

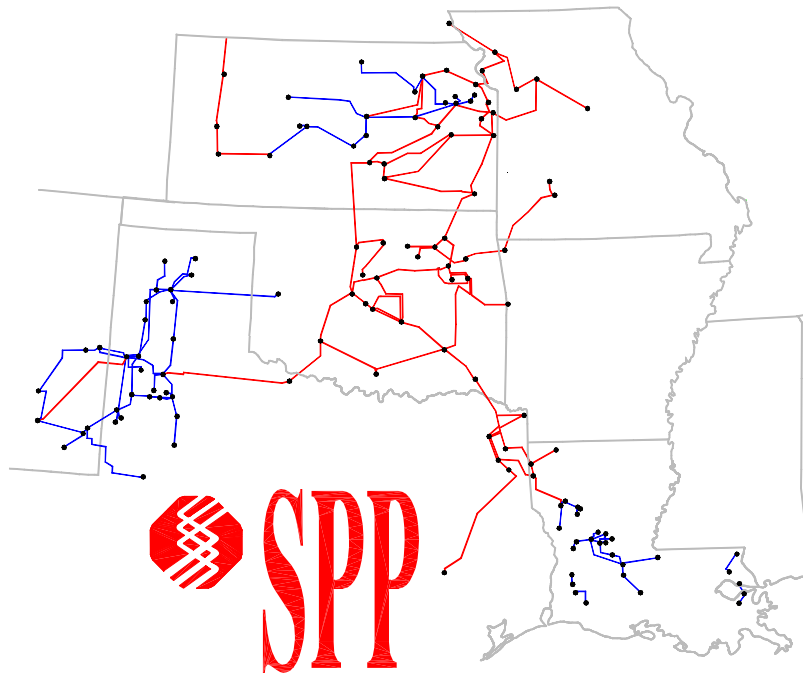
Southwest Power Pool

Intra-Regional Appraisal and Study Observation

2003 Summer Peak

Transmission Assessment

April 2003





SOUTHWEST POWER POOL
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2003 Summer Peak Transmission Assessment

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Overview

In accordance with the MAIN-MAPP-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, MAPP and SPP, and their respective subregions for the modeled 2003 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-MAPP-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 Planning 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 four 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 2003 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 2003 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.

Sub-Regional Appraisal and Study Observations 2003 Summer Peak Transmission Assessment

I. General Observations

The MAIN TASG case was developed from the 2003 Summer Peak model of the SPP 2003 Basecase series of load flow cases along with models from MAIN, MAPP and SERC. The sub-regions of MAIN, MAPP 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
- Central Louisiana Electric Company
- 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

Duke Energy McClain

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 (MAPP)

The member systems in the area are :

Mid-American Energy Company
Muscatine Power and Water Company

Minnesota (MAPP)

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 Subregions

Transfer Direction	2003 Summer		2002 Summer		2003 Summer Limiting Element (2003 Summer Outaged Element)	Owner
	FCITC	Notes	FCITC	Notes		
AMRN-SPP-N	1500*		1500*		No limit found (Each Valid Contingency Tested)	
IOWA-SPP-N	1200*		1200*		No limit found (Each Valid Contingency Tested)	
MINN-SPP-N	900	4,44	750	4I,6I	Lime Creek-Emery 161 kV (Hazelton-Adams 345 kV)	ALTW (ALTW-NSP)
SMAIN-SPP-N	1500*		1500*		Muskogee-Clarksville 345 kV (Riverside Sta.-Muskogee 345 kV)	OKGE-AEPW (OKGE-AEPW)
AMRN-SPP-S	1100		1200		Fort Smith 500/161 kV Tr (Fort Smith 345/161 kV Tr)	OKGE (OKGE)
SPP-N-SPP-S	1200*		1200*	7I	No limit found (Each Valid Contingency Tested)	
SPP-S-SPP-N	1100		1500*		Muskogee-Clarksville 345 kV (Riverside Station-Muskogee 345 kV)	OKGE-AEPW (OKGE-AEPW)

- (*) Denotes transfer level studied.
- (I) Indicates the implementation of a nonemergency guide.
- (i) Indicates the implementation of an emergency guide.
- (4) Arpin Area Operating Guide
- (6) Council Creek Operating Guide
- (7) Hoyt Stranger Operating Guide
- (44) Taconite Harbor Emergency Operating Guide

SPP-North Imports

SPP-N import FCITC from AMRN is 1500 MW. No limiting element was identified up to this transfer level. This is the same level reported in the 2002 summer study with no limitation found. With IPP participation in the AMRN export transfer points, SPP-N import FCITC from AMRN is 1500 MW limited by the Muskogee-Clarksville 345 kV line (OKGE-AEPW) for the outage of Riverside Station-Muskogee 345 kV line (OKGE-AEPW).

SPP-N import FCITC from IOWA is 1200 MW. No limiting element was identified up to this transfer level. This is the same FCITC reported for the 2002 summer study with no limiting element identified up to the transfer level.

SPP-N import FCITC from MINN is 900 MW limited by the Lime Creek-Emery 161 kV line (ALTW) for the outage of Hazelton-Adams 345 kV line (ALTW-NSP) with the availability of one of the Arpin Area Operating Guides and the Taconite Harbor Emergency Operating Guide. Without the availability of these guides, the FCITC would be 200 MW as limited by the Arpin 345/138 kV transformer (ATCLLC) for the outage of the Arpin-Rocky Run 345 kV line (ATCLLC). The import FCITC of 900 MW is an increase from the 750 MW FCITC reported in the 2002 summer study limited by the Lake Field-Triboji 161 kV line (ALTW).

SPP-N import FCITC from SMAIN is 1500 MW limited by the Muskogee-Clarksville 345 kV line (OKGE-AEPW) for the outage of Riverside Station-Muskogee 345 kV line (OKGE-AEPW). No limitation was found up to the test level in the 2002 summer study. With IPP participation in the SMAIN export transfer points, SPP-N import FCITC from SMAIN decreased by 100 MW with the same limitation and outage.

SPP-N import FCITC from SPP-S is 1100 MW limited by the Muskogee-Clarksville 345 kV line (OKGE-AEPW) for the outage of Riverside Station-Muskogee 345 kV line (OKGE-AEPW). The import FCITC of 1100 MW is a decrease from the 1500 MW FCITC reported in the 2002 summer study limited by the

Coffeyville Tap-Dearing 138 kV (AEPW-WERE) for the outage of Delaware-Neosho 345 kV line (AEPW-WERE).

SPP-South Imports

SPP-S import FCITC from AMRN is 1100 MW limited by the Fort Smith 500/161 kV transformer (OKGE) for the outage of Fort Smith 345/161 kV transformer (OKGE). This level is a decrease from the 1200 MW FCITC reported in the 2002 summer study limited by the Danville-N.Magazine 161 kV line (ESI-AEPW) for the outage of Fort Smith-ANO 500 kV line (OKGE-ESI). The import FCITC from AMRN was further reduced to 1000 MW with IPP participation in the AMRN export transfer points.

SPP-S import FCITC from SPP-N is 1200 MW. No limiting element was identified up to this transfer level. This is the same FCITC reported for the 2002 summer study with no limiting element identified up to the transfer level with the availability of the Hoyt Stranger Operating Guide.

**Southwest Power Pool
Regional Appraisal and Study Observations
2003 Summer Peak Transmission Assessment**

I. General Observations

Southwest Power Pool Region is studied with imports and exports from MAIN and MAPP regions. The MAIN, MAPP and SPP loads are approximately 0.4%, 4.5% and 0.4% higher, respectively, than those modeled for the 2002 summer peak period.

The LaCygne to Stilwell 345 kV line is a critical outlet for large base-load generating units owned by Westar Energy and KCP&L. It is also heavily impacted by merchant activity in the SPP region, as well as in the Southeastern Electric Reliability Council (SERC) and the Mid-Continent Area Power Pool (MAPP) regions. The transmission line has been a constraint in the region in recent time. This circuit will be upgraded with a capacity increased from 1,251 MVA to 1,972 MVA. Kansas City Power & Light Company (KCP&L) will be responsible for constructing the upgrade with a target completion date of July 1, 2003.

The 30 mile transmission line, located south-southwest of Kansas City, will be re-conducted using new technology that allows the use of existing structures and for the work to be done while the line is "hot" (i.e. energized) resulting in minimal disruption to the transmission market. The funding for this project results from the agreement approved by the FERC among the SPP Transmission Owners.

II. Regional First Contingency Incremental Transfer Capability (FCITC)

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	2003 Summer		2002 Summer		2003 Summer Limiting Element (2003 Summer Outaged Element)	Owner
	FCITC	Notes	FCITC	Notes		
MAPP-MAIN	1600	4, 44	2000*	4, 44, 23	Eau Claire-Arpin 345 kV Limit (None)	NSP-ATCLLC
SPP-MAIN	2000	4	2100	4	Elk City 230/138 kV Tr. (Oklaunion-Lawton 345 kV Oklaunion DC Tie)	AEPW (AEPW AEPW-ERCOT)
MAIN-MAPP	1000		1050		Poweshiek-Reasnor 161 kV (Bondurant-Montezuma 345 kV)	ALTW (MEC)
SPP-MAPP	1100		800	8	St. Joe-Midway 161 kV (Maryville-Nodaway 161 kV)	MPS (AECI)
MAIN-SPP	1100		1200		Fort Smith 500/161 kV Tr (Fort Smith 345/161 kV Tr)	OKGE (OKGE)
MAPP-SPP	1950	4, 44	2000	4, 23, 44	Fort Smith 500/161 kV Tr (Fort Smith 345/161 kV Tr)	OKGE (OKGE)
TVA-SPP	750		800		Fort Smith 500/161 kV Tr (Fort Smith 345/161 kV Tr)	OKGE (OKGE)

- (*) Denotes transfer level studied.
- (I) Indicates the implementation of a nonemergency guide.
- (i) Indicates the implementation of an emergency guide.
- (4) Arpin Area Operating Guides
- (8) Granville Operating Guide
- (23) Boswell Emergency Operating Guide
- (44) Taconite Harbor-Emergency Operating Guide

SPP-Imports

The 2003 summer import FCITC from MAIN is 1100 MW limited by the Fort Smith 500/161 kV transformer (OKGE) for the outage of Fort Smith 345/161 kV transformer (OKGE). This level is a decrease from the 1200 MW FCITC reported in the 2002 summer study limited by the Danville-N.Magazine 161 kV line (ESI-AEPW) for the outage of Fort Smith-ANO 500 kV line (OKGE-ESI).

The 2003 summer import FCITC from MAPP is 1950 MW limited by the Fort Smith 500/161 kV transformer (OKGE) for the outage of Fort Smith 345/161 kV transformer (OKGE) with one of the Arpin Area Operating Guides and the Taconite Harbor Emergency Operating Guide available. Without the availability of these guides, the MAPP to SPP FCITC would be 350 MW as limited by the Arpin 345/138 kV transformer (ATCLLC) for the outage of the Arpin-Rocky Run 345 kV line (ATCLLC). In the 2002 summer study, the import FCITC was 2000 MW limited by the Mingo 345/320 kV transformer (SECI) for the outage of Mingo-Setab 345 kV line (SECI).

The 2003 summer import FCITC from TVA is 750 MW limited by the Fort Smith 500/161 kV transformer (OKGE) for the outage of Fort Smith 345/161 kV transformer (OKGE). This level is a decrease from the 800 MW FCITC reported in the 2002 summer study limited by Danville-N.Magazine 161 kV line (ESI-AEPW) for the outage of Fort Smith-ANO 500 kV line (OKGE-ESI).

SPP IMPORTS

FROM	TRANSFER CONDITION	CAPABILITY MW	(NOTE)	LIMITING ELEMENT	FLOW	RATING	PTDF/ OTDF	FACILITY OUTAGE(S)
-----	-----	-----	-----	-----	-----	-----	-----	-----
MAIN	IITC	2500*		No Limit Found				None
	FCITC	1100	<=	Fort Smith 500/161 kV Tr.	435	473E	.034	Fort Smith 345/161 kV Tr.
		1800		ANO-Russellville North 161 kV	341	396E	.031	Fort Smith-ANO 500 kV
		1850		Danville-Magazine 161 kV	98	155E	.030	Fort Smith-ANO 500 kV
		2300		Franks 345/161 kV Tr.	321	391E	.030	Franks-Huben 345 kV Huben-Morgan 345 kV
	2500*		No Additional Limit Found				Each Valid Contingency Tested	
MAINx	IITC	2500*		No Limit Found				None
	FCITC	1100	<=	Fort Smith 500/161 kV Tr.	435	473E	.034	Fort Smith 345/161 kV Tr.
		1750		ANO-Russellville North 161 kV	341	396E	.031	Fort Smith-ANO 500 kV
		1850		Danville-Magazine 161 kV	98	155E	.031	Fort Smith-ANO 500 kV
		2150		Franks 345/161 kV Tr.	322	391E	.032	Franks-Huben 345 kV Huben-Morgan 345 kV
	2500*		No Additional Limit Found				Each Valid Contingency Tested	
MAPP	IITC	2000*		No Limit Found				None
	FCITC	350		(4A) Arpin 345/138 kV Tr.	317	336E	.055	Arpin-Rocky Run 345 kV
		1450	<(44a,R)	Silver Bay Bus Tie 115 kV	33	107E	.051	Taconite Harbor-Hoyt Lake 138 kV
		1500	(44a,R)	Silver Bay - Waldo 115 kV	31	107E	.051	Taconite Harbor-Hoyt Lake 138 kV
		1700	(44a,R)	Waldo-Two Harbor 115 kV	21	107E	.051	Taconite Harbor-Hoyt Lake 138 kV
		1950	<-	Fort Smith 500/161 kV Tr.	372	473E	.052	Fort Smith 500/345 kV Tr.
		2000*		No Additional Limit Found				Each Valid Contingency Tested

FROM	TRANSFER CAPABILITY		LIMITING ELEMENT	PTDF/			FACILITY OUTAGE(S)	
	CONDITION	MW (NOTE)		FLOW	RATING	OTDF		
SERCW	IITC	2500*	No Limit Found				None	
	FCITC	0	(47A,R)	Little Gypsy-Fairview 230 kV	483	438E	.035	French Settlement-Sorrento 230 kV
		300	< (53a)	Wilbert-Livonia 138 kV	276	289E	.041	Webre-Richard 500 kV
		850	<-(47I,R)	Little Gypsy-Fairview 230 kV	412	438E	.030	French Settlement-Sorrento 230 kV Open Fairview Reactor
		900		Fort Smith 500/161 kV Tr.	435	473E	.043	Fort Smith 345/161 kV Tr.
		1100	(53a)	Terrebonne-Greenwood 115 kV	191	227E	.034	Webre-Richard 500 kV
		1300		ANO-Russellville North 161 kV	341	396E	.043	Fort Smith-ANO 500 kV
		1450		Danville-Magazine 161 kV	98	155E	.039	Fort Smith-ANO 500 kV
		1700	(53i,R)	Little Gypsy-Fairview 230 kV	359	438E	.045	Webre-Richard 500 kV Krotz Springs-Champagne 138 kV Ramos-Gibson 138 kV
		2000		Russellville East-South 161 kV	258	396E	.067	Fort Smith-ANO 500 kV
		2200		Muskogee-Clarksville 345 kV	823	896E	.034	Riverside Station-Muskogee 345 kV
		TVA	IITC	2500*	No Limit Found			
FCITC	750		<= (R)	Fort Smith 500/161 kV Tr.	435	473E	.050	Fort Smith 345/161 kV Tr.
	1100			ANO-Russellville North 161 kV	341	396E	.050	Fort Smith-ANO 500 kV
	1300			Danville-Magazine 161 kV	98	155E	.044	Fort Smith-ANO 500 kV
	1800			Russellville East-South 161 kV	258	396E	.077	Fort Smith-ANO 500 kV
	1900			Muskogee-Clarksville 345 kV	823	896E	.038	Riverside Station-Muskogee 345 kV
	2100			Franks 345/161 kV Tr.	322	391E	.032	Franks-Huben 345 kV Huben-Morgan 345 kV
	2100			Fort Smith 345/161 kV Tr.	411	489E	.036	Fort Smith 500/161 kV Tr.
2500*		No Additional Limit Found				Each Valid Contingency Tested		

TVAx	IITC	2500*	No Limit Found				None
	FCITC	750	<= (R) Fort Smith 500/161 kV Tr.	435	473E	.051	Fort Smith 345/161 kV Tr.
		1100	ANO-Russellville North 161 kV	341	396E	.050	Fort Smith-ANO 500 kV
		1300	Danville-Magazine 161 kV	98	155E	.044	Fort Smith-ANO 500 kV
		1800	Russellville East-South 161 kV	258	396E	.079	Fort Smith-ANO 500 kV
		1800	New Albany-NW New Albany 161kV	82	140E	.031	Benton-Cordova 500 kV
		1900	Muskogee-Clarksville 345 kV	823	896E	.039	Riverside Station-Muskogee 345 kV
		2100	Franks 345/161 kV Tr.	322	391E	.033	Franks-Huben 345 kV Huben-Morgan 345 kV
		2100	Fort Smith 345/161 kV Tr.	411	489E	.037	Fort Smith 500/161 kV Tr.
		2500	Fort Smith 500/345 kV Tr.	350	718E	.150	Fort Smith 500/161 kV
		2500*	No Additional Limit Found				Each Valid Contingency Tested

SPP NORTH (SPP-N) IMPORTS

FROM	TRANSFER CONDITION	CAPABILITY MW	(NOTE)	LIMITING ELEMENT	FLOW	RATING	PTDF/ OTDF	FACILITY OUTAGE(S)
AMRN	IITC	1500*		No Limit Found				None
	FCITC	1500*	<=	No Limit Found				Each Valid Contingency Tested
AMRNx	IITC	1500*		No Limit Found				None
	FCITC	1500	<=	Muskogee-Clarksville	823	896E	.050	Riverside Station-Muskogee 345 kV
		1500		Overton 345/161 kV Tr.	244	293E	.033	Overton-Sibley 345 kV
		1500*		No Additional Limit Found				Each Valid Contingency Tested
IOWA	IITC	1200*		No Limit Found				None
	FCITC	1200*	<=	No Limit Found				Each Valid Contingency Tested
MINN	IITC	1500*		No Limit Found				None
	FCITC	200		(4A) Arpin 345/138 kV Tr	317	336E	.090	Arpin-Rocky Run 345 kV
		600	<(44a,R)	Silver Bay Bus Tie 115 kV	33	107E	.126	Taconite Harbor-Hoyt Lake 138 kV
		900	<-(R)	Lime Creek-Emery 161 kV	131	198E	.076	Hazelton-Adams 345 kV
		950		Lime Creek-Emery 161 kV	160	198E	.042	Webster-Lehigh 345 kV Webster 345/161 kV Tr.
		1000	(4I,R)	Lime Creek-Emery 161 kV	143	198E	.053	Eau Claire-Arpin 345 kV Wien-Stratford 115 kV Council Creek ALTE-DPC 69 kV Mauston-Hilltop 69 kV Lublin-Lakehead 69 kV
SMAN	IITC	1500*		No Limit Found				None
	FCITC	1500	<=	Muskogee-Clarksville 345 kV	823	896E	.050	Riverside Station-Muskogee 345 kV
		1500		Poweshiek-Reasnor 161 kV	148	195E	.031	Bondurant-Montezuma 345 kV
		1500*		No Additional Limit Found				Each Valid Contingency Tested

SMAINx	IITC	1500*	No Limit Found				None
	FCITC	1400 <=	Muskogee-Clarksville 345 kV	823	896E	.052	Riverside Station-Muskogee 345 kV
		1400 (16A)	Thomas Hill-Salisbury 161 kV	289	334E	.032	Thomas Hill-Moberly Tap 161 kV Moberly Tap-Hinton 161 kV
		1500	Poweshiek-Reasnor 161 kV	148	195E	.032	Bondurant-Montezuma 345 kV
		1500	Overton 345/161 kV	244	293E	.034	Overton-Sibley 345 kV
		1500*	No Additional Limit Found				Each Valid Contingency Tested
SPP-S	IITC	1500*	No Limit Found				None
	FCITC	1100 <=	Muskogee-Clarksville 345 kV	823	896E	.069	Riverside Station-Muskogee 345 kV
		1500*	No Additional Limit Found				Each Valid Contingency Tested

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 1100 <= (R)	Fort Smith 500/161 kV	435	473E .036	Fort Smith 345/161 kV
	1500*	No Additional Limit Found			Each Valid Contingency Tested
AMRNx	IITC 1500*	No Limit Found			None
	FCITC 1000 <= (R)	Fort Smith 500/161 kV	435	473E .037	Fort Smith 345/161 kV
	1500*	No Additional Limit Found			Each Valid Contingency Tested
SPP-N	IITC 1200*	No Limit Found			None
	1200* <=	No Additional Limit Found			Each Valid Contingency Tested

MAIN IMPORTS

FROM	TRANSFER CAPABILITY		LIMITING ELEMENT	FLOW	RATING	PTDF/ OTDF	FACILITY OUTAGE(S)
	CONDITION	MW (NOTE)					
MAPP	IITC	1600	Eau Claire-Arpin 345 kV Limit	460	725N	.165	None
		2000*	No Additional Limit Found				None
	FCITC	200	(4A) Arpin 345/138 kV Tr.	317	336E	.088	Arpin-Rocky Run 345 kV
		1450	<(44a,R) Silver Bay Bus Tie 115 kV	33	107E	.051	Taconite Harbor-Hoyt Lake 138 kV
		1600	<- Eau Claire-Arpin 345 kV Limit	460	725N	.165	None
		1750	(4A) T Corners-Wien 115 kV	125	240E	.066	Eau Claire-Arpin 345 kV
		2000*	No Additional Limit Found				Each Valid Contingency Tested
SPP	IITC	2500*	No Limit Found				None
	FCITC	600	(4A) Arpin 345/138 kV Tr.	317	336E	.032	Arpin-Rocky Run 345 kV
		2000	<= (R) Elk City 230/138 kV Tr.	171	261E	.045	Oklaunion-Lawton 345 kV Oklaunion DC Tie
		2500*	No Additional Limit Found				Each Valid Contingency Tested

MAPP Imports

FROM	TRANSFER CONDITION	CAPABILITY MW	(NOTE)	LIMITING ELEMENT	FLOW	RATING	PTDF/ OTDF	FACILITY OUTAGE(S)
MAIN	IITC	2000*		No Limit Found				None
	FCITC	1000	<= (R)	Poweshiek-Reasnor 161 kV	148	195E	.047	Bondurant-Montezuma 345 kV
		1100		Vinton-Dysart 161 kV	227	276E	.045	Hazleton-Arnold 345 kV
		1200	(R)	Salem 345/161 kV Tr.	291	330E	.034	Sub 91-Quad Cities 345 kV Sub 91 345/161 kV Tr. Davenport-Sub 91 345 kV
SPP	IITC	2000*		No Limit Found				None
	FCITC	1100	<= (R)	St. Joe-Midway 161 kV	140	182E	.037	Fairport-Nodaway 161 kV
		1250		Vinton-Dysart 161 kV	227	276E	.040	Hazleton-Arnold 345 kV
		1350		Dysart-Washburn 161 kV	213	276E	.047	Hazleton-Arnold 345 kV

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 Guide
- (6) Council Creek Operating Guide
- (7) Hoyt-Stranger Operating Guide
- (8) Granville Operating Guide
- (16) Thomas Hill Operating Guide
- (23) Boswell Emergency Operating Guide
- (44) Taconite-Harbor Emergency Operating Guide
- (47) Little Gypsy-Madisonville Operating Guide
- (53) Wilbert-Livonia Emergency Operating Guide

DESCRIPTION OF OPERATING GUIDES/PROCEDURES

Arpin Area Operating Guide (ATC11c) (rev March 2001)

The completion of the Baldwin-Marathon City project (Pine Lake-Cassel 115 kV rebuild) by June 1, 2001 will require modification of the existing Arpin Operating Guide. Modification of the guide is required to fully realize the benefits of the upgraded NSP-ATCLLC interconnection at the T-Corners 115 kV substation. It is anticipated that maintaining the T-Corners interconnection during an outage of the 345 kV line will improve the post-contingency phase angle separation across the 345 kV system. The Arpin Operating guide, which removes limitations on lower voltage facilities during an outage of King-Eau Claire-Arpin 345 kV or Arpin-Rocky Run 345 kV line, is currently under inter-regional review by those transmission entities affected by the guide.

Although not in its final form, the Arpin operating guide included within this study includes two portions to remove limits on lower voltage 115 kV facilities which parallel the King-Eau Claire-Arpin-Rocky Run 345 kV line.

- Part I: For an outage of the King-Eau Claire-Arpin or the Eau Claire-Arpin 345 kV line, this study maintained the interconnection at T Corners (the T Corners-Wien 115 kV line) and simulated the automatic opening of the Arpin-Hume 115 kV line to remove overloads on the 115 kV system between Wien and Arpin.
- Part II: For an outage of the Arpin-Rocky Run 345 kV line, this study maintained the T Corners interconnection, simulated the automatic opening of the Port Edwards-Sand Lake and Port Edwards- Saratoga 138 kV lines to remove overloads on the 138 kV system between Arpin and Port Edwards, and simulated the opening of the Arpin-Hume 115 kV line to remove overloads on the 115 kV system between Arpin and Wien.

Arpin Area Operating Guide (ALTE & WPS) (Guide as used in past studies)

The Arpin area operating guide consists of opening substation breakers to prevent transmission lines from overloading during specific transmission line outages or overload conditions. The Arpin area operating guide is described as three separate parts. All parts of the Arpin area operating guide are required for this seasonal transmission assessment study.

- Part I: The first part of the Arpin area operating guide consists of opening a 115 kV breaker at the T Corners substation to prevent the Wissota - T Corners - Wien 115 kV line from overloading. The Wissota - T Corners - Wien 115 kV line is most susceptible to overloading for the outage of any portion of the King - Eau Claire - Arpin 345 kV line. The T Corners 115 kV breaker will operate automatically for an

overload of the T Corners - Wien 115 kV when the flow is from T Corners to Wien.

Part II: The second part of the Arpin area operating guide consists of opening 138 kV breakers at the Port Edwards substation on the Port Edwards - Wautoma and Port Edwards - Saratoga 138 kV lines to prevent the Arpin - Sigel 138 kV line from overloading. This portion of the guide also requires the operation of a 46 kV breaker at the West Wisconsin Rapids substation to open the West Wisconsin Rapids - Water Quality 46 kV line. The Arpin - Sigel 138 kV line is most susceptible to overloading for the Arpin - Rocky Run 345 kV line outage. These breakers will open automatically for an overload of the Arpin - Sigel 138 kV line.

Part III: The third part of the Arpin area operating guide consists of opening a 115 kV breaker at the Sherman Street substation on the Sherman Street - Cassel 115 kV line to prevent an overload of the Wien - Cassel 115 kV line. The Wien - Cassel 115 kV line is most susceptible to overloads for the outage of the Arpin - Rocky Run 345 kV line. The 115 kV breaker at Sherman Street will open automatically for an overload of the Wien - Cassel 115 kV line.

Council Creek Operation Guide (ALTE)

The Council Creek operating guide consists of the opening of a bus tie breaker at the Council Creek substation to relieve overloads on the 69 kV system which connects the Council Creek 138 kV substation with the Monroe County 161 kV and Hillsboro 161 kV substations. Operation of the breaker at Council Creek separates the ALTE system from the DPC system while maintaining the integrity of the DPC 69 kV system between the Monroe County and Hillsboro 161 kV substations. The 69 kV system is most susceptible to overloading for an outage of any portion of the King - Eau Claire - Arpin 345 kV line. The breaker at the Council Creek substation will open automatically for overload conditions.

Hoyt-Stranger Operating Guide (WR)

The outage of the Hoyt-Stranger 345 kV line can cause unacceptable overloads in the Hoyt 115 kV substation area. When this outage occurs, and overloads are noted in the Hoyt 115 kV substation area, generation at Jeffrey will be reduced until all overloads in the Hoyt area are within acceptable limits.

Granville Operating Guide (WE)

The Granville operating guide consists of closing the Granville 345 kV bus section breaker 1-2 and the Granville - Arcadian 345 kV line following the outage of 345 kV bus section #1 to clear a transformer #1 failure. It also consists of closing the Granville 345 kV bus section breaker 2-3 and the Granville - Edgewater 345 kV line following the outage of 345 kV bus section #3 to clear transformer #3 failure. This procedure is performed by supervisory control.

Boswell Emergency Operating Guide (MP)

MAPP systems do not implement operating procedures for the purpose of increasing nonemergency transfers. However, if a situation exists where a utility requires emergency import, the MAPP 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.

If one of the three Boswell 230 kV transmission outlets trip, or becomes out of service, Boswell generation at Units #3 and #4 will be reduced to be within the guidelines for operation on two outlets. The Boswell Operating Guide consists of reducing generation at Boswell until the Boswell 230 kV transmission outlets are loaded at or below their respective emergency rating.

All Boswell generation limits are based on either Summer or Winter emergency thermal MVA ratings. The actual Boswell generation limit depends upon Manitoba Hydro to U.S. transfer level, International Falls phase shifter flow, Boswell 115 kV generation and line conductor temperature. Since the Manitoba - Minnesota 500 kV transmission upgrade, Boswell generation is not limited transiently. Boswell generation can exceed these limits up to a level at which a thermal line limit is reached.

Taconite Harbor Emergency Operating Guide (MP)

MAPP systems do not implement operating procedures for the purpose of increasing nonemergency transfers. However, if a situation exists where a utility requires emergency import, the MAPP 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. Minnesota Power has an automatic tripping scheme that would open the Taconite Harbor 138/115 kV transformer, for overloads on any of the series elements between Laskin and Colby 115 kV substations. This is done based on about 90% of the emergency rating of the above circuits. Load shedding is also available at the Hoyt Lake Plant as well as generation adjustment.

Thomas Hill Operating Guide (AECI)

The Thomas Hill operating guide calls for reducing generation at Thomas Hill 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.

Wilbert-Livonia Operating Guide (ESI)

The outage of the Webre-Richard 500 kV line can result in limits to transfer by the Wilbert-Livonia-Krotz Springs-Champagne or Terrebonne-Greenwood 138 kV lines. These limits to transfers can be eliminated by opening the Champagne-Krotz Springs and Ramos-Gibson 138 kV lines.

Little Gypsy-Madisonville Operating Guide (ESI)

The Little Gypsy-Fairview-Madisonville 230 kV line will typically limit ESI and SERCW exports for facility outages in the immediate area. This limit to transfers can be eliminated by opening a series reactor bypass switch at Fairview, which is adjacent to Madisonville.

Basecase Schedules for 2003 Summer Peak

FROM		TO		MW Interchange		
Region	Co.	Region	Co.	2003 S	2002 S	
MATN	ATTF	MAPP	DP	-5	-5	
MATN	ATTF	MAPP	NSP	61	0	
MATN	ATTF	MAPP	WAPA	-100	-100	
MATN	AT.TW	MAPP	DPC	-4	0	
MATN	AT.TW	MAPP	GRE	-58	0	
MATN	AT.TW	MAPP	MFC	-66	76	
MATN	AT.TW	MAPP	NSP	-4	0	
MATN	AT.TW	MAPP	SMP	16	40	
MATN	AT.TW	MAPP	WAPA	-33	-11	
MATN	ComEd	MAPP	DPC	0	50	
MATN	ComEd	MAPP	GRE	0	100	
MATN	ComEd	MAPP	MFC	MFC's Share of Quad Cities	428	384
MATN	ComEd	MAPP	MFC		215	136
MATN	ComEd	MAPP	NSP	0	202	
MATN	DELT	MAPP	MFC	150	0	
MATN	TP	MAPP	MFC	0	-15	
MATN	TP	MAPP	NSP	102	102	
MATN	MGE	MAPP	DPC	-30	-30	
MATN	WE	MAPP	MP	-62	-42	
MATN	WE	MAPP	NSP	-42	-62	
MATN	WPS	MAPP	MHRB	-100	-100	
MATN	WPS	MAPP	NSP	-76	-200	
MAIN to MAPP Net				392	525	
MATN	AMRN	SPP	SPA	For Jackson	-16	-16
MATN	CWL	SPP	KACY		-20	-20
MATN	CWL	SPP	SPA		-79	-79
MAIN to SPP Net				-115	-115	
MAPP	NPPD	SPP	MPS	90	80	
MAPP	NPPD	SPP	SECT	0	-4	
MAPP	WAPA	SPP	SECT	4	0	
MAPP TO SPP Net				94	76	