



***System Impact Study SPP-2002-050
For Transmission Service
Requested By
Exelon Generation Co., LLC***

***From AEPW To
Entergy***

***For a Reserved Amount Of 400MW
From 6/1/02
To 6/1/03***

SPP Transmission Planning

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1. Executive Summary

Exelon Generation Co., LLC has requested a system impact study for long-term Firm Point-to-Point transmission service from AEPW to Entergy. The period of the transaction is from 6/1/02 to 6/1/03. The request is for OASIS reservation 350661 in the amount of 400MW. Oasis reservation 350661 is the renewal of the previously confirmed reservation 296669 for 400MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 400MW transfer while maintaining system reliability.

New overloads caused by the 400MW transfer were identified along with determining the impact of the transfer on any previously assigned and identified facilities.

The AEPW to EES transfer impacts facilities that have been identified as limiting constraints for previously studied transfers. Due to the inability to upgrade these limiting constraints within the reservation period using normal construction practices, the ATC is zero for the requested AEPW to EES 400MW transfer.

Curtailed of the previously confirmed AEPW to AMRN 400MW transfer (Oasis Reservation 296672) was looked at as an option to relieving the impact on these facilities caused by the AEPW to EES transfer.

2. Introduction

Exelon Generation Co., LLC has requested an impact study for transmission service from AEPW to EES.

The principal objective of this study is to identify the constraints on the SPP Regional Tariff System that may limit the transfer to less than 400MW. 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 400MW transfer on transmission line loading and transmission bus voltages for outages of single and selected multiple transmission lines and transformers on the SPP system.

ATC analyses shows the amount of First Contingency Incremental Transfer Capabilities (FCITC) between the given study systems and what the limitations are, if any, for transferring up to 400MW.

3. Study Methodology

A. Description

Two analyses were conducted to determine the impact of the 400MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 400MW transfer. The second analysis was done to ensure that available capacity exists on previously identified circuits.

The first analysis was to study the steady-state analysis impact of the 400MW transfer on the SPP system. The second step was to study Available Transfer Capability (ATC) of the facilities identified in the steady-state analysis impact. The steady-state analysis was done to ensure current SPP Criteria and NERC Planning Standards requirements are fulfilled. The Southwest Power Pool (SPP) conforms to the NERC Planning Standards, which provide the strictest requirements, related to thermal overloads with a contingency. It requires that all facilities be within emergency ratings after a contingency.

The second analysis was done to determine the impact of the transfer on previously assigned and identified facilities.

B. Model Updates

SPP used four seasonal models to study the 400MW request. The SPP 2002 Series Cases 2002 Summer Peak, 2002 Fall, 2002/03 Winter Peak, and 2003 Spring were used to study the impact of the 400MW transfer on the SPP system during the transaction period of 6/1/02 to 6/1/03.

The chosen base case models were modified to reflect the most current modeling information. The cases were modified to reflect future firm transfers during the request period that were not already included in the January 2002 base case series models.

C. Transfer Analysis

Using the created models and the ACCC function of PSS/E, single and select double contingency outages were analyzed. Then full AC solution was used to obtain the most accurate results possible. Any facility overloaded, using MVA ratings, in the transfer case and not overloaded in the base case was flagged. The PSS/E options chosen to conduct the Impact Study analysis can be found in Appendix A.

4. Study Results

A. Study Analysis Results

Tables 1, 2, and 3 contain the analysis results of the System Impact Study. The tables identify the seasonal case in which the event occurred; the emergency rating of the overloaded circuit (Rate B), the contingent loading percentage of circuit with and without the studied transfer, the estimated ATC value using interpolation if calculated, any SPP identification or assignment of the event, and any solutions received from the transmission owners.

Table 1 shows the new facility overloads caused by the 400MW transfer.

Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 400MW transfer.

Table 3 documents the 400MW transfer impact on previously assigned and identified facilities. Available estimated in-service dates for the completion of the previously assigned upgrades are given in the table.

Table 4 documents the available confirmed reservation that, when curtailed, would relieve the additional loading on those facilities impacted by the AEPW to EES transfer.

Table 1 – SPP Facility Overloads caused by the AEPW to EES 400MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution
02FA		NONE				NONE	400	
02SP	GRRD-GRRD	CLAREMORE 161/69KV TRANSFORMER CKT 2 54451 CLARMR 5 161 to 54479 CLARMR 269.0 CKT 2	84	99.7	100.9	CLAREMORE 161/69KV TRANSFORMER CKT 1 54451 CLARMR 5 161 to 54479 CLARMR 269.0 CKT1	87	Undetermined
02SP	GRRD-GRRD	CLAREMORE 161/69KV TRANSFORMER CKT 1 54451 CLARMR 5 161 to 54479 CLARMR 269.0 CKT 1	84	99.4	100.6	CLAREMORE 161/69KV TRANSFORMER CKT 2 54451 CLARMR 5 161 to 54479 CLARMR 269.0 CKT2	188	Undetermined
02SP	AEPW-AEPW	GENTRY REC TO FLINT CREEK, 161KV 53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	353	98.6	100.4	FLINT CREEK TO ELM SPRING, 161KV 53139 FLINTCR5 161 to 53194 ELMSPRR5 161 CKT1	313	Undetermined
02SP	AECI-AECI	BRISTOW 138/69KV TRANSFORMER CKT 2 96137 4BRISTOW 138 to 96889 2BRISTOW69.0 CKT 2	56	99.9	100.1	BRISTOW 138/69KV TRANSFORMER CKT 1 96137 4BRISTOW 138 to 96889 2BRISTOW69.0 CKT1	166	Undetermined
02SP	AECI-AECI	BRISTOW 138/69KV TRANSFORMER CKT 1 96137 4BRISTOW 138 to 96889 2BRISTOW69.0 CKT 1	56	99.9	100.1	BRISTOW 138/69KV TRANSFORMER CKT 2 96137 4BRISTOW 138 to 96889 2BRISTOW69.0 CKT2	166	Undetermined
02WP		NONE				NONE	400	
03AP		NONE				NONE	400	
03G		NONE				NONE	400	

Table 2 – Non - SPP Facility Overloads caused by the AEPW to EES 400MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload
02SP	MEC-MEC	64000 LEMARST5 161 to 63889 PLYMOTH5 161 CKT 1	163	100.0	100.5	64200 WEBSTER3 345 to 64202 LEHIGH 3 345 CKT1
02SP	MEC-MEC	64000 LEMARST5 161 to 63889 PLYMOTH5 161 CKT 1	163	99.9	100.5	64200 WEBSTER3 345 to 64645 WEB MID5 161 CKT1
02SP	MEC-MEC	64000 LEMARST5 161 to 63889 PLYMOTH5 161 CKT 1	163	99.9	100.5	64201 WEBSTER5 161 to 64645 WEB MID5 161 CKT1
02SP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	36	95.6	100.3	52690 CARTHG 269.0 to 96649 2JASPER 69.0 CKT1
02SP	EES-SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	99.8	103.5	99817 5ISES 1 161 to 99826 5MORFLD 161 CKT1
02FA	OPPD-OPPD	65390 S1263T1T 161 to 65627 W BROCK869.0 CKT 1	53	99.5	100.1	64863 HUMBOLT5 161 to 65391 S975T4 T 161 CKT1
02FA	OPPD-OPPD	65390 S1263T1T 161 to 65627 W BROCK869.0 CKT 1	53	99.5	100.1	65391 S975T4 T 161 to 65575 S975 869.0 CKT1
02FA	EES-EES	97920 6PPG 23 230 to 98052 2PPC SO 69.0 CKT 1	160	95.2	100.4	97920 6PPG 23 230 to 98051 2PPC NO 69.0 CKT1
02FA	EES-EES	97920 6PPG 23 230 to 98051 2PPC NO 69.0 CKT 1	160	95.1	100.2	97920 6PPG 23 230 to 98052 2PPC SO 69.0 CKT1
03G	AMRN-AMRN	31221 MOBERLY 161 to 31409 OVERTON 161 CKT 1	142	99.3	100.3	96044 7MCCRED 345 to 96049 7THOMHL 345 CKT1

Table 3 – Previously Assigned and Identified SPP Facilities Impacted by the AEPW to EES 400MW Transfer.

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Assignment
02FA		NONE				NONE	400	
02SP	KACP-KACP	STILWELL TO LA CYGNE, 345KV 57968 STILWEL7 345 to 57981 LACYGNE7 345 CKT 1	1251	100.5	103.2	WEST GARDNER TO LA CYGNE 57965 W.GRDNR7 345 to 57981 LACYGNE7 345 CKT1	0	SPP Flowgate, Upgrade Assigned to SPP-2000-108, Date Required 6/1/2005: Build Parallel La Cygne to Stilwell 345kV line, Construction Lead-time 36 Months
02SP	AEPW-AEPW	CHEROKEE TO KNOX LEE, 138KV 53522 CHEROKE4 138 to 53557 KNOXLEE4 138 CKT 1	209	102.8	105.5	Multiple Outage Contingency SOUTHWEST SHREVEPORT TO LONGWOOD, 345KV 53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT 1 SOUTHWEST SHREVEPORT TO DIANA, 345KV 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	0	Upgrade Assigned to SPP-2000-108, Date Required 6/1/2005: Reconductor 3.25 miles of 666 ACSR with 1272 ACSR, Construction Lead-time 12 Months
02SP	AEPW-AEPW	NORAM TO LONGWOOD, 138KV 53473 NORAM 4 138 to 53423 LONGWD 4 138 CKT 1	234	98.1	100.4	Multiple Outage Contingency SOUTHWEST SHREVEPORT TO LONGWOOD, 345KV 53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT 1 SOUTHWEST SHREVEPORT TO DIANA, 345KV 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	333	Previously Identified: Reconductor 4.66 miles of bundled 266 ACSR with 1590 ACSR, Construction Lead-time 15 Months
02SP	EES-SWPA	MIDWAY TO BULL SHOALS, 161KV 99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	167	96.8	100.4	ISES TO MOREFIELD, 161KV 99817 5ISES 1 161 to 99826 5MORFLD 161 CKT1	356	Upgrade Assigned to SPP-2000-108, Date Required 6/1/2005: Replace disconnect switches, metering CTs and wave trap at Bull Shoals, Construction Lead-time 12 Months
02WP		NONE				NONE	400	
03AP		NONE				NONE	400	
03G		NONE				NONE	400	

Table 4 – Amount of Confirmed Reservation 296672 Needed for Curtailment

Overloaded Facility	Date Curtailment Needed	AEPW to EES % Response	AEPW to AMRN % Response	*ATC (MW) Needed	Amount of AEPW to AMRN 400MW transfer (Oasis Reservation 296672) Needed for Curtailment	ATC (MW) Available for AEPW to EES transfer after curtailment of 296672
CLAREMORE 161/69KV TRANSFORMER CKT 1	6/1/02 - 10/1/02	0.25%	0.32%	212	170	400
CLAREMORE 161/69KV TRANSFORMER CKT 2	6/1/02 - 10/1/02	0.25%	0.32%	313	250	400
GENTRY REC TO FLINT CREEK, 161KV	6/1/02 - 10/1/02	1.60%	1.50%	87	93	400
BRISTOW 138/69KV TRANSFORMER	6/1/02 - 10/1/02	0.03%	0.06%	234	117	400
STILWELL TO LA CYGNE, 345KV	6/1/02 - 10/1/02	8.40%	14.40%	400	233	400
CHEROKEE TO KNOX LEE, 138KV	6/1/02 - 10/1/02	1.40%	0.79%	400	709 (only 400MW available for curtailment)	226
NORAM TO LONGWOOD, 138KV	6/1/02 - 10/1/02	1.40%	0.53%	67	171	400
MIDWAY TO BULL SHOALS, 161KV	6/1/02 - 10/1/02	1.50%	2.80%	44	24	400

* ATC Needed = 400MW – ATC from Tables 1 and 3

Table 5 – Amount of Confirmed Reservation 296672 Needed for Curtailment for 226MW of ATC from AEPW to EES

Overloaded Facility	Date Curtailment Needed	AEPW to EES % Response	AEPW to AMRN % Response	*ATC (MW) Needed	**Amount of AEPW to AMRN 400MW transfer (Oasis Reservation 296672) Needed for Curtailment
CLAREMORE 161/69KV TRANSFORMER CKT 1	6/1/02 - 10/1/02	0.25%	0.32%	139	109
CLAREMORE 161/69KV TRANSFORMER CKT 2	6/1/02 - 10/1/02	0.25%	0.32%	38	30
BRISTOW 138/69KV TRANSFORMER	6/1/02 - 10/1/02	0.03%	0.06%	60	30
STILWELL TO LA CYGNE, 345KV	6/1/02 - 10/1/02	8.40%	14.40%	226	132
CHEROKEE TO KNOX LEE, 138KV	6/1/02 - 10/1/02	1.40%	0.79%	226	400

* ATC Needed for 226MW of Service = 226MW – ATC from Tables 1 and 3

**Amount of Curtailment Needed = ATC Needed (MW) *AEPW to EES % Response / AEPW to AMRN % Response

5. Conclusion

The previously assigned and identified facilities limit the ATC to zero due to the inability to upgrade the constraints as required. The acceptance of the 400MW AEPW to EES transfer is dependant on the curtailment of the previously confirmed AEPW to AMRN 400MW transfer (Oasis Reservation 296672).

For the 2002 Summer (6/1/02-10/1/02), the ATC is zero due the loading of the La Cygne to Stilwell 345kV line and the Cherokee to Knox Lee 138kV line. The estimated construction lead-time for the La Cygne to Stilwell overload is 36 months. The estimated construction lead-time for the Cherokee to Knox Lee overload is 12 months. The curtailment of the 400MW transfer from AEPW to AMRN may be used as an option to relieving these overloads.

The amount of curtailment available from AEPW to AMRN is not sufficient enough to relieve the total impact on the Cherokee to Knox Lee 138kV line caused by the AEPW to EES transfer. Therefore, with 400MW of curtailment available from the AEPW to AMRN transfer, the maximum ATC that can be granted for the AEPW to EES transfer is 226MW. Without the availability of this curtailment, the AEPW to EES transfer will be limited to an ATC of 0MW for the 2002 Summer.

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 automatically
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 –1.0
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