



# **SPP** *Southwest Power Pool*

*System Impact Study  
For Transmission Service  
Requested By  
Constellation Power Source, Inc.*

*From Central and South West  
Services To MidAmerican  
Energy Company (MEC)*

*For a Reserved Amount Of 50MW  
From 12/1/02  
To 12/1/04*

*SPP Transmission Planning*

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## **1. Executive Summary**

Constellation Power Source, Inc. (CPS) has requested a system impact study for long-term Firm Point-to-Point transmission service from Central and South West Services to MidAmerican Energy Company. The period of the transaction is from 12/1/02 to 12/1/04. The request is for OASIS numbers 194672.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 50 MW transfer while maintaining system reliability. The analysis in this document shows that to accommodate an additional 50 MW transfer, upgrades will be required on the SPP transmission systems.

Prior to conducting the study for the 50 MW request, SPP studied a 290MW CSWS to EES transfer, System Impact Study SPP-2000-011, a Constellation CSWS to EES 250MW transfer, System Impact Study SPP-2000-043, and a Constellation CSWS to AMRN 150 MW transfer, System Impact Study SPP-2000-044. The customer's acceptance of the facilities identified in these studies affects what facilities will be assigned to Constellation Power Source, Inc. and subsequently the System Impact of the 50MW transfer will need to be reevaluated. The facilities identified in study SPP-2000-011 and the associated costs are listed in Table 5. The facilities identified in study SPP-2000-043 are listed in Table 6, and the facilities identified in study SPP-2000-044 are listed in Table 7.

The new overloads caused by the 50MW transfer are listed in Table 1, Table 2, Table 3, and Table 4. Constellation Power Source, Inc. will not be assigned any new facilities for the incremental 50MW transfer from CSWS to MEC. CPSI will be responsible for the facilities listed in Table 6, Table 7, and Table 8 for the total 450MW of transfers from the Constellation Power Source, Inc. plant with the assumption that the facilities listed in Table 5 are accepted by the previous customer.

The SPP and effected member companies shall use due diligence to coordinate the addition of necessary facilities or transmission system upgrades to provide the requested transmission service. Constellation Power Source, Inc. is to compensate SPP for such costs pursuant to the terms of section 27 of the SPP Open Access Transmission Tariff. Expedited procedures for new facilities are available to Constellation Power Source, Inc. per section 19.8 of the SPP Open Access Transmission Service Tariff.

Engineering and construction of any new facilities or modifications will not start until after a transmission service agreement and/or construction agreement is in place and effected member companies receives the appropriate authorization to proceed from the SPP after they receive authorization from the transmission customer.

## **2. Introduction**

Constellation Power Source, Inc. has requested an impact study for transmission service from CSWS control area with a sink of MEC.

The principal objective of this study is to identify the restraints on the SPP Regional Tariff System that may limit the transfer to less than 50 MW. This study includes two steady-state contingency analyses (PSS/E function ACCC) and Available Transfer Capability (ATC) analyses.

The steady-state analyses consider the impact of the 50 MW 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 50 MW.

### **3. Study Methodology**

#### **A. Description**

Two analyses were conducted to determine the impact of the 50MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 50MW transfer. The second analysis was done to ensure that available capacity exists on previously identified circuits that have been assigned to higher priority customers, including the previous Constellation PSI requested transfers.

The first analysis was done using two steps. The first step was to study the steady-state analysis impact of the 50MW 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 ATC study portion was done using the requirements specified in the current SPP Criteria related to determination of ATC.

The second analysis was done to ensure that capacity exists on previously identified facilities, such as the facilities found in study SPP-2000-011. The analysis also includes determining the loading on the circuits identified for the previous CPS CSWS to EES 250MW transfer (Table 6) and the CPS CSWS to AMRN 150MW transfer (Table 7) after the incremental CSWS to MEC 50MW transfer.

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

SPP used three seasonal models to study the 50MW request. The SPP 2000 Series Cases 2001 April (Spring Minimum), 2004 Summer Peak, and 2004/05 Winter Peak were used to study the impact of the 50MW transfer on the SPP system during the transaction period of 12/01/02 to 12/1/04.

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 2000 base case series models. The added future firm transfers include the CSWS to EES 290MW and 250MW transfers previously mentioned, and the previous studied CWSW to AMRN 150MW transfer. The 2001 April minimum case was further modified to include planned 230KV lines and above listed in the SPP EIA-411. The 50MW transfer was then added to the three base case models to produce the 50MW transfer cases.

The Base and Transfer case Power Flow models developed are assumed a proxy of the system at the beginning of service 12/1/02.

#### **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. Steady-State Analysis Results**

Tables 1, 2, 3, and 4 contain the steady state 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 loading percentage of circuit, the determined ATC value if calculated, any SPP identification or assignment of the event, and any solutions received from the transmission owners.

Table 1 shows that no new overload events were caused by the 50MW transfer. No new overloads can be directly assigned to the Constellation CSWS to MEC 50MW transfer.

Table 2 contains overloads initially caused by the 250MW transfer from CSWS to EES and the 150MW transfer from CSWS to AMRN and are overloaded by subsequent contingencies with the addition of the 50MW transfer. No ATC values were calculated for the events.

Table 3 contains overloads caused initially by higher priority reservations and are again overloaded by subsequent contingencies with the addition of the 50MW transfer. Possible assignment of the overloads to the Constellation Request (#194672) depends on the future acceptance of facility upgrade costs by Transmission Customers of higher priority reservations. The assignment of these upgrade costs to Request (#194672) will be determined by the existence of future service agreements and reevaluation of the Constellation Requests. No ATC values were calculated for the events.

Table 4 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 50MW transfer. The table reports the worst contingency overload. No ATC values were calculated for the events.

### **B. Existing Overload's Available Capacity**

Table 5 lists the facilities assigned to study SPP-2000-011. Again, the assignment of these upgrade costs to the CPS Request will be determined by the existence of future service agreements and the completion of a facility study. The table includes the facility, the required facility upgrade, the estimated cost, and the date the facility is needed for the SPP-2000-011 290MW study.

If the facilities listed in Table 5 are accepted by the customer, the previously identified facilities need to be monitored with the upgraded rating to ensure the new rating is not exceeded. SPP has identified two facilities that will need additional capacity to provide the CSWS to AMRN 50MW transfer and the previous Constellation Requests. The two facilities are listed in Table 8. The table includes the seasonal case, the contingency, the overloaded facility, the existing rating, the upgraded rating, the total 450MW transfer case MVA loading, and the MVA loading without the 450MW of Constellation requests.

Table 6 lists the facilities identified for the previous CPS request (CSWS to EES 250MW). The table shows the facilities loading after the additional 150MW transfer from CSWS to AMRN and the 50MW transfer from CSWS to MEC.

Table 7 lists the facilities identified for the previous CPS request (CSWS to AMRN 150MW). The table shows the facilities loading after the additional 50MW transfer from CSWS to MEC.



**Table 1** – Overloads caused by the 50MW transfer that have not been previously assigned.

Study Year	Opened branch(es)	OVERLOADED BRANCH(ES)	From - To	Rate B <MVA>	%LOADING	ATC	ASSIGNMENT
01AP		NONE					
04SP		NONE					
04WP		NONE					

**Table 2** – Overloads caused by 50MW transfer that have been assigned to the Constellation CSWS to EES 250MW transfer and CSWS to AMRN 150MW transfer

Study Year	Load flow case description / (opened branch(es))	OVERLOADED BRANCH(ES)	From - To	Rate B <MVA>	%LOADING	ASSIGNMENT
01AP		NONE				
04SP	53526 CROCKET7 345 TO 54061 TENASKA7 345 CKT 1	53306 PATTERS4 138 TO 53321 SNASHVL4 138 CKT 1	CESW-CESW	105	101.8	2000-043 CSWS to EES 250MW
04SP	53424 LONGWD 7 345 TO 17529 7ELDEHV 345 CKT 1	53321 SNASHVL4 138 TO 17609 4MURFRE 138 CKT 1	CESW-EES	96	100.9	2000-044 CSWS to AMRN 150MW
04SP	17529 7ELDEHV 345 TO 17530 8ELDEHV 500 CKT 1	53321 SNASHVL4 138 TO 17609 4MURFRE 138 CKT 1	CESW-EES	96	100.7	"
04SP	53322 SUGARHL269.0 TO 53323 SUGARHL4 138 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	101.4	2000-043 CSWS to EES 250MW
04SP	17528 3ELDEHV 115 TO 17530 8ELDEHV 500 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	101.6	"
04SP	17450 3RINGLD 115 TO 17451 3SAILES 115 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	101.6	"
04SP	17451 3SAILES 115 TO 17460 3ADA 115 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	101.4	"
04SP	17453 3MINDEN 115 TO 17460 3ADA 115 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	101.2	"
04SP	55302 FTSMI7 345 TO 55305 FTSMI8 500 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	101.0	"
04SP	55918 FROGVIL4 138 TO 55948 HUGO PP4 138 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	100.7	"
04SP	50023 CARROLL6 230 TO 50126 MESSICK6 230 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	100.8	"
04SP	17576 3ARKA-N 115 TO 17597 3RICHWD# 115 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	100.7	"
04SP	55918 FROGVIL4 138 TO 56098 WSTBANK4 138 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	100.7	"
04SP	56077 UNGER 4 138 TO 56098 WSTBANK4 138 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	100.6	"
04SP	55826 BENNGTN4 138 TO 56077 UNGER 4 138 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	100.6	"
04SP	17632 8ANO 500 TO 17935 8P HILL 500 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	100.5	"
04SP	55826 BENNGTN4 138 TO 55884 DURANT 4 138 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	100.4	"
04SP	17530 8ELDEHV 500 TO 17543 8MCNEIL 500 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	100.4	"
04SP	52814 BRKN BW4 138 TO 54054 BETHEL 4 138 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	100.3	"
04SP	55884 DURANT 4 138 TO 56049 SCOLEMN4 138 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	174	100.3	"
04SP	53394 BROADMR269.0 TO 53408 FTHUMBG269.0 CKT 1	53445 S SHV 269.0 TO 53406 FORBNGT269.0 CKT 1	CESW-CESW	95	100.2	2000-043 CSWS to EES 250MW
04WP	53424 LONGWD 7 345 TO 53620 WILKES 7 345 CKT 1	53383 HOPE 3 115 TO 17537 3PATMOS# 115 CKT 1	CESW-EES	197	101.9	2000-043 CSWS to EES 250MW

**Table 3**– Overloads caused by 50MW transfer that have been previously assigned to customers.

Study Year	Opened branch(es))	OVERLOADED BRANCH(ES)	From - To	Rate B <MVA>	%LOADING	ASSIGNMENT
01AP		NONE				
04SP	53454 SW SHV 7 345 TO 53528 DIANA 7 345 CKT 1	53548 IPCJEFF4 138 TO 53420 LIEBERM4 138 CKT 1	CESW-CESW	115	101.5	2000-011 01SP / Replace 4/0 jumpers to switches & Wavetrap at Lieberman \$10,000
04SP	53526 CROCKET7 345 TO 54061 TENASKA7 345 CKT 1	53611 TATUM 4 138 TO 53598 ROKHILL4 138 CKT 1	CESW-CESW	209	100.3	2000-011 01SP / Reconductor 0.81 miles of 666 ACSR with 1272 ACSR. Replace 800A trap with new 2000A trap. \$190,000
04SP	53423 LONGWD 4 138 TO 53603 SCOTTSV4 138 CKT 1	53611 TATUM 4 138 TO 53522 CHEROKE4 138 CKT 1	CESW-CESW	209	100.3	2000-011 01SP / Reconductor 6.25 miles of 666 ACSR with 1272 ACSR \$1,300,000
04SP	53615 WELSH 7 345 TO 53620 WILKES 7 345 CKT 1	53611 TATUM 4 138 TO 53522 CHEROKE4 138 CKT 1	CESW-CESW	209	100.5	"
04SP	52698 STOCKTN5 161 TO 96108 5OSCEOL 161 CKT 1	59480 MON383 5 161 TO 59468 AUR124 5 161 CKT 1	EMDE-EMDE	157	100.1	1999-015 05SP / BASE CASE MITIGATION PLAN IN EFFECT
04SP	53526 CROCKET7 345 TO 16555 7GRIMES 345 CKT 1	59480 MON383 5 161 TO 59468 AUR124 5 161 CKT 1	EMDE-EMDE	157	100.1	"
04SP	59532 CAR108 269.0 TO 59600 JAS403T269.0 CKT 1	59480 MON383 5 161 TO 59468 AUR124 5 161 CKT 1	EMDE-EMDE	157	100.1	"
04WP	59468 AUR124 5 161 TO 59499 CPK446 5 161 CKT 1	52690 CARTHG 269.0 TO 96649 2JASPER 69.0 CKT 1	SWPA-AECI	43	100.5	2000-003 01SP / CHANGE CT'S RATIO SETTINGS
04WP	50888 POTR C7 345 TO 56449 HOLCOMB7 345 CKT 1	52690 CARTHG 269.0 TO 96649 2JASPER 69.0 CKT 1	SWPA-AECI	43	100.3	"
04WP	57968 STILWEL7 345 TO 59200 PHILL 7 345 CKT 1	52690 CARTHG 269.0 TO 96649 2JASPER 69.0 CKT 1	SWPA-AECI	43	100.1	"
04WP	Multiple Outage Contingency 53454 [SW SHV 7] TO 53528 [DIANA 7] CKT 1 53454 [SW SHV 7] TO 53424 [LONGWD 7] CKT 1	53522 CHEROKE4 138 TO 53557 KNOXLEE4 138 1	CESW-CESW	209	100.4	2000-011 01SP / Reconductor 3.25 miles of 666 ACSR with 1272 ACSR \$720,000

**Table 4 – Summary of the overloads caused by the 50MW transfer owned by Non SPP Tariff Participants**

Study Year	Opened branch(es))	OVERLOADED BRANCH(ES)	From - To	Rate B <MVA>	%LOADING
01AP	53424 LONGWD 7 345 TO 17529 7ELDEHV 345 CKT 1	16502 4DOBBIN 138 TO 16506 4LONGMIR 138 CKT 1	EES-EES	112	102.2
01AP	16528 4L558T48 138 TO 16534 4MT.ZION 138 CKT 1	16519 4LFOREST 138 TO 16578 4WDHAVN 138 CKT 1	EES-EES	206	100.8
01AP	50023 CARROLL6 230 TO 50126 MESSICK6 230 CKT 1	16528 4L558T48 138 TO 16532 4HUNTSVL 138 CKT 1	EES-EES	206	100.9
01AP	53277 LYDIA 7 345 TO 54037 VALIANT7 345 CKT 1	16534 4MT.ZION 138 TO 16528 4L558T48 138 CKT 1	EES-EES	206	101.1
01AP	54033 PITTSB-7 345 TO 54037 VALIANT7 345 CKT 1	16556 4GRIMES 138 TO 16534 4MT.ZION 138 CKT 1	EES-EES	206	101.4
01AP	50045 DOLHILL7 345 TO 50046 DOLHILL6 230 CKT 1	16562 4TUBULAR 138 TO 16502 4DOBBIN 138 CKT 1	EES-EES	112	100.3
04SP	16503 4WALDEN 138 TO 16556 4GRIMES 138 CKT 1	16528 4L558T48 138 TO 16532 4HUNTSVL 138 CKT 1	EES-EES	206	100.6
04SP	16519 4LFOREST 138 TO 16578 4WDHAVN 138 CKT 1	16534 4MT.ZION 138 TO 16528 4L558T48 138 CKT 1	EES-EES	206	100.1
04SP	16534 4MT.ZION 138 TO 16556 4GRIMES 138 CKT 1	16556 4GRIMES 138 TO 16503 4WALDEN 138 CKT 1	EES-EES	206	100.2
04SP	50045 DOLHILL7 345 TO 50046 DOLHILL6 230 CKT 1	16556 4GRIMES 138 TO 16534 4MT.ZION 138 CKT 1	EES-EES	206	100.5
04SP	17434 3BASTRP 115 TO 17459 3IPCO 115 CKT 1	17430 3STERL 115 TO 17480 3CROS-N 115 CKT 1	EES-EES	80	100.2
04SP	53277 LYDIA 7 345 TO 54037 VALIANT7 345 CKT 1	17450 3RINGLD 115 TO 17451 3SAILES 115 CKT 1	EES-EES	115	101.0
04SP	50023 CARROLL6 230 TO 50046 DOLHILL6 230 CKT 1	17502 3LEWIS # 115 TO 17478 3COUCH 115 CKT 1	EES-EES	159	102.0
04SP	17803 8DELL 500 TO 17868 8ISES 500 CKT 1	17537 3PATMOS# 115 TO 17502 3LEWIS # 115 CKT 1	EES-EES	159	101.8
04WP	17528 3ELDEHV 115 TO 17530 8ELDEHV 500 CKT 1	17502 3LEWIS # 115 TO 17478 3COUCH 115 CKT 1	EES-EES	159	101.9
04WP	16828 8RICHARD 500 TO 17026 8WEBRE 500 CKT 1	17537 3PATMOS# 115 TO 17502 3LEWIS # 115 CKT 1	EES-EES	159	101.6

**Table 5** – Facilities previously assigned to study SPP-2000-011

<b>Upgraded Facility Name</b>	<b>Upgraded Component Within Facility</b>	<b>Transmission Owner</b>	<b>Estimated Cost</b>	<b>Date Required</b>
ALUMAX TAP-BANN, 138KV	Reconductor 0.67 miles of 1024 ACAR with 1590 ACSR.	CESW	233,000	6/1/04
PATTERSON - ASHDOWN REC 115KV	Patterson Switch Replacement, 600A To 1200A	CESW	20,000	4/1/01
CHEROKEE REC-KNOX LEE, 138 KV	Reconductor 3.25 miles of 666 ACSR with 1272 ACSR.	CESW	720,000	6/1/01
CHEROKEE REC-TATUM, 138 KV	Reconductor 6.25 miles of 666 ACSR with 1272 ACSR	CESW	1,300,000	6/1/01
DYESS TO CHAMSPR5 161KV	Reconductor 18.73 miles of 666 ACSR with 1590 ACSR	CESW	4,700,000	6/1/04
EAST CENTERTON-GENTRY REC, 161 KV	E.Centernton 161kV Breaker & Switch Replacements, Gentry Tap 161kV Line Switch Replacement	CESW	167,960	6/1/04
GREGGTON-LAKE LAMOND, 69KV	Reconductor 2.66 miles of 755 ACAR with 1272 ACSR	CESW	1,400,000	6/1/04
HAWKINS TO HAWKINS REC 69KV	Reconductor 1.00 mile of 477 ACSR with 795 ACSR	CESW	375,000	6/1/04
JACKSONVILLE -PINE GROVE, 138KV	Reset 300/5 CTs at Jacksonville to 400/5	CESW	1,000	4/1/01
LIEBERMAN-IPC JEFFERSON, 138 KV	Replace 4/0 jumpers to switches & Wavetrap at Lieberman	CESW	10,000	6/1/01
NORTHWEST HENDERSON-POYNTER, 69KV	Replace 4/0 jumpers and bus at Poynter	CESW	45,700	6/1/01
NORTHWEST TEXARKANA TO PATTERSON 138KV	Reconductor 13.37 miles of 1024 ACAR with 1590 ACSR. Replace 1200A switches & brreaker @ Patterson, and replace wavetrap jumpers at both ends.	CESW	3,800,000	12/1/01
ROCK HILL TO TATUM 138KV	Reconductor 0.81 miles of 666 ACSR with 1272 ACSR. Replace 800A trap with new 2000A trap.	CESW	190,000	6/1/01
AURORA H.T.-MONETT, 161 KV	N/A	EDE	N/A	6/1/04
TIPTON FORD TO MONETT 161KV	Reconductor 30 miles of 336 ACSR with 795 MCM.	EDE	5,700,000	6/1/01
STILWELL-LACYGNE, 345 KV	Reconductor to 1192 MCM ACSR	KACP	14,700,000	6/1/01

**Table 5 continued** – Facilities assigned to study SPP-2000-011

<b>Upgraded Facility Name</b>	<b>Upgraded Component Within Facility</b>	<b>Transmission Owner</b>	<b>Estimated Cost</b>	<b>Date Required</b>
BEAVER TO EUREKA SPRINGS 161KV	SWPA Cost-Reconnect CT's to 1000:5 Tap on Bkrs 42, 32, & half or 22. Replace metering & reset relays for Line 2 & Line 3	SWPA,CESW	22,500	6/1/01
"	CESW Cost-Reconductor 1.25 miles of 795 ACSR with 1590 ACSR (CSW owns 1.25 of 7.22 miles of the line)	"	515,000	"
GORE TO MUSKOGEE TAP 161KV	Disconnect Switch#71, 73, &77 Replacement Complete	SWPA	N/A	6/1/01
VAN BUREN TO ROBERT S. KERR 161KV	Replace 161-kV Disconnect Switches 31,33,35,&37 with 1200A Switches	SWPA	105,000	6/1/04
DYESS TO EAST ROGERS 161KV	Reconductor with 1590MCM	CESW	4,000,000	6/1/01
FLINK CREEK TO GENTRY 161KV	Replace Switch	CESW	60,000	6/1/04

**Table 6** – Facilities assigned to study SPP-2000-043 Constellation Power Source Request #194656,194657 (CSWS to EES 250MW)

Study Year	Load flow case description / (opened branch(es))	OVERLOADED BRANCH(ES)	From - To	Rate B <MVA>	%LOADING After 450MW of Transfers	Initial Limit Mileage
01AP	DOLET HILLS 345/230KV XFRM 50045 [DOLHILL7] TO 50046 [DOLHILL6] CKT 1	INTERNATIONAL PAPER to WALLACE LAKE 138KV 50090 IPAPER 4 138 53461 WALLAKE4 138 1	CELE-CESW	236	115.1	Conductor 17.63 miles
04SP	DOLET HILLS 345/230KV XFRM 50045 [DOLHILL7] TO 50046 [DOLHILL6] CKT 1	INTERNATIONAL PAPER to WALLACE LAKE 138KV 50090 IPAPER 4 138 53461 WALLAKE4 138 1	CELE-CESW	209	109.2	Conductor 17.63 miles
04SP	ARKANSAS NUCLEAR ONE to MABELVALE EHV 500KV 17632 [8ANO ] TO 17701 [8MABEL ] CKT 1	BULL SHOALS to MIDWAY AEC 161KV 52660 BULL SH5 161 17875 5MIDWAY# 161 1	SWPA-EES	162	100.4	600A Switches 7.0 miles
04SP	MAYFLOWER to P HILL 500KV 17707 [8MAYFL ] TO 17935 [8P HILL ] CKT 1	BULL SHOALS to MIDWAY AEC 161KV 52660 BULL SH5 161 17875 5MIDWAY# 161 1	SWPA-EES	162	100.6	
04SP	KEO to WEST MEMPHIS EHV 500KV 17758 [8KEO ] TO 17842 [8WM-EHV ] CKT 1	BULL SHOALS to MIDWAY AEC 161KV 52660 BULL SH5 161 17875 5MIDWAY# 161 1	SWPA-EES	162	101.5	
04SP	WALNUT RIDGE to BLACK ROCK 161KV 17839 [5WALNUT ] TO 17848 [5BLKRK# ] CKT 1	BULL SHOALS to MIDWAY AEC 161KV 52660 BULL SH5 161 17875 5MIDWAY# 161 1	SWPA-EES	162	100.9	
04SP	FORT SMITH to ARKANSAS NUCLEAR ONE 500KV 55305 [ FTSMI8] TO 17632 [8ANO ] CKT 1	BULL SHOALS to MIDWAY AEC 161KV 52660 BULL SH5 161 17875 5MIDWAY# 161 1	SWPA-EES	162	100.3	
04SP	FRANKS to SALEM 345KV 96041 [7FRANKS ] TO 96047 [7SALEM ] CKT 1	BULL SHOALS to MIDWAY AEC 161KV 52660 BULL SH5 161 17875 5MIDWAY# 161 1	SWPA-EES	162	100	
04SP	ELDORADO-EHV 500/345KV XFRM 17529 [7ELDEHV ] TO 17530 [8ELDEHV ] CKT 1	PATTERSON to SOUTH NASHVILLE 138KV 53306 PATTERS4 138 53321 SNASHVL4 138 1	CESW-CESW	105	114.2	Wave Trap 25.06 miles
04SP	LONGWOOD to ELDORADO-EHV 345KV 53424 [LONGWD 7] TO 17529 [7ELDEHV ] CKT 1	PATTERSON to SOUTH NASHVILLE 138KV 53306 PATTERS4 138 53321 SNASHVL4 138 1	CESW-CESW	105	114.4	
04SP	DOLET HILLS 345/230KV XFRM 50045 [DOLHILL7] TO 50046 [DOLHILL6] CKT 1	HOPE to PATMOS WEST SS 115KV 53383 HOPE 3 115 17537 3PATMOS# 115 1	CESW-EES	174	115.5	Conductor 11.34 miles
04SP	LYDIA to VALIANT 345KV 53277 [LYDIA 7] TO 54037 [VALIANT7] CKT 1	HOPE to PATMOS WEST SS 115KV 53383 HOPE 3 115 17537 3PATMOS# 115 1	CESW-EES	174	117	
04SP	PITTSBURGH to VALIANT 345KV 54033 [PITTSB-7] TO 54037 [VALIANT7] CKT 1	HOPE to PATMOS WEST SS 115KV 53383 HOPE 3 115 17537 3PATMOS# 115 1	CESW-EES	174	111.9	
04SP	LONGWOOD to WILKES 345KV 53424 [LONGWD 7] TO 53620 [WILKES 7] CKT 1	HOPE to PATMOS WEST SS 115KV 53383 HOPE 3 115 17537 3PATMOS# 115 1	CESW-EES	174	116.6	
04SP	CROCKETT to TENASKA 345KV 53526 [CROCKET7] TO 54061 [TENASKA7] CKT 1	HOPE to PATMOS WEST SS 115KV 53383 HOPE 3 115 17537 3PATMOS# 115 1	CESW-EES	174	121.1	Conductor 11.34 miles

**Table 6 continued**– Facilities assigned to study SPP-2000-043 Constellation Power Source Request #194656,194657 (CSWS to EES 250MW)

Study Year	Load flow case description / (opened branch(es))	OVERLOADED BRANCH(ES)	From - To	Rate B <MVA>	%LOADING After 450MW of Transfers	Initial Limit Mileage
04SP	MUSKOGEE to FORT SMITH 345KV 55224 [ MSKGE7] TO 55302 [ FTSMI7] CKT 1	HOPE to PATMOS WEST SS 115KV 53383 HOPE 3 115 17537 3PATMOS# 115 1	CESW-EES	174	108.8	
04SP	SOUTH SHREVEPORT to WALLACE LAKE 138KV 53446 [S SHV 4] TO 53461 [WALLAKE4] CKT 1	FORBING TAP to SOUTH SHREVEPORT 69KV 53406 FORBNGT269.0 53445 S SHV 269.0 1	CESW-CESW	95	105.1	Jumpers 0.27 miles
04SP	DOLET HILLS 345/230KV XFRM 50045 [DOLHILL7] TO 50046 [DOLHILL6] CKT 1	SOUTH SHREVEPORT to WALLACE LAKE 138KV 53446 S SHV 4 138 53461 WALLAKE4 138 1	CESW-CESW	209	114.1	Conductor 11.18 miles
04SP	SUB 383-MONETT 161/69KV XFRM 59480 [MON383 5] TO 59591 [MON383 2] CKT 1	DIAMOND JCT. to SARCOXIE SOUTHWEST 69KV 59538 DIA131 269.0 59582 SAR362T269.0 1	EMDE-EMDE	38	101	Conductor 8.8 miles
04SP	Multiple Outage Contingency SW SHREVEPORT to DIANA 345KV 53454 [SW SHV 7] TO 53528 [DIANA 7] CKT 1 SW SHREVEPORT to LONGWOOD 345KV 53454 [SW SHV 7] TO 53424 [LONGWD 7] CKT 1	RAINES TO NORAM 138KV 53439 RAINES 4 138 53473 NORAM 4 138 1	CESW-CESW	234	105.3	Conductor 5.5 miles
		NORTH MARSHALL to WOODLAWN 69KV 53579 NMARSHL269.0 53621 WOODLWN269.0 1	CESW-CESW	51	109.2	Jumpers 7.55 miles
04WP	ELDORADO-EHV 500/345KV XFRM 17529 [7ELDEHV ] TO 17530 [8ELDEHV ] CKT 1	PATTERSON to SOUTH NASHVILLE 138KV 53306 PATTERS4 138 53321 SNASHVL4 138 1	CESW-CESW	105	111.1	Wave Trap 25.06 miles
04WP	LONGWOOD to ELDORADO-EHV 345KV 53424 [LONGWD 7] TO 17529 [7ELDEHV ] CKT 1	PATTERSON to SOUTH NASHVILLE 138KV 53306 PATTERS4 138 53321 SNASHVL4 138 1	CESW-CESW	105	111.1	
04WP	ELDORADO-EHV 500/345KV XFRM 17529 [7ELDEHV ] TO 17530 [8ELDEHV ] CKT 1	HOPE to PATMOS WEST SS 115KV 53383 HOPE 3 115 17537 3PATMOS# 115 1	CESW-EES	197	120.9	Conductor 11.34 miles
04WP	LONGWOOD to ELDORADO-EHV 345KV 53424 [LONGWD 7] TO 17529 [7ELDEHV ] CKT 1	HOPE to PATMOS WEST SS 115KV 53383 HOPE 3 115 17537 3PATMOS# 115 1	CESW-EES	197	120.8	



**Table 7** – Facilities assigned to study SPP-2000-044 Constellation Power Source Request #194668,194669 (CSWS to AMRN 150MW)

Study Year	Load flow case description / (opened branch(es))	OVERLOADED BRANCH(ES)	From - To	Rate B <MVA>	%LOADING After 450MW of Transfers	Initial Limit Mileage
01AP		NONE				
04SP	SOUTH SHREVEPORT to WALLACE LAKE 138KV 53446 [S SHV 4] TO 53461 [WALLAKE4] CKT 1	ELLERBE ROAD to FORBING TAP 69KV 53401 ELLERBE269.0 53406 FORBNGT269.0 1	CESW-CESW	95	101.5	Jumpers 2.0 miles
04SP	CHEROKEE to KNOXLEE 138KV 53522 [CHEROKE4] TO 53557 [KNOXLEE4] CKT 1	BLOCKER TAP to ROSBOROUGH 69KV 53516 BLOCKRT269.0 53600 ROSBORO269.0 1	CESW-CESW	72	101.4	600A Switch 4.98 miles
04SP	MARSHALL to MARSHALL AUTO 69KV 53570 [MARSHAL2] TO 53623 [MARAUTO2] CKT 1	HALLSVILLE to LONGVIEW HEIGHTS 69KV 53541 HALLSVL269.0 53567 LONGVHT269.0 1	CESW-CESW	48	100.7	Conductor 7.07 miles
04SP	LONGWOOD to WILKES 345KV 53424 [LONGWD 7] TO 53620 [WILKES 7] CKT 1	NORTH MARSHALL to WOODLAWN 69KV 53579 NMARSHL269.0 53621 WOODLWN269.0 1	CESW-CESW	51	104.1	Jumpers 7.55 miles
04SP	LONGWOOD to WILKES 345KV 53424 [LONGWD 7] TO 53620 [WILKES 7] CKT 1	PIRKEY to SABINE MINING CO. 138KV 53592 PIRKEY 4 138 53602 SABMINT4 138 1	CESW-CESW	287	104.7	1200A Switch 0.88 miles
04SP	LONGWOOD to WILKES 345KV 53424 [LONGWD 7] TO 53620 [WILKES 7] CKT 1	SABINE MINING CO. to SE MARSHALL 138KV 53602 SABMINT4 138 53605 SEMRSHL4 138 1	CESW-CESW	287	101.6	1200A Breaker 10.52 miles
04SP	KILDARE TAP to WHITE EAGLE 138KV 54760 [ KILDR4] TO 54761 [ WHEGL4] CKT 1	CHILOCCO TAP to CHIKASKIA 69KV 54744 CHLOC269.0 54756 CKSKI269.0 1	OKGE-OKGE	57	100.9	Conductor 12.01 miles
04SP	Multiple Outage Contingency SW SHREVEPORT to DIANA 345KV 53454 [SW SHV 7] TO 53528 [DIANA 7] CKT 1 SW SHREVEPORT to LONGWOOD 345KV 53454 [SW SHV 7] TO 53424 [LONGWD 7] CKT 1	MARSHALL to NORTH MARSHALL 69KV 53570 MARSHAL269.0 53579 NMARSHL269.0 1	CESW-CESW	75	101.5	Jumpers 3.49 miles
04WP	ELDORADO-EHV 500/345KV XFRM 17529 [7ELDEHV ] TO 17530 [8ELDEHV ] CKT 1	SOUTH NASHVILLE to MURFREESBORO 138kv 53321 SNASHVL4 138 17609 4MURFRE 138 1	CESW-EES	96	102.3	Wave Trap 19.54 miles
04WP	LONGWOOD to ELDORADO-EHV 345KV 53424 [LONGWD 7] TO 17529 [7ELDEHV ] CKT 1	SOUTH NASHVILLE to MURFREESBORO 138kv 53321 SNASHVL4 138 17609 4MURFRE 138 1	CESW-EES	96	102.3	

**Table 8** – Previously identified and upgraded Facilities needing additional capacity

Study Year	Opened Branch(es)	Overloaded Branch	Existing Rating A <MVA>	Existing Rating B <MVA>	Upgraded Rating A <MVA>	Upgraded Rating B <MVA>	450MW Case Loading <MVA>	No Transfers Case Loading <MVA>
04SP	Multiple Outage Contingency SW SHREVEPORT to DIANA 345KV 53454 [SW SHV 7] TO 53528 [DIANA 7] CKT 1 SW SHREVEPORT to LONGWOOD 345KV 53454 [SW SHV 7] TO 53424 [LONGWD 7] CKT 1	CHEROKEE REC-KNOX LEE, 138 KV 53522 CHEROKE4 138 TO 53557 KNOXLEE4 138 1	180.0	209.0	261.0	287.0	295.5	269.6
04SP	LONGWOOD TO WILKES 345KV 53424 LONGWD 7 345 TO 53620 WILKES 7 345 CKT 1	TATUM TO ROCKHILL 138KV 53611 TATUM 4 138 53598 ROKHILL4 138 CKT 1	180.0	209.0	202.0	235.0	243.3	223.4

## **5. Conclusion**

The results of the study show that before the 50MW transfer can take place system improvements will need to be completed. Although the 50MW transfer did not cause any new facilities to overload, the facilities identified in Table 6, Table 7, and Table 8 will require upgrades before the start of service to maintain system reliability. The assignment of facilities to Constellation Power Source Inc. is dependent on the acceptance of the facilities listed in Table 5 by the previous customer, and that the total 450MW of transfers is confirmed by Constellation Power Source, Inc.

The final assignment of facilities to CPS will be determined by the existence of future service agreements and upon the completion of an agreed upon 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 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