



SPP *Southwest
Power Pool*

*System Impact Study
SPP-2003-275-1
For Transmission Service
Requested By
Kansas Municipal Energy Agency*

From GRDA to WR

*For a Reserved Amount Of 24 MW
From 5/1/2009
To 5/1/2010*

SPP Engineering, Tariff Studies

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ATTACHMENT: *SPP-2003-275-1 Tables*

1. Executive Summary

Kansas Municipal Energy Agency has requested a system impact study to renew long-term Firm Point-to-Point transmission service from GRDA to WR for 24 MW. The period of the service requested is from 5/1/2009 to 5/1/2010. The OASIS reservation numbers are 610382 and 610383.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the renewal of the 24 MW request while maintaining system reliability. The renewal of long-term service is being evaluated due to the FERC settlement agreement, which ended service 5/1/2009 in order to avoid additional upgrade costs. Analysis was conducted for the requested service period above and for the remaining planning horizon from 5/1/2010 to 4/1/2011. The additional evaluation of the planning horizon was conducted to determine any future constraints that may limit the future renewal of service.

Tables 1 and 2 lists the SPP facility overloads and voltage violations, respectively, caused or impacted by the requested service and include solutions with estimated engineering and construction costs to alleviate the limiting facilities. Tables 3 and 4 lists Non-SPP facility overloads and voltage violations, respectively, caused or impacted by the requested service.

The study results of the GRDA to WR 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 the status of one higher priority request. The higher priority request is a SPS to MPS 200 MW Redirect. The redirect request was not modeled in the study cases. The request has a minimal effect on the determined ATC.

SPP will also review the possibility of curtailment of previously confirmed service and/or the redispatch of units as an option for relieving the additional impacts on the SPP facilities caused by the GRDA to WR request. These options will be evaluated as part of the Facility Study. 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 Municipal Energy Agency has requested a system impact study for Point-to-Point Service from GRDA to WR for 24 MW. 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 24 MW request on transmission line loading and transmission bus voltages for system intact and system outages of single and selected multiple transmission lines and transformers on the SPP systems and first tier Non - SPP systems.

3. Study Methodology

A. Description

The system impact analysis was conducted to determine the steady-state impact of the 24 MW transfer 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 lower bound of the normal voltage range monitored is 95%. The lower bound of the emergency voltage range monitored is 90%.

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, and any defined contingencies for these control areas. 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 four seasonal models to study the GRDA to WR 24 MW transfer for the requested service period. The SPP 2004 Series Cases 2007 Summer Peak (07SP), 2007/08 Winter Peak (07WP), 2010 Summer Peak (10SP), and 2010/11 Winter Peak (10WP) were used to study the impact of the 24 MW transfer on the system during the requested service period from 5/1/2009 to 5/1/2010 and remaining planning horizon from 5/1/2010 to 4/1/2011. 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 2004 Series Cases.

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 upgrade for the GRDA to WR request.

4. Study Results

A. Study Analysis Results

Tables 1, 2, 3, and 4 contain the steady-state analysis results of the System Impact Study. The Tables are in the attached workbook *SPP-2003-275-1 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 studied transfer, 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 lists the SPP facility overloads caused or impacted by the 24 MW transfer. Solutions with estimated engineering and construction costs are provided in the tables.

Table 2 lists the SPP facility voltage violations caused or impacted by the 24 MW transfer. Solutions with estimated engineering and construction costs are provided in the tables.

Table 3 lists overloads on Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 24 MW transfer.

Table 4 lists voltage violations on Non - SPP Regional Tariff participants' transmission system caused or impacted by the 24 MW transfer.

Table 1a documents the modeling representation of the events identified in Table 1 to include bus numbers and bus names.

5. Conclusion

The study results of the GRDA to WR 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 the status of one higher priority request. The higher priority request is a SPS to MPS 200 MW Redirect. The redirect request was not modeled in the study cases. The request has a minimal effect on the determined ATC.

SPP will also review the possibility of curtailment of previously confirmed service and/or the redispatch of units as an option for relieving the additional impacts on the SPP facilities caused by the GRDA to WR request. These options will be evaluated as part of the Facility Study. 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

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 Table 1 - SPP Facility Overloads
 Caused or Impacted by 25 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
07SP	WERE	WERE	AUBURN 230/115/13.8KV TRANSFORMER	308	100.2	100.6	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	
07SP	WERE	WERE	AUBURN 230/115/13.8KV TRANSFORMER	308	100.0	100.4	HOYT 345/115/14.4KV TRANSFORMER	0	May be relieved due to Westar Operating Procedure 623 - Outage of the Hoyt 345-115kV Transformer	
07SP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	101.7	103.4	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	0	May be relieved due to Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
07SP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	104.5	106.0	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	
07SP	WERE	WERE	CIRCLE - SANDHILL ARK VALLEY CO-OP D.P. JUNCTION 115KV	68	100.9	102.1	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	0	May be relieved due to Westar Operating Procedure 1204 - Outage of the Circle to Hutchinson Energy Center (HEC) GT 115 kV Line	
07WP	WERE	WERE	NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115KV	160	108.5	110.1	EAST MCPHERSON - SUMMIT 230KV	0	Rebuild 0.88 miles and reconductor with 1192.5 ACSR. Date Upgrade Needed for Renewal of Service is 12/1/09	\$417,200
07WP	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV	68	117.1	118.8	EAST MCPHERSON - SUMMIT 230KV	0	Tear down double circuit, build single circuit with 1192.5 ACSR. Date Upgrade Needed for Renewal of Service is 12/1/09	\$7,800,000
07WP	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV CKT 2	92	102.2	103.7	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Specified For Facility	
07WP	WERE	WERE	CIRCLE - SANDHILL ARK VALLEY CO-OP D.P. JUNCTION 115KV	68	99.1	100.8	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	13	May be relieved due to Westar Operating Procedure 1204 - Outage of the Circle to Hutchinson Energy Center (HEC) GT 115 kV Line	
10SP	WERE	WERE	AUBURN 230/115/13.8KV TRANSFORMER	308	102.0	102.4	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	
10SP	WERE	WERE	AUBURN 230/115/13.8KV TRANSFORMER	308	100.6	100.9	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	
10SP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	118.0	119.6	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	
10SP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	115.2	116.9	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	0	May be relieved due to Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	AUBURN ROAD - KEENE 115KV CKT 2	92	103.2	104.6	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	
10SP	WERE	WERE	AUBURN ROAD - KEENE 115KV CKT 2	92	100.8	102.3	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	0	May be relieved due to Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	353	100.0	100.3	FLINT CREEK - TONTITOWN 161 KV	0	Limits Renewal Rights	
10SP	WERE	WERE	HUTCHINSON ENERGY CENTER GAS TURBINE 2 115/13.8KV TRANSFORMER	65	115.9	119.0	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	0	May be relieved due to Westar Operating Procedure 1204 - Outage of the Circle to Hutchinson Energy Center (HEC) GT 115 kV Line	
10SP	WERE	WERE	HUTCHINSON ENERGY CENTER GAS TURBINE 2 69/13.8KV TRANSFORMER	65	114.5	117.3	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	0	May be relieved due to Westar Operating Procedure 1204 - Outage of the Circle to Hutchinson Energy Center (HEC) GT 115 kV Line	
10SP	WERE	WERE	KEENE - SOUTH ALMA 115KV	68	108.0	109.6	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	
10SP	WERE	WERE	KEENE - SOUTH ALMA 115KV	68	105.1	106.8	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	0	May be relieved due to Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	WHITE JUNCTION - CHASE 69KV	43	99.7	102.2	WEAVER 138/69/13.2KV TRANSFORMER	3	May be relieved due to Westar Operating Procedure 634 - Outage of the Weaver 138-69kV Transformer	
10WP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	108.3	109.8	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10WP	WERE	WERE	CIRCLE - SANDHILL ARK VALLEY CO-OP D.P. JUNCTION 115KV	68	100.2	101.5	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	0	May be relieved due to Westar Operating Procedure 1204 - Outage of the Circle to Hutchinson Energy Center (HEC) GT 115 kV Line	
10WP	WERE	WERE	KEENE - SOUTH ALMA 115KV	68	102.1	103.6	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10WP	WERE	WERE	NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115KV	160	121.9	123.6	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Specified For Facility	
10WP	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV	68	131.6	133.4	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Specified For Facility	
10WP	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV CKT 2	92	114.8	116.4	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Specified For Facility	
10WP	WERE	WERE	SANDHILL JCT - CIRCLE 115KV	141	103.4	105.5	CIRCLE 230/115/13.8KV TRANSFORMER	0	See Previous Upgrade Specified For Facility	
10WP	WERE	WERE	WEST JUNCTION CITY - WEST JUNCTION CITY JUNCTION (EAST) 115KV	141	111.1	111.9	SUMMIT 345/230/14.4KV TRANSFORMER	0	Solution Undetermined, May Only Limit Renewal Rights	
10WP	WERE	WERE	WEST JUNCTION CITY - WEST JUNCTION CITY JUNCTION (EAST) 115KV	141	111.5	112.2	JEFFREY ENERGY CENTER - SUMMIT 345KV	0	May be relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230kV Transformer	
10WP	WERE	WERE	WEST JUNCTION CITY - WEST JUNCTION CITY JUNCTION (EAST) 115KV	141	111.5	112.2	JEFFREY ENERGY CENTER - SUMMIT 345KV	0	May be relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345 kV Line	
10WP	WERE	WERE	WEST MCPHERSON - SANDHILL JCT 115KV	68	98.5	100.5	CIRCLE 230/115/13.8KV TRANSFORMER	19	Solution Undetermined, May Only Limit Renewal Rights	
Total Estimated Cost										\$8,217,200

Study Case	Area	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	ATC (MW)	Solution	Estimated Cost
07SP		NONE IDENTIFIED				24		
07WP		NONE IDENTIFIED				24		
10SP		NONE IDENTIFIED				24		
10WP		NONE IDENTIFIED				24		
Total Estimated Cost								\$ -

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 Table 3 - Non-SPP Facility Overloads
 Caused or Impacted by 25 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
07SP			NONE IDENTIFIED					
07WP	AECI	AECI	96123 5WPLAIN 161 WND 2 WESTPL1	1 56	115.4	116.8	96123 5WPLAIN 161 to 97123 2WSTPL3 69.0 to 97120 1WESTPL2 CKT 2	
10SP			NONE IDENTIFIED					
10WP			NONE IDENTIFIED					

Study Case	Area	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
07SP		NONE IDENTIFIED				
07WP		NONE IDENTIFIED				
10SP		NONE IDENTIFIED				
10WP		NONE IDENTIFIED				

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
07SP	WERE	WERE	56851 AUBURN 6 230 WND 1 AUBRN77X 1	308	100.2	100.6	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	
07SP	WERE	WERE	56851 AUBURN 6 230 WND 1 AUBRN77X 1	308	100.0	100.4	56765 HOYT 7 345 to 57163 HOYT 3 115 to 56804 HOYT 114.4 CKT 1	0	May be relieved due to Westar Operating Procedure 623 - Outage of the Hoyt 345-115kV Transformer	
07SP	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	101.7	103.4	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	0	May be relieved due to Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
07SP	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	104.5	106.0	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	
07SP	WERE	WERE	57412 ARKVALJ3 115 to 57413 CIRCLE 3 115 CKT 1	68	100.9	102.1	57413 CIRCLE 3 115 to 57419 HEC 3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1204 - Outage of the Circle to Hutchinson Energy Center (HEC) GT 115 kV Line	
07WP	WERE	WERE	57372 PHILIPS3 115 to 57374 SPHILPJ3 115 CKT 1	160	108.5	110.1	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	Rebuild 0.88 miles and reconductor with 1192.5 ACSR. Date Upgrade Needed for Renewal of Service is 12/1/09	\$417,200
07WP	WERE	WERE	57374 SPHILPJ3 115 to 57438 WMCIPHER3 115 CKT 1	68	117.1	118.8	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	Tear down double circuit, build single circuit with 1192.5 ACSR. Date Upgrade Needed for Renewal of Service is 12/1/09	\$7,800,000
07WP	WERE	WERE	57374 SPHILPJ3 115 to 57438 WMCIPHER3 115 CKT 2	92	102.2	103.7	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	See Previous Upgrade Specified For Facility	
07WP	WERE	WERE	57412 ARKVALJ3 115 to 57413 CIRCLE 3 115 CKT 1	68	99.1	100.8	57413 CIRCLE 3 115 to 57419 HEC 3 115 CKT 1	13	May be relieved due to Westar Operating Procedure 1204 - Outage of the Circle to Hutchinson Energy Center (HEC) GT 115 kV Line	
10SP	WERE	WERE	56851 AUBURN 6 230 WND 1 AUBRN77X 1	308	102.0	102.4	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	
10SP	WERE	WERE	57151 AUBURN 3 115 WND 2 AUBRN77X 1	308	100.6	100.9	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	
10SP	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	118.0	119.6	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	
10SP	WERE	WERE	57167 KEENE 3 115 to 57151 AUBURN 3 115 CKT 1	68	115.2	116.9	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	0	May be relieved due to Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	57167 KEENE 3 115 to 57151 AUBURN 3 115 CKT 2	92	103.2	104.6	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	
10SP	WERE	WERE	57167 KEENE 3 115 to 57151 AUBURN 3 115 CKT 2	92	100.8	102.3	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	0	May be relieved due to Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	353	100.0	100.3	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT1	0	Limits Renewal Rights	
10SP	WERE	WERE	56696 HEC GT2 13.8 to 57421 HEC GT 3 115 CKT 1	65	115.9	119.0	57413 CIRCLE 3 115 to 57419 HEC 3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1204 - Outage of the Circle to Hutchinson Energy Center (HEC) GT 115 kV Line	
10SP	WERE	WERE	56696 HEC GT2 13.8 to 57514 HEC GT 2 69 CKT 1	65	114.5	117.3	57413 CIRCLE 3 115 to 57419 HEC 3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1204 - Outage of the Circle to Hutchinson Energy Center (HEC) GT 115 kV Line	
10SP	WERE	WERE	57167 KEENE 3 115 to 57339 S ALMA 3 115 CKT 1	68	108.0	109.6	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	
10SP	WERE	WERE	57167 KEENE 3 115 to 57339 S ALMA 3 115 CKT 1	68	105.1	106.8	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	0	May be relieved due to Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	57605 WHITE J269.0 to 57588 CHASE 269.0 CKT 1	43	99.7	102.2	56991 WEAVER 4 138 to 57604 WEAVER 269.0 to 57083 WEAVER 113.2 CKT 1	3	May be relieved due to Westar Operating Procedure 634 - Outage of the Weaver 138-69kV Transformer	
10WP	WERE	WERE	57167 KEENE 3 115 to 57151 AUBURN 3 115 CKT 1	68	108.3	109.8	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	0	May be relieved due to Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10WP	WERE	WERE	57412 ARKVALJ3 115 to 57413 CIRCLE 3 115 CKT 1	68	100.2	101.5	57413 CIRCLE 3 115 to 57419 HEC 3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1204 - Outage of the Circle to Hutchinson Energy Center (HEC) GT 115 kV Line	
10WP	WERE	WERE	57167 KEENE 3 115 to 57339 S ALMA 3 115 CKT 1	68	102.1	103.6	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	0	May be relieved due to Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10WP	WERE	WERE	57372 PHILIPS3 115 to 57374 SPHILPJ3 115 CKT 1	160	121.9	123.6	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	See Previous Upgrade Specified For Facility	
10WP	WERE	WERE	57374 SPHILPJ3 115 to 57438 WMCIPHER3 115 CKT 1	68	131.6	133.4	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	See Previous Upgrade Specified For Facility	
10WP	WERE	WERE	57374 SPHILPJ3 115 to 57438 WMCIPHER3 115 CKT 2	92	114.8	116.4	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	See Previous Upgrade Specified For Facility	
10WP	WERE	WERE	57434 SANDHLJ3 115 to 57413 CIRCLE 3 115 CKT 1	141	103.4	105.5	56871 CIRCLE 6 230 to 57413 CIRCLE 3 115 to 56892 CIRCLE 113.8 CKT 1	0	Solution Undetermined, May Only Limit Renewal Rights	
10WP	WERE	WERE	57342 WJCCTY 3 115 to 57343 WJCCTYE3 115 CKT 1	141	111.1	111.9	56773 SUMMIT 7345 to 56873 SUMMIT 6230 to 56813 SUMMIT 114.4 CKT 1	0	May be relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230kV Transformer	
10WP	WERE	WERE	57342 WJCCTY 3 115 to 57343 WJCCTYE3 115 CKT 1	141	111.5	112.2	56766 JEC N 7345 to 56773 SUMMIT 7345 CKT 1	0	May be relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345 kV Line	
10WP	WERE	WERE	57438 WMCIPHER3 115 to 57434 SANDHLJ3 115 CKT 1	68	98.5	100.5	56871 CIRCLE 6 230 to 57413 CIRCLE 3 115 to 56892 CIRCLE 113.8 CKT 1	19	Solution Undetermined, May Only Limit Renewal Rights	
Total Estimated Cost									\$8,217,200	