



System Impact Study for Long-Term Firm Transmission Service

Midwest ISO Project:	A324
OASIS Reference #:	76452398
	76452399
	76456513
	76456515

INTERIM REPORT – Addendum No. 1

1/16/2007

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Disclaimers

The information contained in this report is in draft form. The information may be subject to revision, verification, and/or additional evaluation. Any person using the information contained in this draft report should understand that the information cannot be relied on as accurate until the study is completed and the report is finalized.

1 Summary

Firm, long term, network firm transmission service has been requested under the Midwest ISO's Open Access Transmission and Energy Markets Tariff.

This report is in draft form and differs from the deliverability results posted the day after this report initially was posted. The customer had requested an update so we posted what was known at the time.

Currently an updated report is being reviewed by the ad hoc group with results that more closely align with the deliverability results.

The changes to the results from the January 4th draft to the one being reviewed are because of the inclusion of planned network upgrades which correspond to a higher queued TSR. Those upgrades are not yet in service, therefore it was inappropriate to include these upgrades in the initial load flow tests.

The requests seek to reserve 603 MW, long term, firm network service from the generation in MP to load in NSP beginning October 1, 2011 and ending November 1, 2036, a description of the requests is in Table 1-1.

Point of Receipt	Point of Delivery	OASIS AREF No.	Capacity	Start Date	Stop Date	Location
		76452398	450	10/01/2011	11/01/2036	
		76452399	153	10/01/2011	11/01/2036	
		76456513	450	10/01/2011	11/01/2036	
		76456515	153	10/01/2011	11/01/2036	

Table 1-1 Transmission Service Request Detail

The associated generation interconnection information is project number G519 queue number 38491-01 for option A and G477, queue number 38280-02 for option B.

The request for 603 MW for firm transmission service cannot be granted at this time. Constraints are listed in Tables 2-1 through 2-14. All constraints must be mitigated before service can be granted.

The System Impact Study will now continue to determine the remaining constraints and mitigation required to correct the constraints found.

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2 Results

The limiting facilities are listed in the constraint summary tables. Contingency descriptions that are not included in tables 2-1 through 2-14 can be found in Section 4 in the appendix.

2.1 Option A 2011 Results

2011 Summer peak – Option A

Limiting Element	Post Transfer Post Cont MVA	Rating MVA	Contingency	Pre Transfer Post Cont MVA	TDF	FCITC
61710 MINNTAC7 115 61708 VIRGNIA7 115 1	242.9	144	61623 MINNTAC4 230 61624 FORBES 4 230 1	224.4	3.07	-2620.61
60214 HIBRDGE7 115 60239 ROGRSLK7 115 1	278.7	200	ASKNGCHISOEAUCLARP	259.1	3.25	-1818.23
61558 MINT1JCT 115 61710 MINNTAC7 115 1	495	373	MINNTAC 2T	462.9	5.32	-1688.78
61623 MINNTAC4 230 61558 MINT1JCT 115 1	495	373	MINNTAC 2T	462.9	5.32	-1688.78
61560 MINT2JCT 115 61710 MINNTAC7 115 2	494.7	373	625	462.5	5.34	-1676.04
61623 MINNTAC4 230 61560 MINT2JCT 115 2	494.7	373	625	462.5	5.34	-1676.04
61683 STIN-MN7 115 61684 STIN-WI7 115 1	296.8	200	39449 ARROWHD 345 39450 ST LAKE 345 1	264.3	5.39	-1193.01
60114 ELM CRK3 345 60115 ELMCRK 7 115 9	496.4	448	009 7	477.3	3.17	-925.02
60197 CHIS CO2 500 61493 CHIS D1Y 110 10	1674.2	1203	60197 CHIS CO2 500 61494 CHIS D2Y 110 9	1422.9	41.67	-527.65
60197 CHIS CO2 500 61494 CHIS D2Y 110 9	1674.2	1203	60197 CHIS CO2 500 61493 CHIS D1Y 110 10	1422.9	41.67	-527.65
61493 CHIS D1Y 110 60199 CHIS CO3 345 10	1671.2	1203	60197 CHIS CO2 500 61494 CHIS D2Y 110 9	1420.1	41.64	-521.35
61494 CHIS D2Y 110 60199 CHIS CO3 345 9	1671.2	1203	60197 CHIS CO2 500 61493 CHIS D1Y 110 10	1420.1	41.64	-521.35
61493 CHIS D1Y 110 60197 CHIS CO2 500 10	1667.6	1203	CHISO_500_3WINDTRX9	1416.5	41.64	-512.71
61494 CHIS D2Y 110 60197 CHIS CO2 500 9	1667.6	1203	CHISO_500_3WINDTRX10	1416.5	41.64	-512.71
60251 TERMINL3 345 61491 TERMID2Y 110 9	743.6	672	NSP 6B	704.7	6.45	-506.89
61653 RIVERTN7 115 61652 BRAINRD7 115 1	151.9	90	61612 RIVERTN4 230 61617 MUDLAKE4 230 1	114.7	6.17	-400.38
61491 TERMID2Y 110 60252 TERMINL7 115 9	741.2	672	NSP 6B	699.4	6.93	-395.27
61612 RIVERTN4 230 61796 RIVERJCT 115 1	237	187	61612 RIVERTN4 230 61617 MUDLAKE4 230 1	201.5	5.89	-246.30
61684 STIN-WI7 115 61632 DAHLBRG7 115 1	134	98	61615 ARROWHD4 230 39448 AWHD PST 230 1	108.4	4.25	-244.97
60105 PR ISLD3 345 60106 PR ISLD5 161 10	250.8	224	905	231.6	3.18	-238.69
61796 RIVERJCT 115 61653 RIVERTN7 115 1	235.8	187	61612 RIVERTN4 230 61617 MUDLAKE4 230 1	199.2	6.07	-201.00
60196 CHISAGO7 115 60199 CHIS CO3 345 6	603.1	448	022 1	475.5	21.16	-129.96
61632 DAHLBRG7 115 60292 IRONRIV7 115 1	128.4	98	61615 ARROWHD4 230 39448 AWHD PST 230 1	102.8	4.25	-113.06
60262 EDEN PR3 345 60263 EDEN PR7 115 10	481.7	448	705 1	447.4	5.69	10.55
61718 16L TAP7 115 61720 COTTNTP7 115 1	110.1	90	022 2	87.1	3.81	76.03
61720 COTTNTP7 115 62447 BERGNTP7 115 1	108.1	90	022 2	85.2	3.80	126.39
61625 BLCKBRY4 230 61612 RIVERTN4 230 1	469.9	378	61612 RIVERTN4 230 61626 BOSWELL4 230 1	349.6	19.95	142.35
61673 ARROWHD7 115 62447 BERGNTP7 115 1	106.7	90	022 2	83.7	3.81	165.17
60320 HYDROLN5 161 60321 HYDROLN7 115 1	206.3	187	050 3	174.8	5.22	233.54
60198 CHIS-N 2 500 60197 CHIS CO2 500 1	1880.8	1732	009 3	1612.4	44.51	268.70
61612 RIVERTN4 230 61625 BLCKBRY4 230 1	455.5	378	015 2	305.9	24.81	290.62
60197 CHIS CO2 500 60198 CHIS-N 2 500 1	1869.7	1732	9	1601.9	44.41	292.94
60292 IRONRIV7 115 60291 INOPUMP7 115 1	125.2	112	61615 ARROWHD4 230 39448 AWHD PST 230 1	99.5	4.26	293.29
61651 MUDLAKE7 115 62175 DEWING 7 115 1	101	90	FORBES_500_230_TRX	76.1	4.13	336.61
61740 GR RPDS7 115 62448 HILLCTY7 115 1	102.9	90	015 2	73.3	4.91	340.21
62175 DEWING 7 115 61650 LITTLEF7 115 1	99.5	90	61617 MUDLAKE4 230 63045 BENTON 4 230 1	76.7	3.78	351.75
69105 PILSEN7 115 60295 BAYFRNT7 115 1	121.4	111	61615 ARROWHD4 230 39448 AWHD PST 230 1	95.5	4.30	360.87
60199 CHIS CO3 345 60196 CHISAGO7 115 6	477.7	448	022 6	403	12.39	363.25
60291 INOPUMP7 115 69105 PILSEN7 115 1	122.2	112	61615 ARROWHD4 230 39448 AWHD PST 230 1	96.4	4.28	364.60
61739 BLCKBRY7 115 61663 FLDWDTP7 115 1	100.8	90	98L	70.7	4.99	386.64
61653 RIVERTN7 115 62448 HILLCTY7 115 1	100.1	90	015 2	70.6	4.89	396.55
61650 LITTLEF7 115 62175 DEWING 7 115 1	96.9	90	FORBES_500_230_TRX	72.2	4.10	434.55
62448 HILLCTY7 115 61653 RIVERTN7 115 1	95.9	90	61612 RIVERTN4 230 61625 BLCKBRY4 230 1	72.2	3.93	452.89
62447 BERGNTP7 115 61673 ARROWHD7 115 1	94.4	90	61614 98L TAP4 230 61625 BLCKBRY4 230 1	76.2	3.02	457.22

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61615 ARROWHD4 230 63055 BEARCK 4 230 1	347.3	327	015 2	246.9	16.65	481.08
60221 KOLMNLK3 345 60222 KOLMNLK7 115 10	454.2	448	022 4	411.6	7.06	515.24
60106 PR ISLD5 161 63071 SPRNGCK5 161 1	239.7	236.5	60217 INVRHLS3 345 60218 INVRHLS7 115 9	215.3	4.05	523.92
60221 KOLMNLK3 345 60222 KOLMNLK7 115 9	452.1	448	022 2	405.1	7.79	550.40
60920 LINDSTM7 115 60196 CHISAGO7 115 P1	313.6	310	022 1	255.2	9.68	565.83

Table 2-1 Branch Violations

Branch Violations with Worst Case Dispatch to come in a future report, if applicable. The analysis is not completely edited at this time due to time constraints.

Monitored Element	Contingency	Rating MW or MVA	Post Transfer, Post Cont MW	Pre Transfer, Post Cont MW	Impact MW	DF	FCITC
60101 FORBES 2 500 60198 CHIS-N 2 500 1	raise 'COYOTE1G 24' gen 82.8MW dispatch raise 'TAC HBRG13.2' gen -31.7MW dispatch raise 'STANT41G 18' gen 47.1 MW dispatch raise 'LASKIN 7 115' gen 11.0 MW dispatch raise 'THOMSON7 115' gen 17.3 MW dispatch raise 'HOOTLK3G13.8' gen 35.0 MW dispatch raise 'BOSWE72G14.4' gen 7.0 MW dispatch raise 'HOOTLK2G13.8' gen 20.0 MW dispatch raise 'CENTER1G 22' gen 18.0 MW dispatch raise 'EDGE GEN34.5' gen 2.1 MW dispatch raise 'HYDRO G 6.6' gen 1.4 MW dispatch raise 'BOSWE44G22.8' gen 1.3 MW dispatch raise 'CASS LK8 69' gen 2.5 MW dispatch raise 'QUADRNT7 115' gen 2.0 MW dispatch raise 'CLOQUET7 115' gen 18.9 MW dispatch	1749	1772.3	1493.8	46.19	552.55	1749

Table 2-2 Flowgate Violations

Bus #	Bus Name	KV	Area	Pre Transfer Post Cont Voltage	Contingency	Post Transfer Post Cont Volt	Delta Post Cont
60146	GRANCTY7	115	600	0.8135	780 1	0.7971	1.64%
60154	SAUK RV7	115	600	0.8423	780 1	0.8272	1.51%
60163	WST CLD7	115	600	0.8371	780 1	0.8212	1.59%
60164	XRDS 7	115	600	0.8213	780 1	0.805	1.63%
60165	MEI INT7	115	600	0.8257	780 1	0.8095	1.62%
61637	PLATTRV7	115	608	0.8898	780 1	0.8669	2.29%
61650	LITTLEF7	115	608	0.9175	780 1	0.8929	2.46%
61656	MAHTOWA7	115	608	0.6956	26L	0.6802	1.54%
62268	LANGLTP7	115	618	0.8907	780 1	0.8678	2.29%
62269	LANGOLA7	115	618	0.8898	780 1	0.8669	2.29%
62814	WESTWD 7	115	600	0.8347	780 1	0.8187	1.60%
62819	FSCHRHL7	115	600	0.852	780 1	0.8335	1.85%

Table 2-3 Voltage Violations

2011 Winter peak – Option A

Limiting Element	Post Transfer Post Cont MVA	Rating MVA	Contingency	Pre Transfer Post Cont MVA	TDF	FCITC
60289 HURLEY 7 115 60288 IRONWD 7 115 1	72.7	66	60321 HYDROLN7 115 60326 JIMFLS 7 115 1	53.2	3.23	395.82

Table 2-4 Branch Violations

Branch Violations with Worst Case Dispatch to come in a future report, if applicable. The analysis is not completely edited at this time due to time constraints.

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There are no applicable flowgate violations for the 2011 winter analysis with the generating unit at the Option A substation.

Bus #	Bus Name	KV	Area	Pre Transfer Post Cont Voltage	Contingency	Post Transfer Post Cont Volt	Delta Post Cont
60320	HYDROLN5	161	600	0.9013	60319 WHEATTP5 161 60320 HYDROLN5 161 1	0.8708	3.05%
66778	RUNNINNT	230	608	1.1063	61627 SHANNON4 230 66753 RUNNING4 230 1	0.8671	23.92%
66779	RUNNINST	230	608	1.1063	61627 SHANNON4 230 66753 RUNNING4 230 1	0.8667	23.96%
67556	WHTSL1 4	220	667	1.115	39676 GARDR PK 345 39785 ROCKY RN 345 1	1.1038	1.12%
67589	WHTSL2 4	220	667	1.1149	39676 GARDR PK 345 39785 ROCKY RN 345 1	1.1038	1.11%
67770	SK1 SUB7	110	667	1.1616	61627 SHANNON4 230 66753 RUNNING4 230 1	1.1385	2.31%
67771	STAR LK7	110	667	1.1569	61627 SHANNON4 230 66753 RUNNING4 230 1	1.1335	2.34%
67772	BRERTON7	110	667	1.1591	61627 SHANNON4 230 66753 RUNNING4 230 1	1.1358	2.33%

Table 2-5 Voltage Violations

2.2 Option B 2011 Results

2011 Summer peak– Option B

Limiting Element	Post Transfer Post Cont MVA	Rating MVA	Contingency	Pre Transfer Post Cont MVA	TDF	FCITC	
61626 BOSWELL4 230 61625 BLCKBRY4 230 1	822	595	61625 BLCKBRY4 230 61626 BOSWELL4 230 2	768.6	8.86	-1960.31	
60214 HIBRDGE7 115 60239 ROGRSLK7 115 1	255.8	200	NSP 11E	233.9	3.63	-933.41	
60355 WRIV RD7 115 60181 ALDRICH7 115 1	236.2	192	60181 ALDRICH7 115 60355 WRIV RD7 115 2	215.9	3.37	-709.94	
60114 ELM CRK3 345 60115 ELMCRK 7 115 9	485	448	009 8	465	3.32	-512.55	
60251 TERMINL3 345 61491 TERMID2Y 110 9	752.6	672	NSP 6B	708.8	7.26	-506.63	
61491 TERMID2Y 110 60252 TERMINL7 115 9	752.6	672	NSP 6B	703.3	8.18	-382.84	
61684 STIN-WI7 115 61632 DAHLBRG7 115 1	139.1	98	AWHD PST-ARROWHD	111.5	4.58	-294.95	
60105 PR ISLD3 345 60106 PR ISLD5 161 10	251.2	224		905	231.3	3.30	-221.20
61632 DAHLBRG7 115 60292 IRONRIV7 115 1	132.8	98	AWHD PST-ARROWHD	105.8	4.48	-174.20	
61718 16L TAP7 115 61720 COTTNTP7 115 1	122.1	90	61615 ARROWHD4 230 61624 FORBES 4 230 1	96.6	4.23	-156.07	
61625 BLCKBRY4 230 61612 RIVERTN4 230 1	475	378	022 8	396.3	13.05	-140.21	
67559 LAVEREN4 230 67557 LETELER4 230 1	460.5	419.5	67526 ST.LEON4 230 67575 STANLEY4 230 1	426.1	5.70	-115.69	
61720 COTTNTP7 115 62447 BERGNTP7 115 1	120.1	90	61615 ARROWHD4 230 61624 FORBES 4 230 1	94.6	4.23	-108.78	
61708 VIRGNIA7 115 62454 PEARY 7 115 1	116.6	90	015 1¹	93.7	3.80	-97.43	
61653 RIVERTN7 115 61652 BRAINRD7 115 1	111	90	61612 RIVERTN4 230 61617 MUDLAKE4 230 1	92.9	3.00	-96.61	
61730 78L TAP7 115 61733 NATIONL7 115 1	147.2	80	044 2	88.1	9.80	-82.64	
62447 BERGNTP7 115 61673 ARROWHD7 115 1	118.6	90	61615 ARROWHD4 230 61624 FORBES 4 230 1	93.1	4.23	-73.31	
62454 PEARY 7 115 61718 16L TAP7 115 1	113.8	90	015 1	91.3	3.73	-34.84	
67526 ST.LEON4 230 67575 STANLEY4 230 1	332.3	309.1	67557 LETELER4 230 67559 LAVEREN4 230 1	308.6	3.93	12.72	
60197 CHIS CO2 500 60198 CHIS-N 2 500 1	2155.6	1732		9	1703.9	74.91	37.51
61739 BLCKBRY7 115 61781 20L TAP7 115 1	168.4	144	RIVERTN4-BLCKBRY4	142.1	4.36	43.56	
60262 EDEN PR3 345 60263 EDEN PR7 115 10	480.4	448	705 1	445.2	5.84	47.97	
61615 ARROWHD4 230 63055 BEARCK 4 230 1	570.1	327	044 2	305.5	43.88	49.00	
61612 RIVERTN4 230 61625 BLCKBRY4 230 1	445.8	378	RAUN-NEAL4T1	369.1	12.72	69.97	
60199 CHIS CO3 345 60196 CHISAGO7 115 6	521.5	448	022 8	434.6	14.41	92.98	
61683 STIN-MN7 115 61684 STIN-WI7 115 1	326.6	200	044 2	164.7	26.85	131.48	
60320 HYDROLN5 161 60321 HYDROLN7 115 1	214	187	050 3	175.3	6.42	182.30	
60198 CHIS-N 2 500 60197 CHIS CO2 500 1	1993.9	1732	61615 ARROWHD4 230 61624 FORBES 4 230 1	1596	65.99	206.10	

¹ The bolded contingencies are still being analyzed because they did not solve correctly. The updated values will be completed for the final report.

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66705 DRAYTON7 115 63255 DONALDS7 115 1	210	198	66752 DRAYTON4 230 66755 PRAIRIE4 230 1	191.7	3.03	207.59	
60292 IRONRIV7 115 60291 INOPUMP7 115 1	129.5	112	ARROWHD-ST LAKE	102.5	4.48	212.17	
60196 CHISAGO7 115 60920 LINDSTM7 115 P1	368.6	310	022 1	274.9	15.54	225.88	
60221 KOLMNLK3 345 60222 KOLMNLK7 115 10	476.6	448	022 4	428.8	7.93	242.21	
69105 PILSEN7 115 60295 BAYFRNT7 115 1	125	111	AWHD PST-ARROWHD	98.6	4.38	283.23	
60291 INOPUMP7 115 69105 PILSEN7 115 1	126	112	AWHD PST-ARROWHD	99.5	4.39	284.43	
60210 FIFTHST7 115 60181 ALDRICH7 115 1	229.3	209		980	190.3	6.47	289.13
61665 THOMSON7 115 61664 WRENSHL7 115 1	117.8	98	044 2	78.5	6.52	299.20	
61664 WRENSHL7 115 61656 MAHTOWA7 115 1	117.9	98	044 2	74.4	7.21	327.14	
62925 DICKNSN7 115 62667 ST BONI7 115 1	200.3	191.6	009 5	181.2	3.17	328.34	
60199 CHIS CO3 345 60186 AS KING3 345 1	1280.7	1165	022 11	1018.5	43.48	336.92	
60236 REDROCK3 345 60238 REDROCK7 115 9	455.7	448	60236 REDROCK3 345 60238 REDROCK7 115 10	436.2	3.23	364.89	
60199 CHIS CO3 345 60221 KOLMNLK3 345 1	1273.1	1165	022 6	991.3	46.73	371.69	
67557 LETELER4 230 66752 DRAYTON4 230 1	430.9	419.5	022 11	387.5	7.20	444.61	
60230 OAKDALE7 115 60250 TANRSLK7 115 1	145.4	140	NSP 2E	111.6	5.61	506.66	
61550 FORB1JCT 230 60101 FORBES 2 500 1	725.8	672	60101 FORBES 2 500 61552 FORB2JCT 230 1	347.9	62.67	517.15	
61624 FORBES 4 230 61550 FORB1JCT 230 1	715.1	672	60101 FORBES 2 500 61552 FORB2JCT 230 1	343.8	61.58	533.00	
60106 PR ISLD5 161 63071 SPRNGCK5 161 1	238	236.5	60217 INVRHLS3 345 60218 INVRHLS7 115 9	215.5	3.73	562.80	

Table 2-6 Branch Violations

Branch Violations with Worst Case Dispatch to come in a future report, if applicable. The analysis is not completely edited at this time due to time constraints.

Monitored Element	Contingency	Rating MW or MVA	Post Transfer, Post Cont MW	Pre Transfer, Post Cont MW	DF	FCITIC
60101 FORBES 2 500 60198 CHIS-N 2 500 1	raise 'COYOTE1G 24' gen 82.8 MW dispatch raise 'TAC HBRG13.2' gen 2.8 MW dispatch raise 'STANT41G 18' gen 46.2 MW dispatch raise 'LASKIN 7 115' gen 11.0 MW dispatch raise 'THOMSON7 115' gen 17.3 MW dispatch raise 'HOOTLK3G13.8' gen 34.9 MW dispatch raise 'BOSWE72G14.4' gen 7.0 MW dispatch raise 'HOOTLK2G13.8' gen 20.8 MW dispatch raise 'CENTER1G 22' gen 18.0 MW dispatch raise 'EDGE GEN34.5' gen 2.1 MW dispatch raise 'HYDRO G 6.6' gen 1.4 MW dispatch raise 'BOSWE44G22.8' gen 1.3 MW dispatch raise 'CASS LK8 69' gen 2.5 MW dispatch raise 'QUADRNT7 115' gen 2.0 MW dispatch raise 'CLOQUET7 115' gen 18.9 MW dispatch	1749	1958.6	1586	61.79	263.79

Table 2-7 Flowgate Violations

Bus #	Bus Name	KV	Area	Pre Transfer Post Cont Voltage	Contingency	Post Transfer Post Cont Volt	Delta Post Cont	
60374	FIBROMN7	115	600	0.9138		510	0.8851	2.87%
61689	FRNCHRV7	115	608	0.9303	61574 LASKNJCT 115 61701 LASKIN 6 138 1		0.8952	3.51%
61690	TWO HBR7	115	608	0.9121	61574 LASKNJCT 115 61701 LASKIN 6 138 1		0.8725	3.96%
62001	BENSON 7	115	626	0.9138		510	0.8851	2.87%
62002	WALDEN 7	115	626	0.9175		510	0.8824	3.51%
62170	WALDO 7	115	608	0.9119	61574 LASKNJCT 115 61701 LASKIN 6 138 1		0.8719	4.00%
62752	MLTN TP7	115	626	0.9384		510	0.8869	5.15%
62753	MILTONA7	115	626	0.9378		510	0.8863	5.15%
63218	MOROTP 7	115	626	0.9204		510	0.8828	3.76%
63221	BRANDN 7	115	626	0.9434		510	0.8944	4.90%
63222	ALEXAND7	115	626	0.9466		510	0.8965	5.01%
66555	MORRIS 7	115	652	0.9241		510	0.8848	3.93%

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67452	ALEXSS	115	626	0.9431	510	0.8928	5.03%
67453	ALEXSWM	115	626	0.9425	510	0.8921	5.04%
67454	ALEXPLDM	115	626	0.9374	510	0.8865	5.09%
67461	ALEXSOUM	115	626	0.9364	510	0.8855	5.09%

Table 2-8 Voltage Violations

2011 Winter peak– Option B

Limiting Element	Post Transfer Post Cont MVA	Rating MVA	Contingency	Pre Transfer Post Cont MVA	TDF	FCITC
61550 FORB1JCT 230 60101 FORBES 2 500 1	849.2	773	60101 FORBES 2 500 61552 FORB2JCT 230 1	471.6	62.62	481.31

Table 2-9 Branch Violations

Branch Violations with Worst Case Dispatch to come in a future report, if applicable. The analysis is not completely edited at this time due to time constraints.

There are no applicable flowgate violations for the 2011 winter analysis with the generating unit at the option B substation.

Bus #	Bus Name	KV	Area	Pre Transfer Post Cont Voltage	Contingency	Post Transfer Post Cont Volt	Delta Post Cont
67556	WHTSL1 4	220	667	1.1318	SINGLE-042	1.1103	2.15%
67589	WHTSL2 4	220	667	1.1318	SINGLE-042	1.1103	2.15%
67770	SK1 SUB7	110	667	1.1595	SINGLE-042	1.1452	1.43%
67771	STAR LK7	110	667	1.1548	SINGLE-042	1.1404	1.44%
67772	BRERTON7	110	667	1.1569	SINGLE-042	1.1426	1.43%

Table 2-10 Voltage Violations

2.3 Option A 2014 Results

Limiting Element	Post Transfer Post Cont MVA	Rating MVA	Contingency	Pre Transfer Post Cont MVA	TDF	FCITC	
60262 EDEN PR3 345 60263 EDEN PR7 115 9	625.8	515	705 4	593.3	5.39	-1452.77	
60218 INVRHLS7 115 60223 KOCHREF7 115 1	432.7	397	60201 CHEMOLT7 115 60342 WHAST 7 115 1	408.7	3.98	-293.96	
60114 ELM CRK3 345 60115 ELMCRK 7 115 9	543.8	515	009 7	523.8	3.32	-265.32	
60355 WRIV RD7 115 60181 ALDRICH7 115 2	226.1	199	60181 ALDRICH7 115 60355 WRIV RD7 115 1	207.2	3.13	-261.62	
61653 RIVERTN7 115 61652 BRAINRD7 115 1	140.7	99	61612 RIVERTN4 230 61617 MUDLAKE4 230 1	111.5	4.84	-258.13	
60251 TERMINL3 345 61491 TERMID2Y 110 9	832.5	773	NSP 6B	779.5	8.79	-73.95	
61491 TERMID2Y 110 60252 TERMINL7 115 9	832.7	773	NSP 6B	777.8	9.10	-52.72	
60197 CHIS CO2 500 61493 CHIS D1Y 110 10	1644	1385	60197 CHIS CO2 500 61494 CHIS D2Y 110 9	1349.1	48.91	73.41	
60197 CHIS CO2 500 61494 CHIS D2Y 110 9	1644	1385	60197 CHIS CO2 500 61493 CHIS D1Y 110 10	1349.1	48.91	73.41	
61493 CHIS D1Y 110 60199 CHIS CO3 345 10	1641.2	1385	60197 CHIS CO2 500 61494 CHIS D2Y 110 9	1348.4	48.56	75.37	
61494 CHIS D2Y 110 60199 CHIS CO3 345 9	1641.2	1385	60197 CHIS CO2 500 61493 CHIS D1Y 110 10	1348.4	48.56	75.37	
62925 DICKNSN7 115 62667 ST BONI7 115 1	206	191.6	009 5	187.4	3.08	136.16	
61615 ARROWHD4 230 61624 FORBES 4 230 1	499.2	407	022 2	378.1	20.08	143.90	
60214 HIBRDGE7 115 60239 ROGRSLK7 115 1	245.2	220	NSP 2E	208.5	6.09	188.95	
60196 CHISAGO7 115 60199 CHIS CO3 345 6	573.5	515	022 1	444.8	21.34	328.91	
61739 BLCKBRY7 115 61663 FLDWDTP7 115 1	105.9	99	98L	87.8	3.00	373.13	
60203 COON CK7 115 60253 TWIN LK7 115 1	404.4	397	022 5	382.4	3.65	400.17	
60262 EDEN PR3 345 60263 EDEN PR7 115 10	528.5	515	705 1	484.8	7.25	416.72	
63218 MOROTP 7 115 66555 MORRIS 7 115 1	96.7	88		9	67.2	4.89	425.17
61624 FORBES 4 230 61615 ARROWHD4 230 1	421.7	407	61614 98L TAP4 230 61625 BLCKBRY4 230 1	351.6	11.63	476.55	
60209 ELLOTPK7 115 60246 SO TOWN7 115 1	246.1	239	** Base Case **	210.1	5.97	484.08	
60150 MNVLTAP4 230 66550 GRANITF4 230 1	428.9	426		9	409.6	3.20	512.39
61667 POTLTCH7 115 61668 CLOQUET7 115 1	101.9	99	022 2	80.9	3.48	519.73	

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61663 FLDWDTP7 115 61739 BLCKBRY7 115 1	101.8	99	022 2	78.6	3.85	530.22
60198 CHIS-N 2 500 60197 CHIS CO2 500 1	1945.9	1905	39448 AWHD PST 230 39449 ARROWHD 345 1	1582.1	60.33	535.21
61612 RIVERTN4 230 61796 RIVERJCT 115 1	235.2	233	61612 RIVERTN4 230 61617 MUDLAKE4 230 1	205.1	4.99	558.93
61625 BLCKBRY4 230 61624 FORBES 4 230 1	232.2	219	61824 MESABA 3 345 61825 FORBES 3 345 1	47.2	30.68	559.98
60240 RIVRSID7 115 60209 ELLOTPK7 115 1	283.5	283	60209 ELLOTPK7 115 60226 MAIN ST7 115 1	257.6	4.30	591.36

Table 2-11 Branch Violations

Branch Violations with Worst Case Dispatch to come in a future report, if applicable. The analysis is not completely edited at this time due to time constraints.

There are no applicable flowgate violations for the 2014 summer analysis with the generating unit at the option A substation.

Bus #	Bus Name	KV	Area	Pre Transfer Post Cont Voltage	Contingency	Post Transfer Post Cont Volt	Delta Post Cont
62005	KERKHOT7	115	600	0.8815	500	0.8482	3.33%
62006	KERKHO 7	115	626	0.9172	500	0.8675	4.97%
62425	WILLMAR7	115	618	0.8609	500	0.8327	2.82%
63186	WILTON Y	230	626	0.9062	66792 MAPLE R3 345 67400 ALEXSUB3 345 1	0.8926	1.36%
63197	CASS LKY	115	626	0.9084	66792 MAPLE R3 345 67400 ALEXSUB3 345 1	0.8929	1.55%
63240	MN PIPE7	115	626	0.9063	66792 MAPLE R3 345 67400 ALEXSUB3 345 1	0.8922	1.41%
63241	CLEARBR7	115	626	0.9065	66792 MAPLE R3 345 67400 ALEXSUB3 345 1	0.8924	1.41%
63242	CLBKPIP7	115	626	0.9063	66792 MAPLE R3 345 67400 ALEXSUB3 345 1	0.8922	1.41%
63247	CASS LK7	115	626	0.9056	66792 MAPLE R3 345 67400 ALEXSUB3 345 1	0.8909	1.47%
63248	CASS N 7	115	626	0.9053	66792 MAPLE R3 345 67400 ALEXSUB3 345 1	0.8906	1.47%
66776	WILTON T	115	626	0.9036	66792 MAPLE R3 345 67400 ALEXSUB3 345 1	0.8902	1.34%
66789	BEMIDJIT	115	626	0.9004	66792 MAPLE R3 345 67400 ALEXSUB3 345 1	0.8868	1.36%

Table 2-12 Voltage Violations

2.4 Option B 2014 Results

Limiting Element	Post Transfer Post Cont MVA	Rating MVA	Contingency	Pre Transfer Post Cont MVA	TDF	FCITC
60222 KOLMNLK7 115 60212 GOOSELK7 115 1	322.2	213	60196 CHISAGO7 115 60199 CHIS CO3 345 6	303.9	3.03	-2995.23
60262 EDEN PR3 345 60263 EDEN PR7 115 9	626.3	515	705 4	592	5.69	-1353.67
61683 STIN-MN7 115 61684 STIN-WI7 115 1	262.7	220	61615 ARROWHD4 230 39448 AWHD PST 230 1	243.2	3.23	-717.42
61626 BOSWELL4 230 61625 BLCKBRY4 230 1	691.9	655	61625 BLCKBRY4 230 61626 BOSWELL4 230 2	673.6	3.03	-612.89
60218 INVRHLS7 115 60223 KOCHREF7 115 1	435.9	397	60201 CHEMOLT7 115 60342 WHAST 7 115 1	410	4.30	-302.66
60251 TERMINL3 345 61491 TERMID2Y 110 9	836.6	773	NSP 6B	783.9	8.74	-124.72
61691 SLVRBYH7 115 62170 WALDO 7 115 1	135.2	107	044 2	111.7	3.90	-120.60
61491 TERMID2Y 110 60252 TERMINL7 115 9	836.6	773	NSP 6B	780.5	9.30	-80.61
61653 RIVERTN7 115 61652 BRAINRD7 115 1	119.5	99	61612 RIVERTN4 230 61617 MUDLAKE4 230 1	101.1	3.05	-68.82
60197 CHIS CO2 500 61493 CHIS D1Y 110 10	1732.4	1385	60197 CHIS CO2 500 61494 CHIS D2Y 110 9	1410.8	53.33	-48.37
60197 CHIS CO2 500 61494 CHIS D2Y 110 9	1732.4	1385	60197 CHIS CO2 500 61493 CHIS D1Y 110 10	1410.8	53.33	-48.37
61493 CHIS D1Y 110 60199 CHIS CO3 345 10	1730.2	1385	60197 CHIS CO2 500 61494 CHIS D2Y 110 9	1408	53.43	-43.04
61494 CHIS D2Y 110 60199 CHIS CO3 345 9	1730.2	1385	60197 CHIS CO2 500 61493 CHIS D1Y 110 10	1408	53.43	-43.04
61615 ARROWHD4 230 61624 FORBES 4 230 1	701	407	022 2	416.8	47.13	-20.79

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60288 IRONWD 7 115 60298 PARKFLS7 115 1	142.4	44	022 2	45	16.15	-6.19
60209 ELLOTPK7 115 60246 SO TOWN7 115 1	302.8	263	60217 INVRHLS3 345 60218 INVRHLS7 115 9	262.4	6.70	8.96
60288 IRONWD 7 115 60289 HURLEY 7 115 1	174	67	015 1	57.3	19.35	50.12
61690 TWO HBR7 115 62170 WALDO 7 115 1	181.3	107	015 1	95.8	14.18	78.99
60212 GOOSELK7 115 60222 KOLMNLK7 115 1	236.4	213	022 2	209	4.54	88.03
61667 POTLTCH7 115 61668 CLOQUET7 115 1	131	99	044 1	92.7	6.35	99.19
61708 VIRGNIA7 115 62454 PEARY 7 115 1	168.4	99	015 1	82.5	14.25	115.83
61612 RIVERTN4 230 61625 BLCKBRY4 230 1	681	415	022 2	351.6	54.63	116.06
61718 16L TAP7 115 61720 COTTNTP7 115 1	210.3	113	015 1	86.8	20.48	127.92
61718 16L TAP7 115 62454 PEARY 7 115 1	166	99	015 1	79.7	14.31	134.85
60196 CHISAGO7 115 60199 CHIS CO3 345 6	633.8	515	022 1	477.8	25.87	143.79
61740 GR RPDS7 115 62448 HILLCTY7 115 1	152.1	99	022 2	82.3	11.58	144.27
61663 FLDWDTP7 115 61739 BLCKBRY7 115 1	151.5	99	015 1	81.7	11.58	149.45
61625 BLCKBRY4 230 61626 BOSWELL4 230 2	596	439	015 1	373.7	36.87	177.13
61653 RIVERTN7 115 62448 HILLCTY7 115 1	146.1	99	022 2	79.2	11.09	178.47
61708 VIRGNIA7 115 61710 MINNTAC7 115 1	233.7	160	015 1	127.4	17.63	184.93
61720 COTTNTP7 115 62447 BERGNTP7 115 1	148.9	113	022 2	93.8	9.14	210.12
60214 HIBRDGE7 115 60239 ROGRSLK7 115 1	233.3	220	NSP 2E	210.9	3.71	244.97
61673 ARROWHD7 115 62447 BERGNTP7 115 1	142.6	113	022 2	92.2	8.36	248.86
62448 HILLCTY7 115 61653 RIVERTN7 115 1	111.7	99	61612 RIVERTN4 230 61625 BLCKBRY4 230 1	90	3.60	250.09
61721 ETCO 7 115 61722 FORBES 7 115 1	117.6	107	022 2	85.7	5.29	402.63
60203 COON CK7 115 60253 TWIN LK7 115 1	403.7	397	022 5	382	3.60	416.82
66550 GRANITF4 230 60150 MNVLTAP4 230 1	431.6	426	60108 WILMART3 345 60331 LKFLDXL3 345 1	413	3.08	421.45
63218 MOROTP 7 115 66555 MORRIS 7 115 1	96.6	88	9	67.6	4.81	424.18
60295 BAYFRNT7 115 60350 GINGLES7 115 1	114.9	105	015 2	81.3	5.57	425.33
63050 WILLMAR4 230 66550 GRANITF4 230 1	325.7	318	015 1	286.6	6.48	484.25
60198 CHIS-N 2 500 60197 CHIS CO2 500 1	1983.4	1905	61615 ARROWHD4 230 39448 AWHD PST 230 1	1583.7	66.29	484.72
61624 FORBES 4 230 61615 ARROWHD4 230 1	423.1	407	NSP 2E	335.8	14.48	491.79
60197 CHIS CO2 500 60198 CHIS-N 2 500 1	1970	1905	9	1569.5	66.42	505.13
62447 BERGNTP7 115 61673 ARROWHD7 115 1	116	113	61615 ARROWHD4 230 61624 FORBES 4 230 1	94.7	3.53	518.07
60262 EDEN PR3 345 60263 EDEN PR7 115 10	519.1	515	705 1	486.7	5.37	526.69
61689 FRNCHRV7 115 61690 TWO HBR7 115 1	121.5	120	022 2	92	4.89	572.34

Table 2-13 Branch Violations

Branch Violations with Worst Case Dispatch and Voltage Violations to come in a future report, if applicable, the analysis is not completely edited at this time due to time constraints.

Monitored Element	Contingency	Rating MW or MVA	Post Transfer, Post Cont MW	Pre Transfer, Post Cont MW	DF	FCITC
60101 FORBES 2 500 60198 CHIS-N 2 500 1	raise 'COYOTE1G 24' gen 28.4 MW dispatch raise 'STANT41G 18' gen 39.1 MW dispatch raise 'LASKIN 7 115' gen 47.5 MW dispatch raise 'CENTER1G 22' gen 18.0 MW dispatch raise 'QUADRNT7 115' gen 2.0 MW dispatch raise 'BOSWE43G20.9' gen 48.3 MW dispatch raise 'GENBUS G 6.6' gen 11.1 MW dispatch raise 'TAC HBRG13.2' gen -2.5 MW dispatch	1749.0	1869.9	1486.3	63.62	412.92

Table 2-14 Flowgate Violations

3 Conclusion

Based on the above results, it is concluded that the request for 603 MW for firm transmission service cannot be granted at this time. Constraints are listed in Tables 2-1 through 2-14. All constraints must be mitigated before service can be granted.

The System Impact Study will now continue to determine the remaining constraints and mitigation required to correct the constraints found.

4 Appendix A – Contingency Description

CONTINGENCY 'NSP 2E'

OPEN LINE FROM BUS 'AS KING3 345' TO BUS 'CHIS CO3 345' CKT 1
OPEN LINE FROM BUS 'AS KING3 345' TO BUS 'REDROCK3 345' CKT 1
OPEN LINE FROM BUS 'AS KING3 345' TO BUS 'EAU CL 3 345' CKT 1
OPEN LINE FROM BUS 'EAU CL 3 345' TO BUS 'ARP 345 345' CKT 1
OPEN LINE FROM BUS 'EAU CL 3 345' TO BUS 'EAU CLA5 161' CKT 9
END

CONTINGENCY 'NSP 6B'

OPEN LINE FROM BUS 'KOLMNLK3 345' TO BUS 'COON CK3 345' CKT 1
OPEN LINE FROM BUS 'KOLMNLK3 345' TO BUS 'KOLMNLK7 115' CKT 9
OPEN LINE FROM BUS 'KOLMNLK3 345' TO BUS 'KOLMNLK7 115' CKT 10
OPEN LINE FROM BUS 'TERMID1Y 110' TO BUS 'TERMINL3 345' CKT 10
OPEN LINE FROM BUS 'TERMID1Y 110' TO BUS 'TERMINL7 115' CKT 10
OPEN LINE FROM BUS 'TERMID1Y 110' TO BUS 'TERTER1934.5' CKT 10
END

CONTINGENCY 'NSP 11E'

OPEN LINE FROM BUS 'SHEPARD7 115' TO BUS 'HIBRDGE7 115' CKT 1
OPEN LINE FROM BUS 'SHEPARD7 115' TO BUS 'SO TOWN7 115' CKT 1
END

CONTINGENCY 'AWHD PST-ARROWHD' / 39448 AWHD PST 230 39449 ARROWHD 345 1
TRIP BRANCH FROM BUS 39448 TO BUS 39449 CKT 1
END

CONTINGENCY 'ARROWHD-ST LAKE' / 39449 ARROWHD 345 39450 ST LAKE 345 1
TRIP BRANCH FROM BUS 39449 TO BUS 39450 CKT 1
END

CONTINGENCY 'RIVERTN4-BLCKBRY4' / 61612 RIVERTN4 230 61625 BLCKBRY4 230 1
TRIP BRANCH FROM BUS 61612 TO BUS 61625 CKT 1
END

CONTINGENCY 'RAUN-NEAL4T1'

OPEN LINE FROM BUS 'RAUN 3 345' TO BUS 'NEAL 4G 24' CKT 1
OPEN LINE FROM BUS 'RAUN 3 345' TO BUS 'RAUN MD5 161' CKT 1
END

CONTINGENCY 'CHISO_500_3WINDTRX9'

OPEN LINE FROM BUS 'CHIS CO2 500' TO BUS 'CHIS D2Y 110' CKT 9
OPEN LINE FROM BUS 'CHIS CO3 345' TO BUS 'CHIS D2Y 110' CKT 9
OPEN LINE FROM BUS 'CHIS T2934.5' TO BUS 'CHIS D2Y 110' CKT 9
END

CONTINGENCY 'CHISO_500_3WINDTRX10'

OPEN LINE FROM BUS 'CHIS CO3 345' TO BUS 'CHIS D1Y 110' CKT 10
OPEN LINE FROM BUS 'CHIS T1934.5' TO BUS 'CHIS D1Y 110' CKT 10
OPEN LINE FROM BUS 'CHIS CO2 500' TO BUS 'CHIS D1Y 110' CKT 10
END

CONTINGENCY 'FORBES_500_230_TRX'

OPEN LINE FROM BUS 'FORB1JCT 230' TO BUS 'FORB1TR934.5' CKT 1
OPEN LINE FROM BUS 'FORB1JCT 230' TO BUS 'FORBES 2 500' CKT 1
OPEN LINE FROM BUS 'FORB1JCT 230' TO BUS 'FORBES 4 230' CKT 1
OPEN LINE FROM BUS 'FORB2JCT 230' TO BUS 'FORB2TR934.5' CKT 1
OPEN LINE FROM BUS 'FORB2JCT 230' TO BUS 'FORBES 2 500' CKT 1
OPEN LINE FROM BUS 'FORB2JCT 230' TO BUS 'FORBES 4 230' CKT 1
END

CONTINGENCY 'ASKNGCHISOEAUCLARP'

OPEN LINE FROM BUS 'AS KING3 345' TO BUS 'CHIS CO3 345' CKT 1
OPEN LINE FROM BUS 'AS KING3 345' TO BUS 'REDROCK3 345' CKT 1
OPEN LINE FROM BUS 'AS KING3 345' TO BUS 'EAU CL 3 345' CKT 1
OPEN LINE FROM BUS 'EAU CL 3 345' TO BUS 'ARP 345 345' CKT 1
OPEN LINE FROM BUS 'EAU CL 3 345' TO BUS 'EAU CLA5 161' CKT 9
END

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CONTINGENCY 'MINNTAC 2T'

OPEN LINE FROM BUS 'MINNTAC4 230' TO BUS 'FORBES 4 230' CKT 1
OPEN LINE FROM BUS 'MINT2JCT 115' TO BUS 'MINNTAC4 230' CKT 2
OPEN LINE FROM BUS 'MINT2JCT 115' TO BUS 'MINNTAC7 115' CKT 2
OPEN LINE FROM BUS 'MINT2JCT 115' TO BUS 'MINT2TR913.8' CKT 2

END

CONTINGENCY 'SINGLE-042' //SHUNT AND LOAD AMOUNT IS CASE SPECIFIC AND WAS ADJUSTED APPROPRIATELY

COM 'RUNNING-SHANNON 230 KV'
COM 'REDUCE 100% MEASURED AT 67576'
TRIP LINE FROM BUS 66753 TO BUS 61627 CKT 1
CHANGE BUS 67503 SHUNT BY XXXX MW
SET BUS 60110 LOAD TO 0 MW / 48.10
SET BUS 60111 LOAD TO 0 MW / 3.460

END

CONTINGENCY '26L'

OPEN LINE FROM BUS 'MAHTOWA7 115' TO BUS 'CROMWLL7 115' CKT 1
OPEN LINE FROM BUS 'THOMSON7 115' TO BUS 'WRENSHL7 115' CKT 1
OPEN LINE FROM BUS 'WRENSHL7 115' TO BUS 'MAHTOWA7 115' CKT 1

END

CONTINGENCY '98L'

OPEN LINE FROM BUS '98L TAP4 230' TO BUS 'ARROWHD4 230' CKT 1
OPEN LINE FROM BUS '98L TAP4 230' TO BUS 'BLCKBRY4 230' CKT 1
OPEN LINE FROM BUS '98L TAP4 230' TO BUS 'HILLTOP4 230' CKT 1

END

CONTINGENCY '009' //SHUNT AND LOAD AMOUNT IS CASE SPECIFIC AND WAS ADJUSTED APPROPRIATELY

TRIP LINE FROM BUS 63030 TO BUS 60270 CKT 1
TRIP LINE FROM BUS 60270 TO BUS 60233 CKT 1
TRIP LINE FROM BUS 63030 TO BUS 60202 CKT 1
TRIP LINE FROM BUS 63030 TO BUS 62925 CKT 1
SET BUS 63030 LOAD TO 1055.0 MW
CHANGE BUS 63000 GENERATION BY -581.0 MW

END

CONTINGENCY '009 3'

COM 'DICKINSON 345 KV LINE OUTAGE-COMMON TOWER'
COM 'CUDC LINES TRIP, ALSO OPENS MAPLE GRV. TO PARKERS 345KV'
COM 'TRIP LINE FROM BUS 63030 TO BUS 60202 CKT 1 DCRED'
COM 'TRIP LINE FROM BUS 63030 TO BUS 60270 CKT 1 DCRED'
COM 'TRIP LINE FROM BUS 60270 TO BUS 60233 CKT 1 DCRED'
COM 'TRIP DC 1 AND 2'
COM 'COAL CREEK UNIT#2 TRIPPED'
COM 'THIS IS A CONSERVATIVE REPRESENTATION'
COM 'COAL CREEK #1 WILL ALSO RUNBACK TO 325 MW, IF NEEDED'

DISCONNECT BUS 63030
DISCONNECT BUS 63001
DISCONNECT BUS 60270

END

CONTINGENCY '009 5'

OPEN LINE FROM BUS 'ELM CRK3 345' TO BUS 'PARKERS3 345' CKT 1
OPEN LINE FROM BUS 'DICKNSN3 345' TO BUS 'MPLEGV13 345' CKT 1
OPEN LINE FROM BUS 'MPLEGV13 345' TO BUS 'PARKERS3 345' CKT 1

END

CONTINGENCY '009 7'

OPEN LINE FROM BUS 'SHERCO 3 345' TO BUS 'MPLEGV23 345' CKT 1
OPEN LINE FROM BUS 'MPLEGV23 345' TO BUS 'COON CK3 345' CKT 1
OPEN LINE FROM BUS 'ELM CRK3 345' TO BUS 'PARKERS3 345' CKT 1
OPEN LINE FROM BUS 'COON CK3 345' TO BUS 'CNCMID1Y 110' CKT 9
OPEN LINE FROM BUS 'CNCMID1Y 110' TO BUS 'COON CK7 115' CKT 9
OPEN LINE FROM BUS 'CNCMID1Y 110' TO BUS 'CNCTER1934.5' CKT 9

END

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CONTINGENCY '009 8'

OPEN LINE FROM BUS 'ELM CRK3 345' TO BUS 'PARKERS3 345' CKT 1
OPEN LINE FROM BUS 'SHERCO 3 345' TO BUS 'MPLEGV23 345' CKT 1
OPEN LINE FROM BUS 'MPLEGV23 345' TO BUS 'COON CK3 345' CKT 1
OPEN LINE FROM BUS 'DICKNSN3 345' TO BUS 'COON CK3 345' CKT 1
OPEN LINE FROM BUS 'COON CK3 345' TO BUS 'CNCMID1Y 110' CKT 9
OPEN LINE FROM BUS 'CNCMID1Y 110' TO BUS 'COON CK7 115' CKT 9
OPEN LINE FROM BUS 'CNCMID1Y 110' TO BUS 'CNCTER1934.5' CKT 9
END

CONTINGENCY '015 1' //SHUNT AND LOAD AMOUNT IS CASE SPECIFIC AND WAS ADJUSTED APPROPRIATELY

OPEN LINE FROM BUS 'FORBES 2 500' TO BUS 'FORB1JCT 230' CKT 1
OPEN LINE FROM BUS 'FORB1JCT 230' TO BUS 'FORBES 4 230' CKT 1
OPEN LINE FROM BUS 'FORB1JCT 230' TO BUS 'FORB1TR934.5' CKT 1
OPEN LINE FROM BUS 'FORBES 2 500' TO BUS 'FORB2JCT 230' CKT 1
OPEN LINE FROM BUS 'FORB2JCT 230' TO BUS 'FORBES 4 230' CKT 1
OPEN LINE FROM BUS 'FORB2JCT 230' TO BUS 'FORB2TR934.5' CKT 1
OPEN LINE FROM BUS 'FORBES 2 500' TO BUS 'CHIS-N 2 500' CKT 1
OPEN LINE FROM BUS 'DORSEY 2 500' TO BUS 'ROSEAUN2 500' CKT 1
OPEN LINE FROM BUS 'ROSEAUN2 500' TO BUS 'ROSEAUS2 500' CKT 1
OPEN LINE FROM BUS 'ROSEAUS2 500' TO BUS 'FORBES 2 500' CKT 1
CHANGE BUS 67503 SHUNT BY XXXX MW
SET BUS 60110 LOAD TO 0 MW / 48.10
SET BUS 60111 LOAD TO 0 MW / 3.460
END

CONTINGENCY '015 2' //SHUNT AND LOAD AMOUNT IS CASE SPECIFIC AND WAS ADJUSTED APPROPRIATELY

TRIP LINE FROM BUS 60101 TO BUS 60198 CKT 1
TRIP LINE FROM BUS 60197 TO BUS 60198 CKT 1
CHANGE BUS 67503 SHUNT BY XXXX MW
SET BUS 60110 LOAD TO 0 MW / 48.10
SET BUS 60111 LOAD TO 0 MW / 3.460
END

CONTINGENCY '022 1' //SHUNT AND LOAD AMOUNT IS CASE SPECIFIC AND WAS ADJUSTED APPROPRIATELY

TRIP LINE FROM BUS 60186 TO BUS 60199 CKT 1
TRIP LINE FROM BUS 60199 TO BUS 60221 CKT 1
TRIP LINE FROM BUS 60221 TO BUS 60222 CKT 10
COM 'IF CHISAGO-FORBES 500 KV LINE'
COM 'FLOW IS LESS THAN 350 MW THERE IS NO DC REDUCTION.'
COM 'IF FLOW ON THE CHISAGO-FORBES 500 KV LINE IS 350 TO 550 MW'
COM 'REDUCE THE DC 40%, AND REDUCE THE DC 100% IF THE FLOW IS'
COM 'ABOVE 550 MW.'
CHANGE BUS 67503 SHUNT BY XXXX MW
SET BUS 60110 LOAD TO 0 MW / 48.10
SET BUS 60111 LOAD TO 0 MW / 3.460
END

CONTINGENCY '022 2' //SHUNT AND LOAD AMOUNT IS CASE SPECIFIC AND WAS ADJUSTED APPROPRIATELY

TRIP LINE FROM BUS 60186 TO BUS 60199 CKT 1
TRIP LINE FROM BUS 60199 TO BUS 60221 CKT 1
TRIP LINE FROM BUS 60186 TO BUS 60221 CKT 1
TRIP LINE FROM BUS 60221 TO BUS 60222 CKT 10
TRIP LINE FROM BUS 60199 TO BUS 61493 CKT 10
TRIP LINE FROM BUS 60197 TO BUS 61493 CKT 10
TRIP LINE FROM BUS 60197 TO BUS 61494 CKT 9
TRIP LINE FROM BUS 60199 TO BUS 61494 CKT 9
CHANGE BUS 67503 SHUNT BY XXXX MW
SET BUS 60110 LOAD TO 0 MW / 48.10
TRIP LINE FROM BUS 60197 TO BUS 60198 CKT 1
TRIP LINE FROM BUS 60198 TO BUS 60101 CKT 1
END

CONTINGENCY '022 4'

OPEN LINE FROM BUS 'COON CK3 345' TO BUS 'KOLMNLK3 345' CKT 1
OPEN LINE FROM BUS 'KOLMNLK3 345' TO BUS 'TERMINL3 345' CKT 1
OPEN LINE FROM BUS 'KOLMNLK3 345' TO BUS 'KOLMNLK7 115' CKT 9
OPEN LINE FROM BUS 'TERMINL3 345' TO BUS 'TERMID1Y 110' CKT 10
OPEN LINE FROM BUS 'TERMID1Y 110' TO BUS 'TERMINL7 115' CKT 10
OPEN LINE FROM BUS 'TERMID1Y 110' TO BUS 'TERTER1934.5' CKT 10
END

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CONTINGENCY '022 5'

OPEN LINE FROM BUS 'KOLMNLK3 345' TO BUS 'TERMINL3 345' CKT 1
OPEN LINE FROM BUS 'COON CK3 345' TO BUS 'TERMINL3 345' CKT 1
OPEN LINE FROM BUS 'TERMINL3 345' TO BUS 'TERMID1Y 110' CKT 10
OPEN LINE FROM BUS 'TERMID1Y 110' TO BUS 'TERMINL7 115' CKT 10
OPEN LINE FROM BUS 'TERMID1Y 110' TO BUS 'TERTER1934.5' CKT 10
OPEN LINE FROM BUS 'TERMINL3 345' TO BUS 'TERMID2Y 110' CKT 9
OPEN LINE FROM BUS 'TERMID2Y 110' TO BUS 'TERMINL7 115' CKT 9
OPEN LINE FROM BUS 'TERMID2Y 110' TO BUS 'TERTER2934.5' CKT 9
END

CONTINGENCY '022 6'

OPEN LINE FROM BUS 'AS KING3 345' TO BUS 'CHIS CO3 345' CKT 1
OPEN LINE FROM BUS 'AS KING3 345' TO BUS 'KOLMNLK3 345' CKT 1
END

CONTINGENCY '022 8'

OPEN LINE FROM BUS 'AS KING3 345' TO BUS 'KOLMNLK3 345' CKT 1
OPEN LINE FROM BUS 'CHIS CO3 345' TO BUS 'KOLMNLK3 345' CKT 1
OPEN LINE FROM BUS 'KOLMNLK3 345' TO BUS 'KOLMNLK7 115' CKT 10
END

CONTINGENCY '022 11'

OPEN LINE FROM BUS 'CHIS CO3 345' TO BUS 'KOLMNLK3 345' CKT 1
OPEN LINE FROM BUS 'KOLMNLK3 345' TO BUS 'KOLMNLK7 115' CKT 10
END

CONTINGENCY '044 1' //SHUNT AND LOAD AMOUNT IS CASE SPECIFIC AND WAS ADJUSTED APPROPRIATELY

TRIP LINE FROM BUS 60199 TO BUS 61493 CKT 10
TRIP LINE FROM BUS 60199 TO BUS 61494 CKT 9
CHANGE BUS 67503 SHUNT BY XXXX MW
SET BUS 60110 LOAD TO 0 MW / 48.10
END

CONTINGENCY '044 2' //SHUNT AND LOAD AMOUNT IS CASE SPECIFIC AND WAS ADJUSTED APPROPRIATELY

TRIP LINE FROM BUS 60197 TO BUS 61493 CKT 10
TRIP LINE FROM BUS 60197 TO BUS 61494 CKT 9
CHANGE BUS 67503 SHUNT BY XXXX MW
SET BUS 60110 LOAD TO 0 MW / 48.10
SET BUS 60111 LOAD TO 0 MW / 3.460
END

CONTINGENCY '050 3'

OPEN LINE FROM BUS 'EAU CL 3 345' TO BUS 'ARP 345 345' CKT 1
OPEN LINE FROM BUS 'COC DPC 69' TO BUS 'COC 69 69' CKT 1
OPEN LINE FROM BUS 'HLT 69 69' TO BUS 'MAUSTON 69' CKT 1
END

CONTINGENCY '500'

TRIP LINE FROM BUS 66550 TO BUS 63050 CKT 1
TRIP LINE FROM BUS 63050 TO BUS 62427 CKT 1
END

CONTINGENCY '510'

OPEN LINE FROM BUS 'GRANITF4 230' TO BUS 'MORRIS 4 230' CKT 1
OPEN LINE FROM BUS 'MORRIS 4 230' TO BUS 'MORRIS 7 115' CKT 1
OPEN LINE FROM BUS 'MOORHED4 230' TO BUS 'MORRIS 4 230' CKT 1
END

CONTINGENCY '625'

OPEN LINE FROM BUS 'MINNTAC4 230' TO BUS 'FORBES 4 230' CKT 1
OPEN LINE FROM BUS 'MINNTAC4 230' TO BUS 'MINT1JCT 115' CKT 1
OPEN LINE FROM BUS 'MINT1JCT 115' TO BUS 'MINNTAC7 115' CKT 1
OPEN LINE FROM BUS 'MINT1JCT 115' TO BUS 'MINT1TR913.8' CKT 1
END

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CONTINGENCY '705 1'
OPEN LINE FROM BUS 'BLUE LK3 345' TO BUS 'PARKERS3 345' CKT 1
OPEN LINE FROM BUS 'BLUE LK3 345' TO BUS 'EDEN PR3 345' CKT 1
OPEN LINE FROM BUS 'EDEN PR3 345' TO BUS 'EDEN PR7 115' CKT 9
END

CONTINGENCY '705 4'
OPEN LINE FROM BUS 'PARKERS3 345' TO BUS 'EDEN PR3 345' CKT 1
OPEN LINE FROM BUS 'EDEN PR3 345' TO BUS 'EDEN PR7 115' CKT 10
END

CONTINGENCY '780 1'
OPEN LINE FROM BUS 'BENTON 7 115' TO BUS 'GRANCTY7 115' CKT 1
OPEN LINE FROM BUS 'BENTON 7 115' TO BUS 'BENCTP7 115' CKT 1
OPEN LINE FROM BUS 'BENCTP7 115' TO BUS 'GRANCTY7 115' CKT 1
OPEN LINE FROM BUS 'BENCTP7 115' TO BUS 'STCLOUD7 115' CKT 1
OPEN LINE FROM BUS 'GRANCTY7 115' TO BUS 'STREGIS7 115' CKT 1
END

CONTINGENCY '905'
OPEN LINE FROM BUS 'PR ISLD3 345' TO BUS 'BYRON 3 345' CKT 1
OPEN LINE FROM BUS 'PR ISLD3 345' TO BUS 'REDROCK3 345' CKT 2
END

CONTINGENCY '980'
OPEN LINE FROM BUS 'WRIV RD7 115' TO BUS 'RIVRSID7 115' CKT 1
OPEN LINE FROM BUS 'WRIV RD7 115' TO BUS 'RIVRSID7 115' CKT 2
END