SPP Southwest Power Pool

Preliminary System Impact Study SPP-2004-046-1P For The Designation of a New Network Resource Requested By Empire District Electric Company

From AEPW to EDE

For a Reserved Amount Of 150MW From 6/1/2007 To 6/1/2017

SPP Engineering, Tariff Studies

System Impact Study

Empire District Electric Company has requested a system impact study to designate a New Network Resource in the AEPW Control Area for 150 MW to serve Network Load in the EMDE Control Area. The period of the service requested is from 6/1/2007 to 6/1/2017. The OASIS reservation number is 665166. The principal objective of this study is to identify system constraints on the SPP Regional Tariff System and potential system facility upgrades that may be necessary to provide the requested service.

This study was performed for the AEPW to EDE request in order to provide preliminary results identifying facility upgrades that may be required for the requested service. The requested service was modeled as a transfer from the New Network Resource in the AEPW Control Area to the Network Load in the EMDE Control Area. The preliminary study is performed with only confirmed reservations included in the models. The models do not include any reservations, even those with a higher priority, that are still in study mode. The results of the transfer analyses are documented in Tables 1, 2, and 3 of the report. Table 1 summarizes the results of the Scenario 1 system impact analysis. Table 2 summarizes the results of the Scenario 2 system impact analysis. Table 3 summarizes the results of the Scenario 3 system impact analysis. The results given in Tables 1, 2, and 3 include upgrades that may be assigned to higher priority requests. If a facility identified for the AEPW to EDE study is also identified for a study with higher priority, the facility will be assigned to the request with the highest priority. If the higher priority customer does not take service, the facility would then be assigned to the AEPW to EDE request. The primary purpose of this preliminary study is to provide the customer with an estimated cost of the facility upgrades that may be required in order to accommodate the requested service. The preliminary study is performed by monitoring each facility at 90% of its rating. This is done to provide an estimate of possible overloads that may be assigned to the customer if requests with higher priority are accepted.

Eight seasonal models were used to study the AEPW to EDE request for the requested service period. The SPP 2004 Series Cases Update 2, 2005 April Minimum (05AP), 2005 Spring Peak (05G), 2005 Summer Shoulder (05SH), 2005 Fall Peak (05FA), 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 request on the SPP system during the requested service period of 6/1/2007 to 6/1/2017. 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 January 2004 base case series models. From the eight seasonal models, three system scenarios were developed. Scenario 1 includes confirmed West to East transfers not already included in the January 2004 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 2004 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 2004 base case series models, SPS Importing, and the Lamar HVDC Tie flowing from Lamar to SPS, and ERCOT importing.

PTI's MUST First Contingency Incremental Transfer Capability (FCITC) DC analysis was used to study the request. The MUST options chosen to conduct the System Impact Study analysis can be found in Appendix A. The MUST option to convert MVA branch ratings to estimated MW ratings was used to partially compensate for reactive loading.

These study results are preliminary estimates only and are not intended for use in final determination of the granting of service. These results do not include an evaluation of potential constraints in the planning horizon beyond the reservation period that may limit the right to renew service. Any solutions, upgrades, and costs provided in the preliminary System Impact Study are planning estimates only. The final ATC and upgrades required may vary from these results due to the status of higher priority requests, unknown facility upgrades and proposed transmission plans that will be identified during the facility study process, and the final results of the full AC analysis.

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 AEPW to EDE request. It is the responsibility of the customer to reach an agreement with the applicable party concerning the curtailment of confirmed service and the redispatch of units. The curtailment and redispatch requirements would be called upon prior to implementing NERC TLR Level 5a. 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 upgrade solutions, cost assignments and available redispatch and curtailment options will be determined upon the completion of the facility study.

Table 1 – SPP facility overloads identified for the AEPW to EDE transfer using Scenario 1

Study Case	From Area - To Area	Branch Overload	Rating <MW>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
05AP		NONE IDENTIFIED						150		
05G		NONE IDENTIFIED						150		
05SH	OKGE-OKGE	55235 PECANCK7 345 *B423 PECANCK1 1 1	364	99.2	101.7	6.1140	55224 MUSKOGE7 345 55302 FTSMITH7 345 1	47	Add 2nd 345/161 kV 369MVA transformer.	$ 3,000,000
05SH	OKGE-OKGE	55234 PECANCK5 161 *B423 PECANCK1 1 1	366	98.4	100.9	6.1140	55224 MUSKOGE7 345 55302 FTSMITH7 345 1	98	See Previous Upgrade Specified For Facility	
05SH	OKGE-OKGE	55228 5TRIBES5 161 55234 PECANCK5 161 1	221	97.1	99.8	3.9430	55230 AGENCY 5 161 55234 PECANCK5 161 1	150	May be able to increase CTR (if relays will coordinate) at Five Tribes sub.	$ 5,000
05FA	SWPA-AEPW	52680 BEAVER 5 161 53136 EUREKA 5 161 1	256	90.2	93.1	5.0270	59481 MON383 7 345 59984 BRKLNE 7 345 1	150	Rebuild 1.25 miles of 795 ACSR with 1590 ACSR	$ 600,000
05FA	SWPA-AEPW	52680 BEAVER 5 161 53136 EUREKA 5 161 1	256	90.2	93.1	5.0270	Multiple Outage Contingency 59481 MON383 7 345 59984 BRKLNE 7 345 1 53140 FLINTCR7 345 59481 MON383 7 345 1	150	See Previous Upgrade Specified For Facility	
05FA	EMDE-EMDE	59467 ORO110 5 161 59494 OAK432 5 161 1	212	93.4	97.0	5.0710	59476 ASB349 5 161 59491 PUR421 5 161 1	150	Reconductor with 795 ACSR	$ 375,000
07SP	EMDE-EMDE	59592 JOP389 2 69 *B296 JOPLINSW 1 1	74	89.2	100.8	5.7250	59483 JOP389 5 161 59607 JOP422 5 161 1	140	Replace 161/69 KV Transformer with a 150 MVA Transformer.	$ 1,565,000
07SP	EMDE-EMDE	59483 JOP389 5 161 *B296 JOPLINSW 1 1	74	89.2	100.7	5.7250	59483 JOP389 5 161 59607 JOP422 5 161 1	140	See Previous Upgrade Specified For Facility	
07SP	SWPA-AEPW	52680 BEAVER 5 161 53136 EUREKA 5 161 1	259	90.5	93.5	5.2560	59481 MON383 7 345 53140 FLINTCR7 345 1	150	See Previous Upgrade Specified For Facility	
07SP	SWPA-AEPW	52680 BEAVER 5 161 53136 EUREKA 5 161 1	259	90.5	93.5	5.2560	59984 Brklne 7 345 59481 Mon383 7 345 1 59481 Mon383 7 345 53140 Flintcr7 345 1	150	See Previous Upgrade Specified For Facility	
07SP	SWPA-SPRM	52692 SPRGFLD5 161 59969 BRKLNE 5 161 1	317	91.2	94.2	6.3120	59955 JUNCTN 5 161 59969 BRKLNE 5 161 1	150	Upgrade the main and transfer buses and buswork within bay at Springfield to 1600 amps. Replace disconnect switches at Springfield.	$ 250,000
07SP	AEPW-AEPW	53154 CHAMSPR5 161 53170 TONTITN5 161 1	242	89.5	92.5	4.7080	53155 CHAMSPR7 345 53176 TONTITN7 345 1	150	Rebuild 12 miles with 2156MCM ACSR. Replace Chamber Springs wavetrap & reset relays.	$ 7,200,000
07SP	AEPW-AEPW	53154 CHAMSPR5 161 53170 TONTITN5 161 1	242	89.4	92.3	4.7080	3Wnd: OPEN *B0 4 1	150	See Previous Upgrade Specified For Facility	
07SP	OKGE-OKGE	55234 PECANCK5 161 *B399 PECANCK1 1 1	365	91.7	94.0	5.7000	55224 MUSKOGE7 345 55302 FTSMITH7 345 1	150	See Previous Upgrade Specified For Facility	
07SP	OKGE-OKGE	55235 PECANCK7 345 *B399 PECANCK1 1 1	362	92.6	95.0	5.7000	55224 MUSKOGE7 345 55302 FTSMITH7 345 1	150	See Previous Upgrade Specified For Facility	
07SP	EMDE-EMDE	59467 ORO110 5 161 59494 OAK432 5 161 1	212	95.8	99.2	4.7370	59476 ASB349 5 161 59491 PUR421 5 161 1	150	See Previous Upgrade Specified For Facility	
07SP	EMDE-EMDE	59483 JOP389 5 161 *B296 JOPLINSW 1 1	74	83.0	94.2	5.5480	3Wnd: OPEN *B2 97 J OPLINW 1	150	See Previous Upgrade Specified For Facility	
07SP	EMDE-EMDE	59592 JOP389 2 69 *B296 JOPLINSW 1 1	74	82.9	94.2	5.5480	3Wnd: OPEN *B2 97 J OPLINW 1	150	See Previous Upgrade Specified For Facility	
07WP	SWPA-AEPW	52680 BEAVER 5 161 53136 EUREKA 5 161 1	256	92.7	96.6	6.6080	59481 MON383 7 345 59984 BRKLNE 7 345 1	150	See Previous Upgrade Specified For Facility	
07WP	SWPA-AEPW	52680 BEAVER 5 161 53136 EUREKA 5 161 1	256	92.7	96.6	6.6080	Multiple Outage Contingency 59481 MON383 7 345 59984 BRKLNE 7 345 1 53140 FLINTCR7 345 59481 MON383 7 345 1	150	See Previous Upgrade Specified For Facility	
07WP	OKGE-OKGE	55234 PECANCK5 161 *B399 PECANCK1 1 1	366	91.6	94.0	5.7260	55224 MUSKOGE7 345 55302 FTSMITH7 345 1	150	See Previous Upgrade Specified For Facility	
07WP	OKGE-OKGE	55235 PECANCK7 345 *B399 PECANCK1 1 1	366	91.9	94.3	5.7260	55224 MUSKOGE7 345 55302 FTSMITH7 345 1	150	See Previous Upgrade Specified For Facility	
10SP	EMDE-EMDE	59592 JOP389 2 69 *B296 JOPLINSW 1 1	74	94.3	105.8	5.6930	59483 JOP389 5 161 59607 JOP422 5 161 1	74	See Previous Upgrade Specified For Facility	
10SP	EMDE-EMDE	59483 JOP389 5 161 *B296 JOPLINSW 1 1	74	94.3	105.8	5.6930	59483 JOP389 5 161 59607 JOP422 5 161 1	74	See Previous Upgrade Specified For Facility	
10SP	EMDE-EMDE	59480 MON383 5 161 *B343 MONETT 1 1	146	97.1	102.1	4.8370	59468 AUR124 5 161 59480 MON383 5 161 1	86	Solution Undetermined	TBD
10SP	AEPW-AEPW	53154 CHAMSPR5 161 53170 TONTITN5 161 1	242	97.6	100.5	4.7180	53155 CHAMSPR7 345 53176 TONTITN7 345 1	124	See Previous Upgrade Specified For Facility	
10SP	EMDE-EMDE	59591 MON383 2 69 *B343 MONETT 1 1	147	95.9	100.8	4.8370	59468 AUR124 5 161 59480 MON383 5 161 1	126	Solution Undetermined	TBD
10SP	AEPW-AEPW	53154 CHAMSPR5 161 53170 TONTITN5 161 1	242	97.4	100.4	4.7180	3Wnd: OPEN *B0 49 1	131	See Previous Upgrade Specified For Facility	
10SP	SWPA-AEPW	52680 BEAVER 5 161 53136 EUREKA 5 161 1	260	89.2	92.3	5.3590	59481 MON383 7 345 59984 BRKLNE 7 345 1	150	See Previous Upgrade Specified For Facility	
10SP	SWPA-AEPW	52680 BEAVER 5 161 53136 EUREKA 5 161 1	260	89.2	92.3	5.3590	Multiple Outage Contingency 59481 MON383 7 345 59984 BRKLNE 7 345 1 53140 FLINTCR7 345 59481 MON383 7 345 1	150	See Previous Upgrade Specified For Facility	
10SP	SWPA-SPRM	52692 SPRGFLD5 161 59969 BRKLNE 5 161 1	312	90.6	94.2	7.4050	59959 BATFLD 5 161 59960 SWDISP 5 161 1	150	See Previous Upgrade Specified For Facility	
10SP	AEPW-AEPW	53131 DYESS 5 161 53135 EROGERS5 161 1	241	88.9	91.9	4.9160	53139 FLINTCR5 161 53187 GENTRYR5 161 1	150	Rebuild 13.42 miles of 666 ACSR with 1590 ACSR. Replace Dyess wavetrapSolution Undetermined	$ 6,750,000
10SP	AEPW-AEPW	53781 BA101-N4 138 53818 ONETA--4 138 1	233	90.9	93.6	4.1040	3Wnd: OPEN *B0 22 1	150	Rebuild 6.05 miles of 795 ACSR with 1590 ACSR. Replace jumper @ Oneta	$ 3,600,000
10SP	AEPW-AEPW	53781 BA101-N4 138 53818 ONETA--4 138 1	233	88.4	91.2	4.3420	53797 BANNTAP4 138 53818 ONETA--4 138 1	150	See Previous Upgrade Specified For Facility	
10SP	GRRD-GRRD	54435 KERR GR5 161 54437 412SUB 5 161 1	334	91.9	93.8	4.3650	54450 GRDA1 7 345 53140 FLINTCR7 345 1	150	Reconductor 12.5 miles with 1590MCM ACSR	$ 1,918,000
10SP	GRRD-GRRD	54437 412SUB 5 161 54514 KANSATP5 161 1	334	90.8	92.7	4.3650	54450 GRDA1 7 345 53140 FLINTCR7 345 1	150	Reconductor 9.7 miles with 1590MCM ACSR.	$ 1,488,000
10SP	OKGE-OKGE	55228 5TRIBES5 161 55234 PECANCK5 161 1	220	89.8	92.3	3.6780	55230 AGENCY 5 161 55234 PECANCK5 161 1	150	See Previous Upgrade Specified For Facility	
10SP	OKGE-OKGE	55234 PECANCK5 161 *B399 PECANCK1 1 1	365	92.1	94.4	5.7020	55224 MUSKOGE7 345 55302 FTSMITH7 345 1	150	See Previous Upgrade Specified For Facility	

Table 1 – SPP facility overloads identified for the AEPW to EDE transfer using Scenario 1

Study Case	From Area - To Area	Branch Overload	Rating <MW>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
10SP	OKGE-OKGE	55235 PECANCK7 345 *B399 PECANCK1 1 1	362	93.1	95.4	5.7020	55224 MUSKOGE7 345 55302 FTSMITH7 345 1	150	See Previous Upgrade Specified For Facility	
10SP	EMDE-EMDE	59438 EXP449T2 69 59592 JOP389 2 69 1	39	83.1	95.3	3.1280	59543 NEO184 2 69 59563 LIN314 2 69 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59483 JOP389 5 161 *B296 JOPLINSW 1 1	74	87.1	98.2	5.4880	3Wnd: OPEN *B2 97 J OPLINW 1	150	See Previous Upgrade Specified For Facility	
10SP	EMDE-EMDE	59525 JOP 59 2 69 59551 GAT258 2 69 1	64	90.9	99.2	3.5440	59483 JOP389 5 161 59607 JOP422 5 161 1	150	See Previous Upgrade Specified For Facility	
10SP	EMDE-EMDE	59533 ATL109 2 69 59565 SOL315T2 69 1	64	84.8	94.8	4.2480	59483 JOP389 5 161 59607 JOP422 5 161 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59565 SOL315T2 69 59595 RNM393 2 69 1	64	84.2	94.0	4.2040	59483 JOP389 5 161 59607 JOP422 5 161 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59592 JOP389 2 69 *B296 JOPLINSW 1 1	74	87.0	98.1	5.4880	3Wnd: OPEN *B2 97 J OPLINW 1	150	See Previous Upgrade Specified For Facility	
10SP	EMDE-AECI	59604 BHJ415 2 69 96673 2JAMESV 69 1	67	82.9	96.5	6.1160	Base Case	150	Solution Undetermined	TBD
10SP	EMDE-AECI	59604 BHJ415 2 69 96673 2JAMESV 69 1	84	78.2	91.8	7.6590	59478 DAD368 5 161 96101 5MORGAN 161 1	150	Solution Undetermined	TBD
10WP	SWPA-AEPW	52680 BEAVER 5 161 53136 EUREKA 5 161 1	257	93.5	97.5	6.7930	59481 MON383 7 345 59984 BRKLNE 7 345 1	150	See Previous Upgrade Specified For Facility	
10WP	SWPA-AEPW	52680 BEAVER 5 161 53136 EUREKA 5 161 1	257	93.5	97.5	6.7930	Multiple Outage Contingency 59481 MON383 7 345 59984 BRKLNE 7 345 1 53140 FLINTCR7 345 59481 MON383 7 345 1	150	See Previous Upgrade Specified For Facility	
									This cost may be higher due to additional facilities whose solutions will be determined during the Facility Study process	$*
									Total Cost with Facilities Monitored @ 90% Loading	$ 26,751,000
									Total Cost with Facilities Monitored @ 100% Loading	$ 11,765,000

Table 2 – SPP facility overloads identified for the AEPW to EDE transfer using Scenario 2

Study Case	From Area - To Area	Branch Overload	Rating <MW>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
05AP		NONE IDENTIFIED						150		
05G		NONE IDENTIFIED						150		
05SH		NONE IDENTIFIED						150		
05FA		NONE IDENTIFIED						150		
07SP	EMDE-EMDE	59592 JOP389 2 69 *B296 JOPLINSW 1 1	74	90.0	101.6	5.7250	59483 JOP389 5 161 59607 JOP422 5 161 1	130	See Previous Upgrade Specified For Facility in Scenario 1	
07SP	EMDE-EMDE	59483 JOP389 5 161 *B296 JOPLINSW 1 1	74	90.0	101.5	5.7250	59483 JOP389 5 161 59607 JOP422 5 161 1	130	See Previous Upgrade Specified For Facility in Scenario 1	
07SP	EMDE-EMDE	59483 JOP389 5 161 *B296 JOPLINSW 1 1	74	84.3	95.5	5.5480	3Wnd: OPEN *B2 97 J OPLINW 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
07SP	EMDE-EMDE	59592 JOP389 2 69 *B296 JOPLINSW 1 1	74	84.3	95.5	5.5480	3Wnd: OPEN *B2 97 J OPLINW 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
07SP	EMDE-AECI	59604 BHJ415 2 69 96673 2JAMESV 69 1	87	78.6	91.9	7.6890	59478 DAD368 5 161 96101 5MORGAN 161 1	150	Solution Undetermined	TBD
07WP		NONE IDENTIFIED						150		
10SP	EMDE-EMDE	59592 JOP389 2 69 *B296 JOPLINSW 1 1	74	95.0	106.5	5.6930	59483 JOP389 5 161 59607 JOP422 5 161 1	65	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	EMDE-EMDE	59483 JOP389 5 161 *B296 JOPLINSW 1 1	74	95.0	106.5	5.6930	59483 JOP389 5 161 59607 JOP422 5 161 1	66	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	SWPA-SPRM	52692 SPRGFLD5 161 59969 BRKLNE 5 161 1	310	88.0	91.1	6.4080	59955 JUNCTN 5 161 59969 BRKLNE 5 161 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	AEPW-AEPW	53781 BA101-N4 138 53818 ONETA--4 138 1	233	90.4	93.2	4.3420	53797 BANNTAP4 138 53876 41_161E4 138 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	AEPW-AEPW	53781 BA101-N4 138 53818 ONETA--4 138 1	233	89.1	91.7	4.1040	3Wnd: OPEN *B0 22 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	EMDE-EMDE	59438 EXP449T2 69 59592 JOP389 2 69 1	38	83.4	95.6	3.1280	59543 NEO184 2 69 59563 LIN314 2 69 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59466 ATL109 5 161 *B162 ATLAS 1 1	74	80.1	93.2	6.4430	59483 JOP389 5 161 59607 JOP422 5 161 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59480 MON383 5 161 *B343 MONETT 1 1	146	90.1	95.1	4.8370	59468 AUR124 5 161 59480 MON383 5 161 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59483 JOP389 5 161 *B296 JOPLINSW 1 1	74	88.3	99.4	5.4880	3Wnd: OPEN *B2 97 J OPLINW 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	EMDE-EMDE	59525 JOP 59 2 69 59551 GAT258 2 69 1	64	87.2	95.4	3.5440	59483 JOP389 5 161 59607 JOP422 5 161 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	EMDE-EMDE	59533 ATL109 2 69 *B162 ATLAS 1 1	74	80.0	93.0	6.4430	59483 JOP389 5 161 59607 JOP422 5 161 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59533 ATL109 2 69 59565 SOL315T2 69 1	64	85.9	95.8	4.2480	59483 JOP389 5 161 59607 JOP422 5 161 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59565 SOL315T2 69 59595 RNM393 2 69 1	64	85.3	95.1	4.2040	59483 JOP389 5 161 59607 JOP422 5 161 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59591 MON383 2 69 *B343 MONETT 1 1	147	88.9	93.8	4.8370	59468 AUR124 5 161 59480 MON383 5 161 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59592 JOP389 2 69 *B296 JOPLINSW 1 1	74	88.2	99.3	5.4880	3Wnd: OPEN *B2 97 J OPLINW 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	EMDE-AECI	59604 BHJ415 2 69 96673 2JAMESV 69 1	68	83.4	96.9	6.1160	Base Case	150	Solution Undetermined	TBD
10SP	EMDE-AECI	59604 BHJ415 2 69 96673 2JAMESV 69 1	85	82.2	95.7	7.6590	59478 DAD368 5 161 96101 5MORGAN 161 1	150	Solution Undetermined	TBD
10WP		NONE IDENTIFIED						150		
									This cost may be higher due to additional facilities whose solutions will be determined during the Facility Study process	$*
									Total Cost with Facilities Monitored @ 90% Loading	$ -
									Total Cost with Facilities Monitored @ 100% Loading	$ -

Table 3 – SPP facility overloads identified for the AEPW to EDE transfer using Scenario 3

Study Case	From Area - To Area	Branch Overload	Rating <MW>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
05AP		NONE IDENTIFIED						150		
05G		NONE IDENTIFIED						150		
05SH	OKGE-OKGE	55228 5TRIBES5 161 55234 PECANCK5 161 1	221	89.5	92.2	3.9430	55230 AGENCY 5 161 55234 PECANCK5 161 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
05SH	OKGE-OKGE	55234 PECANCK5 161 *B423 PECANCK1 1 1	366	91.5	94.0	6.1140	55224 MUSKOGE7 345 55302 FTSMITH7 345 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
05SH	OKGE-OKGE	55235 PECANCK7 345 *B423 PECANCK1 1 1	363	92.3	94.8	6.1140	55224 MUSKOGE7 345 55302 FTSMITH7 345 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
05FA	EMDE-EMDE	59467 ORO110 5 161 59494 OAK432 5 161 1	212	89.8	93.4	5.0710	59476 ASB349 5 161 59491 PUR421 5 161 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
07SP	EMDE-EMDE	59592 JOP389 2 69 *B296 JOPLINSW 1 1	74	89.4	101.0	5.7250	59483 JOP389 5 161 59607 JOP422 5 161 1	137	See Previous Upgrade Specified For Facility in Scenario 1	
07SP	EMDE-EMDE	59483 JOP389 5 161 *B296 JOPLINSW 1 1	74	89.4	101.0	5.7250	59483 JOP389 5 161 59607 JOP422 5 161 1	137	See Previous Upgrade Specified For Facility in Scenario 1	
07SP	SWPA-SPRM	52692 SPRGFLD5 161 59969 BRKLNE 5 161 1	316	89.5	92.5	6.3120	59955 JUNCTN 5 161 59969 BRKLNE 5 161 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
07SP	AEPW-AEPW	53781 BA101-N4 138 53818 ONETA--4 138 1	233	89.2	91.8	4.1060	3Wnd: OPEN *B0 60 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
07SP	AEPW-AEPW	53781 BA101-N4 138 53818 ONETA--4 138 1	233	88.6	91.4	4.3430	53797 BANNTAP4 138 53818 ONETA--4 138 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
07SP	EMDE-EMDE	59467 ORO110 5 161 59494 OAK432 5 161 1	212	92.8	96.2	4.7370	59476 ASB349 5 161 59491 PUR421 5 161 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
07SP	EMDE-EMDE	59483 JOP389 5 161 *B296 JOPLINSW 1 1	74	83.4	94.6	5.5480	3Wnd: OPEN *B2 97 J OPLINW 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
07SP	EMDE-EMDE	59592 JOP389 2 69 *B296 JOPLINSW 1 1	74	83.3	94.6	5.5480	3Wnd: OPEN *B2 97 J OPLINW 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
07WP		NONE IDENTIFIED						150		
10SP	EMDE-EMDE	59592 JOP389 2 69 *B296 JOPLINSW 1 1	74	94.6	106.1	5.6930	59483 JOP389 5 161 59607 JOP422 5 161 1	71	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	EMDE-EMDE	59483 JOP389 5 161 *B296 JOPLINSW 1 1	74	94.6	106.1	5.6930	59483 JOP389 5 161 59607 JOP422 5 161 1	71	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	SWPA-SPRM	52692 SPRGFLD5 161 59969 BRKLNE 5 161 1	311	89.4	93.0	7.4050	59959 BATFLD 5 161 59960 SWDISP 5 161 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	AEPW-AEPW	53154 CHAMSPR5 161 53170 TONTITN5 161 1	242	93.4	96.3	4.7180	53155 CHAMSPR7 345 53176 TONTITN7 345 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	AEPW-AEPW	53154 CHAMSPR5 161 53170 TONTITN5 161 1	242	93.2	96.2	4.7180	3Wnd: OPEN *B0 49 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	AEPW-AEPW	53781 BA101-N4 138 53818 ONETA--4 138 1	233	96.2	98.9	4.1040	3Wnd: OPEN *B0 22 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	AEPW-AEPW	53781 BA101-N4 138 53818 ONETA--4 138 1	233	95.1	97.9	4.3420	53797 BANNTAP4 138 53818 ONETA--4 138 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	EMDE-EMDE	59438 EXP449T2 69 59592 JOP389 2 69 1	38	83.4	95.6	3.1280	59543 NEO184 2 69 59563 LIN314 2 69 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59466 ATL109 5 161 *B162 ATLAS 1 1	74	78.7	91.7	6.4430	59483 JOP389 5 161 59607 JOP422 5 161 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59480 MON383 5 161 *B343 MONETT 1 1	146	94.8	99.8	4.8370	59468 AUR124 5 161 59480 MON383 5 161 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59483 JOP389 5 161 *B296 JOPLINSW 1 1	74	87.7	98.8	5.4880	3Wnd: OPEN *B2 97 J OPLINW 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	EMDE-EMDE	59525 JOP 59 2 69 59551 GAT258 2 69 1	64	89.4	97.6	3.5440	59483 JOP389 5 161 59607 JOP422 5 161 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
10SP	EMDE-EMDE	59533 ATL109 2 69 *B162 ATLAS 1 1	74	78.6	91.7	6.4430	59483 JOP389 5 161 59607 JOP422 5 161 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59533 ATL109 2 69 59565 SOL315T2 69 1	64	85.5	95.4	4.2480	59483 JOP389 5 161 59607 JOP422 5 161 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59565 SOL315T2 69 59595 RNM393 2 69 1	64	85.0	94.8	4.2040	59483 JOP389 5 161 59607 JOP422 5 161 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59591 MON383 2 69 *B343 MONETT 1 1	147	93.6	98.5	4.8370	59468 AUR124 5 161 59480 MON383 5 161 1	150	Solution Undetermined	TBD
10SP	EMDE-EMDE	59592 JOP389 2 69 *B296 JOPLINSW 1 1	74	87.5	98.7	5.4880	3Wnd: OPEN *B2 97 J OPLINW 1	150	See Previous Upgrade Specified For Facility in Scenario 1	

Table 3 – SPP facility overloads identified for the AEPW to EDE transfer using Scenario 3

Study Case	From Area - To Area	Branch Overload	Rating <MW>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
10SP	EMDE-AECI	59604 BHJ415 2 69 96673 2JAMESV 69 1	68	82.4	95.9	6.1160	Base Case	150	Solution Undetermined	TBD
10SP	EMDE-AECI	59604 BHJ415 2 69 96673 2JAMESV 69 1	85	79.3	92.9	7.6590	59478 DAD368 5 161 96101 5MORGAN 161 1	150	Solution Undetermined	TBD
10WP		NONE IDENTIFIED						150		
									This cost may be higher due to additional facilities whose solutions will be determined during the Facility Study process	$*
									Total Cost with Facilities Monitored @ 90% Loading	$ -
									Total Cost with Facilities Monitored @ 100% Loading	$ -

Appendix A

MUST CHOICES IN RUNNING FCITC DC ANALYSIS

CONSTRAINTS/CONTINGENCY INPUT OPTIONS

1. AC Mismatch Tolerance – 2 MW
2. Base Case Rating – Rate A
3. Base Case % of Rating – 90%
4. Contingency Case Rating – Rate B
5. Contingency Case % of Rating – 90%
6. Base Case Load Flow – Do not solve AC
7. Convert branch ratings to estimated MW ratings – Yes
8. Contingency ID Reporting – Labels
9. Maximum number of contingencies to process - 50000

MUST CALCULATION OPTIONS

1. Phase Shifters Model for DC Linear Analysis – Constant flow for Base Case and Contingencies
2. Report Base Case Violations with FCITC – Yes
3. Maximum number of violations to report in FCITC table - 50000
4. Distribution Factor (OTDF and PTDF) Cutoff – 0.03
5. Maximum times to report the same elements - 10
6. Apply Distribution Factor to Contingency Analysis – Yes
7. Apply Distribution Factor to FCITC Reports – Yes
8. Minimum Contingency Case flow change – 1 MW
9. Minimum Contingency Case Distribution Factor change – 0.0
10. Minimum Distribution Factor for Transfer Sensitivity Analysis – 0.0