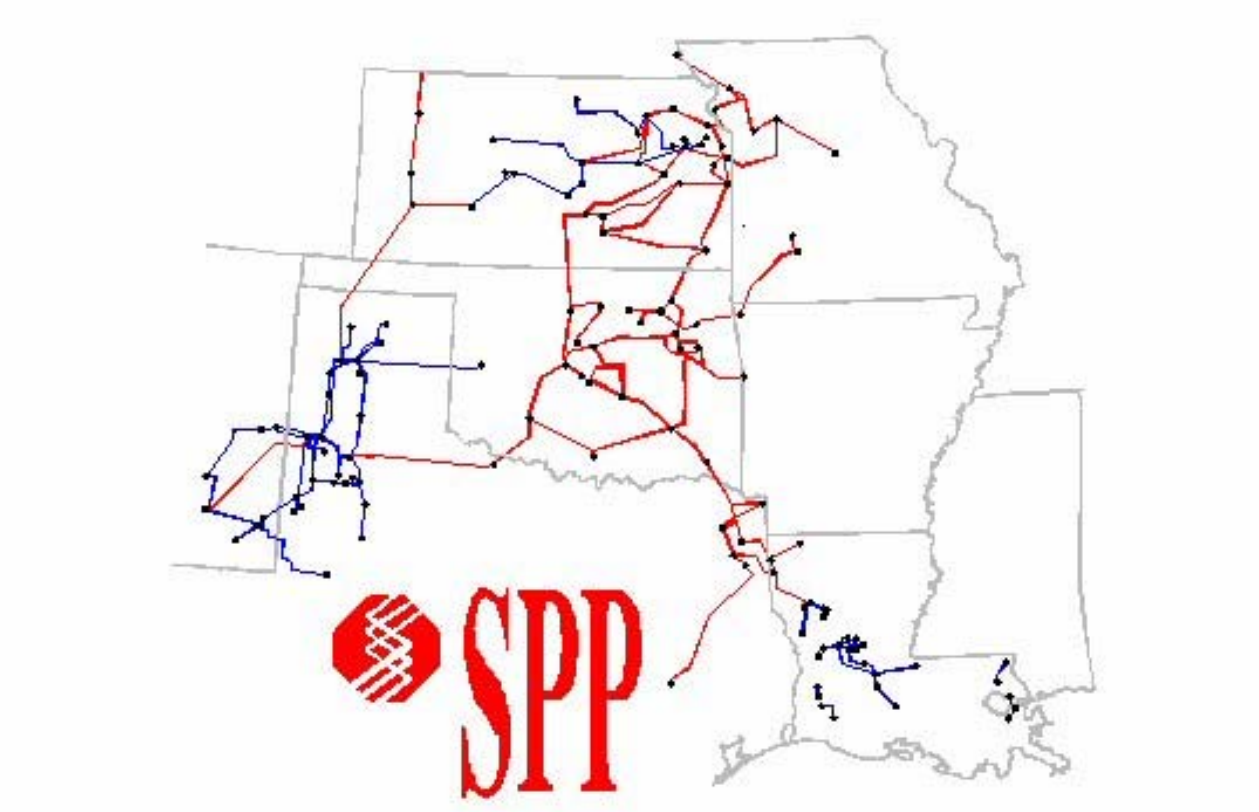
Southwest Power Pool

Intra-Regional Appraisal and Study Observation

2014 Summer Peak

Transmission Assessment

Nov 2005



SOUTHWEST POWER POOL
Intra-Regional Appraisal and Study Observation
2014 Summer Peak Transmission Assessment

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Overview

In accordance with the MAIN-MRO-SPP (MMS) Agreement to review the reliability of the interconnected system along the interface of the three regions, a study was made to determine the ability of this system to transfer power between MAIN, MRO and SPP, and their respective subregions for the modeled 2014 summer peak conditions. The primary goal of this report is to review and assess the overall adequacy of the Southwest Power Pool region's interconnected bulk electric transmission system based on the results of the MMS study.

The specific tasks involved were:

1. Determine the adequacy of the bulk transmission system for numerous contingency conditions.
2. Review the application of operating guides required in this study to assure they perform as intended.
3. Determine areas where special operating procedures might be required to reduce heavy transmission loading during contingency conditions.

Regional transfers were studied with information supplied by neighboring regions. Individual NERC Regions are allowed to simulated transfers using their own criteria defined for transmission assessments. The MAIN-MRO-SPP (MMS) study is performed for summer and winter peaks by a separate study group at the request of NERC. Transfer capability of the inter- and intra-transmission system was also studied as an indicator of the overall adequacy of the transmission system. The simulated transfers do not represent how commercial business is done and should not be used as an indicator of commercially available transmission capacity for the given season. These transfer numbers are not simultaneous and cannot be added together (see NERC document on Transfer Capability).

The NERC Reliability Standards define system reliability in terms of adequacy and security. This report addresses system adequacy. This study does not assess system security, which involves the system's response to sudden disturbances and requires the use of study techniques such as short circuit and stability analysis.

This study does not determine if adequate generating capacity exists to create the transfers documented here, especially if the system is experiencing a wide-spread temporary power deficiency as has happened during adverse weather conditions. **The nature of the study was to focus on the bulk transmission network.**

SPP is divided into two sub-regions consisting of the North and South. The North Sub-Region contains the operating companies in the states of Kansas and Missouri. The South Sub-Region contains the remaining companies in SPP which includes all of Oklahoma and parts of Arkansas, Louisiana, Mississippi, New Mexico, and Texas.

Each transfer direction was studied to determine any limiting facilities under any single contingency event (Linear FCITC - First Contingency Incremental Transfer Capability) up to the transfer test level. The three most limiting elements are noted. Operating Guides used are shown as applicable to increase transfer capability.

This study is based on a single "snapshot" which includes many variables and thus, many assumptions. Many of these variables (load, generation dispatch, unit outages, generating

additions, etc.) will change throughout the 2014 Summer Peak season, so they will differ from those simulated in the models. These transfer capability numbers, therefore, should be taken as a **guide** to transmission adequacy during 2014 summer peak period.

A change in the method used in simulating the transfer levels could also vary the values of the transfer capability number. For more specific details on the transmission assessment methodology and procedures, contact the Southwest Power Pool office.

Southwest Power Pool
Sub-Regional Appraisal and Study Observations
2014 Summer Peak Transmission Assessment

I. General Observations

The MAIN TASG case was developed from the 2014 Summer Peak model of the SPP 2005 Update 4 series of load flow cases along with models from MAIN, MRO and SERC. The sub-regions of MAIN, MRO and SPP along with member companies are listed below.

SPP-North

The SPP-North sub-region consists of the utilities located principally within the states of Kansas and Missouri. The member systems in the area are:

The Board of Public Utilities, Kansas City
City Power & Light, Independence
City Utilities, Springfield
The Empire District Electric Company
Kansas City Power & Light Company
Midwest Energy Inc.
Sunflower Electric Power Corp.
Aquila, Inc.
- Missouri Public Service Company
- West Plains Energy
- St. Joseph Light & Power

Westar Energy
- Westar Energy, Inc.
- Kansas Gas and Electric Company

SPP-South

The SPP-South sub-region consists of the utilities located principally within the states of Oklahoma, Arkansas, Louisiana, Mississippi, New Mexico, and Texas. The member systems in the area are:

American Electric Power
- AEP Public Service Company of Oklahoma
- AEP Southwestern Electric Power Company

CLECO Power
City of Lafayette, Louisiana
Louisiana Energy & Power Authority
Grand River Dam Authority
Oklahoma Gas & Electric Company
Oklahoma Municipal Power Authority
Southwestern Power Administration
Southwestern Public Service Company
Western Farmers Electric Cooperative

MAIN-South

The member systems in the area are :

Ameren
Central Illinois Light Company
Columbia Water & Light
City Water Light and Power, Springfield, Illinois
Duke Energy Audrain County – IPP Control Area
Electric Energy, Incorporated
Illinois Municipal Electric Agency
Illinois Power Company
Southern Illinois Power Cooperative
Soyland Power Cooperative

Iowa (MRO)

The member systems in the area are :

Mid-American Energy Company
Muscatine Power and Water Company

Minnesota (MRO)

The member systems in the area are :

Dairyland Power Cooperative
Great River Energy
Cooperative Power
United Power Association
Manitoba Hydro-Electric Board
Minnesota Power
Excel Energy Company
Southern Minnesota Power

II. Nonsimultaneous Import Transfer Capabilities (MW) for SPP Sub-Regions

Transfer Direction	2014 Summer		2005 Summer		2014 Summer (2014 Summer Outaged Element)	Owner
	FCITC	Notes	FCITC	Notes		
AMRN-SPP-N	250		1400		Russellville East-South 161 kV (Ft.Smith-ANO 500 kV)	ESI (OKGE-ESI)
IOWA-SPP-N	2000*	10	1200*	16,72	No Limit Found (Each Valid Contingency Tested)	-
MINN-SPP-N	350	23,44	1200	4,23,44,72	Russellville East-South 161 kV (Ft.Smith-ANO 500 kV)	ESI (OKGE-ESI)
SMAIN-SPP-N	250		1400	16	Russellville East-South 161 kV (Ft.Smith-ANO 500 kV)	ESI (OKGE-ESI)
AMRN-SPP-S	0		1000	68	ANO-Russellville North 161 kV (Ft. Smith-ANO 500 kV)	(ESI) (OKGE-ESI)
SPP-S–SPP-N	1500*		1200*		No Limit Found (Each Valid Contingency Tested)	-
SPP-N–SPP-S	600	65	1200*	68,71	Neosho SPA-Neosho South Jct 161 kV (Neosho SPA-Washburn 161 kV)	SPA-EMDE (SPA-AECI)

([1]) FCTTC is defined as the scheduled transfers plus the lower of either the FCITC or test level.
(*) Denotes transfer level studied or based upon the transfer level studied.

A description of the following guides can be found in Section IV:

(4) Arpin Area Operating Guides
(23) Boswell Special Protection System
(68) Wells Operating Guide
(10) Lake Road-Nashua Operating Guide
(16) Thomas Hill Operating Guide
(44) Taconite Harbor Special Protection System
(72) Woodbin-East Temporary Operating Guide
(65) Lawrence Hill Operating Guide

SPP Imports

SPP-N import FCITC from AMRN is 250 MW limited by the Russellville East-South 161 kV line (ESI) for the outage of the Ft. Smith-ANO 500 kV line (OKGE-ESI). This level is a decrease from the 1400 MW reported in the 2005 summer study limited by the Moberly-Salisbury 161 kV (AMEN-KCPL) for the outage of Salisbury-Thomas Hill 161 kV (KCPL-AECI).

SPP-N import FCITC from IOWA is 2000 MW. No limiting element was identified up to this transfer level with the availability of the Lake Road-Nashua Operating Guide. No limit was identified up to the 1200 MW test level in the 2005 summer study.

SPP-N import FCITC from MINN is 350 MW limited by the Russellville East-South 161 kV line (ESI) for the outage of the Ft. Smith-ANO 500 kV line (OKGE-ESI) with the availability of Boswell Special Protection System and Taconite Harbor Special Protection System. This level is a decrease from the 1200 MW reported in the 2005 summer study limited by the Prestot-Eau Claire 161 kV line (XEL) for the outage of Tremval-Alma 161 kV line (XEL-DPC).

SPP-N import FCITC from SMAIN is 250 MW limited by the Russellville East-South 161 kV line (ESI) for the outage of the Ft. Smith-ANO 500 kV line (OKGE-ESI). This level is a decrease from the 1400 MW FCITC reported in the 2005 summer study limited by the Overton 345/161 kV transformer (AMRN) for the outage of Overton-Sibley 345 kV line (AMRN-MIPU).

SPP-S import FCITC from AMRN is 0 MW limited by the ANO-Russellville North 161 kV line (ESI) for the outage of the Fort Smith-ANO 500 kV line (OKGE-ESI). This level is a decrease from the 1000 MW reported in the 2005 summer study limited by the Danville-Magazine 161 kV line (ESI-AEPW) for the outage of Fort Smith-ANO 500 kV line (OKGE-ESI).

SPP-N import FCITC from SPP-S is 1500 MW. No limiting element was identified up to this transfer level. This level is an increase from the 1200 MW reported in the 2005 summer study with no limit identified up to the transfer level.

SPP-S import FCITC from SPP-N is 600 MW limited by the Neosho SPA-Neosho South Jct 161 kV (SPA-EMDE) for the outage of the Neosho SPA-Washburn 161 kV (SPA-AECI) with the availability of the Lawrence Hill 230/115 kV Transformer Operating Guide. This level is a decrease from the 1200 MW reported in the 2005 summer study with no limit identified up to the transfer level.

Entergy currently has not developed an improvement plan to address the limitations associated with the outage of the Fort Smith-ANO 500 kV line (OKGE-ESI), but the expectation is that plans will be developed well in advance of the 2014 summer time frame that addresses these limits. Absent limitations associated with the outage of the Fort Smith-ANO 500 kV line, the FCITC from AMRN, MINN, SMAIN, and AMRN to SPP-N would be 1200 MW, 650 MW, 1200 MW, and 1200 MW, respectively, and the FCITC from AMRN to SPP-S would be 1500 MW.

Southwest Power Pool
Inter-Regional Appraisal and Study Observations
2014 Summer Peak Transmission Assessment

I. General Observations

Compared to the loads modeled in the 2005 summer study, the MAIN, MRO, and SPP loads are approximately 16%, 17%, and 19% higher, respectively, in this study.

Regional imports into SPP from MAIN and TVA as well as sub-regional imports into SPP-S from AMRN were limited 161 kV lines in the vicinity of A.N.O. and Russellville for the outages of Ft. Smith-ANO 500 kV line. Entergy currently has not developed an improvement plan to address the limitations associated with the outage of the Fort Smith-ANO 500 kV line (OKGE-ESI), but the expectation is that plans will be developed well in advance of the 2014 summer time frame that addresses these limits. Absent this local area problem, imports capabilities for these directions are greater than 1200 MW.

II. Regional First Contingency Incremental Transfer Capability (FCITIC)

The FCITC are incremental above the modeled base case transactions. These values should be considered along with the base case transfers listed in Section V of this report. The following tables show the FCITC for the SPP Inter-Regional Transfers.

Transfer Direction	2014 Summer			2005 Summer			2014 Summer Limiting Element (2014 Summer Outaged Element)	Owner
	FCITC	FCTTC[1]	Notes	FCITC	FCTTC[1]	Notes		
MRO-MAIN	2000*	1700*	23,44	1500	1100	23, 44, 4	No Limit Found (Each Valid Contingency Tested)	-
SPP-MAIN	750	850		2500*	2600*		Jeffery EC.-Hoyt 345 kV (Jeffery EC.-Swissvale 345 kV)	-
MAIN-MRO	800	1100		1100	1500	67	Fox River-N. Appleton 345 kV (N. Appleton-Kewaunee 345 kV)	ATCLLC (ATCLLC)
SPP-MRO	700	450		1300	1050		Jeffery EC.-Hoyt 345 kV (Jeffery EC.-Swissvale 345 kV)	WR (WR)
MAIN-SPP	0	0	68	2500*	2400*	68	ANO-Russellville North 161 kV (Ft. Smith-ANO 500 kV)	(ESI) (OKGE-ESI)
MRO-SPP	350	600	23,44	2000*	2250*	4,10, 23,44 ,68	Russellville East-South 161 kV Ft. Smith-ANO 500 kV)	(ESI) (OKGE-ESI)
TVA-SPP	0	0		750	750	68	ANO-Russellville North 161 kV (Ft. Smith-ANO 500 kV)	(ESI) (OKGE-ESI)
SERCW-SPP	0	0		850	850	68	ANO-Russellville North 161 kV (Ft. Smith-ANO 500 kV)	(ESI) (OKGE-ESI)

([1]) FCTTC is defined as the scheduled transfers plus the lower of either the FCITC or test level.
(*) Denotes transfer level studied or based upon the transfer level studied.

A description of the following guides can be found in Section IV:

(4) Arpin Area Operating Guides
(10) Lake Road – Nashua Guide
(23) Boswell Special Protection System
(44) Taconite Harbor Special Protection System
(67) Salem Transformer Emergency Operating Guide
(68) Wells Operating Guide

SPP-Imports

The SPP import FCITC from MAIN is 0 MW limited by the ANO-Russellville North 161 kV line (ESI) for the outage of the Fort Smith-ANO 500 kV line (OKGE-ESI). This level is a decrease from the 2500 MW reported in the 2005 summer study with no limitation found.

The SPP import FCITC from MRO is 350 MW limited by the Russellville East-South 161 kV line (EES) for outage of the Fort Smith-ANO 500 kV line (OKGE-ESI) with the availability of the Boswell Special Protection System and Taconite Harbor Special Protection System. This level is a decrease from the 2000 MW FCITC reported in the 2005 summer study with no limitation found.

The SPP import FCITC from TVA is 0 MW limited by the ANO-Russellville North 161 kV line (ESI) for the outage of the Fort Smith-ANO 500 kV line (OKGE-ESI). This level is a decrease from the 750 MW reported in the 2005 summer study limited by the Danville-Magazine 161 kV line (ESI-AEPW) for the outage of Fort Smith-ANO 500 kV line (ESI-OKGE).

The SPP import FCITC from SERCW is 0 MW limited by the ANO-Russellville North 161 kV line (ESI) for the outage of the Fort Smith-ANO 500 kV line (OKGE-ESI). This level is a decrease from the 850 MW reported in the 2005 summer study limited by the Danville-Magazine 161 kV line (ESI-AEPW) for the outage of Fort Smith-ANO 500 kV line (ESI-OKGE).

Entergy currently has not developed an improvement plan to address the AN0-Russellville North limitations, but the expectation is that plans will be developed well in advance of the 2014 summer time frame that addresses these limits. Absent limitations associated with the outage of the Fort Smith-ANO 500 kV line, the FCITC from MAIN, MRO,TVA and SERCW to SPP would be 2450 MW, 1150 MW, 1600 MW, and 1800 MW respectively.

SPP IMPORTS

FROM	TRANSFER CAPABILITY CONDITION	MW	(NOTE)	LIMITING ELEMENT	FLOW	RATING	PTDF/ OTDF	FACILITY OUTAGE(S)
MAIN	IITC	2500*		No Limit Found				None
	FCITC	0	<= (R)	ANO-Russellville North 161 kV	464	394E	.030	Ft. Smith-ANO 500 kV
		1000	(68)	Wells 500/230 kV Tr.	509	560E	.050	Richard-Wells 500 kV
		2450		Huben-Marshfield 161 kV	128	203E	.030	Brookline-Morgan 345 kV
		2500*		No Additional Limit Found				Each Valid Contingency Tested
MRO	IITC	2000*		No Limit Found				None
	FCITC	0	< (23a)	Boswell-Blackberry 230 kV ckt. 2	516	437E	.041	Boswell-Blackberry 230 kV ckt. 1
		0	(44a,R)	Silver Bay Bus Tie 115 kV	123	107E	.065	Hoyt Lake-Laskin 138 kV
		350	<-	Russellville East-South 161 kV	385	396E	.033	Ft. Smith-ANO 500 kV
		1150	(68)	Wells 500/230 kV Tr.	509	560E	.044	Richard-Wells 500 kV
		1150	(10,R)	Lake Road-Nashua 161 kV	100	153E	.045	Stranger-Iatan 345 kV
		2000*		No Additional Limit Found				Each Valid Contingency Tested
SERCW	IITC	2500*		No Limit Found				None
	FCITC	0	<= (R)	ANO-Russellville North 161 kV	464	394E	.042	Ft. Smith-ANO 500 kV
		1400	(68)	Wells 500/230 kV Tr.	509	560E	.037	Richard-Wells 500 kV
		1800	(R)	Ft. Smith 500/161 kV Tr. 1	409	479E	.039	Ft. Smith 500/161 kV Tr. 2
		2000		Muskogee-Clarksville 345 kV	901	985E	.042	Riverside Station-Muskogee 345 kV
		2200		Ft. Smith-Arklahoma 161 kV	260	333E	.034	Muskogee-Ft. Smith 345 kV
		2300		Welsh-Lydia 345 kV	922	1059E	.058	Welsh-Wilkes 345 kV NW Texarkana-Welsh 345 kV
		2500*		No Additional Limit Found				Each Valid Contingency Tested

Transfer direction with subscript ‘x’ includes uncommitted resources in the exporting subsystem

FROM	TRANSFER CAPABILITY CONDITION	MW	(NOTE)	LIMITING ELEMENT	FLOW	RATING	PTDF/ OTDF	FACILITY OUTAGE(S)
TVA	IITC	2500*		No Limit Found				None
	FCITC	0	<= (R)	ANO-Russellville North 161 kV	464	394E	.048	Ft. Smith-ANO 500 kV
		850	(68)	Wells 500/230 kV Tr.	509	560E	.060	Richard-Wells 500 kV
		1600	(R)	Ft. Smith 500/161 kV Tr. 1	409	479E	.042	Ft. Smith 500/161 kV Tr. 2
		1700		McAdams-Pickens 230 kV	392	457E	.038	McAdams-Lakeover 500 kV
		2000		Ft. Smith-Arklahoma 161 kV	260	333E	.036	Muskogee-Ft. Smith 345 kV
		2200		Muskogee-Clarksville 345 kV	901	985E	.038	Riverside Station-Muskogee 345 kV
		2500*		No Additional Limit Found				Each Valid Contingency Tested
TVAx	IITC	2500*		No Limit Found				None
	FCITC	0	<= (R)	ANO-Russellville North 161 kV	464	394E	.054	Ft. Smith-ANO 500 kV
		850	(68)	Wells 500/230 kV Tr.	509	560E	.060	Richard-Wells 500 kV
		1200		McAdams-Pickens 230 kV	392	457E	.056	McAdams-Lakeover 500 kV
		1400		Horn Lake 230/115 kV Tr.	307	353E	.032	Freeport 500/230 kV Tr.
		1500	(R)	Ft. Smith 500/161 kV Tr. 1	409	479E	.047	Ft. Smith 500/161 kV Tr. 2

Transfer direction with subscript ‘x’ includes uncommitted resources in the exporting subsystem

SPP NORTH (SPP-N) IMPORTS

FROM	TRANSFER CAPABILITY CONDITION	MW	(NOTE)	LIMITING ELEMENT	FLOW	RATING	PTDF/ OTDF	FACILITY OUTAGE(S)
AMRN	IITC	1500*		No Limit Found				None
	FCITC	250	<= (R)	Russellville East-South 161 kV	385	396E	.044	Ft. Smith-ANO 500 kV
		1200		Truman-Clinton 161 kV	173	223E	.043	Thomas Hill-Norborne 345 kV
		1300		Moberly-Salisbury 161 kV	161	212E	.038	Salisbury-Thomas Hill 161 kV
		1500*		No Additional Limit Found				Each Valid Contingency Tested
AMRNx	IITC	1500*		No Limit Found				None
	FCITC	250	<= (R)	Russellville East-South 161 kV	385	396E	.043	Ft. Smith-ANO 500 kV
		900	(16,R)	Thomas Hill-Salisbury 161 kV	306	333E	.030	Thomas Hill-Moberly Tap 161 kV Moberly Tap-Hinton 161 kV
		1200		Truman-Clinton 161 kV	173	223E	.042	Thomas Hill-Norborne 345 kV
		1300		Moberly-Salisbury 161 kV	161	212E	.038	Salisbury-Thomas Hill 161 kV
		1500*		No Additional Limit Found				Each Valid Contingency Tested
IOWA	IITC	2000*		No Limit Found				None
	FCITC	1000	(10A,R)	Lake Road-Nashua 161 kV	100	153E	.050	Stranger-Iatan 345 kV
		2000*	<=	No Additional Limit Found				Each Valid Contingency Tested

Transfer direction with subscript ‘x’ includes uncommitted resources in the exporting subsystem

FROM	TRANSFER CAPABILITY CONDITION	MW	(NOTE)	LIMITING ELEMENT	FLOW	RATING	PTDF/ OTDF	FACILITY OUTAGE(S)
MINN	IITC	650		Silver Bay Bus Tie 115 kV	78	98N	.031	None
		800		Silver Bay-Waldo 115 kV	73	97N	.031	None
		1100		Waldo-Two Harbors 115 kV	61	97N	.031	None
		1500*		No Additional Limit Found				None
	FCITC	0	< (23a)	Boswell-Blackberry 230 kV ckt. 2	516	437E	.057	Boswell-Blackberry 230 kV ckt. 1
		0	(44a,R)	Silver Bay Bus Tie 115 kV	123	107E	.085	Hoyt Lake-Laskin 138 kV
		350	<-	Russellville East-South 161 kV	385	396E	.032	Ft. Smith-ANO 500 kV
		650		Silver Bay Bus Tie 115 kV	78	98N	.031	None
SMAIN	IITC	1500*		No Limit Found				None
	FCITC	250	<= (R)	Russellville East-South 161 kV	385	396E	.045	Ft. Smith-ANO 500 kV
		1200		Truman-Clinton 161 kV	173	223E	.043	Thomas Hill-Norborne 345 kV
		1300		Moberly-Salisbury 161 kV	161	212E	.038	Salisbury-Thomas Hill 161 kV
		1500*		No Additional Limit Found				Each Valid Contingency Tested
SMAINx	IITC	1500*		No Limit Found				None
	FCITC	250	<= (R)	Russellville East-South 161 kV	385	396E	.044	Ft. Smith-ANO 500 kV
		1200		Truman-Clinton 161 kV	173	223E	.042	Thomas Hill-Norborne 345 kV
		1300		Moberly-Salisbury 161 kV	161	212E	.038	Salisbury-Thomas Hill 161 kV
		1500*		No Additional Limit Found				Each Valid Contingency Tested
SPP-S	IITC	1500*		No Limit Found				None
	FCITC	1500*		No Additional Limit Found				Each Valid Contingency Tested

Transfer direction with subscript ‘x’ includes uncommitted resources in the exporting subsystem

SPP SOUTH (SPP-S) IMPORTS

FROM	TRANSFER CAPABILITY CONDITION	MW	(NOTE)	LIMITING ELEMENT	FLOW	RATING	PTDF/ OTDF	FACILITY OUTAGE(S)
AMRN	IITC	1500*		No Limit Found				None
	FCITC	0	<= (R)	ANO-Russellville North 161 kV	464	394E	.031	Ft. Smith-ANO 500 kV
		800	(68)	Wells 500/230 kV Tr.	509	560E	.065	Richard-Wells 500 kV
		1500*		No Additional Limit Found				Each Valid Contingency Tested
AMRNx	IITC	1500*		No Limit Found				None
	FCITC	0	<= (R)	ANO-Russellville North 161 kV	464	394E	.030	Ft. Smith-ANO 500 kV
		800	(68)	Wells 500/230 kV Tr.	509	560E	.064	Richard-Wells 500 kV
		1500*		No Additional Limit Found				Each Valid Contingency Tested
SPP-N	IITC	1000		Neosho SPA-Neosho South Jct 161 kV	95	129N	.033	None
	FCITC	0	(65A)	Lawrence Hill 230/115 kV Tr.	313	297E	.051	Lawrence Hill-Midland 230 kV
		450	(65A)	Midland 230/115 kV Tr.	285	308E	.049	Lawrence Hill 230/115 kV Tr.
		600	<=	Neosho SPA-Neosho South Jct 161 kV	132	156E	.041	Neosho SPA-Washburn 161 kV
		1000	(68)	Wells 500/230 kV Tr.	509	560E	.049	Richard-Wells 500 kV
		1000		Neosho SPA-Neosho South Jct 161 kV	95	129N	.033	None

Transfer direction with subscript ‘x’ includes uncommitted resources in the exporting subsystem

FOOTNOTES

(R) This element repeats as a limit for other outages.
(A) Availability of operating guide for both emergency and nonemergency transactions will increase capability to the reported FCITC level.
(a) Availability of operating guide for emergency transactions will increase capability to the reported FCITC Level.
(<) Reported FCITC limit for nonemergency transactions.
(<-) Reported FCITC limit for emergency transactions.
(<=) Reported FCITC limit for emergency and nonemergency transactions.
(I) Indicates implementation of a nonemergency operating guide.
(i) Indicates implementation of an emergency operating guide.
(*) Denotes transfer level studied.

Operating Guides

(4) Arpin Area Operating Guides
(23) Boswell Special Protection System
(10) Lake Road – Nashua Guide
(67) Salem Transformer Emergency Operating Guide
(44) Taconite Harbor Special Protection System
(16) Thomas Hill Operating Guide
(68) Wells Operating Guide
(72) Woodbin-East Temporary Operating Guide
(65) Lawrence Hill 230/115 kV Transformer Operating Guide

Arpin Area Operating Guides (4)

Transmission Owner: ATCLLC

Transmission Operator: MISO/ATCLLC

Control Area: ALTE/WPS

Reliability Coordinator: MISO

Automatic
Post-Contingency Implementation

Guide Description:

Council Creek 69 kV Bus Tie Status

This tie would be expected to be open during high transfer periods. This tie is very sensitive to flows across the interface and studies have shown that it will overload at high transfer levels with all facilities in service. The relays at Council Creek are set to trip 69 kV breaker #335-S in 10 seconds if the flow from Oakdale exceeds 32 MVA or the flow from Monroe County exceeds 50 MVA.

Post - Contingency Mitigation
Upon the loss of Arpin-Rocky Run 345kV:

The Port Edwards 138kV System

The Arpin 345-138 kV transformer and the Arpin-Port Edwards 138 kV system are both susceptible to overloading for the outage of the Arpin-Rocky Run 345 kV line. To prevent this, the relays at Port Edwards will trip breaker #421 on the Wautoma 138 kV line and breaker #436 on the Saratoga 138 kV line when the flow from Lakehead Vesper reaches 231 MVA.

The Hillsboro-Hilltop 69 kV Line

This line is sensitive to loss of the Arpin-Rocky Run 345 kV line and will overload. The relays at Hilltop are set to trip 69 kV breaker #569 at Hilltop if the flow is greater than or equal to 72 MVA.

The Lublin-Lakehead 69 kV Line

This line is also sensitive to the loss of the Arpin-Rocky Run 345 kV line. The DPC system operators will open this line by supervisory control in response to sag limitations at 27 MVA and above, depending on ambient temperature. The relays at Lublin are set to operate breaker #12NB56 automatically at 47 MVA.

The T-Corners Area 115 kV System

Open Wien-Stratford 115kV. The Arpin 138-115 kV transformer and the Arpin-

Hume-Wildwood-McMillan-Stratford-Wien 115 kV system is susceptible to overloading for the outage of the Arpin-Rocky Run 345 kV line with the Port Edwards 138 kV lines open at high transfer levels. The relay setting at Wien will trip the B-54 breaker on the Wien-Stratford 115 kV line at 90 MVA in 10 seconds. This protects the Marshfield 115 kV system from overload and will also limit the Arpin 138-115 kV transformer to approximately 160 MVA with normal Marshfield system peak loads.

ATCLLC will test the line from Arpin to determine if the fault is temporary or permanent.

***Temporary Fault**:* The line is available to the network. A minimum 5-minute time delay from the original trip is required to discharge capacitor banks before attempting to loop the Arpin-Rocky Run 345 kV line. These capacitor banks are required to maintain adequate system voltage at high transfer levels and are required to be available when closing the loop. These include:

Eau Claire 161 kV – (4) 88.0 MVAR switched
Arpin 138 kV - (1) 50.0 MVAR switched
T-Corners 115 kV – (1) 20.0 MVAR and (4) 30.0 MVAR
Wien 115 kV – (3) 21.6 MVAR (manually switched)

Prior to re-closing at Arpin, the ATCLLC system operator contacts the WPS system operator, who notifies the Weston generating station of the situation and requests that the station prepare for re-closure of the Arpin-Rocky Run facility. The ATCLLC system operator verifies with the WPS system operator that the Weston generating units are prepared for networking the 345 kV system. The ATCLLC system operator verifies with XEL that the Eau Claire capacitors are available. The ATCLLC system operator verifies that the Arpin capacitors are available. The ATCLLC system operator verifies that the T Corners-Wien 115 kV line is closed. The ATCLLC system operator closes the 345 kV line breaker at Arpin.

Permanent Fault: If the Arpin-Rocky Run 345 kV line cannot be successfully re-closed and it is determined that the outage is not of a temporary nature, additional measures need to be taken by the system operators to prepare for the next contingency. The next worst contingency with Arpin-Rocky Run 345 kV out of service is expected to be Rocky Run-North Appleton 345 kV. The next contingency would have very serious consequences and would require the curtailment of schedules across the Minnesota-Eastern Wisconsin interface. To prepare for the next contingency and reduce its' severity, the following steps should be followed.

Post-Contingency Operation for a Permanent Fault

The ATCLLC system operator contacts the WPS system operator, who notifies the Weston generating plant of the permanent fault situation. ATCLLC will take necessary action to return the system to a secure state. ATCLLC will review real-time security analysis to determine necessary actions. This may include, but is not limited to:

a. Initiating TLR (as needed) for the Rocky Run-North Appleton contingency (ATCLLC).
b. Initiating TLR (as needed) for the Prairie Island-Byron contingency (XEL).

Pre – Contingency loading of Eau Claire-Arpin

At a loading level of 765 MW, ATC and MISO will coordinate the issuance of TLR Level 1. At a loading level of 790 MW, ATC and MISO will coordinate issuance of the appropriate TLR level to avoid increasing the flow above the 790 MW limit. [2] Before TLR Level 2 or higher is called, MISO should identify all Firm Redispatch (FRD) on the Eau Claire-Arpin flowgate. All available FRD should be utilized. The MISO Security Coordinator will maintain the real-time flow as measured at Eau Claire, on the Eau Claire-Arpin 345 kV line to a maximum value of 790 MW. The MISO Security Coordinator may limit the pre-contingent flow to less than 790 MW if real-time studies, including, but not limited to, the daily voltage stability study indicate a need for reduction to a lesser value.

Post - Contingency Mitigation

Upon the loss of King-Eau Claire-Arpin 345kV or the Eau Claire-Arpin 345kV line:

The Hillsboro-Hilltop 69 kV Line

This line is very sensitive to loss of the Eau Claire-Arpin 345 kV line and will overload. The relays at Hilltop are set to trip 69 kV breaker # 569 at Hilltop if the flow is greater than or equal to 72 MVA.

The Lublin-Lakehead 69 kV Line

This line is also sensitive to the loss of the Eau Claire-Arpin 345 kV line. The DPC system operators will open this line by supervisory control in response to sag limitations at 27 MVA and above, depending on ambient temperature. The relays at Lublin are set to operate breaker #12NB56 automatically at 47 MVA.

The T-Corners Area 115 kV System

The Hydro Lane-T Corners-Wien 115 kV line and the Wien-McMillan-Wildwood-Hume-Arpin 115 kV systems are susceptible to overloading for the outage of any portion of the King-Eau Claire-Arpin 345kV line. The relays at Wien are set to open the B-54 breaker on the Wien-Stratford 115 kV line when the flow exceeds 90 MVA for 10 seconds. This operation will prevent the Marshfield 115 kV system from overloading. If this line does not trip automatically, the ATCLLC system operator should open the B-54 breaker at Wien via supervisory control if system conditions are such that opening the line will improve conditions on the 115 kV system.

XEL and ATCLLC will test the line from Eau Claire to determine if the fault is temporary or permanent.

Temporary Fault: The line is available to the network. A minimum 5-minute time delay from the original trip is required to discharge capacitor banks before attempting to loop the Eau Claire-Arpin 345 kV line. These capacitor banks are required to maintain adequate system voltage at high transfer levels and are required to be available when closing the loop. These include:

Eau Claire 161kV – (4) 88 MVAR switched
Arpin 138kV - (1) 50 MVAR switched
T-Corners 115 kV – (4) 30 MVAR switched

Prior to re-closing at Arpin, the ATCLLC system operator notifies the Weston generating station of the situation and requests that the station prepare for re-closure of the Eau Claire-Arpin facility. The ATCLLC system operator verifies that the Weston generating units are prepared for networking the 345 kV system. The ATCLLC system operator verifies that the T Corners-Wien 115 kV line is closed. The ATCLLC system operator verifies with XEL that the Eau Claire capacitors are available and that the King-Eau Claire 345 kV line is closed. The ATCLLC system operator verifies with XEL that the Eau Claire end of the line is closed. The ATCLLC system operator verifies that the Arpin capacitors are available. The ATCLLC system operator closes the 345 kV line breaker at Arpin.

Permanent Fault: If the Eau Claire-Arpin 345 kV line cannot be successfully reclosed and it is determined that the outage is not of a temporary nature, additional measures need to be taken by the system operators to prepare for the next contingency. The next worst contingency with Eau Claire-Arpin 345 kV line out of service is expected to be Prairie Island-Byron 345 kV line. The next contingency would have very serious consequences and would require the curtailment of schedules across this interface and south of Twin Cities. To prepare for the next contingency and reduce its' severity, the steps in section 5.3 should be followed.

Post-Contingency Operation for a Permanent Fault

The ATCLLC system operator notifies the Weston generating plant of the permanent fault situation. The ATCLLC system operators assess system conditions to determine if complete separation of the Minnesota-Eastern Wisconsin tie is necessary. Upon verification that complete interface separation is necessary to protect the NSP/DPC 69 kV system, open breaker #W-23 at Wien on the Wien-T Corners line. Under certain high transfer system condition during a permanent Eau Claire-Arpin outage, if the power flow on the T-corners to Wien (W-23) line is over 88 MW, one T-Corners 115/69 kV transformer may be overloaded for loss of the Hydro Lane to T-Corners 115 kV line. Leaving this line in service during a permanent Eau Claire-Arpin outage could result in system violations in western and central Wisconsin for the next contingency. Close breaker #B-54 on the Wien-Stratford 115 kV line. ATCLLC and XEL will take necessary action to return the system to a secure state. ATCLLC, XEL, and MISO will review real-time security analysis to determine necessary actions. This may include, but is not limited to:

a. Initiating TLR (as needed) for the Prairie Island-Byron contingency (XEL).
b. Initiating TLR (as needed) for the Wempletown-Paddock contingency (ATCLLC).

The Arpin Area Operating guides are automatic and do not require operator intervention.

The Arpin Area Operating guides are automatic and do not make use of short-term ratings for limiting facilities.

Arpin Area Opertng Guides are updated annually by ATC, DPC and XEL based on MISO request and are assessed on an as needed basis. They are studied by simulating contingencies for both the pre-implementation and post-implementation of the operating guide in internal as well as regional studies.

Boswell Emergency Operating Guide (23)

Transmission Owner: Minnesota Power

Transmission Operator: MP

Control Area: MP

Reliability Coordinator: MISO

Automatic
Post-Contingency Implementation

Guide Description:

MRO systems **do not implement operating procedures for the purpose of increasing non-emergency transfers.** However, if a situation exists where a utility requires emergency import, the MRO system(s) responsible for the operating procedure will implement the procedure only as long as the implementation of the guide isn't detrimental to the network or system reliability. The Boswell special protection system is designed to automatically reduce generation at the Clay Boswell plant in response to contingent overloads of the following lines:

Boswell Blackberry 230 kV circuits 1 & 2
Boswell – Shannon 230 kV line
Blackberry – Riverton 230 kV line
Arrowhead – Bear Creek 230 kV line

If an overload occurs on any of the transmission lines (listed above), generation at Boswell Units #3 and #4 will be reduced such that all remaining lines are within their long term continuous rating. This action is automatic and not dependant on operator action.

The approximate time required to implement this guide is 10 Minutes**.**

Based on engineering judgment, MP believes that the post-contingency loading of the transmission lines mentioned above would be acceptable provided the pre-contingency line flow does not exceed the normal ratings of the lines. These acceptable post-contingency loadings may exceed emergency ratings during the 10 minutes it would take to implement the special protection system.

The Boswell Special Protection System is assessed on an as needed basis and is studied by simulating contingencies for both the pre-implementation and post-implementation of the operating guide in internal as well as regional studies.

Lake Road-Nashua Operating Guide (10)

Transmission Owner: KCPL

Transmission Operator: KCPL

Control Area: KCPL

Reliability Coordinator: SPP

Automatic
Post-Contingency Implementation

Guide Description:

The Lake Road-Nashua operating guide is implemented automatically on a post-contingency basis. The guide calls for corrective action to relieve overloads on the Lake Road to Nashua 161 kV line with either the St Joe-Hawthorn 345 kV line outage or the Iatan-Stranger Creek 345 kV line outage. The Lake Road-Nashua 161 kV line is opened automatically. The Lake Road-Nashua operating guide is unconditionally available.

Automatic overcurrent relays will trip the breakers associated with this line at normal clearing time of 10.8 cycles.

The continuous normal summer rating and 8 hour emergency summer rating of the Lake Road-Nashua 161 kV line is 153 MVA and 172 MVA, respectively. No special short-term rating is used.

The effectiveness of this guide was initially assessed by transfer study analysis and continues to be studied seasonally by contingency analysis.

Salem Emergency Operating Guide (67)

Transmission Owner: ALTW

Transmission Operator: ATCLLC

Control Area: ALTW

Reliability Coordinator: MISO

Post-Contingency Implementation
Operator Intervention

Guide Description:

The purpose of this guide is to protect the Salem 345/161 kV transformer from a thermal overload for the loss of the Quad Cities-Sub 91 345 kV line. Potential overloading of this transformer may result from to high south to north flows in Wisconsin and high east to west flows in Iowa. For an overload condition, the system operator will open the 161 kV bus tie at Salem Substation via supervisory control. This operating guide will not be used to increase non-emergency transactions.

The approximate time required to implement this guide is 30 minutes.

Short-term rating of limiting facilities and duration for which the rating can be used is 110% for 30 minutes.

This guide was last evaluated by MISO and ALTW on 10/15/04.

Taconite Harbor Special Protection System (44)

Transmission Owner: Minnesota Power

Transmission Operator: MP

Control Area: MP

Reliability Coordinator: MISO

Automatic
Post-Contingency Implementation

Guide Description:

MRO systems **do not implement operating procedures for the purpose of increasing non-emergency transfers.** However, if a situation exists where a utility requires emergency import, the MRO system(s) responsible for the operating procedure will implement the procedure only as long as the implementation of the guide isn't detrimental to the network or system reliability. The Taconite Harbor special protection system is designed to automatically reduce generation at the Taconite Harbor plant in response to contingent overloads of the portion of the system known as the North Shore Loop. The North shore loop system consists of all transmission lines directly connected to the following stations: Laskin, Hoyt Lakes, Taconite Harbor, and Silver Bay. Should any of these lines (described above) become overloaded, the Taconite Harbor generation will automatically be run back such that all remaining lines are within their long term continuous rating. This action is automatic and not dependant on operator action.

The approximate time required to implement this guide is 10 Minutes.

Based on engineering judgment, MP believes that the post-contingency loading of the transmission lines known as the North Shore Loop would be acceptable provided the pre-contingency line flow does not exceed the normal ratings of the lines. These acceptable post-contingency loadings may exceed emergency ratings during the 10 minutes it would take to implement the special protection system.

The Taconite Harbor Special Protection System is assessed on an as needed basis and is studied by simulating contingencies for both the pre-implementation and post-implementation of the operating guide in internal as well as regional studies.

Thomas Hill Operating Guide (16)

Transmission Owner: Associated Elec Coop (AECI)

Transmission Operator: AECI

Control Area: AECI

Reliability Coordinator: TVA

Post-Contingency Implementation
Operator Intervention

Guide Description:

The Thomas Hill operating guide calls for manually reducing generation at Thomas Hill, on a post-contingency basis, during a first contingency until all in-service Thomas Hill outlet elements are loaded at or below their respective emergency ratings. The Thomas Hill operating guide can be used for remote facilities when one of the Thomas Hill outlet facilities would pose a more severe limit causing the guide to already be in effect. The Thomas Hill operating guide is unconditionally available.

The approximate time required to implement this guide is ten to fifteen minutes.

The pre-contingency loading of the Thomas Hill outlet facilities provide a fifteen minute operating window before the facilities reach the conductor temperature associated with the modeled 372 MVA emergency rating.

AECI assesses its operating guides during internal seasonal operating studies performed on an annual basis.

Wells Guide (68)

Transmission Owner:	Cleco Power
Transmission Operator:	Cleco Power
Control Area:	Cleco
Reliability Coordinator:	Entergy

Automatic

Guide Description:

Wells 36 ohm series reactor will be placed in service for cases in which Cleco's Wells 500/230 kV autotransformer and/or Lafayette Utility System (LUS) Bonin 230/138 kV autotransformer exceeds emergency rating.

The approximate time required to implement this guide is approximately 4 seconds.

Short-term rating of limiting facilities and duration for which the rating can be used: Ratings during switching not provided.

A joint transmission study was performed by SPP, Cleco, Entergy, and LUS to evaluate the impact of the installation of Wells as well as the 36 ohm reactor.

Woodbin-East Temporary Operating Guide (72)

Transmission Owner: Aquila

Transmission Operator: MIPU

Control Area: MPS

Reliability Coordinator: MISO

Post-Contingency Implementation
Operator Intervention

Guide Description:

Outage of the St.Joe-Cook 161 kV transmission line can cause overloads on the Woodbin-East 161 kV Line. When this occurs, the East-Industrial Park 161 kV line is opened to relieve the overload of Woodbin-East 161 kV line.

For post-contingency operating steps, the approximate time required to implement this guide: No answer provided.

Short-term rating of limiting facilities and duration for which the rating can be used: No answer provided.

It is essential that the system withstands any resulting overloads and voltages and places no undue burden on neighboring systems prior to, and subsequent to, implementation of the guide. When and how was this assessed? No answer provided.

Lawrence Hill 230/115 kV Transformer Operating Guide (65)

This guide also known as two separate guides, the Midland 230 kV Operating Guide and the Lawrence Hill 230/115 kV Transformer Operating Guide.

Transmission Owner: Westar

Transmission Operator: Westar

Control Area: WR

Reliability Coordinator: SPP

Post-Contingency Implementation
Operator Intervention

Guide Description:

Midland

The loss of the Midland Junction 230-115 kV transformer or Midland Junction-Lawrence Hill 230 kV line during peak load conditions will result in an overload of the Lawrence Hill 230-115 kV transformer. The operating guide calls for :

1. Open Midland-Tonga Tap 115 kV line.

2. If the Lawrence Hill 230/115 kV transformer still exceeds its acceptable limit after Step 1, open Midland-Pentagon 115 kV line.

3. If the Lawrence Hill 230/115kV transformer still exceeds it's acceptable limit, request the Generation System Operator to lower generation at either LEC and/or TEC until the load level on the Lawrence transformer is within acceptable limits.

Lawrence Hill

The loss of the Lawrence Hill 230-115 kV transformer during peak load conditions will result in an overload of the Midland 230-115 kV transformer. The operating guide calls for :

1. Open Midland-Tonga Tap 115 kV line;

2. If the Midland 230-115kV transformer still exceeds its acceptable limit after Step 1, open Midland-Pentagon 115 kV line.

The approximate time required to implement this guide is 15 minutes.

Short-term ratings are good for the 15 minutes required to implement the directive. The Lawrence Hill 230/115 kV transformer short-term emergency rating is 364 MVA. The Midland 230-115 kV transformer short-term emergency rating is 364 MVA.

The ability of the system to withstand any resulting overloads and voltages and place no undue burden on neighboring systems prior to, and subsequent to, implementation of the guide is accessed though an annual directive review.

Basecase Schedules for 2014 Summer Peak

FROM		TO			MW Interchange	
Regi	Co.	Region	Co.		2014 S	2005 S
MAIN	ALTE	MRO	DPC		-5	-5
MAIN	ALTE	MRO	NSP		66	61
MAIN	ALTW	MRO	DPC		-6	-6
MAIN	ALTW	MRO	GRE		-134	-98
MAIN	ALTW	MRO	MEC		-157	-119
MAIN	ALTW	MRO	MPW		0	0
MAIN	ALTW	MRO	XEL		-22	-20
MAIN	ALTW	MRO	SMP		-8	-5
MAIN	ALTW	MRO	WAPA		-96	-84
MAIN	AMRN	MRO	MEC		1	0
MAIN	NI	MRO	GRE		50	0
MAIN	NI	MRO	MEC	MEC's Share of Quad Cities	434	428
MAIN	NI	MRO	MEC		300	350
MAIN	NI	MRO	XEL		0	0
MAIN	NI	MRO	MEC		0	0
MAIN	IP	MRO	XEK		0	100
MAIN	IP	MRO	MEC		0	100
MAIN	MGE	MRO	DPC		-30	-30
MAIN	WE	MRO	MP		-62	-62
MAIN	WE	MRO	XEL		-42	-42
MAIN	WPS	MRO	MH		-108	-108
MAIN	WPS	MRO	MP		0	-76
MAIN	WPS	MRO	XEL		0	0
	MAIN to MRO Net				**181**	**384**
MAIN	AMRN	SPP	SPA		0	0
MAIN	CWL	SPP	KACY		-20	-20
MAIN	CWL	SPP	SPA		-79	-79
	MAIN to SPP Net				**-99**	**-99**
MRO	MEC	SPP	KCPL		71	50
MRO	NPPD	SPP	MPS		175	175
MRO	WAPA	SPP	SECI		4	4
	MRO TO SPP Net				**250**	**229**

Basecase Schedules for 2014 Summer Peak

FROM		TO			MW Interchange	
Regi	Co.	Region	Co.		2014 S	2005 S
MAIN	ALTE	MRO	DPC		-5	-5
MAIN	ALTE	MRO	NSP		66	61
MAIN	ALTW	MRO	DPC		-6	-6
MAIN	ALTW	MRO	GRE		-134	-98
MAIN	ALTW	MRO	MEC		-157	-119
MAIN	ALTW	MRO	MPW		0	0
MAIN	ALTW	MRO	XEL		-22	-20
MAIN	ALTW	MRO	SMP		-8	-5
MAIN	ALTW	MRO	WAPA		-96	-84
MAIN	AMRN	MRO	MEC		1	0
MAIN	NI	MRO	GRE		50	0
MAIN	NI	MRO	MEC	MEC's Share of Quad Cities	434	428
MAIN	NI	MRO	MEC		300	350
MAIN	NI	MRO	XEL		0	0
MAIN	NI	MRO	MEC		0	0
MAIN	IP	MRO	XEK		0	100
MAIN	IP	MRO	MEC		0	100
MAIN	MGE	MRO	DPC		-30	-30
MAIN	WE	MRO	MP		-62	-62
MAIN	WE	MRO	XEL		-42	-42
MAIN	WPS	MRO	MH		-108	-108
MAIN	WPS	MRO	MP		0	-76
MAIN	WPS	MRO	XEL		0	0
	MAIN to MRO Net				**181**	**384**
MAIN	AMRN	SPP	SPA		0	0
MAIN	CWL	SPP	KACY		-20	-20
MAIN	CWL	SPP	SPA		-79	-79
	MAIN to SPP Net				**-99**	**-99**
MRO	MEC	SPP	KCPL		71	50
MRO	NPPD	SPP	MPS		175	175
MRO	WAPA	SPP	SECI		4	4
	MRO TO SPP Net				**250**	**229**