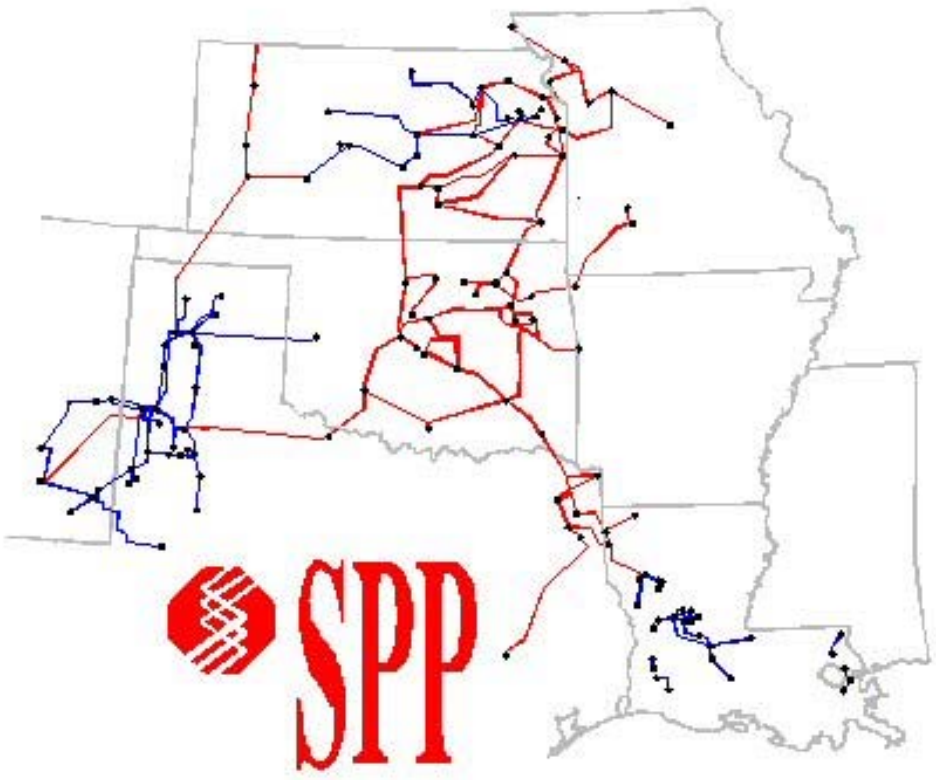
Southwest Power Pool

Intra-Regional Appraisal and Study Observation

2005 Summer Peak

Transmission Assessment

May 2005



SOUTHWEST POWER POOL
Intra-Regional Appraisal and Study Observation
2005 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 2005 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 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 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 2005 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 2005 summer peak period.

Additional study was performed to evaluate transfer capabilities with respect to voltage limits. This analysis is intended to serve as a screening study for areas of the system that may require further analysis.

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
2005 Summer Peak Transmission Assessment

I. General Observations

The MAIN TASG case was developed from the 2005 Summer Peak model of the SPP 2005 Update 1 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	2005 Summer		2004 Summer		2005 Summer (2005 Summer Outaged Element)	Owner
	FCITC	Notes	FCITC	Notes		
AMRN-SPP-N	1400		N/A		Moberly-Salisbury 161 kV (Salisbury-Thomas Hill 161 kV)	AMRN-KCPL (KCPL-AECI)
IOWA-SPP-N	1200*	16,72	1200*		No Limit Found (Each Valid Contingency Tested)	-
MINN-SPP-N	1200	4,23,44,72	1200	4,23,44	Presto T-Eau Claire 161 kV (Tremval-Alma 161 kV)	(XEL) (XEL-DPC)
SMAIN-SPP-N	1400	16	1100		Overton 345/161 kV Tr. (Overton-Sibley 345 kV)	AMRN (AMRN-MIPU)
AMRN-SPP-S	1000	68	N/A		Danville-Magazine 161 kV (Fort Smith-ANO 500 kV)	(AEPW-ESI) (OKGE-ESI)
SPP-S–SPP-N	1200*		1200		No Limit Found (Each Valid Contingency Tested)	-
SPP-N–SPP-S	1200*	68,71	1200*	71	No Limit Found (Each Valid Contingency Tested)	-

([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 Exhibit D-2:

(4) Arpin Area Operating Guides
(16) Thomas Hill Operating Guide
(23) Boswell Special Protection System
(44) Taconite Harbor Special Protection System
(68) Wells Operating Guide
(72) Woodbin-East Temporary Operating Guide
(71) TEC-Tecumseh Hill Operating Guide

SPP-North Imports

Due to the integration of IP into Ameren since the 2004 summer study, comparison of the 2005 summer results to 2004 summer results for SPP-S and SPP-N imports from AMRN would not be a valid comparison. See the Ameren appraisal, Section B-1, of the MAIN TASG 2005 Summer Report.

SPP N import FCITC from AMRN is 1400 MW 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 1200 MW. No limiting element was identified up to this transfer level with the availability of the Thomas Hill Operating Guide and Woodbin-East Temporary Operating Guide. This is the same FCITC reported for the 2004 summer study with no limiting element identified up to the transfer level.

SPP N import FCITC from MINN is 1200 MW limited by the Prestot-Eau Claire 161 kV line (XEL) for the outage of Tremval-Alma 161 kV line (XEL-DPC) with the availability of Arpin Area Operating Guides, Boswell Special Protection System, Taconite Harbor Special Protection System and Woodbin-East Temporary Operating Guide. This level is the same as reported in the 2004 summer study limited by the Sheffield-Hampton 161 kV line (MEC) for the outage of Emery-Floyd 161 kV line (ALTW-MEC).

SPP N import FCITC from SMAIN is 1400 MW limited by the Overton 345/161 kV transformer (AMRN) for the outage of Overton-Sibley 345 kV line (AMRN-MIPU) with the availability of Thomas Hill Operating Guide. This level is an increase from the 1100 MW FCITC limited by the Fort Smith 500/161 kV transformer (OKGE) for the outage of Fort Smith 500/345 kV transformer (OKGE). With IPP participation in the SMAIN export transfer points, SPP-N import FCITC from SMAIN decreased by 300 MW.

SPP-N import FCITC from SPP-S is 1200 MW. No limiting element was identified up to this transfer level. This is the same FCITC reported for the 2004 summer study limited by the Brookline-Morgan 161 kV (SPRM-AECI) for the outage of McCredie-Montgomery 345 kV (AMRN) and McCredie-Overton 345 kV (AMRN).

SPP-South Imports

SPP S import FCITC from AMRN is 1000 MW limited by the Danville-Magazine 161 kV line (ESI-AEPW) for the outage of Fort Smith-ANO 500 kV line (OKGE-ESI) with the availability of the Wells Operating Guide.

SPP-S import FCITC from SPP-N is 1200 MW with no limit identified up to the transfer level with the availability of TEC-Tecumseh Hill Operating Guide and the Wells Operating Guide. This is the same FCITC reported in 2004 summer with no limiting element identified.

Southwest Power Pool
Inter-Regional Appraisal and Study Observations
2005 Summer Peak Transmission Assessment

I. General Observations

Compared to the loads modeled in the 2004 summer study, the MAIN, MRO, and SPP loads are approximately 0.9%, 4.7%, and 1.2% higher, respectively, in this study. The 4.7% growth rate for MRO is due to incorrect load modeling in the 2004 summer study. The actual forecasted seasonal demand for the 2004 summer peak was 35,335 MW. The actual load growth for MRO between 2004 summer and 2005 summer is projected to be 1.9%.

The MRO import FCITC from MAIN and SPP are limited by a common facility, the Salem 345/161 kV transformer (ALTW). This transformer is sensitive to south to north and east to west transfers. Linear analysis showed MRO import FCITC to be in the range of 1100-1300 MW. The simultaneous transfer limits for MRO imports from MAIN and SPP are displayed in Section E.

The MAIN import FCITC from MRO is 500 MW lower in the 2005 summer than in the 2004 summer study. This is due in part, to an increase in the MRO export participation points from Minnesota, and an increase in the dispatch of the Wheaton and Elk Mound generators.

Regional imports into SPP from MAIN, SERCW and TVA as well as sub-regional imports into SPP-S from AMRN were limited by the Fort Smith 500/161 kV transformer as reported in the 2004 summer study. SPP imports have now improved significantly with the installation of the second Fort Smith 500/161 kV transformer. This system expansion was completed in December 2004 by OKGE.

CLECO and Entergy have planned for the installation of a 500/230 kV transformer at Wells by summer 2005. The transformer will provide an extra source into the Acadiana load pocket. Until the 230 kV system is expanded, a Wells Operating Guide will be required to limit loadings on the Wells 500/230 kV and Bonin 230/138 kV transformers for critical contingencies in the area. To address these limitations, an automatic scheme will energize a reactor in series with the Wells 500/230 kV transformer to limit flows on both the Wells and Bonin transformers. Impacts due to the operating guide are examined in the FCITC review.

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	2005 Summer			2004 Summer			2005 Summer Limiting Element (2005 Summer Outaged Element)	Owner
	FCITC	FCTTC[1]	Notes	FCITC	FCTTC[1]	Notes		
MRO-MAIN	1500	1100	23, 44, 4	2000*	1250*	4,44	Hazleton-Dundee 161 kV (King-Eau Claire 345 kV Arpin-Eau Claire 345 kV Wien-Stratford 115 kV Hilltop-Mauston 69 kV Lublin-Lakehead 69 kV)	ALTW (XEL) (ATCLLC-XEL) (ATCLLC) (ATCLLC-DPC) (DPC)
SPP-MAIN	2500*	2600*		2500*	2600*	4	No Limit Found (Each Valid Contingency Tested)	-
MAIN-MRO	1100	1500	67	200	950		Salem 345/161 kV Tr. (Beaver Channel-Albany 161 kV Albany 138/161 kV Tr Albany-York 161 kV Savanna-York 161 kV York 161/34.5 kV Tr Savanna 161/34.5 kV Tr)	ALTW (ALTW) (ALTW) (ALTW) (ALTW) (ALTW) (ALTW) (ALTW)
SPP-MRO	1300	1050		850	750		Salem 345/161 kV Tr. (Hazleton-Arnold 345 kV)	ALTW (ALTW-MEC)
MAIN-SPP	2500*	2400*	68	400	300		No Limit Found (Each Valid Contingency Tested)	-
MRO-SPP	2000*	2250*	4,10, 23,44 ,68	1400	1500	4,44	No Limit Found (Each Valid Contingency Tested)	-
TVA-SPP	750	750	68	300	300		Danville-Magazine 161 kV (Fort Smith-ANO 500 kV)	(ESI-AEPW) (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 Exhibit D-2:

(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

Regional imports into SPP from MAIN, SERCW and TVA as well as sub-regional imports into SPP-S from AMRN were limited by the Fort Smith 500/161 kV transformer as reported in the 2004 summer study. SPP imports have now improved significantly with the installation of the second Fort Smith 500/161 kV transformer. This system expansion was completed in December 2004 by OKGE.

The SPP import FCITC from MAIN is 2500 MW with the availability of the Wells Operating Guide. No limit was identified up to the test level. This level is an increase from the 400 MW FCITC reported in the 2004 summer study limited by the Fort Smith 500/161 kV transformer (OKGE) for the outage of Fort Smith 345/161 kV transformer (OKGE).

The SPP import FCITC from MRO is 2000 MW with the availability of the Arpin Area Operating Guide, Lake Road-Nashua Operating Guide, Boswell Special Protection System, Taconite Harbor Special Protection System, and the Wells Operating Guide. No limit was identified up to the test level. This level is an increase from the 1400 MW FCITC reported in the 2004 summer study limited by the Fort Smith 500/161 kV transformer (OKGE) for the outage of Fort Smith 345/161 kV transformer (OKGE).

The SPP import FCITC from TVA is 750 MW limited by the Danville-Magazine 161 kV line (ESI-AEPW) for the outage of Fort Smith-ANO 500 kV line (ESI-OKGE) with the availability of the Wells Operating Guide. This level is an increase from the 300 MW FCITC reported in the 2004 summer study limited by the Fort Smith 500/161 kV transformer (OKGE) for the outage of Fort Smith 345/161 kV transformer (OKGE).

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	(68A)	Wells 500/230 kV Tr.	680	560E	.050	Richard-Wells 500 kV
		2500*	<=	No Additional Limit Found				Each Valid Contingency Tested
MRO	IITC	2000*		No Limit Found				None
	FCITC	0	(68A)	Wells 500/230 kV Tr.	680	560E	.043	Richard-Wells 500 kV
		0	< (23a)	Boswell-Blackberry 230 kV ckt. 2	453	437E	.037	Boswell-Blackberry 230 kV ckt. 1
		200	(44a,R)	Silver Bay-Silver Bay 115 kV	95	107E	.055	Hoyt Lake-Laskin 138 kV
		800	(4A)	Sigel-LP Vesper 138 kV	196	226E	.037	Arpin-Rocky Run 345 kV
		1000	(4A)	Arpin 345/138 kV Tr.	335	380E	.045	Arpin-Rocky Run 345 kV
		1000	(4A)	Arpin-Sigel 138 kV	244	285E	.041	Arpin-Rocky Run 345 kV
		1350	(10A,R)	Lake Road-Nashua 161 kV	87	153E	.048	Stranger-Iatan 345 kV
		2000*	<-	No Additional Limit Found				Each Valid Contingency Tested
SERCW	IITC	2500*		No Limit Found				None
	FCITC	0	(68A)	Wells 500/230 kV Tr.	680	560E	.062	Richard-Wells 500 kV
		850	<=	Danville-Magazine 161 kV	117	148E	.038	Fort Smith-ANO 500 kV
		2100	(66)	Holden-Pittsville 161 kV	72	226E	.073	Clinton-Holden 161 kV
		2100		ANO-Russellville North 161 kV	306	396E	.042	Fort Smith-ANO 500 kV

FROM	TRANSFER CAPABILITY CONDITION	MW	(NOTE)	LIMITING ELEMENT	FLOW	RATING	PTDF/ OTDF	FACILITY OUTAGE(S)
TVA	IITC	2500*		No Limit Found				None
	FCITC	0	(68A)	Wells 500/230 kV Tr.	680	560E	.061	Richard-Wells 500 kV
		750	<=	Danville-Magazine 161 kV	117	148E	.043	Fort Smith-ANO 500 kV
		1900		ANO-Russellville North 161 kV	306	396E	.049	Fort Smith-ANO 500 kV
TVAx	IITC	2500*		No Limit Found				None
	FCITC	0	(68A)	Wells 500/230 kV Tr.	680	560E	.057	Richard-Wells 500 kV
		700	<=	Danville-Magazine 161 kV	117	148E	.045	Fort Smith-ANO 500 kV
		1800		ANO-Russellville North 161 kV	306	396E	.051	Fort Smith-ANO 500 kV

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	1400	<=	Moberly-Salisbury 161 kV	147	212E	.047	Salisbury-Thomas Hill 161 kV
		1400		Eldon-Osage 138 kV	92	163E	.049	McCredie-Overton 345 kV McCredie-Montgomery 345 kV
		1500*		No Additional Limit Found				Each Valid Contingency Tested
AMRNx	IITC	1500*		No Limit Found				None
	FCITC	350	(16A,R)	Thomas Hill-Salisbury 161 kV	323	334E	.032	Thomas Hill-Moberly 161 kV Moberly-Hinton 161 kV
		1000	<=	Overton 345/161 kV Tr.	251	291E	.039	Overton-Sibley 345 kV
		1500*		No Additional Limit Found				Each Valid Contingency Tested
IOWA	IITC	1200*		No Limit Found				None
	FCITC	350	(16A,R)	Thomas Hill-Salisbury 161 kV	323	334E	.031	Thomas Hill-Moberly 161 kV Moberly-Hinton 161 kV
		150	(72A,R)	Woodbin-East 161 kV	199	205E	.035	St. Joe-Cook 161 kV
		1200*	<=	No Additional Limits 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	1200		Silver Bay-Silver Bay 115 kV	57	97N	.033	None
		1300		Presto T-Eau Claire 161 kV	229	269N	.031	None
		1300		Silver Bay-Waldo 115 kV	54	97N	.033	None
	FCITC	0	< (23a)	Boswell-Blackberry 230 kV ckt. 2	453	437E	.066	Boswell-Blackberry 230 kV ckt. 1
		100	(44a,R)	Silver Bay Bus Tie 115 kV	95	107E	.097	Hoyt Lake-Laskin 138 kV
		150	(72A)	Woodbin-East 161 kV	199	205E	.034	St. Joe-Cook 161 kV
		400	(4A)	Sigel-LP Vesper 138 kV	196	226E	.073	Arpin-Rocky Run 345 kV
		500	(4A)	Arpin-Sigel 138 kV	244	285E	.079	Arpin-Rocky Run 345 kV
		500	(4A)	Arpin 345/138 kV Tr.	335	380E	.087	Arpin-Rocky Run 345 kV
		1200	<-	Presto T-Eau Claire 161 kV	258	297E	.032	Tremval-Alma 161 kV
		1200		Silver Bay-Silver Bay 115 kV	57	97N	.033	None
SMAIN	IITC	1500*		No Limit Found				None
	FCITC	1300	(16A)	Thomas Hill-Salisbury 161 kV	294	334E	.030	Moberly-Moberly Tap 161 kV
		1400	<=	Overton 345/161 kV Tr.	251	291E	.030	Overton-Sibley 345 kV
		1500	(R)	Moberly-Salisbury 161 kV	147	212E	.045	Salisbury-Thomas Hill 161 kV
		1500		Eldon-Osage 138 kV	92	163E	.048	McCredie-Overton 345 kV McCredie-Montgomery 345 kV
		1500*		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)
SMAINx	IITC	1500*		No Limit Found				None
	FCITC	350	(16A,R)	Thomas Hill-Salisbury 161 kV	323	334E	.032	Thomas Hill-Moberly 161 kV Moberly-Hinton 161 kV
		1100	<=	Overton 345/161 kV Tr.	251	291E	.037	Overton-Sibley 345 kV
		1500*		No Additional Limit Found				Each Valid Contingency Tested
SPP-S	IITC	1500*		No Limit Found				None
	FCITC	1500*	<=	No 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	(68A)	Wells 500/230 kV Tr.	680	560E	.064	Richard-Wells 500 kV
		1000	<=	Danville-Magazine 161 kV	117	148E	.031	Fort Smith-ANO 500 kV
		1300	(12)	Maries 138/161 kV Tr.	53	100E	.036	Bland-Franks 345 kV
		1500*		No Additional Limit Found				Each Valid Contingency Tested
AMRNx	IITC	1500*		No Limit Found				None
	FCITC	0	(68A)	Wells 500/230 kV Tr.	680	560E	.065	Richard-Wells 500 kV
		1000	<=	Danville-Magazine 161 kV	117	148E	.032	Fort Smith-ANO 500 kV
		1500*		No Additional Limit Found				Each Valid Contingency Tested
SPP-N	IITC	1200*		No Limit Found				None
	FCITC	0	(68A)	Wells 500/230 kV Tr.	680	560E	.048	Richard-Wells 500 kV
		300	(71A)	Tecumseh EC-Hook Junction 115 kV	150	159E	.031	Tecumseh EC-Tecumseh Hill 115 kV
		1200*	<=	No Additional Limit Found				Each Valid Contingency Tested

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

Southwest Power Pool
Voltage Study Appraisal
2005 Summer Peak Transmission Assessment

Introduction

This study was completed subsequent to completion of the 2005 MAIN Summer Transmission Assessment Study with the purpose of evaluating transfer capabilities with respect to voltage limits, and verifying the capability of the transmission system during NERC Category C and D events. MAIN has routinely performed transfer capability studies based on circuit thermal ratings. While this provides a good indication of thermal limitations of the system, it does not ensure that there are not more stringent voltage limitations. Historically, the MAIN region and surrounding regions have been primarily limited by thermal constraints. There have been specific interfaces limited by voltage or voltage stability. These specific interfaces have been analyzed by special studies focusing on only those areas. This study is intended to serve as a screening study for areas of the system that may require further analysis.

The base case used for this study was the same base case as used for the 2005 MAIN Summer Transmission Assessment Study in conducting the thermal transfer analyses, except that minor adjustments were made to facilitate the use of A/C solution techniques of PTI's MUST program. The objective of this voltage study was to determine if there were potential voltage limits that are more constraining than the thermal limits identified in the previous thermal study, and to evaluate the capability of the transmission system to survive NERC Category C and D events.

This study addresses sensitivity of the monitored voltages to the following variation:

a) NERC Category B events with imports into each region or subregion with critical generating units out of service.
b) NERC Category C and D events with transfers through and around the region or subregion.

Category B Screening

Base Case

A review of the 2005 summer TASG voltage analysis results considering single contingencies on the SPP transmission system showed that some transmission voltages were below the SPP criteria of 0.90 per unit. Several of the low voltages can be mitigated by turning on capacitors.

Voltages in several SPP buses in the Northwest Kansas area drop below 0.8 per unit under N-1 conditions. These low voltages are the result of contingencies around the Knoll area. WEPL is planning for the installation of an 8 Mvar STATCOM and 30 Mvars of capacitors in near future to mitigate the problem.

Transfer Case

As per additional TASG study method, SPP provided four directions to MAIN for performing the voltage limited import capability into SPP. Below is a summary of those results.

AMRN-SPP-S

The reported thermal FCITC from AMRN for summer 2005 is 1000 MW. The generating unit outaged in this scenario consists of the Dolet Hills unit that is generating at 660MW. The transfer level tested for this scenario was 1200 MW. The results of the analysis did not show any voltage levels below target values. The result shows that voltage constraints would not limit the reported thermal FCITC value.

MAIN-SPP

No thermal limitation was identified for SPP imports from MAIN for summer 2005. 2500 MW of transfers was simulated in the thermal analysis. The generating unit outaged in this scenario consists of the Wolf Creek Nuclear Plan, and the Northeastern Station Unit #1 that summed to approximately 1600 MW. The transfer level tested for this scenario was 2700 MW.

In this scenario, voltage at several SPP area buses in the Northwest Kansas area drop below the SPP criteria of 0.9 per unit. These low voltages are the result of contingencies around the Knoll area. These problems exist in the base scenario while transfers simulated slightly exacerbate the problem. WEPL is planning for the installation of an 8 Mvar STATCOM and 30 Mvars of capacitors in near future to mitigate the problem.

TVA-SPP

The reported thermal FCITC from TVA for summer 2005 is 750 MW. The generating unit outaged in this scenario consists of the Sooner unit that is generating at 500MW. The transfer level tested for this scenario was 850 MW. The results of the analysis did not show any voltage levels below target values. The result shows that voltage constraints would not limit the reported thermal FCITC value.

MAPP-SPP

No thermal limitation was identified for SPP imports from MAPP for summer 2005. 2000 MW of transfers was simulated in the thermal analysis. The generating unit outaged in this scenario consists of the Tolk Unit #1, and Seminole Unit #1 that summed to approximately 980 MW. The transfer level tested for this scenario was 2200 MW. The result shows that voltage constraints for Category B contingencies would not limit the reported thermal FCITC value.

Category C & D Screening

SPP through the Expansion Planning Process has already examined some category C & D contingencies for criteria violations. In this study, SPP has decided to identify category C & D contingencies that are sensitive to transfers across SPP. These contingencies consist of bus outages, double line outages originating from the same bus, and double tie line outages above 230 kV in SPP Area. Load shedding is an acceptable way of mitigating system problem for category C & D outages.

Contingencies that failed the screening criteria (110% loading or 0.90 per unit bus voltage) are shown on the table below. Only contingencies that cause 2 percentage points higher in loading or 2 percentage points lower voltage than the basecase are listed. The table below list only contingencies in the SPP region or are ties to the SPP region. Double line outages where an operating guide is available for at least one of the elements is not considered in the list.

Four sensitivity scenarios were selected to simulate transfers across SPP. Out of the 29 scenarios, these 4 scenarios best represents flows across SPP. Results of this study will be coordinated with SPP transmission owners and corrective actions will then be determined.

There were 2 unsolved contingencies in the basecase. For the loss of the Chaves 230 kV bus, local load shedding will occur in the Roswell, NM area. For double outages of Roosevelt-Tolk East 230 kV & Roosevelt-Tolk West 230 kV lines, local load shedding will occur in the Clovis, NM area.

Contingencies involving the loss of Knoll bus, or any other contingencies that includes the loss of Knoll-Summit 230 kV line will cause depressed voltage in west Kansas. WEPL is planning for the installation of an 8 Mvar STATCOM and 30 Mvars of capacitors in near future to mitigate the problem.

The outage of Tolk #1 represents the single largest hazard on the SPS system. In addition to the generation outage, the loss of the Tuco-Oklaunion 345 kV line will cause depressed voltage through the SPS system. A voltage stability study for SPS imports was conducted in 2004. Results of the study show that ATC for SPS imports in summer of 2005 to be 0 MW for the loss of the Tolk unit & Tuco-Oklaunion 345 kV line.

The following table is an overview of the results of these screenings against the 2005 Summer Base Case and four sensitivity cases. Only contingencies, without operating guides in the SPP region are listed.

Contingency	NERC Cat.	Base Case	ESI-AMRNW 2100 MW	MAIN-MAPP 1300 MW	MAPP-SERCW 2200 MW	TVA-SMAIN 2600 MW
Bus outage: 51111 DFSMTH6 230	C-1	OL			O	
Bus outage: 52073 CHAVES6 230	C-1	X				
D:Tolk #1 + TUCO 345-O.K.U3451*	C-3	X				
D:ROOSEVL6-TOLKE6 2 +ROOSEVL6-TOLKW6 1*	C-3	X				
D:BENTON 7-WOLFCRK71 +ROSEHIL7-WOLFCRK71*	C-3				O	
D:COLFAX 6-RODEMR 61 +ELEESV 6-RODEMR 61*	C-3		O			
D:HARRNG6 -NICHOL6 1 +HARRNG6 -NICHOL6 2*	C-3	O			O	
D:HOLCOMB7-SETAB 71 +HOLCOMB7-SPERVIL71*	C-3				L	
D:HOLCOMB7-SETAB 71 +MINGO 7-SETAB 71*	C-3				L	
D:HOLCOMB7-SPERVIL71 +FINNEY7 -HOLCOMB71*	C-3				L	
D:KNOLL 6-SUMMIT 61 +EMCPHER6-SUMMIT 61*	C-3	L			L	
D:KNOLL 6-SUMMIT 61 +MORRIS 6-SUMMIT 61*	C-3	L			L	
D:LAWHILL6-LEC U5 61 +LAWHILL6-SWISVAL61*	C-3	O	O		O	O
D:LYDIA 7-WELSH 71 +NWTXARK7-WELSH 71*	C-3	OL	OL	O		OL
D:NWTXARK7-WELSH 71 +LYDIA 7-NWTXARK71*	C-3	OL	OL			O
D:PITTSB-7-VALIANT71 +PITTSB-7-KIOWA 71*	C-3	O	O			
D:SOONER 7-SPRNGCK71 +WOODRNG7-SOONER 71*	C-3	O			O	
D:W.GRDNR7-LACYGNE71 +STILWEL7-LACYGNE71*	C-3				O	
D:CLARKSV7-MUSKOGE71 +R.S.S.-7-MUSKOGE71*	C-3	O	O	O		O
D:HAWTH 7-ST JOE 31 +HAWTH 7-SIBLEY 71*	C-3				O	
D:HAWTH 7-ST JOE 31 +IATAN 7-ST JOE 31*	C-3				O	
D:R.S.S.-7-MUSKOGE71 +PITTSB-7-MUSKOGE71*	C-3		O			O
D:R.S.S.-7-MUSKOGE71 +PITTSB-7-SEMINOL71*	C-3		O			
D:ST JOE 3-COOPER 31 +COOPER 3-7FAIRPT 1*	C-3				L	
D:SWISVAL7-STILWEL71 +HAWTH 7-ST JOE 31*	C-3				O	

Key:
L = Voltage below screening levels/planning parameter levels
D = Delta Voltage above screening levels/planning parameter levels
O = Loading above screening levels/planning parameter levels
X = The powerflow model failed to converge.

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
(71) TEC-Tecumseh Hill Operating Guide
(16) Thomas Hill Operating Guide
(68) Wells Operating Guide
(72) Woodbin-East Temporary 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.

TEC-Tecumseh Hill Operating Guide (71)

Transmission Owner: Westar

Transmission Operator: Westar

Control Area: WR

Reliability Coordinator: SPP

Post-Contingency Implementation
Operator Intervention

Guide Description:

Outage of the Tecumseh Energy Center-Tecumseh Hill 161 kV transmission line can cause overloads on the TEC-County Line and/or County Line-Tecumseh Hill 115 kV lines. When this occurs, decrease the total generation of TEC until the loading on the TEC to County Line and County Line to Tecumseh Hill 115 kV lines are within acceptable limits.

The approximate time required to implement this guide is 15 minutes. TEC units 7 and 8 can each reduce generation at a rate of 1.5 MW per minute.

The TEC-Hook Junction 115 kV line has a short-term emergency rating of 192 MVA.

An annual operating directives review is performed to assure 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.

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.

Basecase Schedules for 2005 Summer Peak

FROM		TO			MW Interchange	
Regi	Co.	Region	Co.		2005 S	2004 S
MAIN	ALTE	MRO	DPC		-5	-5
MAIN	ALTE	MRO	NSP		61	55
MAIN	ALTW	MRO	DPC		-6	-5
MAIN	ALTW	MRO	GRE		-98	-93
MAIN	ALTW	MRO	MEC		-119	-12
MAIN	ALTW	MRO	MPW		0	7
MAIN	ALTW	MRO	XEL		-20	-2
MAIN	ALTW	MRO	SMP		-5	-7
MAIN	ALTW	MRO	WAPA		-84	-70
MAIN	AMRN	MRO	MEC		0	50
MAIN	NI	MRO	GRE		0	50
MAIN	NI	MRO	MEC	MEC's Share of Quad Cities	428	428
MAIN	NI	MRO	MEC		350	432
MAIN	NI	MRO	XEL		0	150
MAIN	NI	MRO	MEC		0	50
MAIN	IP	MRO	XEK		100	102
MAIN	IP	MRO	MEC		100	0
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		-76	-76
MAIN	WPS	MRO	XEL		0	-50
	MAIN to MRO Net				**384**	**762**
MAIN	AMRN	SPP	SPA		0	-16
MAIN	CWL	SPP	KACY		-20	-20
MAIN	CWL	SPP	SPA		-79	-79
	MAIN to SPP Net				**-99**	**-115**
MRO	MEC	SPP	KCPL		50	0
MRO	NPPD	SPP	MPS		175	100
MRO	WAPA	SPP	SECI		4	4
	MRO TO SPP Net				**229**	**104**