	See Previous Upgrade Specified for Facility	
06G	31	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	98.0	100.8	9.0	56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT 1	9	See Previous Upgrade Specified for Facility	
06G	31	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	97.9	100.8	9.0	58757 CONCORD3 115 to 58758 CONCORD6 230 CKT 1	9	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	103.1	105.8	4.3	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
06SP	42	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	127.1	129.4	5.3	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SP	42	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	109.8	111.8	4.5	57982 IATAN 7 345 to 59199 ST JOE 3 345 CKT 1	0	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	104.3	109.6	12.2	56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT 1	0	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	112.5	115.0	5.6	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SP	42	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	109.5	112.1	5.6	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06FA	26	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	121.1	122.1	3.6	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06FA	26	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	104.2	105.1	3.7	57982 IATAN 7 345 to 59199 ST JOE 3 345 CKT 1	0	See Previous Upgrade Specified for Facility	
06FA	26	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	112.5	113.6	4.1	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06FA	26	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	110.3	111.4	4.2	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	99.5	101.4	3.8	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	3	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
06SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	125.4	127.1	4.9	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	110.8	112.3	4.4	57982 IATAN 7 345 to 59199 ST JOE 3 345 CKT 1	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	108.2	112.2	11.4	56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT 1	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	108.2	112.2	11.4	58757 CONCORD3 115 to 58758 CONCORD6 230 CKT 1	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	103.1	104.8	5.1	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	114.5	116.4	5.2	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	96.8	100.9	11.3	56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT 1	10	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	96.7	100.9	11.3	58757 CONCORD3 115 to 58758 CONCORD6 230 CKT 1	10	Rebuild 15.15 mile line with 1192.5 kmil ACSR.	\$3,200,000
06SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	99.2	100.8	4.2	57982 IATAN 7 345 to 59199 ST JOE 3 345 CKT 1	7	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	112.0	113.9	5.3	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06WP	27	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	122.6	123.5	3.3	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06WP	27	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	115.9	117.0	3.7	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06WP	27	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	114.0	115.1	3.7	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07SP	43	WERE	WERE	57413 CIRCLE 3 115 to 57419 HEC 3 115 CKT 1	141	127.7	130.8	10.0	57413 CIRCLE 3 115 to 57415 DAVIS 3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1205 - Outage of the Circle to Davis 115kV line	
07SP	43	WERE	WERE	57413 CIRCLE 3 115 to 57419 HEC 3 115 CKT 1	141	111.3	114.3	10.0	57513 HEC 2 69 to 57514 HEC GT 2 69 CKT 1	0	May be relieved due to Westar Operating Procedure 1306 - Outage of the HEC to HEC GT 69kV Line	
07SP	43	WERE	WERE	57413 CIRCLE 3 115 to 57419 HEC 3 115 CKT 1	141	108.0	111.0	9.8	REMOVE UNIT 1 FROM BUS 56693 [HEC U3 14.400] DISPATCH	0	Solution Undetermined	
07SP	43	WERE	WERE	57413 CIRCLE 3 115 to 57419 HEC 3 115 CKT 1	141	106.9	110.2	10.9	58792 SEWARD 3 115 to 58796 ST-JOHN3 115 CKT 1	0	Solution Undetermined	



Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
07SP	43	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	128.7	130.5	4.1	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07SP	43	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	110.0	111.8	4.0	57982 IATAN 7 345 to 59199 ST JOE 3 345 CKT 1	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	104.3	109.5	11.8	56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT 1	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	104.3	109.5	11.7	58757 CONCORD3 115 to 58758 CONCORD6 230 CKT 1	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	113.5	115.6	4.4	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07SP	43	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	110.6	112.7	4.5	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	119.2	120.6	4.9	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	100.2	101.9	6.1	57982 IATAN 7 345 to 59199 ST JOE 3 345 CKT 1	0	See Previous Upgrade Specified for Facility	
07WP	27	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	112.0	113.5	4.8	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	110.1	111.5	4.8	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	105.3	106.9	3.5	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	57153 COLINE 3 115 to 57192 HOOKJCT3 115 CKT 1	92	119.7	123.4	7.6	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	57153 COLINE 3 115 to 57182 TECHILE3 115 CKT 1	106	104.3	106.7	5.8	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	57795 GILL E 2 69 to 57813 MACARTH2 69 CKT 1	68	117.9	119.9	3.1	57795 GILL E 2 69 to 57825 OATVILL2 69 CKT 1	0	Replace substation bus and jumpers at MacArthur 69 kV.	\$98,000
10SP	44	WERE	WERE	57795 GILL E 2 69 to 57825 OATVILL2 69 CKT 1	72	127.0	129.2	3.6	57795 GILL E 2 69 to 57813 MACARTH2 69 CKT 1	0	Replace disconnect switches at Gill 69 kV (use 800 A.), Replace line switch at Oatville 69 kV (use 800 A.).	\$45,000
10SP	44	WERE	WERE	57795 GILL E 2 69 to 57825 OATVILL2 69 CKT 1	72	111.2	113.0	3.1	57796 GILL W 2 69 to 57804 HAYSVLJ2 69 CKT 1	0	See Previous Upgrade Specified for Facility	
10SP	44	WERE	WERE	57180 TEC E 3 115 to 57192 HOOKJCT3 115 CKT 1	160	123.1	126.8	13.7	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	112.0	114.3	12.0	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	102.3	105.2	4.6	57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Transformer	
10SP	44	WERE	WERE	57182 TECHILE3 115 WND 2 1	69	102.0	104.9	4.6	57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Transformer	
10SP	44	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	102.7	104.8	3.3	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	57182 TECHILE3 115 WND 2 1	69	102.3	104.4	3.3	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	99.5	102.5	4.6	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	2	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Transformer	
10WP	27	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	97.8	100.2	6.0	58757 CONCORD3 115 to 58758 CONCORD6 230 CKT 1	12	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Transformer	
10WP	27	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	97.8	100.1	6.0	56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT 1	12	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Transformer	
15SP	45	WERE	WERE	57156 54&MERI3 115 to 57163 HOYT 3 115 CKT 1	179	110.1	111.6	6.1	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	100.3	101.3	13.6	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Auburn Road to Jeffrey Energy Center 345kV Line	
15SP	45	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	117.3	120.4	6.8	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	Contingency Solution Not Converged					56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1			
15SP	45	WERE	WERE	57162 GOODYR 3 115 to 57169 NTHLAND3 115 CKT 1	175	110.4	111.7	5.2	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	Rebuild 3.44-mile line	\$940,000
15SP	45	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	111.4	113.2	43.2	56766 JEC N 7 345 to 56770 MORRIS 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center - Morris County 345KV	
15SP	45	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	111.2	112.7	37.2	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
15SP	45	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	100.4	102.0	38.3	56769 LANG 7 345 to 56770 MORRIS 7 345 CKT 1	0	Solution Undetermined	

Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
15SP	45	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	100.2	101.9	39.3	56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345kV Line	
15SP	45	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	100.1	101.6	37.8	56773 SUMMIT 7 345 to 56873 SUMMIT 6 230 to 56813 SUMMIT 114.4 CKT 1	0	May be relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230kV Transformer	
15SP	45	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	100.3	101.5	28.7	REMOVE UNIT 1 FROM BUS 57957 [IAT G1 124.000] DISPATCH	0	Solution Undetermined	
15SP	45	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	99.5	101.4	45.1	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	3	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
15SP	45	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	123.7	124.5	4.1	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	102.5	103.3	4.2	56766 JEC N 7 345 to 56770 MORRIS 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center - Morris County 345KV	
15SP	45	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	105.4	108.6	4.9	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	57182 TECHILE3 115 WND 2 1	69	104.5	107.7	4.9	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	101.0	105.0	6.1	57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1	0	Solution Undetermined	
15SP	45	WERE	WERE	57182 TECHILE3 115 WND 2 1	69	100.6	104.3	5.7	57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1	0	Solution Undetermined	
15SP	45	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	97.9	101.4	5.4	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	8	Solution Undetermined	
15SP	45	WERE	WERE	57182 TECHILE3 115 WND 2 1	69	97.3	100.8	5.3	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	10	Solution Undetermined	
Total Estimated Engineering and Construction Cost											\$10,083,000	



SPP-2004-029-1  
 Table 1.2a - Modeling Representation for Table 1.2  
 Includes Bus Numbers and Bus Names

Southwest Power Pool  
 System Impact Study

Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
07SP	43	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	101.3	103.3	4.6	64787 COOPER 5 161 to 65024 COOPER Y 345 CKT 1	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	104.4	106.1	3.6	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07SP	43	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	101.5	103.2	3.6	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	110.8	112.2	5.0	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	103.3	104.7	4.9	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	101.4	102.8	4.9	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	57374 SPHILPJ3 115 to 57438 WMCIPHER3 115 CKT 1	68	105.6	107.7	5.4	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	See Previous Upgrade Specified for Facility	
10SP	44	WERE	WERE	57153 COLINE 3 115 to 57192 HOOKJCT3 115 CKT 1	92	119.3	123.0	7.6	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	57153 COLINE 3 115 to 57182 TECHILE3 115 CKT 1	106	108.5	110.9	5.8	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	57795 GILL E 2 69 to 57813 MACARTH2 69 CKT 1	68	115.9	117.9	3.1	57795 GILL E 2 69 to 57825 OATVILL2 69 CKT 1	0	See Previous Upgrade Specified for Facility	
10SP	44	WERE	WERE	57795 GILL E 2 69 to 57825 OATVILL2 69 CKT 1	72	124.8	127.0	3.6	57795 GILL E 2 69 to 57813 MACARTH2 69 CKT 1	0	See Previous Upgrade Specified for Facility	
10SP	44	WERE	WERE	57795 GILL E 2 69 to 57825 OATVILL2 69 CKT 1	72	109.2	111.1	3.1	57796 GILL W 2 69 to 57804 HAYSVLJ2 69 CKT 1	0	See Previous Upgrade Specified for Facility	
10SP	44	WERE	WERE	57180 TEC E 3 115 to 57192 HOOKJCT3 115 CKT 1	160	122.7	126.4	13.7	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	110.3	112.5	12.1	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	98.9	101.8	4.6	57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1	5	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Transformer	
10WP	27	WERE	WERE	57374 SPHILPJ3 115 to 57438 WMCIPHER3 115 CKT 1	68	99.0	100.5	3.8	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT 1	8	See Previous Upgrade Specified for Facility	
10WP	27	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	98.0	100.4	6.3	58757 CONCORD3 115 to 58758 CONCORD6 230 CKT 1	11	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Transformer	
10WP	27	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	97.9	100.4	6.3	56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT 1	11	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Transformer	
15SP	45	WERE	WERE	57156 54&MERI3 115 to 57163 HOYT 3 115 CKT 1	179	106.7	108.7	7.8	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	106.9	110.4	7.6	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45			Contingency Solution Not Converged					56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1			
15SP	45	WERE	WERE	57153 COLINE 3 115 to 57182 TECHILE3 115 CKT 1	106	114.9	116.3	3.2	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
15SP	45	WERE	WERE	57162 GOODYR 3 115 to 57169 NTHLAND3 115 CKT 1	175	107.8	109.5	6.9	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	106.7	108.6	46.9	56766 JEC N 7 345 to 56770 MORRIS 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center - Morris County 345kV Line	
15SP	45	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	105.0	106.7	40.4	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	0	May be relieved due to Westar Operating Procedure 400 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
15SP	45	WERE	WERE	57253 MOCKBRD3 115 to 57270 STULL T3 115 CKT 1	92	114.6	116.1	3.1	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	57182 TECHILE3 115 to 57270 STULL T3 115 CKT 1	92	121.9	123.4	3.0	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	121.9	123.3	6.9	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	104.8	105.8	4.9	56766 JEC N 7 345 to 56770 MORRIS 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center - Morris County 345kV Line	
15SP	45	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	103.2	103.9	3.6	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Auburn Road to Jeffrey Energy Center 345kV Line	
15SP	45	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	100.5	101.1	3.4	57153 COLINE 3 115 to 57162 GOODYR 3 115 CKT 1	0	Solution Undetermined	
15SP	45	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	99.9	100.5	3.1	REMOVE UNIT 1 FROM BUS 56663 [LEC U5 24.000] DISPATCH	2	Solution Undetermined	
15SP	45	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	99.8	100.4	3.1	56772 STRANGR7 345 to 57977 CRAIG 7 345 CKT 1	4	May be relieved due to Westar Operating Procedure 401 - Outage of the Stranger Creek - Craig 345kV Line	
15SP	45	WERE	WERE	57182 TECHILE3 115 to 57180 TEC E 3 115 CKT 1	236	100.1	100.7	3.3	57153 COLINE 3 115 to 57456 COLINE 269.0 to 57443 COLINE 134.5 CKT 1	0	Solution Undetermined	
15SP	45	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	100.5	103.9	5.2	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	97.5	101.1	5.6	57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1	9	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Transformer	
											Total Estimated Engineering and Construction Cost	\$14,017,200

Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
05SP	42	WERE	WERE	57309 WEMPOR3 115 to 57301 EAST ST3 115 CKT 1	92	100.3	102.7	5.2	56863 MORRIS 6 230 to 57305 MORRIS 3 115 to 56890 MORRIS 113.8 CKT 1	0	May be relieved due to Westar Operating Procedure 625 - Outage of the Morris County Transformer	
05FA	26	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	115.0	116.4	5.0	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05FA	26	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	106.8	108.2	5.0	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
05FA	26	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	104.7	106.1	5.0	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	100.7	102.6	3.8	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
06SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	121.4	122.9	4.3	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	106.3	110.3	11.4	56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT 1	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	106.3	110.3	11.4	58757 CONCORD3 115 to 58758 CONCORD6 230 CKT 1	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	107.2	108.7	4.3	57982 IATAN 7 345 to 59199 ST JOE 3 345 CKT 1	0	See Previous Upgrade Specified for Facility	
06SH	34	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	110.3	111.9	4.2	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SH	34	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	107.8	109.4	4.2	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SP	42	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	106.4	107.0	8.1	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 400 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
06SP	42	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	104.4	107.0	4.2	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	0	May be relieved due to Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
06SP	42	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	123.6	125.6	4.8	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SP	42	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	107.1	109.1	4.5	57982 IATAN 7 345 to 59199 ST JOE 3 345 CKT 1	0	Rebuild 15.50-mile line (1192.5 kcmil 45/7 ACSR, 223 MVA, 245 MVA), Replace CTs and Wave Trap (2000 A.)	\$5,800,000
06SP	42	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	102.8	108.0	12.0	56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT 1	0	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	102.8	108.0	12.0	58757 CONCORD3 115 to 58758 CONCORD6 230 CKT 1	0	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	101.8	104.8	7.1	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	0	See Previous Upgrade Specified for Facility	
06SP	42	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	108.8	111.0	4.7	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06SP	42	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	105.9	108.0	4.7	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06WP	27	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	119.1	120.0	3.1	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06WP	27	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	112.3	113.4	3.7	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
06WP	27	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	110.3	111.4	3.8	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07SP	43	WERE	WERE	57413 CIRCLE 3 115 to 57419 HEC 3 115 CKT 1	141	128.5	131.5	10.0	57413 CIRCLE 3 115 to 57415 DAVIS 3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1205 - Outage of the Circle to Davis 115kV Line	
07SP	43	WERE	WERE	57413 CIRCLE 3 115 to 57419 HEC 3 115 CKT 1	141	112.0	115.1	9.9	57513 HEC 2 69 to 57514 HEC GT 2 69 CKT 1	0	May be relieved due to Westar Operating Procedure 1306 - Outage of the HEC to HEC GT 69kV Line	
07SP	43	WERE	WERE	57413 CIRCLE 3 115 to 57419 HEC 3 115 CKT 1	141	108.8	111.9	10.2	REMOVE UNIT 1 FROM BUS 56693 [HEC U3 14.400] DISPATCH	0	Solution Undetermined	
07SP	43	WERE	WERE	57413 CIRCLE 3 115 to 57419 HEC 3 115 CKT 1	141	108.5	111.7	10.8	58792 SEWARD 3 115 to 58796 ST-JOHN3 115 CKT 1	0	Solution Undetermined	
07SP	43	WERE	WERE	57419 HEC 3 115 to 57413 CIRCLE 3 115 CKT 1	141	101.7	104.7	9.9	57419 HEC 3 115 to 57513 HEC 269.0 to 57445 HEC 134.5 CKT 1	0	May be relieved due to Westar Operating Procedure 626 - Outage of the HUTCHINSON ENERGY CENTER TRANSFORMER	
07SP	43	WERE	WERE	57419 HEC 3 115 to 57413 CIRCLE 3 115 CKT 1	141	98.1	102.5	14.4	56871 CIRCLE 6 230 to 57413 CIRCLE 3 115 to 56892 CIRCLE 113.8 CKT 1	4	Solution Undetermined	
07SP	43	WERE	WERE	57419 HEC 3 115 to 57413 CIRCLE 3 115 CKT 1	141	99.0	102.0	9.7	56469 SPERVIL7 345 to 58795 SPEARVL6 230 to 56468 SPERTER113.8 CKT 1	6	Solution Undetermined	
07SP	43	WERE	WERE	57419 HEC 3 115 to 57413 CIRCLE 3 115 CKT 1	141	97.5	100.5	9.8	57044 GILL E 4 138 to 57796 GILL W 269.0 to 56733 GEC U3 14.4 CKT 1	11	Solution Undetermined	
07SP	43	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	124.5	126.2	3.7	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07SP	43	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	106.2	107.9	3.9	57982 IATAN 7 345 to 59199 ST JOE 3 345 CKT 1	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	102.2	107.4	11.6	56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT 1	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	102.2	107.3	11.6	58757 CONCORD3 115 to 58758 CONCORD6 230 CKT 1	0	See Previous Upgrade Specified for Facility	
07SP	43	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	109.3	111.0	3.6	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07SP	43	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	106.3	108.0	3.6	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	115.7	117.0	4.7	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	108.3	109.7	4.7	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
07WP	27	WERE	WERE	57217 KELLY 3 115 to 57331 KING HL3 115 CKT 1	92	106.4	107.7	4.7	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	

Study Case	Transfer Amount (MW)	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
10SP	44	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	99.5	101.1	3.5	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	4	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	57153 COLINE 3 115 to 57192 HOOKJCT3 115 CKT 1	92	119.6	123.2	7.6	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	57153 COLINE 3 115 to 57182 TECHILE3 115 CKT 1	106	107.3	109.7	5.8	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	57795 GILL E 2 69 to 57813 MACARTH2 69 CKT 1	68	117.0	119.0	3.1	57795 GILL E 2 69 to 57825 OATVILL2 69 CKT 1	0	Replace substation bus and jumpers at MacArthur 69 kV.	\$98,000
10SP	44	WERE	WERE	57795 GILL E 2 69 to 57825 OATVILL2 69 CKT 1	72	126.0	128.2	3.6	57795 GILL E 2 69 to 57813 MACARTH2 69 CKT 1	0	Replace disconnect switches at Gill 69 kV (use 800 A.), Replace line switch at Oatville 69 kV (use 800 A.).	\$45,000
10SP	44	WERE	WERE	57795 GILL E 2 69 to 57825 OATVILL2 69 CKT 1	72	110.3	112.2	3.1	57796 GILL W 2 69 to 57804 HAYSVLJ2 69 CKT 1	0	See Previous Upgrade Specified for Facility	
10SP	44	WERE	WERE	57795 GILL E 2 69 to 57825 OATVILL2 69 CKT 1	72	102.3	104.2	3.1	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	0	See Previous Upgrade Specified for Facility	
10SP	44	WERE	WERE	57180 TEC E 3 115 to 57192 HOOKJCT3 115 CKT 1	160	122.9	126.7	13.7	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line	
10SP	44	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	111.9	114.1	12.0	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
10SP	44	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	100.4	103.4	4.6	57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Tranformer	
10SP	44	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	100.9	103.0	3.3	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Tranformer	
10SP	44	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	97.6	100.5	4.6	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	11	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Tranformer	
15SP	45	WERE	WERE	57156 54&MERI3 115 to 57163 HOYT 3 115 CKT 1	179	109.7	111.2	6.1	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	99.7	100.8	13.5	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	3	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	57152 CIRCLVL3 115 to 57165 HTI JCT3 115 CKT 1	97	111.5	114.6	6.7	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	57162 GOODYR 3 115 to 57169 NTHLAND3 115 CKT 1	175	110.2	111.5	5.1	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	110.1	112.0	46.6	56766 JEC N 7 345 to 56770 MORRIS 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center - Morris County 345kV	
15SP	45	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	108.4	110.9	59.8	56853 LAWHILL6230 to 56854 LEC U5 6230 CKT 1	0	Solution Undetermined	
15SP	45	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	109.0	110.7	39.3	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
15SP	45	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	99.1	100.8	38.8	56769 LANG 7 345 to 56770 MORRIS 7 345 CKT 1	7	Solution Undetermined	
15SP	45	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	123.7	124.5	4.1	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
15SP	45	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	106.2	107.4	6.3	56853 LAWHILL6230 to 56854 LEC U5 6230 CKT 1	0	Solution Undetermined	
15SP	45	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	104.4	105.3	4.7	56766 JEC N 7 345 to 56770 MORRIS 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 401 - Outage of theJEFFREY ENERGY CENTER - MORRIS COUNTY 345KV	
15SP	45	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	103.2	103.8	3.3	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
15SP	45	WERE	WERE	57180 TEC E 3 115 to 57182 TECHILE3 115 CKT 1	236	100.1	100.7	3.2	57153 COLINE 3 115 to 57162 GOODYR 3 115 CKT 1	0	Solution Undetermined	
15SP	45	WERE	WERE	57182 TECHILE3 115 to 57180 TEC E 3 115 CKT 1	236	100.0	100.6	3.2	57153 COLINE 3 115 to 57456 COLINE 269.0 to 57443 COLINE 134.5 CKT 1	1	Solution Undetermined	
15SP	45	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	103.7	106.8	4.9	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Tranformer	
15SP	45	WERE	WERE	56920 TECHILL5 161 WND 1 1	69	99.1	103.0	6.1	57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1	3	May be relieved due to Westar Operating Procedure 632 - Overload of the Tecumseh Energy Center 161/115kV Tranformer	
											Total Estimated Engineering and Construction Cost	\$5,943,000