

# Screening Study SPP-LTSR-2011-005

For OASIS Request # 75627231

MAINTAINED BY  
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## **Executive Summary**

Nebraska Public Power District has requested a screening study to determine the impacts on SPP facilities due to a Long Term Service Request of 201 MW. The service type requested for this screening study is Long Term Service Request (LTSR). The period of the service requested is from 7/1/2012 to 7/1/2032.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the LTSR request while maintaining system reliability. The LTSR request was studied using two system scenarios. The service was modeled by a transfer from NPPD to EES. The two scenarios were studied to capture system limitations caused or impacted by the requested service. An analysis was conducted on the planning horizon from 7/1/2012 to 7/1/2032.

Facilities on the SPP system were identified for the requested service due to the SPP Study Methodology criteria. Table 1 summarizes the results of the screening study analysis for the transfer for the scenarios listed in the table. Table 1 lists SPP thermal transfer limitations identified. Table 2 lists the network upgrades required to mitigate the limitations impacted by this request.

## Introduction

Nebraska Public Power District has requested a screening study to determine the impacts on SPP facilities for a Long Term Service Request of 201 MW.

The purpose of the LTSR Option Screening Study is to provide the Eligible Customer with an approximation of the transmission remediation costs of each potential LTSR and a reasonable cost differential between alternatives for the purpose of an Eligible Customer's ranking of its potential LTSRs. The results of the Screening Study are not binding and the Eligible Customer retains the rights to enter the Aggregate Transmission Service Study. The Screening Study results will not assess the third party impacts and upgrades required. Service will not be granted based on the Screening Study for potential LTSRs on the Transmission System. To obtain a Service Agreement, Eligible Customers must apply for service and follow the application process set forth in Parts II and III of the Tariff.

This study includes DC contingency analysis (MUST Activity FCITC). The DC analysis considers the impact of the request on transmission line and transformer loadings for outages of single transmission lines, transformers, and generating units, and selected multiple transmission lines and transformers on the SPP and first-tier third party systems.

The LTSR request was studied using two system scenarios. The service was modeled by a transfer from NPPD to EES. The two scenarios were studied to capture the system limitations caused or impacted by the requested service. Scenario 0 includes projected usage of transmission service included in the SPP 2010 Series Cases. Scenario 5 includes transmission service not already included in the SPP 2010 Series Cases.

## Study Methodology

### Description

The facility study analysis was conducted to determine the DC impact of the requested service on the SPP system. The DC analysis was performed to ensure current SPP Criteria and NERC Reliability Standards requirements are fulfilled. SPP conforms to NERC Reliability Standards, which provide strict requirements related to voltage violations and thermal overloads during normal conditions and during a contingency. NERC Standards require all facilities to 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 Model Development Working Group (MDWG) models, respectively.

The contingency set includes all SPP control area branches and ties 69 kV 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 control areas with SPP reserve share program redispatch. The monitor elements include all SPP control area branches and ties 69 kV and above.

A 3 % transfer distribution factor (TDF) cutoff was applied to all SPP control area facilities.

### Model Updates

SPP used five seasonal models to study the NPPD to EES 201 MW request for the requested service period. The following SPP Transmission Expansion Plan 2010 Build 2 Cases were used to study the impact of the requested service on the transmission system:

- 2012 Summer Peak (12SP)
- 2012/13 Winter Peak (12WP)
- 2016 Summer Peak (16SP)
- 2016/17 Winter Peak (16WP)
- 2021 Summer Peak (21SP)

The Summer Peak models apply to June through September and the Winter Peak models apply to December through March.

The chosen base case models were modified to reflect the current modeling information. From the five seasonal models, two system scenarios were developed. Scenario 0 includes projected usage of transmission included in the SPP 2010 Series Cases. Scenario 5 includes transmission not already included in the SPP 2010 Series Cases.

### **Transfer Analysis**

Using the selected cases base cases, the MUST Activity FCITC was run to determine the facility overloads caused or impacted by the transfer. Transfer distribution factor cutoffs were applied to determine the impacted facilities. The MUST options chosen to conduct the analysis can be found in Appendix A.

## **Study Results**

### **Study Analysis Results**

Table 1 contains the initial DC analysis results of the LTSR. The tables are attached to the end of this report, if applicable. The tables identify the scenario and season in which the event occurred, the transfer amount studied, the facility control area location, applicable ratings of the thermal transfer limitations, and the loading percentage.

Table 1 lists the SPP thermal transfer limitations caused or impacted by the 201 MW requested transfer for applicable scenarios. Solutions are identified for the limitations in this table.

Table 2 lists the network upgrades required to mitigate the limitations caused or impacted by this request. Engineering and construction costs are provided for assigned upgrades in this table.

## Conclusion

The results of the screening study show that limiting constraints exist within the SPP regional transmission system for the requested transfer of 201 MW. The next steps are to WITHDRAW the request on OASIS and, if desired, enter a new OASIS request into the aggregate study queue.

The results contained in this study are for informational purposes only. Service will not be granted based on the Screening Study results. To obtain a Service Agreement, Eligible Customers must apply for service and follow the application processes set forth in Parts II and III of the Tariff and enter the Aggregate Study process. The results of the Aggregate Study may vary from the results of this screening study.

As a final step in this process, it is requested that the customer WITHDRAW the LTSR screening study request on OASIS.



## Appendix A

### MUST CHOICES IN RUNNING LOAD FLOW PROGRAM AND FCITC

#### Solutions – First Contingency Incremental Transfer Capability (FCITC)

1. AC MW Mismatch Tolerance – 2
2. Base Case Rating-Rating A
3. Base Case Percent of Rating-100
4. Contingency Case Rating – Rate B
5. Contingency Case Rating of Percent of Rating – 100
6. Base Case Load Flow-PSS\E
7. Convert Branch Rating to Estimated MW Rating-No
8. Contingency ID Reporting- Labels
9. Maximum Number of Contingencies to Process- 50,000

#### Must Solution parameters:

1. Phase Shifter Code – Constant Flow in Cont
2. Ignore Base Case Constraints in FCITC Report- Include
3. Max Number of Violations to Report in FCITC and Gen Sensor Table – 50,000
4. Default Minimum Distribution Factor Magnitude Cutoff(PTDF&OTDF)- 0.030
5. Summary Table Maximum Times to Report the Same Element- 10
6. Apply Min. Distr. Factor Cutoff for Contingency Analysis- Yes
7. Apply Minimum Distribution Factor to FCITC Solution Reports-Yes
8. Minimum Contingency Case (Pre & Post) Flow Change- 3
9. Minimum Contingency Case Distribution Factor Change-0.0
10. Minimum Distribution Factor for Transfer Sensitivity Analysis- 0.0

Scenario	Season	From Area	To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	12WP	NPPD	EES	CANADAY - LEXINGTON 115KV CKT 1	107.6	3.6%	CROOKED CREEK - RIVERDALE 230KV CKT 1	CANADAY - LEXINGTON 115KV CKT 1	Increase clearances to 100 Deg C and upgrade terminal equipment (PCB, DISC, WVTTRF, CT, BUS) to effect higher rating
5	16SP	NPPD	EES	CLINTON - MONTROSE 161KV CKT 1	109.2	0.03727	OVERTON-TRF	CLINTON - MONTROSE 161KV CKT 1 AECI	Upgrade limiting terminal equipment at Clinton
5	16SP	NPPD	EES	CLINTON - MONTROSE 161KV CKT 1	108.4	0.03769	7OVERTON 345.00 - SIBLEY 345KV CKT 1	CLINTON - MONTROSE 161KV CKT 1 AECI	Upgrade limiting terminal equipment at Clinton
5	16SP	NPPD	EES	CLINTON - MONTROSE 161KV CKT 1	106.9	0.03386	ADRIAN - ARCHIE 161KV CKT 1	CLINTON - MONTROSE 161KV CKT 1 AECI	Upgrade limiting terminal equipment at Clinton
5	16WP	NPPD	EES	CLINTON - MONTROSE 161KV CKT 1	103.5	0.03599	OVERTON-TRF	CLINTON - MONTROSE 161KV CKT 1 AECI	Upgrade limiting terminal equipment at Clinton
5	16WP	NPPD	EES	CLINTON - MONTROSE 161KV CKT 1	102.9	0.0364	7OVERTON 345.00 - SIBLEY 345KV CKT 1	CLINTON - MONTROSE 161KV CKT 1 AECI	Upgrade limiting terminal equipment at Clinton
5	21SP	NPPD	EES	CLINTON - MONTROSE 161KV CKT 1	108.6	0.04015	OVERTON-TRF	CLINTON - MONTROSE 161KV CKT 1 AECI	Upgrade limiting terminal equipment at Clinton
5	21SP	NPPD	EES	CLINTON - MONTROSE 161KV CKT 1	108.0	0.04061	7OVERTON 345.00 - SIBLEY 345KV CKT 1	CLINTON - MONTROSE 161KV CKT 1 AECI	Upgrade limiting terminal equipment at Clinton
5	21SP	NPPD	EES	CLINTON - MONTROSE 161KV CKT 1	106.1	0.03598	ADRIAN - ARCHIE 161KV CKT 1	CLINTON - MONTROSE 161KV CKT 1 AECI	Upgrade limiting terminal equipment at Clinton
5	12WP	NPPD	EES	GRAND ISLAND - SWEETWATER 345KV CKT 1	107.4	39.0%	AXTELL - SWEETWATER 345KV CKT 1	Priority Projects	
5	12WP	NPPD	EES	MOUNDRIDGE (MOUND10X) 138/115/13.8KV TRANSFORMER CKT 1	112.8	3.2%	RENO COUNTY - WICHITA 345KV CKT 1	Priority Projects	
5	12WP	NPPD	EES	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	105.6	7.2%	SPP-SWPS-05	Priority Projects	

Transmission Owner	Upgrade	Solution	Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)	Estimated Engineering & Construction Cost	RTO Determined Need Date
	None					

**Construction Pending Projects - The requested service is contingent upon completion of the following upgrades. Cost is not assignable to the transmission customer.**

Transmission Owner	Upgrade	Solution	Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)	Estimated Engineering & Construction Cost
NPPD	CANADAY - LEXINGTON 115KV CKT 1	Increase clearances to 100 Deg C and upgrade terminal equipment (PCB, DISC, WVTRP, CT, BUS) to effect higher rating	10/1/2012	6/1/2013	\$3,500,000
AECI	CLINTON - MONROSE 161KV CKT 1 AECI	Upgrade limiting terminal equipment at Clinton	6/1/2013	6/1/2013	\$180,000

**Priority Projects - The requested service is contingent upon completion of the following upgrades. Cost is not assignable to the transmission customer.**

Transmission Owner	Upgrade	Solution	Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)
MKEC	Line - Comanche County - Medicine Lodge 345 kV dbl ckt	Build a new 55 mile double circuit 345 kV line	7/31/2011	1/1/2015
MKEC	Line - Medicine Lodge - Wichita 345 kV dbl ckt MKEC	Build a new 35 mile double circuit 345 kV line with at least 3000 A capacity from the new Medicine Lodge 345 kV substation to the WR interception from the Wichita substation.	7/31/2011	1/1/2015
MKEC	Line - Medicine Lodge - Woodward 345 kV dbl ckt MKEC	Build a new 28.6 mile dbl ckt 345 kV line with at least 3000 A capacity from the Medicine Lodge sub to the KS/OK state border towards the Woodward District EHV sub. Install the necessary breakers and terminal equipment at the Medicine Lodge sub.	7/31/2011	1/1/2015
MKEC	Line - Spearville - Comanche County 345 kV dbl ckt MKEC	Build a new 27.5 mile double circuit 345 kV line	7/31/2011	1/1/2015
MKEC	XFR - Medicine Lodge 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Medicine Lodge substation.	7/31/2011	1/1/2015
OKGE	Line - Hitchland - Woodward 345 kV dbl ckt OKGE	Build a new 60.5 mile double circuit 345 kV line	7/31/2011	7/1/2014
OKGE	Line - Medicine Lodge - Woodward 345 kV dbl Ckt OKGE	Build a new 79 mile dbl ckt 345 kV line with at least 3000 A capacity from the Woodward District EHV sub to the KS/OK state border towards the Medicine Lodge sub. Upgrade the Woodward District EHV sub with the necessary breakers and terminal equipment.	7/31/2011	1/1/2015
SPS	Line - Hitchland - Woodward 345 kV dbl ckt SPS	Build a new 60.5 mile double circuit 345 kV line	7/31/2011	7/1/2014
SUNC	Line - Spearville - Comanche County 345 kV dbl ckt SUNC	Build a new 27.5 mile double circuit 345 kV line with at least 3000 A capacity from the Spearville substation to the MKEC interception point from the new Comanche County substation.	7/31/2011	1/1/2015
WERE	Line - Medicine Lodge - Wichita 345 kV dbl ckt WERE	Build a new 35 mile double circuit 345 kV line	7/31/2011	1/1/2015