4.2.4 60% Series Compensation Sensitivity

The change from 50% series compensation to 60% series compensation on the new 500 kV lines shifts the cost up slightly. Most of the same improvements are required just at a different transfer level. Only two options were studied with the 60% series compensation W1A and Y1B. In the charts and tables they are called out as W1A60 and Y1B60. The first limiters are shown in Table 4.2-12 and the system intact overloads are shown in Table 4.2-13. A chart comparing the difference between the 50% and 60% series compensation is shown in Figure 4.2-14 and Figure 4.2-15, which also includes the build out costs.

Figure 4.2-14 Compare 50% to 60% Series Comp. W1A to Y1B

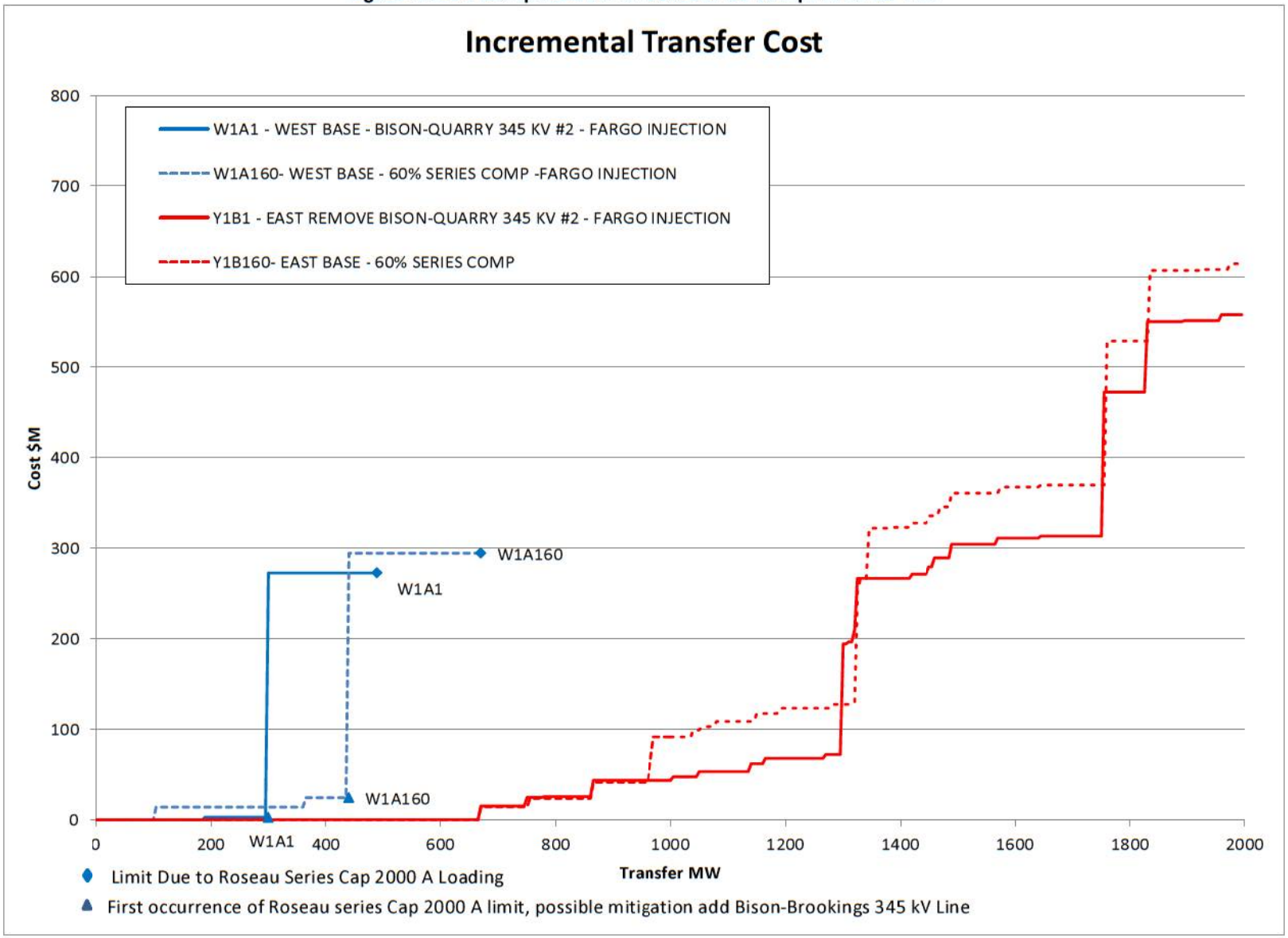
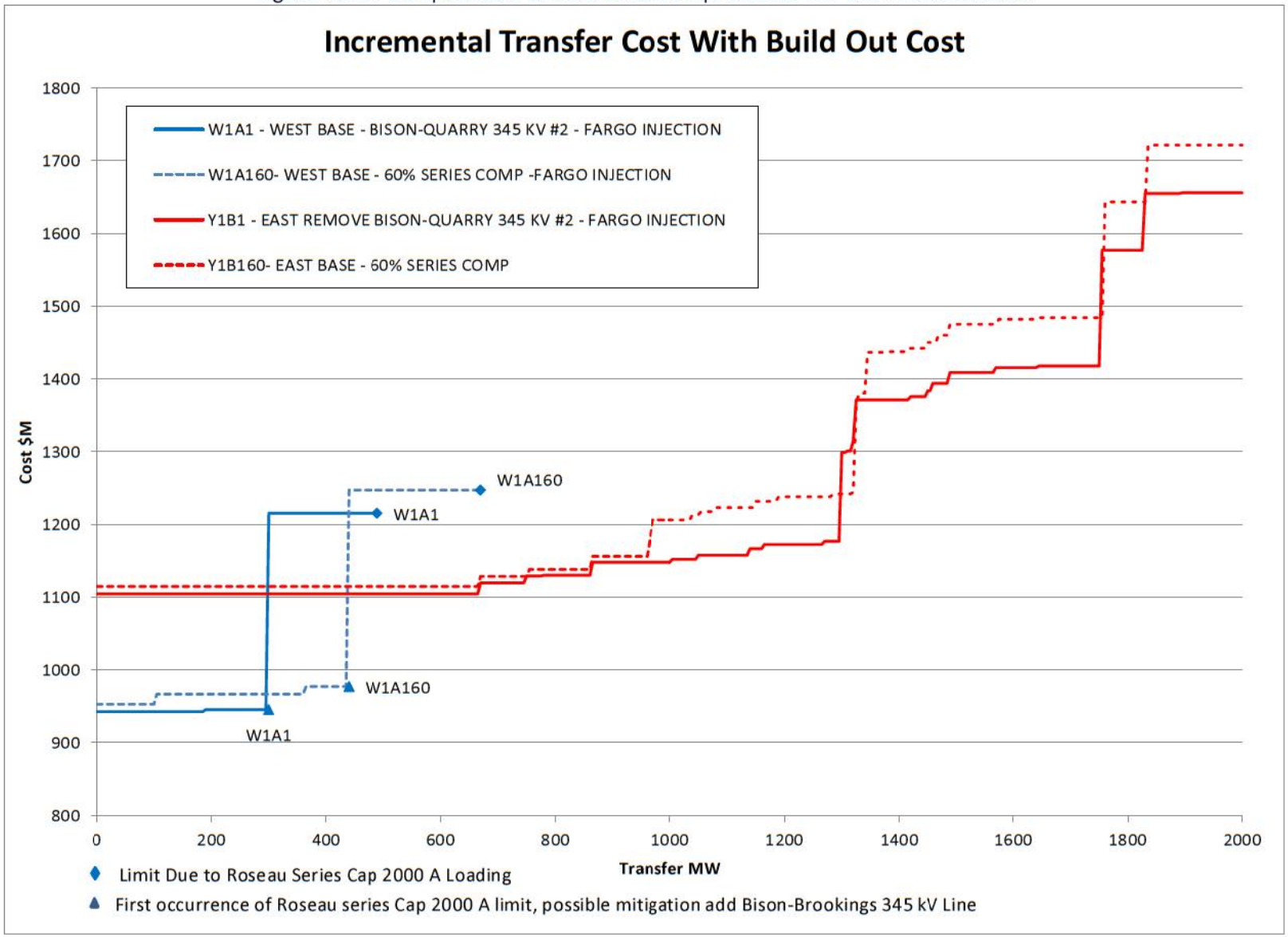


Figure 4.2-15 Compare 50% to 60% Series Comp. W1A to Y1B With Build Out Cost



4.2.5 MVP Scenario Sensitivity

The 1C scenario is based on the 1A base case with the addition of following MVP projects:

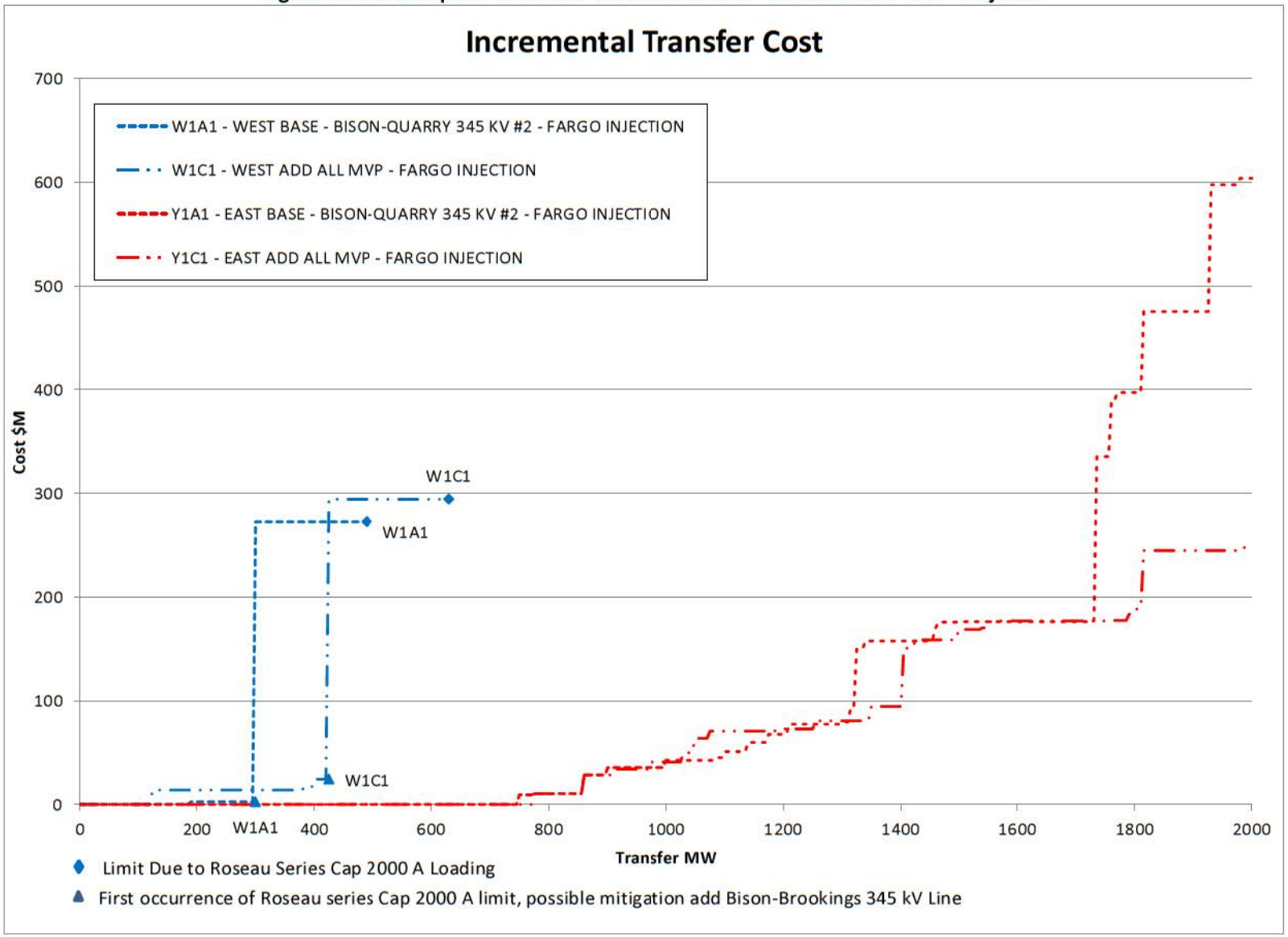
- Ellendale-Big Stone-Brookings County 345 kV
- Sheldon-Webster-Lakefield-Lime Creek-Hazelton 345 kV
- Ottumwa-Quincy-Sugar Creek 345 kV
- Adair-Ottumwa 345 kV
- North La Crosse-Madison-Cardinal-Spring Green-Dubuque 345 kV
- Sidney-Rising 345 kV
- Reynolds-Burr Oak-Hiple 345 kV
- Fargo-Oak Grove 345 kV
- Meadow Lake-Greentown 765 kV
- Michigan Thumb Loop Expansion 345 kV

Even with the MVP projects, the Fargo Option could not get more than 630 MW of additional wind injection because issue of the overloading the Roseau series capacitors, this is with the Bison-Brookings 345 kV line added as mitigation for the first occurrence of the Roseau Series Capacitors overload at 425 MW. The Iron Range options of the base case (Y1A) and MVP case (Y1C) are very similar in incremental cost until around 1700 MW, due to the Electric Jct.-Nelson overload upgrade. A chart comparing the difference between the east and west options of the MVP scenarios is shown in Figure 4.2-16.

The following MVP project is in the MISO 2017 summer peak MTEP08 base case:

- Brookings-Southeast Twin Cities 345 kV

Figure 4.2-16 Compare W1A and W1C to Y1A and Y1C Additional MVP Projects

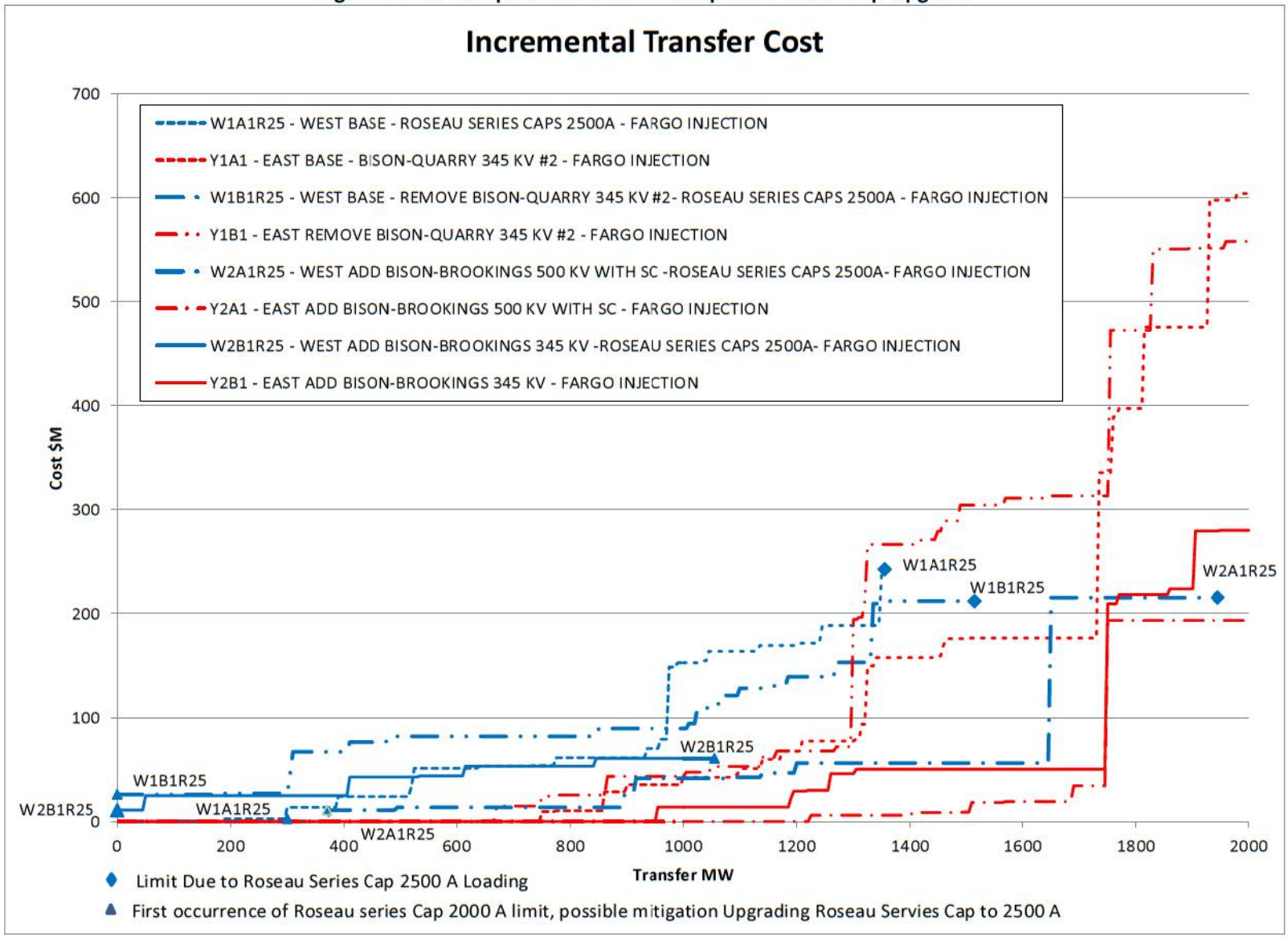


4.2.6 Roseau Series Capacitor 2500 Amp Upgrade Sensitivity

For this sensitivity, the Roseau Series Capacitors were upgraded from 2000 Amp to 2500 Amp for the occurrence of the 2000 Amp limitation. When the Roseau Series Capacitors 2500 Amp upgrade was the limitation the charts were ended. The MH runback was still limited to 1732 MW maximum. The viability of this upgrade is beyond the scope of this report, see Section 4.1.

The incremental cost for the Fargo scenario is more costly than the Iron Range scenario and does not go to 2000 MW wind injection for most of the scenarios, see Figure 4.2-17.

Figure 4.2-17 Compare Roseau Series Capacitor 2500 Amp Upgrade

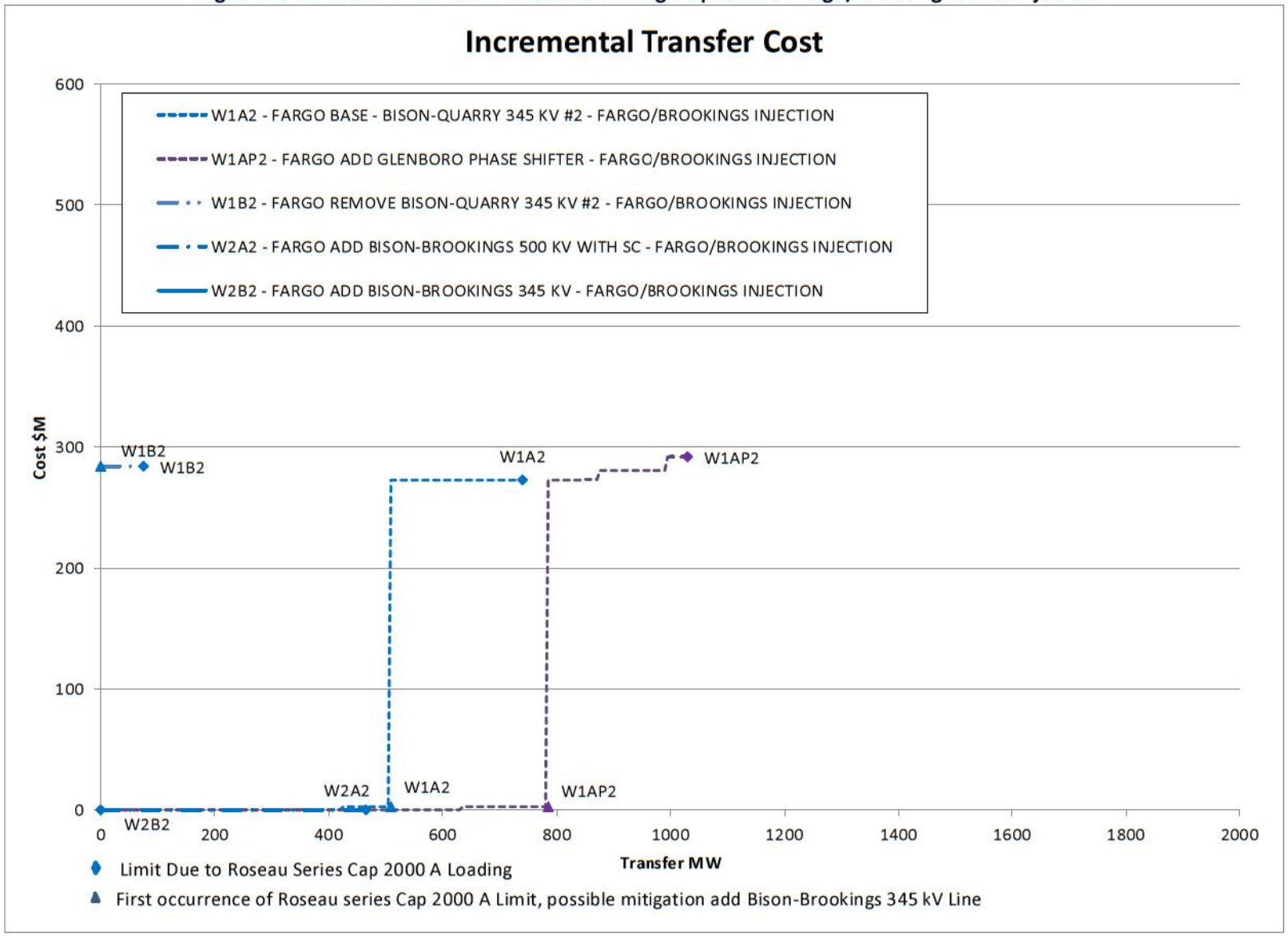


4.3 Fargo Option Fargo/Brookings Wind Injection

The Fargo options all have a 500 kV line from Dorsey to Bison at 50% series compensation and at least one 500/345 kV transformer at Bison. With these scenarios, the Manitoba power and the wind injection are both entering the 345 kV system at about the same point in Fargo (Bison 345 kV bus). With half the power being injecting at Fargo, not all the Red River Valley overloads occur before the 2000 MW cutoff. With half the wind injection at Brookings, the Split Rock-White 345 kV line and Watertown transformer overloads occur. The scenarios with the strongest outlets from the Red River Valley had the lowest incremental cost. The Roseau capacitors were the first overload encountered for system intact. The Fargo 500 kV line option does not complete the 2000 MW transfer due to the Roseau series capacitors overload even with the addition of the Bison-Brookings 345 kV line as mitigation of the first occurrence of the Roseau Series Capacitor overload. The overload output for all scenarios ran is in Appendix B1.

A chart showing the incremental cost is in Figure 4.3-1. The scenario with the highest incremental cost is W1A and W1AP. These scenarios do not provide for an independent transmission path for the wind injection at Fargo should the CapX Fargo-Twin Cities 345 kV line have an outage, the underlying 230 kV and 115 kV transmission grid would also require upgrading to accommodate the increased power flow.

Figure 4.3-1 Incremental Transfer Cost with Fargo Option for Fargo/Brookings Wind Injection



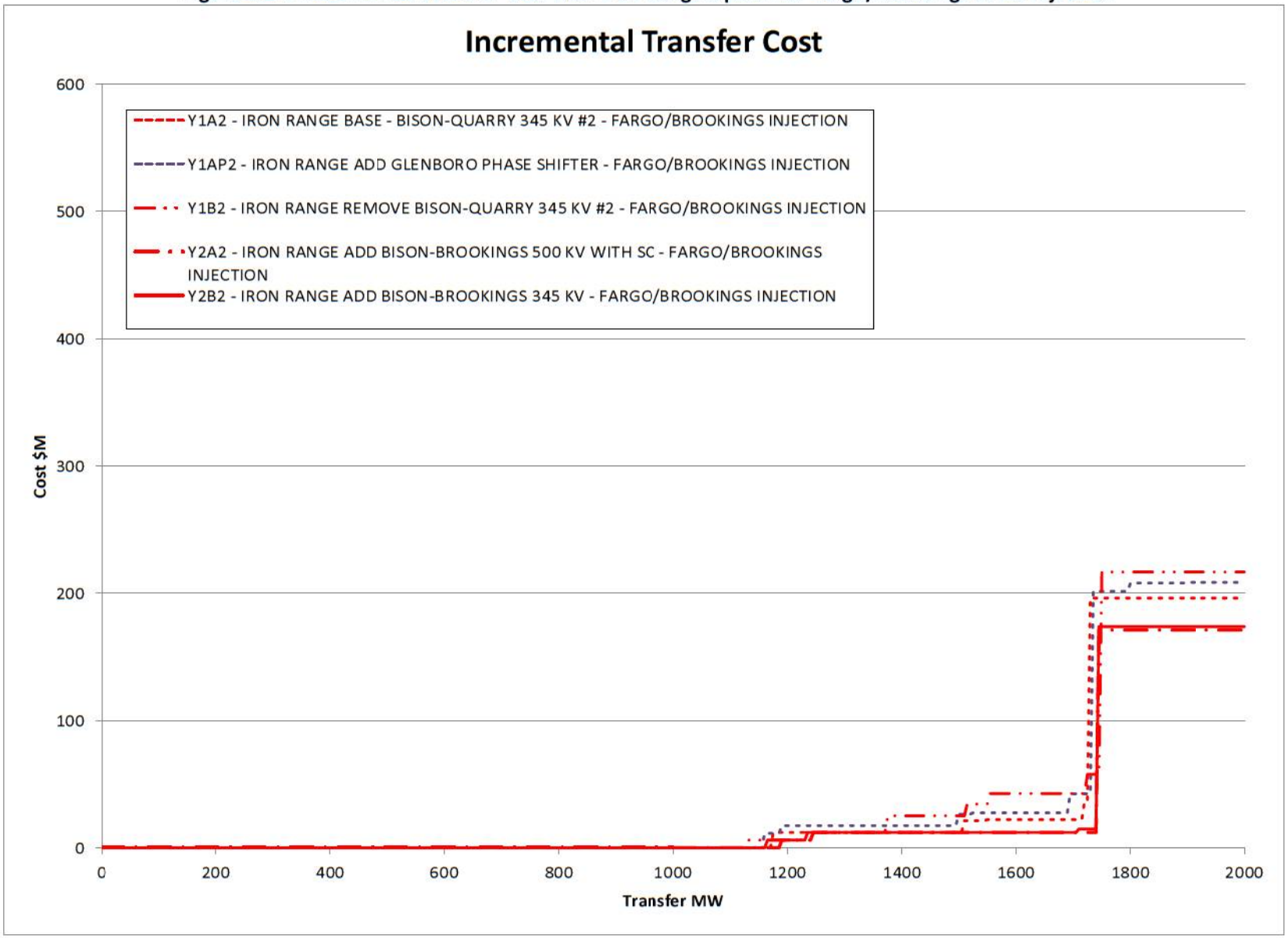
4.3.1 Iron Range Option Fargo/Brookings Wind Injection

The Iron Range scenarios all have a 500 kV line from Dorsey to the Blackberry with 50% series compensation, a double circuit 345 kV line from the Blackberry to Arrowhead, two 500/345 kV transformers at Blackberry, and one 345/230 kV transformer at Blackberry. With these scenarios, the Manitoba power and the wind injection are entering the 345 kV system at totally different points, some of the same upgrades due to CapX line outage are still required but at higher wind injection levels and mostly occurring after the 2000 MW cutoff. The Roseau capacitors do not overload for this option. The overloads are primarily Split Rock-White 345 kV line, Electric Junction-Nelson 345 kV line, and Arpin 345/138kV transformer.

The Bison-Maple River 345 kV, Maple River-Sheyenne 230 kV lines and the Maple River 345/230 kV transformers overload for the loss of Bison-Alexandria 345 kV line at a 1375 MW wind injection level when there is not an additional outlet for the wind injection out of the Fargo area. The lines still overload for some of the scenarios but at higher wind injection levels. With the loss of the Alexandria-Quarry 345 kV line, the Fargo area 230 kV system overloads. For the scenario with the 500 kV line from Fargo-Brookings there are no overloads in the Red River Valley. The single most costly upgrade is the Electric Junction-Nelson 345 kV line, it occurs around 1740 MW. The stronger the outlet to Brookings County the lower the incremental costs. The overload output for all scenarios ran is in Appendix B2.

The scenario with the lowest incremental cost is Y2A (Bison-Split Rock 500 kV). The second lowest incremental cost is Y2B which is the Bison-Brookings 345 kV line. A chart showing the incremental cost is in Figure 4.3-2. The scenario with the highest incremental cost is Y1B. This scenario does not provide for an independent transmission path for the wind injection at Fargo should the CapX Fargo-Twin Cities 345 kV line have an outage, the underlying 230 kV and 115 kV transmission grid requires upgrading to accommodate the increased power flow.

Figure 4.3-2 Incremental Transfer Cost with Iron Range Option for Fargo/Brookings Wind Injection



4.3.2 Comparison of Options Fargo/Brookings Wind Injection

The least incremental cost scenario is Y2A, eastern option with 500 kV line Bison-Brookings County. The 500 kV line only goes from Bison to Brookings County with transformers required at both ends, a double circuit 345 kV would be the same. It provides two independent outlets from Fargo for the wind injection. The Iron Range option with a single 345 kV line is a very close second. A chart showing the incremental cost is in Figure 4.3-4. A table with the incremental costs is shown in Table 4.3-3.

The most costly incremental is Y1B, there are no additional independent outlets for the wind injections and requires slightly more upgrades to the 230 kV system in the Red River Valley. The Fargo option is limited by the Roseau Series Capacitor to 2000 amps system intact, allowing only 1030 MW max (W1AP) additional wind injection after the addition of the Bison-Brookings 345 kV line for mitigation of the first occurrence of the Roseau Series Capacitor overload.

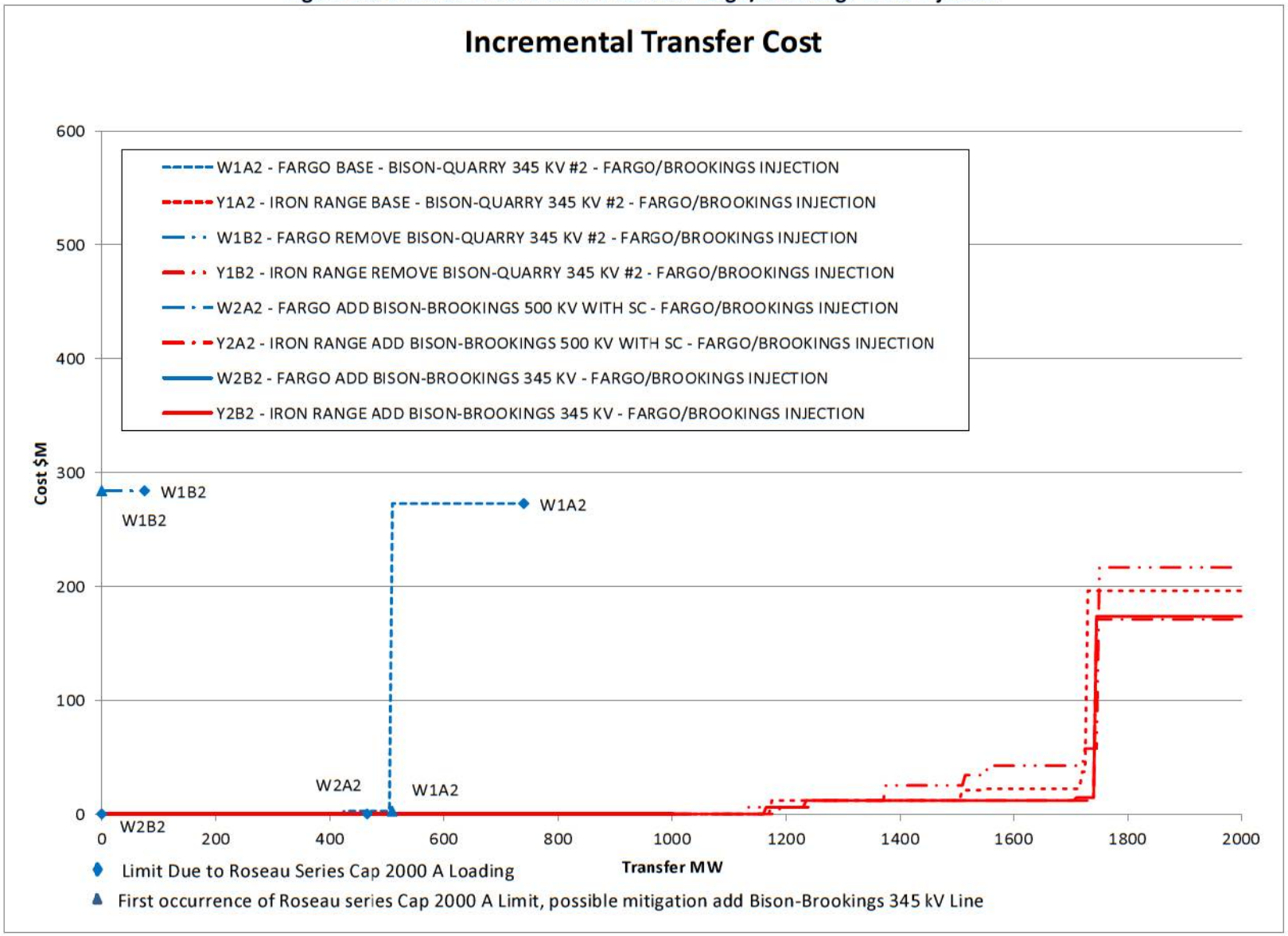
The Iron Range option has the first limiters occurring at higher wind injection than the other two options. For the Fargo option the Roseau capacitor bank is the first limiter. See Table 4.2-12 for the complete list of first limiters.

The Iron Range option only had one system intact overload, Y2A, Split Rock-White 345 kV line at 1990 MW. The Fargo option had the Roseau capacitor bank and Split Rock-White 345 kV line for some of the scenarios. A table showing the system intact overloads is in Table 4.2-13.

Table 4.3-3 Cost Comparison for Fargo/Brookings Wind Injection (in $M)

	FARGO 500 MW	IRON RANGE 500 MW	FARGO 1000 MW	IRON RANGE 1000 MW	FARGO 1500 MW	IRON RANGE 1500 MW	FARGO 2000 MW	IRON RANGE 2000 MW
1A :Base Bison-Quarry #2	3	0	*(273 @ 740 MW)*	0	N/A	12	N/A	196
1AP Add Glenboro Phase Shifter	0	0	*292*	0	*(292 @ 1030 MW)*	26	N/A	209
1B Remove Bison-Quarry #2	*(284 @ 75 MW)*	0	N/A	0	N/A	25	N/A	217
2A Add Bison-Brookings 500 kV with SC	*(0 @ 465 MW)*	0	N/A	0	N/A	12	N/A	171
2B Add Bison-Brookings 345 kV	*(0 @ 0 MW)*	0	N/A	0	N/A	12	N/A	174

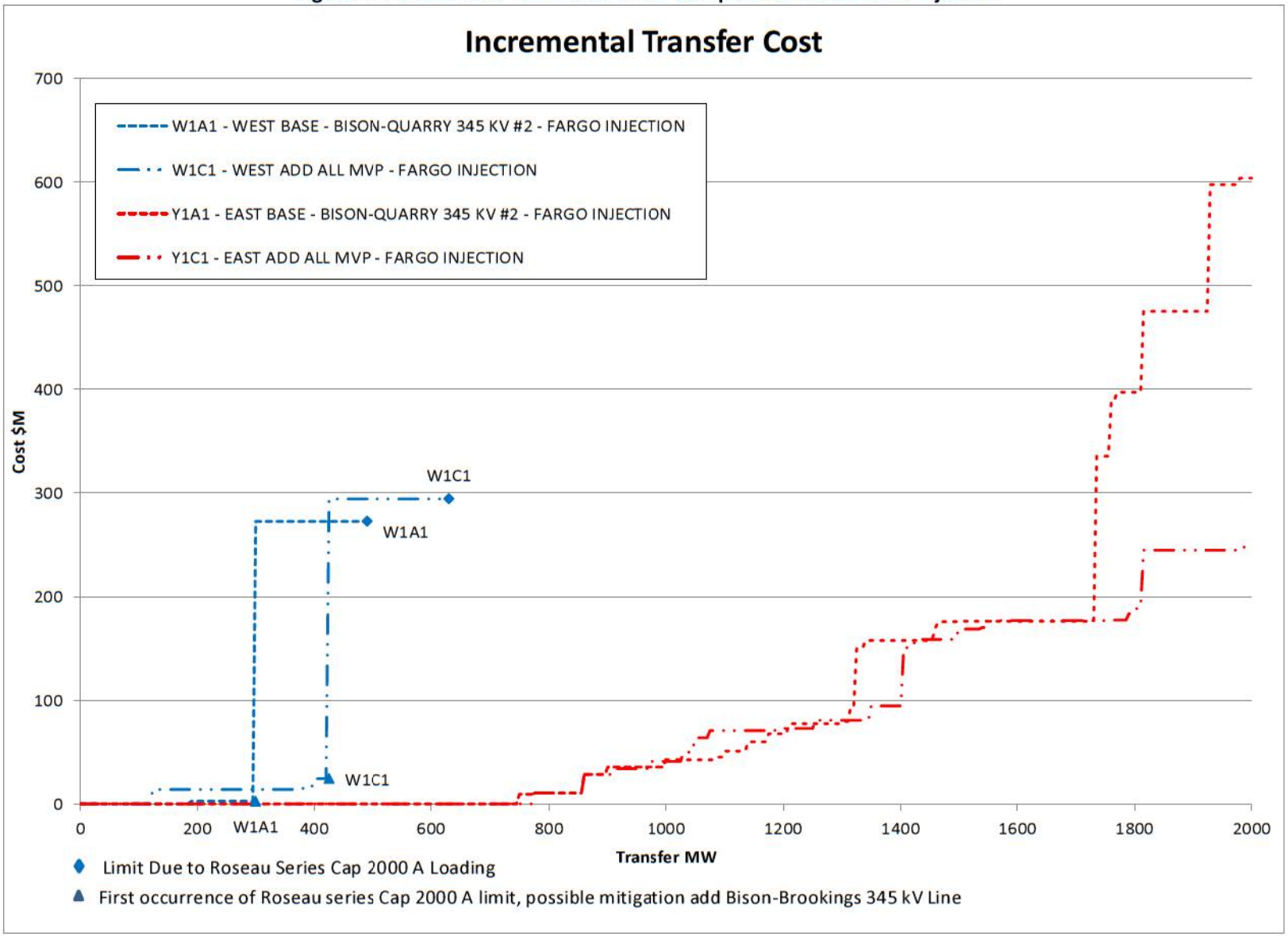
Figure 4.3-4 Incremental Transfer Cost for Fargo/Brookings Wind Injection



4.4 NDEX Wind Injection Sensitivity

In order to evaluate the influence the point source has on the results instead of injecting the wind at the Bison 345 kV bus the entire area within the historical NDEX (North Dakota Export) boundary was used for a source. The power transfer was increased by decreasing the NDEX load. This was only used for the W1A, Fargo 500 kV line with double circuit 345 kV Bison-Quarry, and Y1B, Iron Range 500 kV line with double circuit 345 kV Blackberry-Arrowhead. The options are noted at W1AND and Y1BND in the charts and tables. The incremental cost for comparing W1A and Y1B with each other and with the Fargo wind injection versus the NDEX wind injection sourcing is shown in Figure 4.4-1 The Roseau series capacitors system intact limit is 705 MW for the Fargo option after the addition of the Bison-Brookings 345 kV line for the first occurrence of the Roseau Series Capacitor overload. The overload output for all scenarios ran is in Appendix C1 and C2.

Figure 4.4-1 W1A and Y1B Incremental Compare for NDEX Wind Injection



Under Separate Cover

Appendix A Fargo Wind Injection

- **A1 Fargo Option**
- **A2 Iron Range Option**

Appendix B Fargo/Brookings Co. Wind Injection

- **B1 Fargo Option**
- **B2 Iron Range Option**

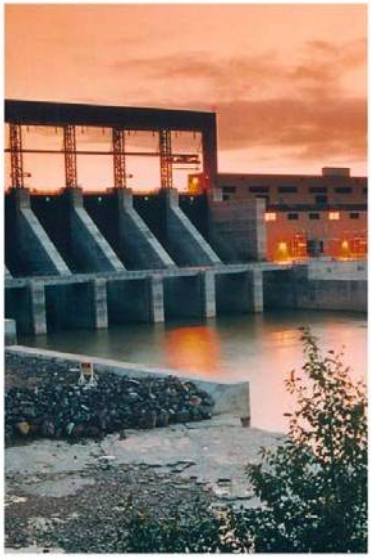
Appendix C NDEX Wind Injection

- **C1 Fargo Option**
- **C2 Iron Range Option**

Appendix D Costs

Appendix E Iron Range Option with Fargo Tap Sensitivity

Manitoba - United States Transmission Development Wind Injection Study Appendix



Maximizing Wind and Water

Prepared for:

Minnesota Power

Excel Engineering, Inc.

Revision Date
March 1, 2013

Principal Contributors:

Michael Cronier, PE
LaShel Marvig, PE

Appendix A Fargo Wind Injection

Fargo Option

Case File - C:\MP-MH-EHV\Work\Bison-Zion\Bison-Zion-PF\MH_SUPK_B_W1A.sav
Sub File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV.sub
Mon File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH.mon
Con File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV-W1A.con
Exc File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH-Exclude.exc

Transfer From: BisonGen
Transfer To: EAST_MISO
Transfer Level: 3000 MW
Transfer Goal: 2000 MW
System Intact DF 5.%
Contingency DF 5.%

Wed, 06 Jun 2012 15:12:12

Transfer MW	Limiting Facility	Outage	DF%	Remedy	Upgrade Estimate
-145	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	33.4	DC Runback	0
125	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601045 ALEXSS3 345 601047 QUARRY3 345 1 Open 601045 ALEXSS3 345 601047 QUARRY3 345 2	31.4	DC Runback	0
130	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	24.5	DC Runback	0
145	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	35.3	DC Runback	0
190	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV	23.0	Reconductor to (1272 ACSS)	$2.59M
190	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	23.0		
220	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	9.9	DC Runback	0
280	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	17.7	DC Runback	0
280	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	17.7	DC Runback	0
300	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	21.8	Construct Bison-Brookings 345 kV line (to get 545.1 MW transfer) $270M	$270.00M
405	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601045 ALEXSS3 345 601047 QUARRY3 345 1 Open 601045 ALEXSS3 345 601047 QUARRY3 345 2	25.7	DC Runback	0
455	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	8.1	DC Runback	0
490	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	18.8	Roseau Series Cap 2000 A Limit	
570	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	18.6	DC Runback	0
585	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	27.0	DC Runback	0
755	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	8.1	Upgrade to 1828 Amps (1192 ACSS)	$9.18M
765	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	13.5	DC Runback	0
765	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	13.5	DC Runback	0
805	Arpin 345/138 kV Tx at 113% of 336 MVA Owner(s): 691	Open Arpin-Rocky run 345 kV	6.3	Upgrade To 550 MVA	$7.50M
805	Coon Creek-Kohlman Lake 345 kV at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~15 Miles	Open Coon Creek-Terminal 345 kV	8.3	Upgrade (Terminal Equipment)	$.50M
810	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	27.0	Uprate to 2500 Amps (Conductor Rating)	$1.00M
810	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	18.6	Upgrade to (2-795 ACSS)	$9.45M
825	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open Ridgeway-Richer 230 kV	19.5	DC Runback	0
845	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601045 ALEXSS3 345 601047 QUARRY3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	21.8		
850	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open Shannon-Running 230 kV	19.5		
855	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 2	14.0	Upgrade To 672 MVA	$8.00M

855	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 1	14.0	Upgrade To 672 MVA	$8.00M
965	Quarry 345/115 kV Tx at 115% of 448 MVA Owner(s): XCEL	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	12.6	DC Runback	0
985	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	13.5		
990	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	13.5		
1005	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open Bison-Maple River 230 kV	24.1		
1035	Sigel-Arpin 138 kV at 100% of 287 MVA (1201 amps) Owner(s): 691 5.23 Miles	Open Arpin-Rocky run 345 kV	5.4	Upgrade to 1419 Amps (795 ACSS)	$7.85M
1165	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601045 ALEXSS3 345 601047 QUARRY3 345 1 Open 601045 ALEXSS3 345 601047 QUARRY3 345 2	16.2		
1200	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	12.0		
1205	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	12.0		
1230	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	7.4	DC Runback	0
1250	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601045 ALEXSS3 345 601047 QUARRY3 345 1 Open 601045 ALEXSS3 345 601047 QUARRY3 345 2	23.1		
1255	Quarry 345/115 kV Tx at 115% of 448 MVA Owner(s): XCEL	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	12.6	Upgrade To 672 MVA	$8.00M
1305	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	10.0	Uprate to 2500 Amps (Conductor Rating)	$1.00M
1320	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Maple River-Red River 115 1	13.5		
1325	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601045 ALEXSS3 345 601047 QUARRY3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	14.9		
1365	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601045 ALEXSS3 345 601047 QUARRY3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	21.5		
1375	Coon Creek-Kohlman Lake 345 kV at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~15 Miles	Open Coon Creek-Terminal 345 kV Open 601024 TERMINL3 345 605585 TERMID1Y 110 10 Open 603110 TERMINL7 115 605585 TERMID1Y 110 10 Open 605516 TERTER19 34.5 605585 TERMID1Y 110 10	8.2		
1470	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	7.4	Upgrade to 1109 Amps (556 ACSS)	$69.33M
1495	Maple River 345/230 kV tx 1 at 100% of 336 MVA Owner(s): OTP	System Intact	9.2		
1500	Maple River 345/230 kV tx 2 at 100% of 336 MVA Owner(s): OTP	System Intact	9.2		
1595	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	10.0	Reconductor to (795 ACSS)	$8.80M
1625	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	10.0	DC Runback	0
1635	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open T-Corners-Wien 115 kV Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV	13.0	Upgrade to (2-795 ACSS)	$159.04M
1640	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open T-Corners-Wien 115 kV Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV	13.0		
1655	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1680	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1700	Sheyenne-Maple River 230 at 100% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	System Intact	12.9		

1730	Fargo-Moorhead 230 kV at 110% of 240 MVA (602 amps) Owner(s): WAPA ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	6.0	DC Runback	0
1755	Bison-Maple River 345 kV at 100% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	System Intact	18.4		
1755	Chisago County 500/345/34.5 kV Tx #10 at 115% of 1203 MVA Owner(s): XCEL	Open Chisago County 500/345/34.5 kV Tx #9	15.8	Upgrade To Beyond Single Tx	$25.00M
1755	Chisago County 500/345/34.5 kV Tx #9 at 115% of 1203 MVA Owner(s): XCEL	Open Chisago County 500/345/34.5 kV Tx #10	15.8	Upgrade To Beyond Single Tx	$25.00M
1760	Elm Creek-Monticello 345 kV at 100% of 1195 MVA (2000 amps) Owner(s): XCEL ~19 Miles	Open Sherco-Coon Creek 345 kV #1 Open 601011 SHERCO 3 345 615327 GRE-BUNKER 3 345 1 Open 601019 COON CK3 345 615327 GRE-BUNKER 3 345 1 Open Coon Creek 345/115 kV tx #10 Open 615327 GRE-BUNKER 3 345 BS0392 345/230 1.00 1 Open 615328 GRE-BUNKER 4 230 BS0392 345/230 1.00 1 Open 615330 GRE-BUNKER T13.8 BS0392 345/230 1.00 1	14.7	Upgrade to 2190 Amps (2 x 954 ACSS)	$53.96M
1895	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open Brookings Co - Lyon Co 345 kV	14.8	Increase Conductor Temperature	$6.00M
1915	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	10.0	Reconductor to (795 ACSS)	$2.20M

Case File - C:\MP-MH-EHV\Work\Bison-Zion\Bison-Zion-PF\MH_SUPK_B_W1A60.sav
Sub File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV.sub
Mon File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH.mon
Con File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV-W1A.con
Exc File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH-Exclude.exc

Transfer From: BisonGen
Transfer To: EAST_MISO
Transfer Level: 3000 MW
Transfer Goal: 2000 MW
System Intact DF 5.%
Contingency DF 5.%

Tue, 13 Nov 2012 13:26:25

MW*DF as % of Line Rating Cutoff: 9999.%

Transfer MW	Limiting Facility	Outage	DF%	Remedy	SM
-90	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	34.6	DC Runback	0
85	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	23.7	DC Runback	0
95	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	34.1	DC Runback	0
105	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV	22.3	Upgrade to 2367 Amps (1590 ACSS)	$13.90M
105	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	22.3		
170	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	9.7	DC Runback	0
190	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601047 QUARRY3 345 2	32.6	DC Runback	0
235	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	17.1	DC Runback	0
235	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	17.1	DC Runback	0
365	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	34.1	Uprate to 2500 Amps (Conductor Rating)	$1.00M
365	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	23.7	Upgrade to (2-795 ACSS)	$9.45M
440	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	22.8	Construct Bison-Brookings 345 kV line (to get 545.1 MW transfer) $270M	$270.00M
495	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601047 QUARRY3 345 2	26.8		
670	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	19.7	Roseau Series Cap 2000 A Limit	
700	Coon Creek-Kohlman Lake 345 kV at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~15 Miles	Open Coon Creek-Terminal 345 kV	8.0	Upgrade (Terminal Equipment)	$.50M
715	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	13.1	DC Runback	0
715	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	13.1	DC Runback	0
720	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	7.9	Upgrade to 1828 Amps (1192 ACSS)	$9.18M
770	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 2	13.7	Upgrade To 672 MVA	$8.00M
775	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 1	13.7	Upgrade To 672 MVA	$8.00M
810	Arpin 345/138 kV Tx at 113% of 336 MVA Owner(s): 691	Open Arpin-Rocky run 345 kV	6.3	Upgrade To 550 MVA	$7.50M
920	Quarry 345/115 kV Tx at 115% of 448 MVA Owner(s): XCEL	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	12.3	DC Runback	0
925	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open Bison-Maple River 230 kV	23.5		
955	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	22.8		
965	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	13.1		
965	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	13.1		
975	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	23.9		

985	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	28.0		
1040	Sigel-Arpin 138 kV at 100% of 287 MVA (1201 amps) Owner(s): 691 5.23 Miles	Open Arpin-Rocky run 345 kV	5.4	Upgrade to 1418 Amps (795 ACSS)	$7.85M
1120	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601047 QUARRY3 345 2	15.8		
1125	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	11.8		
1130	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	11.8		
1195	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	7.2	DC Runback	0
1210	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601047 QUARRY3 345 2	22.4		
1230	Quarry 345/115 kV Tx at 115% of 448 MVA Owner(s): XCEL	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	12.3	Upgrade To 672 MVA	$8.00M
1250	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Maple River-Red River 115 1	13.2		
1275	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	14.6		
1280	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	9.7	DC Runback	0
1290	Coon Creek-Kohlman Lake 345 kV at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~15 Miles	Open Coon Creek-Terminal 345 kV Open 601024 TERMINL3 345 605585 TERMID1Y 110 10 Open 603110 TERMINL7 115 605585 TERMID1Y 110 10 Open 605516 TERTER19 34.5 605585 TERMID1Y 110 10	7.9		
1310	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	20.9		
1425	Maple River 345/230 kV tx 1 at 100% of 336 MVA Owner(s): OTP	System Intact	9.0		
1430	Maple River 345/230 kV tx 2 at 100% of 336 MVA Owner(s): OTP	System Intact	9.0		
1460	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	7.2	Upgrade to 1111 Amps (556 ACSS)	$69.33M
1590	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	9.7	Reconductor to (795 ACSS)	$8.80M
1610	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	9.7	DC Runback	0
1635	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open T-Corners-Wien 115 kV Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV	13.0	Upgrade to (2-795 ACSS)	$159.04M
1640	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open T-Corners-Wien 115 kV Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV	13.0		
1645	Sheyenne-Maple River 230 at 100% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	System Intact	12.6		
1655	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1655	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1680	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1695	Bison-Maple River 345 kV at 100% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	System Intact	18.0		
1715	Fargo-Moorhead 230 kV at 110% of 240 MVA (602 amps) Owner(s): WAPA ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	5.9	DC Runback	0

1735	Elm Creek-Monticello 345 kV at 100% of 1195 MVA (2000 amps) Owner(s): XCEL ~19 Miles	Open Sherco-Coon Creek 345 kV #1 Open 601011 SHERCO 3 345 615327 GRE-BUNKER 3 345 1 Open 601019 COON CK3 345 615327 GRE-BUNKER 3 345 1 Open Coon Creek 345/115 kV tx #10 Open 615327 GRE-BUNKER 3 345 B$0392 345/230 1.00 1 Open 615328 GRE-BUNKER 4 230 B$0392 345/230 1.00 1 Open 615330 GRE-BUNKER T13.8 B$0392 345/230 1.00 1	14.5	Upgrade to 2190 Amps (2 x 954 ACSS)	$53.96M
1845	Chisago County 500/345/34.5 kV Tx #10 at 115% of 1203 MVA Owner(s): XCEL	Open Chisago County 500/345/34.5 kV Tx #9	16.4	Upgrade To Beyond Single Tx	$25.00M
1850	Chisago County 500/345/34.5 kV Tx #9 at 115% of 1203 MVA Owner(s): XCEL	Open Chisago County 500/345/34.5 kV Tx #10	16.4	Upgrade To Beyond Single Tx	$25.00M
1880	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open Brookings Co - Lyon Co 345 kV	14.7	Increase Conductor Temperature	$6.00M
1915	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	9.7	Reconductor to (795 ACSS)	$2.20M
1995	Moorhead-Morris 230 kV at 110% of 239 MVA (600 amps) Owner(s): WAPA ~96 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	6.3	DC Runback	0

Case File - C:\MP-MH-EHV\Work\Bison-Zion\Bison-Zion-PF\MH_SUPK_B_W1AP.sav
Sub File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV.sub
Mon File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH.mon
Con File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV-W1AP.con
Exc File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH-Exclude.exc

Transfer From: BisonGen
Transfer To: EAST_MISO
Transfer Level: 3000 MW
Transfer Goal: 2000 MW
System Intact DF 5.%
Contingency DF 5.%

Tue, 05 Jun 2012 15:37:15

Transfer MW	Limiting Facility	Outage	DF%	Remedy	Upgrade Estimate
-30	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	33.5	DC Runback	0
210	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	35.3	DC Runback	0
210	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	24.5	DC Runback	0
235	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	9.9	DC Runback	0
240	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601045 ALEXSS3 345 601047 QUARRY3 345 1 Open 601045 ALEXSS3 345 601047 QUARRY3 345 2	31.4	DC Runback	0
280	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	23.0	Upgrade to 2296 Amps (2 x795 ACSS) - $13.9M	13.9
280	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV	23.0		
345	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	17.7	DC Runback	0
345	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	17.7	DC Runback	0
370	Center-Heskett 230 kV at 110% of 428 MVA (1074 amps) Owner(s): MPC 22.5 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	5.1	DC Runback	0
460	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	21.8	Construct Bison-Brookings 345 kV line (to get 545.1 MW transfer) $270M	$270.00M
465	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	8.1	DC Runback	0
545	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601045 ALEXSS3 345 601047 QUARRY3 345 1 Open 601045 ALEXSS3 345 601047 QUARRY3 345 2	25.8	DC Runback	0
565	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	18.4		
565	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV	18.4		
660	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	27.0	DC Runback	0
665	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	18.6	DC Runback	0
680	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	18.8	Roseau Series Cap 2000 A Limit	
750	Coon Creek-Kohlman Lake 345 kV at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~15 Miles	Open Coon Creek-Terminal 345 kV	8.3	Upgrade (Terminal Equipment)	$.50M
765	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	8.1	Upgrade to 1824 Amps (1192 ACSS)	$9.18M
825	Arpin 345/138 kV Tx at 113% of 336 MVA Owner(s): 691	Open Arpin-Rocky run 345 kV	6.3	Upgrade To 550 MVA	$7.50M
840	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	13.5	DC Runback	0
840	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	13.5	DC Runback	0
885	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	27.0	Uprate to 2500 Amps (Conductor Rating)	$1.00M
905	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	18.6	Upgrade to (2-795 ACSS)	$9.45M
960	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 2	14.0	Upgrade To 672 MVA	$8.00M

960	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 1	14.0	DC Runback	0
975	Quarry 345/115 kV Tx at 115% of 448 MVA Owner(s): XCEL	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	12.6	DC Runback	0
1010	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601045 ALEXSS3 345 601047 QUARRY3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	21.8		
1020	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open Ridgeway-Richer 230 kV	19.5	DC Runback	0
1030	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	22.9	DC Runback	0
1055	Sigel-Arpin 138 kV at 100% of 287 MVA (1201 amps) Owner(s): 691 5.23 Miles	Open Arpin-Rocky run 345 kV	5.4	Upgrade to 1414 Amps (795 ACSS)	$7.85M
1065	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	13.5		
1065	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	13.5		
1105	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open Bison-Maple River 230 kV	24.1		
1225	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	7.4	DC Runback	0
1265	Quarry 345/115 kV Tx at 115% of 448 MVA Owner(s): XCEL	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	12.6	Upgrade To 672 MVA	$8.00M
1265	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601045 ALEXSS3 345 601047 QUARRY3 345 1 Open 601045 ALEXSS3 345 601047 QUARRY3 345 2	16.2		
1305	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	12.0		
1305	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	12.0		
1315	Coon Creek-Kohlman Lake 345 kV at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~15 Miles	Open Coon Creek-Terminal 345 kV Open 601024 TERMINL3 345 605585 TERMID1Y 110 10 Open 603110 TERMINL7 115 605585 TERMID1Y 110 10 Open 605516 TERTER19 34.5 605585 TERMID1Y 110 10	8.2		
1335	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601045 ALEXSS3 345 601047 QUARRY3 345 1 Open 601045 ALEXSS3 345 601047 QUARRY3 345 2	23.1		
1345	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	10.0	DC Runback	0
1435	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601045 ALEXSS3 345 601047 QUARRY3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	15.0		
1445	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Maple River-Red River 115 1	13.5		
1455	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601045 ALEXSS3 345 601047 QUARRY3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	21.5		
1465	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	7.4	Upgrade to 1110 Amps (556 ACSS)	$69.33M
1600	Maple River 345/230 kV tx 1 at 100% of 336 MVA Owner(s): OTP	System Intact	9.2		
1600	Maple River 345/230 kV tx 2 at 100% of 336 MVA Owner(s): OTP	System Intact	9.2		
1635	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	10.0	Reconductor to (795 ACSS)	$8.80M
1645	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open T-Corners-Wien 115 kV Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV	13.0	Upgrade to (2-795 ACSS)	$159.04M
1650	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open T-Corners-Wien 115 kV Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV	13.0		
1665	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		

1665	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1665	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	10.0	DC Runback	0
1690	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1745	Fargo-Moorhead 230 kV at 110% of 240 MVA (602 amps) Owner(s): WAPA ~11 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2	6.0	DC Runback	0
1780	Elm Creek-Monticello 345 kV at 100% of 1195 MVA (2000 amps) Owner(s): XCEL ~19 Miles	Open Sherco-Coon Creek 345 kV #1 Open 601011 SHERCO 3 345 615327 GRE-BUNKER 3 345 1 Open 601019 COON CK3 345 615327 GRE-BUNKER 3 345 1 Open Coon Creek 345/115 kV tx #10 Open 615327 GRE-BUNKER 3 345 B\$0392 345/230 1.00 1 Open 615328 GRE-BUNKER 4 230 B\$0392 345/230 1.00 1 Open 615330 GRE-BUNKER T13.8 B\$0392 345/230 1.00 1	14.7	Upgrade to 2190 Amps (2 x 954 ACSS)	$53.96M
1830	Sheyenne-Maple River 230 at 100% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	System Intact	12.9		
1860	Bison-Maple River 345 kV at 100% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	System Intact	18.4		
1895	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open Brookings Co - Lyon Co 345 kV	14.8	Increase Conductor Temperature	$6.00M
1910	Chisago County 500/345/34.5 kV Tx #10 at 115% of 1203 MVA Owner(s): XCEL	Open Chisago County 500/345/34.5 kV Tx #9	15.8	Upgrade To Beyond Single Tx	$25.00M
1910	Chisago County 500/345/34.5 kV Tx #9 at 115% of 1203 MVA Owner(s): XCEL	Open Chisago County 500/345/34.5 kV Tx #10	15.8	Upgrade To Beyond Single Tx	$25.00M
1955	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601045 ALEXSS3 345 601067 BISON 3 345 1 Open 601045 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	10.0	Reconductor to (795 ACSS)	$2.20M

Case File - C:\MP-MH-EHV\Work\Bison-Zion\Bison-Zion-PF\MH_SUPK_B_W1B.sav
Sub File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV.sub
Mon File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH.mon
Con File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV-W1B.con
Exc File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH-Exclude.exc

Transfer From: BisonGen
Transfer To: EAST_MISO
Transfer Level: 3000 MW
Transfer Goal: 2000 MW
System Intact DF 5.%
Contingency DF 5.%

Tue, 05 Jun 2012 15:27:14

Transfer MW	Limiting Facility	Outage	DF%	Remedy	Upgrade Estimate
-240	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV	27.6	Upgrade to 2856 Amps (2 x 954 ACSS) - $15M	15
-240	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	27.6		
-155	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	34.2	DC Runback	0
-140	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	33.5	DC Runback	0
-135	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	26.2	Construct Bison-Brookings 345 kV line (to get 545.1 MW transfer) $270M	$270.00M
50	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	22.0	Roseau Series Cap 2000 A Limit	
135	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	27.5		
150	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	27.0		
325	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open Ridgeway-Richer 230 kV	22.9		
340	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open Shannon-Running 230 kV	22.9		
370	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 2	16.2	Upgrade To 800 MVA	$9.00M
370	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 1	16.2	Upgrade To 800 MVA	$9.00M
370	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1	26.0		
495	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open Bison-Maple River 230 kV	27.9	Uprate to 2500 Amps (Conductor Rating)	$1.00M
575	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	18.6	DC Runback	0
580	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	26.9		
590	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	18.4		
605	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	26.4		
665	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	13.9		
665	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	13.9		
760	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	13.5		
760	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	13.5		
785	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	13.2		
790	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	13.2		
790	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Maple River-Red River 115 1	15.5	Upgrade to (2-795 ACSS)	$9.45M
885	Arpin 345/138 kV Tx at 113% of 336 MVA Owner(s): 691	Open Arpin-Rocky run 345 kV	6.2	Upgrade To 550 MVA	$7.50M
925	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601031 BRKNGCO3 345 601067 BISON 3 345 1	18.8		
930	Maple River 345/230 kV tx 1 at 100% of 336 MVA Owner(s): OTP	System Intact	10.6		

930	Maple River 345/230 kV tx 2 at 100% of 336 MVA Owner(s): OTP	System Intact	10.6		
970	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601031 BRKNGCO3 345 601067 BISON 3 345 1	26.9		
995	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Wahpeton-Fergus Falls 230 kV Open Wahpeton-Frontier 230 kV Open Wahpeton 230/115 kV tx #1	17.3		
1085	Chisago County 500/345/34.5 kV Tx #10 at 115% of 1203 MVA Owner(s): XCEL	Open Chisago County 500/345/34.5 kV Tx #9	18.9	Upgrade To Beyond Single Tx	$25.00M
1085	Chisago County 500/345/34.5 kV Tx #9 at 115% of 1203 MVA Owner(s): XCEL	Open Chisago County 500/345/34.5 kV Tx #10	18.9	Upgrade To Beyond Single Tx	$25.00M
1115	Sigel-Arpin 138 kV at 100% of 287 MVA (1201 amps) Owner(s): 691 5.23 Miles	Open Arpin-Rocky run 345 kV	5.3	Upgrade to 1398 Amps (795 ACSS)	$7.85M
1130	Sheyenne-Maple River 230 at 100% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	System Intact	14.9		
1135	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 1	23.5		
1155	Bison-Maple River 345 kV at 100% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	System Intact	21.3		
1235	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	7.3	DC Runback	0
1310	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	7.1	DC Runback	0
1320	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	9.9	DC Runback	0
1405	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	9.5	DC Runback	0
1550	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open Brookings Co - Lyon Co 345 kV	16.0	Increase Conductor Temperature	$6.00M
1560	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1	6.3	DC Runback	0
1635	Bison 345/230 kV TX #1 at 115% of 336 MVA Owner(s): XCEL	Open Bison-Maple River 345 kV	10.7	Upgrade To 448 MVA	$6.00M
1635	Bison 345/230 kV TX #1 at 115% of 336 MVA Owner(s): XCEL	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	10.7		
1635	Bison 345/230 kV TX #2 at 115% of 336 MVA Owner(s): XCEL	Open Bison-Maple River 345 kV	10.7	Upgrade To 448 MVA	$6.00M
1635	Bison 345/230 kV TX #2 at 115% of 336 MVA Owner(s): XCEL	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	10.7		
1635	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	9.9	DC Runback	0
1670	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open T-Corners-Wien 115 kV Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV	13.0	Upgrade to (2-795 ACSS)	$159.04M
1675	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open T-Corners-Wien 115 kV Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV	13.0		
1690	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1690	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1690	Maple River-Red River 115 1 at 110% of 318 MVA (1596 amps) Owner(s): XCEL ~6 Miles	Open Sheyenne-Maple River 230 Open Frontier-Maple River 230 kV	6.7	Upgrade to 1862 Amps (1192 ACSS)	$6.12M
1715	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.7		
1730	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601048 LYON CO 3 345 601049 FRANKLN 3 345 1 Open 601048 LYON CO 3 345 601049 FRANKLN 3 345 2	16.4		

1735	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	9.5	DC Runback	0
1745	Fargo-Moorhead 230 kV at 110% of 240 MVA (602 amps) Owner(s): WAPA ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	6.0	DC Runback	0
1785	Frontier-Maple River 230 kV at 100% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	System Intact	7.6	Reconductor to (795 ACSS)	$2.20M
1795	Fargo-Moorhead 230 kV at 110% of 240 MVA (602 amps) Owner(s): WAPA ~11 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	5.8	DC Runback	0
1810	Wahpeton-Frontier 230 kV at 100% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	System Intact	7.6	Reconductor to (795 ACSS)	$8.80M
1820	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601031 BRKNGCO3 345 601067 BISON 3 345 1	9.7		
1840	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open Wahpeton-Fergus Falls 230 kV Open Wahpeton-Frontier 230 kV Open Wahpeton 230/115 kV tx #1	6.2	Upgrade to 1107 Amps (556 ACSS)	$69.33M
1845	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601049 FRANKLN 3 345 601050 HELENAS 3 345 1 Open 601049 FRANKLN 3 345 601050 HELENAS 3 345 2	16.4		
1890	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open Sheyenne-Maple River 230	9.0		
1925	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open Sheyenne-Audubon 230 kV	8.4		
1995	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open Wahpeton-Fergus Falls 230 kV	5.9		

Case File - C:\MP-MH-EHV\Work\Bison-Zion\Bison-Zion-PF\MH_SUPK_B_W1C.sav
Sub File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV.sub
Mon File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH.mon
Con File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV-W1C.con
Exc File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH-Exclude.exc

Transfer From: BisonGen
Transfer To: EAST_MISO
Transfer Level: 3000 MW
Transfer Goal: 2000 MW
System Intact DF 5.%
Contingency DF 5.%

Tue, 05 Jun 2012 15:32:28

Transfer MW	Limiting Facility	Outage	DF%	Remedy	Upgrade Estimate
-40	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	32.5	DC Runback	0
110	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	35.8	DC Runback	0
125	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV	23.5	Upgrade to 2408 Amps (2 x 795 ACSS) - $13.9M	13.9
125	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	23.5		
135	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	24.4	DC Runback	0
245	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	17.9	DC Runback	0
245	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	17.9	DC Runback	0
245	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601047 QUARRY3 345 2	30.5	DC Runback	0
285	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	9.7	DC Runback	0
310	Center-Heskett 230 kV at 110% of 428 MVA (1074 amps) Owner(s): MPC 22.5 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	5.6	DC Runback	0
370	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 504.0 MW dispatch	35.8	Uprate to 2500 Amps (Conductor Rating)	$1.00M
400	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 504.0 MW dispatch	24.4	Upgrade to (2-795 ACSS)	$9.45M
425	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	21.3	Construct Bison-Brookings 345 kV line (to get 545.1 MW transfer) $270M	$270.00M
510	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	8.0	DC Runback	0
525	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601047 QUARRY3 345 2	25.3	DC Runback	0
630	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	18.4	Roseau Series Cap 2000 A Limit	
705	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	13.7	DC Runback	0
705	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	13.7	DC Runback	0
765	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 2	14.3	Upgrade To 672 MVA	$8.00M
765	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 1	14.3	Upgrade To 672 MVA	$8.00M
765	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 1	14.3		
805	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	8.0	Upgrade to 1800 Amps (1192 ACSS)	$9.18M
905	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open Bison-Maple River 230 kV	24.6		
940	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 504.0 MW dispatch	13.7		
940	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 504.0 MW dispatch	13.7		
975	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	21.4	DC Runback	0
975	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open Ridgeway-Richer 230 kV	19.2	DC Runback	0

1000	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open Shannon-Running 230 kV	19.2	DC Runback	0
1020	Quarry 345/115 kV Tx at 115% of 448 MVA Owner(s): XCEL	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	12.4	DC Runback	0
1070	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	10.5	DC Runback	0
1100	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	12.3		
1100	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	12.3		
1135	Coon Creek-Kohlman Lake 345 kV at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~15 Miles	Open Coon Creek-Terminal 345 kV	7.7	Upgrade (Terminal Equipment)	$.50M
1135	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601047 QUARRY3 345 2	16.3		
1165	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601047 QUARRY3 345 2	23.5		
1265	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Maple River-Red River 115 1	13.6		
1270	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	21.9		
1285	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	15.1		
1305	Quarry 345/115 kV Tx at 115% of 448 MVA Owner(s): XCEL	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2 Change bus 667033 DORSEYS4 230 load by 486.5 MW dispatch	12.4	Upgrade To 672 MVA	$8.00M
1325	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	7.3	DC Runback	0
1375	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	10.5	DC Runback	0
1375	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 504.0 MW dispatch	10.5	Reconductor to (795 ACSS)	$8.80M
1390	Maple River 345/230 kV tx 1 at 100% of 336 MVA Owner(s): OTP	System Intact	9.4		
1390	Maple River 345/230 kV tx 2 at 100% of 336 MVA Owner(s): OTP	System Intact	9.4		
1410	Arpin 345/138 kV Tx at 113% of 336 MVA Owner(s): 691	Open Arpin-Rocky run 345 kV	5.4	Upgrade To 448 MVA	$6.00M
1470	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open Brookings Co - Lyon Co 345 kV	16.0	Increase Conductor Temperature	$6.00M
1570	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 504.0 MW dispatch	7.3	Upgrade to 1091 Amps (477 ACSS)	$68.89M
1585	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601048 LYON CO 3 345 601049 FRANKLN 3 345 1 Open 601048 LYON CO 3 345 601049 FRANKLN 3 345 2	16.3		
1645	Bison-Maple River 345 kV at 100% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	System Intact	18.8		
1650	Sheyenne-Maple River 230 at 100% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	System Intact	13.0		
1680	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 504.0 MW dispatch	10.5	Reconductor to (795 ACSS)	$2.20M
1695	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601049 FRANKLN 3 345 601050 HELENAS 3 345 1 Open 601049 FRANKLN 3 345 601050 HELENAS 3 345 2	16.4		
1720	Fargo-Moorhead 230 kV at 110% of 240 MVA (602 amps) Owner(s): WAPA ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	6.0	DC Runback	0
1755	Coon Creek-Kohlman Lake 345 kV at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~15 Miles	Open Coon Creek-Terminal 345 kV Open 601024 TERMINL3 345 605585 TERMID1Y 110 10 Open 603110 TERMINL7 115 605585 TERMID1Y 110 10 Open 605516 TERTER19 34.5 605585 TERMID1Y 110 10	7.6		

1775	Elm Creek-Monticello 345 kV at 100% of 1195 MVA (2000 amps) Owner(s): XCEL ~19 Miles	Open Sherco-Coon Creek 345 kV #1 Open 601011 SHERCO 3 345 615327 GRE-BUNKER 3 345 1 Open 601019 COON CK3 345 615327 GRE-BUNKER 3 345 1 Open Coon Creek 345/115 kV tx #10 Open 615327 GRE-BUNKER 3 345 B$0396 345/230 1.00 1 Open 615328 GRE-BUNKER 4 230 B$0396 345/230 1.00 1 Open 615330 GRE-BUNKER T13.8 B$0396 345/230 1.00 1	14.7	Upgrade to 2190 Amps (2 x 954 ACSS)	$53.96M
1800	Chisago County 500/345/34.5 kV Tx #10 at 115% of 1203 MVA Owner(s): XCEL	Open Chisago County 500/345/34.5 kV Tx #9	15.7	Upgrade To Beyond Single Tx	$25.00M
1800	Chisago County 500/345/34.5 kV Tx #9 at 115% of 1203 MVA Owner(s): XCEL	Open Chisago County 500/345/34.5 kV Tx #10	15.7	Upgrade To Beyond Single Tx	$25.00M
1985	Moorhead-Morris 230 kV at 110% of 239 MVA (600 amps) Owner(s): WAPA ~96 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	6.4	DC Runback	0
1990	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	8.2		

Case File - C:\MP-MH-EHV\Work\Bison-Zion\Bison-Zion-PF\MH_SUPK_B_W2A.sav
Sub File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV.sub
Mon File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH.mon
Con File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV-W2A.con
Exc File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH-Exclude.exc

Transfer From: BisonGen
Transfer To: EAST_MISO
Transfer Level: 3000 MW
Transfer Goal: 2000 MW
System Intact DF 5.%
Contingency DF 5.%

Tue, 05 Jun 2012 15:49:09

Transfer MW	Limiting Facility	Outage	DF%	Remedy	Upgrade Estimate
375	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	16.6	Roseau Series Cap 2000 A Limit	
485	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601057 MIDCOMP-N 500 601060 BISON 500 1	25.8		
490	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601058 BRKNGCO2 500 601059 MIDCOMP-S 500 1	25.8		
490	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601057 MIDCOMP-N 500 601059 MIDCOMP-S 500 1	25.8		
495	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	17.0	Reconductor to 1946 Amps (1272 ACSS) - $2.59M	2.59
495	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV	17.0		
655	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	20.2		
675	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	19.9		
760	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 667039 RIDGEWY4 230 667046 RICHER 4 230 1	17.3		
780	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 608627 SHANNON4 230 657753 RUNNING4 230 1	17.3		
850	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601048 LYON CO 3 345 601049 FRANKLN 3 345 1 Open 601048 LYON CO 3 345 601049 FRANKLN 3 345 2	18.1		
870	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601049 FRANKLN 3 345 601050 HELENAS 3 345 1 Open 601049 FRANKLN 3 345 601050 HELENAS 3 345 2	18.2		
890	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1	19.3		
895	Arpin 345/138 kV Tx at 113% of 336 MVA Owner(s): 691	Open Arpin-Rocky run 345 kV	6.0	Upgrade To 448 MVA - $6M	6
895	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601031 BRKNGCO3 345 601048 LYON CO 3 345 1	22.1	Increase Conductor Temperature	$6.00M
915	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 2	13.0	Upgrade To 672 MVA - $8M	8
915	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 1	13.0	Upgrade To 672 MVA - $8M	8
950	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601057 MIDCOMP-N 500 601060 BISON 500 1	19.0		
955	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601057 MIDCOMP-N 500 601059 MIDCOMP-S 500 1	19.0		
955	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601058 BRKNGCO2 500 601059 MIDCOMP-S 500 1	19.0		
1005	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601057 MIDCOMP-N 500 601060 BISON 500 1	27.2	DC Runback	0
1005	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601057 MIDCOMP-N 500 601059 MIDCOMP-S 500 1	27.2		
1005	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601058 BRKNGCO2 500 601059 MIDCOMP-S 500 1	27.2		
1075	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open Bison-Maple River 230 kV	22.3	Uprate to 1778 Amps (Conductor Rating) - $1M	1
1080	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601048 LYON CO 3 345 601049 FRANKLN 3 345 1 Open 601048 LYON CO 3 345 601049 FRANKLN 3 345 2	21.6		
1140	Sigel-Arpin 138 kV at 100% of 287 MVA (1201 amps) Owner(s): 691 5.23 Miles	Open Arpin-Rocky run 345 kV	5.2	Upgrade to 1386 Amps (795 ACSS) - $4.18M	4.18

1165	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601049 FRANKLN 3 345 601050 HELENAS 3 345 1 Open 601049 FRANKLN 3 345 601050 HELENAS 3 345 2	21.6		
1180	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601057 MIDCOMP-N 500 601060 BISON 500 1	13.6		
1180	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601057 MIDCOMP-N 500 601060 BISON 500 1	13.6		
1185	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601057 MIDCOMP-N 500 601059 MIDCOMP-S 500 1	13.6		
1185	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601058 BRKNGCO2 500 601059 MIDCOMP-S 500 1	13.6		
1185	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601057 MIDCOMP-N 500 601059 MIDCOMP-S 500 1	13.6		
1185	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601058 BRKNGCO2 500 601059 MIDCOMP-S 500 1	13.6		
1200	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601057 MIDCOMP-N 500 601060 BISON 500 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	19.0	Upgrade to (2-795 ACSS)	$9.45M
1235	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601057 MIDCOMP-N 500 601060 BISON 500 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	27.2		
1290	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	21.0		
1290	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	11.2		
1290	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	11.2		
1290	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	14.4		
1320	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	14.2		
1335	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	20.6		
1380	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601057 MIDCOMP-N 500 601060 BISON 500 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	25.8		
1410	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601057 MIDCOMP-N 500 601060 BISON 500 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	13.6		
1415	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601057 MIDCOMP-N 500 601060 BISON 500 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	13.6		
1440	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Maple River-Red River 115 1	12.4		
1450	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	21.0		
1470	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	14.4		
1520	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	10.5		
1520	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	10.5		
1535	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Bison 500/345 kV Tx #1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	26.7		
1545	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open Bison 500/345 kV Tx #1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	39.0		
1545	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Bison 500/345 kV Tx #1	26.7		
1550	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	20.9		
1560	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open Bison 500/345 kV Tx #1	39.0		
1565	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	10.3		
1565	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	10.3		

1575	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	20.7		
1600	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 652506 FTTHOMP3 345 659105 LELANDO3 345 1	19.8		
1605	Maple River 345/230 kV tx 1 at 100% of 336 MVA Owner(s): OTP	System Intact	8.6		
1605	Maple River 345/230 kV tx 2 at 100% of 336 MVA Owner(s): OTP	System Intact	8.6		
1645	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601049 FRANKLN 3 345 601050 HELENAS 3 345 1 Open 601048 LYON CO 3 345 601049 FRANKLN 3 345 1	20.0		
1650	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 603152 T-CRNRS7 115 699706 WIEN 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1	13.0	Upgrade to 2141 Amps (2 x795 ACSS) - $159.04M	159.04
1655	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open 603152 T-CRNRS7 115 699706 WIEN 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1	13.0		
1655	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 652523 SIOUXFL4 230 652606 LETCHER4 230 1 Open 652513 HANLON 4 230 652523 SIOUXFL4 230 1	19.5		
1665	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Bison 500/345 kV Tx #1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	19.5		
1665	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Bison 500/345 kV Tx #1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	19.5		
1665	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1	20.5		
1665	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 603152 T-CRNRS7 115 699706 WIEN 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1	20.1		
1670	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1 Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1670	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1 Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1680	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	10.5		
1680	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	10.5		
1685	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Bison 500/345 kV Tx #1	19.5		
1685	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Bison 500/345 kV Tx #1	19.5		
1695	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1 Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1695	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1 Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1700	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	19.9		
1720	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV	12.7		
1725	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Wahpeton-Fergus Falls 230 kV Open Wahpeton-Frontier 230 kV Open 620191 WAHPET1Y 230 620329 WAHPETN4 230 1 Open 620191 WAHPET1Y 230 620229 WAHPETN7 115 1 Open 620129 WAHPETN9 41.6 620191 WAHPET1Y 230 1	13.6		
1750	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV	12.7		
1750	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Frontier-Maple River 230 kV	13.6		
1750	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Wahpeton-Frontier 230 kV	13.6		
1835	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601057 MIDCOMP-N 500 601060 BISON 500 1	9.8	DC Runback	0

1835	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601058 BRKNGCO2 500 601059 MIDCOMP-S 500 1	9.8	DC Runback	0
1835	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601057 MIDCOMP-N 500 601059 MIDCOMP-S 500 1	9.8	DC Runback	0
1840	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Arpin-Rocky run 345 kV Open 699241 POE 138 138 699939 SAL 138 138 1 Open 698948 HOLYWOOD 138 699241 POE 138 138 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 699706 WIEN 115 699710 STRATFRD 115 1	12.7		
1845	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open A5 King-Eau Claire 345 kV Open 601028 EAU CL 3 345 602021 EAU CLA5 161 9	12.3		
1860	Sheyenne-Maple River 230 at 100% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	System Intact	11.9		
1885	Bison-Maple River 345 kV at 100% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	System Intact	17.1		
1915	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601031 BRKNGCO3 345 601048 LYON CO 3 345 1	18.0		
1925	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	6.1	DC Runback	0
1935	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	19.3		
1945	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 1	18.5		
1945	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	System Intact	19.2		
1950	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1	18.5		
1985	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	20.7		

Case File - C:\MP-MH-EHV\Work\Bison-Zion\Bison-Zion-PF\MH_SUPK_B_W2B.sav
Sub File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV.sub
Mon File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH.mon
Con File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV-W2B.con
Exc File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH-Exclude.exc

Transfer From: BisonGen
Transfer To: EAST_MISO
Transfer Level: 3000 MW
Transfer Goal: 2000 MW
System Intact DF 5.%
Contingency DF 5.%

Tue, 05 Jun 2012 16:01:37

Transfer MW	Limiting Facility	Outage	DF%	Remedy	Upgrade Estimate
-1145	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open Bison 500/345 kV Tx #1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	6.7	Roseau Series Cap 2000 A Limit	
-20	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	21.6		
50	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV	21.7	Upgrade to 2367 Amps (2 x 795 ACSS) - $13.9M	13.9
50	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	21.7		
95	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	27.0		
110	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	26.6		
250	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 667039 RIDGEWY4 230 667046 RICHER 4 230 1	22.5		
275	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 608627 SHANNON4 230 657753 RUNNING4 230 1	22.5		
325	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1	25.5		
335	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 1	25.6		
375	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 602013 ROSEAU 4 230 667046 RICHER 4 230 1	22.5		
375	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 602013 ROSEAU 4 230 657757 MORANVI4 230 1 Open 602013 ROSEAU 4 230 667046 RICHER 4 230 1	22.5		
380	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 602013 ROSEAU 4 230 657757 MORANVI4 230 1	22.5		
410	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 2	16.4	Upgrade To 800 MVA - $9M	9
410	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 2	16.4		
410	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 1	16.4	Upgrade To 800 MVA - $9M	9
410	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 1	16.4		
535	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open Bison-Maple River 230 kV	28.2	Uprate to 2017 Amps (Conductor Rating) - $1M	1
600	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	18.8	DC Runback	
610	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	27.2		
615	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	18.6	Upgrade to 1929 Amps (1192 ACSS) - $9.24M	9.24
635	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	26.8		
700	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	14.1		
705	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	14.1		
785	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	13.6		
785	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	13.6		
810	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	27.2		

810	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	13.4		
815	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	13.4		
815	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	18.8		
820	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Maple River-Red River 115 1	15.7		
845	Arpin 345/138 kV Tx at 113% of 336 MVA Owner(s): 691	Open Arpin-Rocky run 345 kV	6.2	Upgrade To 550 MVA - $7.5M	7.5
895	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	26.6		
950	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601031 BRKNGCO3 345 601067 BISON 3 345 1	19.0		
965	Maple River 345/230 kV tx 1 at 100% of 336 MVA Owner(s): OTP	System Intact	10.8		
965	Maple River 345/230 kV tx 2 at 100% of 336 MVA Owner(s): OTP	System Intact	10.8		
985	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	13.6		
985	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	13.6		
1000	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601031 BRKNGCO3 345 601067 BISON 3 345 1	27.2		
1020	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Wahpeton-Fergus Falls 230 kV Open Wahpeton-Frontier 230 kV Open 620191 WAHPET1Y 230 620329 WAHPETN4 230 1 Open 620191 WAHPET1Y 230 620229 WAHPETN7 115 1 Open 620129 WAHPETN9 41.6 620191 WAHPET1Y 230 1	17.4		
1025	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Frontier-Maple River 230 kV	17.5		
1030	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Wahpeton-Frontier 230 kV	17.5		
1080	Sigel-Arpin 138 kV at 100% of 287 MVA (1201 amps) Owner(s): 691 5.23 Miles	Open Arpin-Rocky run 345 kV	5.3	Upgrade to 1405 Amps (795 ACSS) - $4.18M	4.18
1090	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 1	16.7		
1095	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1	16.7		
1130	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Fargo-Jamestown 230 kV ckt 1	13.8		
1135	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	25.5		
1160	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 1	23.8		
1160	Sheyenne-Maple River 230 at 100% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	System Intact	15.0		
1165	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1	23.8		
1175	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601031 BRKNGCO3 345 601067 BISON 3 345 1	13.6		
1175	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601031 BRKNGCO3 345 601067 BISON 3 345 1	13.6		
1185	Bison-Maple River 345 kV at 100% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	System Intact	21.5		
1195	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601031 BRKNGCO3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	19.0		
1230	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601031 BRKNGCO3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	27.2		
1250	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	7.4	DC Runback	

1285	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601067 BISON 3 345 602050 BISON 4 230 2	23.4		
1285	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601067 BISON 3 345 602050 BISON 4 230 1	23.4		
1290	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 608550 FORB1JCT 230 608551 FORB1TR9 34.5 1 Open Forbes 500/230 kv Tx Open Forbes Jct-Forbes 230 kV Open 608552 FORB2JCT 230 608553 FORB2TR9 34.5 1 Open Forbes 500/230 kV Tx Open Forbes Jct-Forbes 230 kV	21.8		
1305	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	16.7		
1315	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open Buffalo 345/115 kV tx	21.9		
1325	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	7.2	Upgrade to 1106 Amps (556 ACSS) - $56.17M	56.17
1330	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	10.0	DC Runback	
1360	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	23.8		
1360	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 1	11.9		
1365	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1	11.9		
1365	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 1	11.9		
1365	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 1	11.9		
1365	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 1	11.9		
1365	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1	11.9		
1370	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1	11.9		
1370	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1	11.9		
1390	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601031 BRKNGCO3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	25.8		
1405	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601031 BRKNGCO3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	13.6		
1405	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601031 BRKNGCO3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 501.5 MW dispatch	13.6		
1415	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	9.6	Reconductor to 989 Amps (795 ACSS) - $8.8M	8.8
1465	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	7.4		
1480	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	23.6		
1490	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601067 BISON 3 345 602050 BISON 4 230 2	11.7		
1490	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601067 BISON 3 345 602050 BISON 4 230 1	11.7		
1490	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601067 BISON 3 345 602050 BISON 4 230 1	11.7		
1490	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601067 BISON 3 345 602050 BISON 4 230 2	11.7		
1490	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601067 BISON 3 345 602050 BISON 4 230 2	11.7		
1490	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601067 BISON 3 345 602050 BISON 4 230 1	11.7		
1490	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601067 BISON 3 345 602050 BISON 4 230 2	11.7		
1490	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601067 BISON 3 345 602050 BISON 4 230 1	11.7		
1490	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Close 601061 DBCOMPN 500 601062 DBCOMPS 500 2 Open 601061 DBCOMPN 500 601062 DBCOMPS 500 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	16.2		

1515	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Close 601061 DBCOMPN 500 601062 DBCOMPS 500 2 Open 601061 DBCOMPN 500 601062 DBCOMPS 500 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	23.4		
1550	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	11.9		
1550	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	11.9		
1560	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	15.7		
1565	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1	6.4	DC Runback	
1570	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601031 BRKNGCO3 345 601048 LYON CO 3 345 1	16.1	Uprate to 1316 Amps (Terminal Equipment) - $0.5M	0.5
1590	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	10.0		
1605	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	22.4		
1640	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	10.0	DC Runback	
1655	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 603152 T-CRNRS7 115 699706 WIEN 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1	13.0	Upgrade to 2140 Amps (2 x795 ACSS) - $159.04M	159.04
1660	601067 BISON 3 345 602050 BISON 4 230 1 at 115% of 336 MVA Owner(s): XCEL	Open Bison-Maple River 345 kV	10.8	Upgrade To 448 MVA - $6M	6
1660	601067 BISON 3 345 602050 BISON 4 230 1 at 115% of 336 MVA Owner(s): XCEL	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	10.8		
1660	601067 BISON 3 345 602050 BISON 4 230 2 at 115% of 336 MVA Owner(s): XCEL	Open Bison-Maple River 345 kV	10.8	Upgrade To 448 MVA - $6M	6
1660	601067 BISON 3 345 602050 BISON 4 230 2 at 115% of 336 MVA Owner(s): XCEL	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	10.8		
1660	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open 603152 T-CRNRS7 115 699706 WIEN 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1	13.0		
1675	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1 Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1675	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1 Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1700	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1 Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.7		
1700	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1 Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.7		
1710	Maple River-Red River 115 1 at 110% of 318 MVA (1596 amps) Owner(s): XCEL ~6 Miles	Open Sheyenne-Maple River 230 Open Frontier-Maple River 230 kV	6.7	Upgrade to 1854 Amps (1192 ACSS) - $4.62M	4.62
1720	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Close 601061 DBCOMPN 500 601062 DBCOMPS 500 2 Open 601061 DBCOMPN 500 601062 DBCOMPS 500 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	11.7		
1720	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Close 601061 DBCOMPN 500 601062 DBCOMPS 500 2 Open 601061 DBCOMPN 500 601062 DBCOMPS 500 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	11.7		
1725	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV	12.7		
1740	Fargo-Moorhead 230 kV at 110% of 240 MVA (602 amps) Owner(s): WAPA ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1	6.0	DC Runback	
1740	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	9.6	Reconductor to 944 Amps (795 ACSS) - $2.2M	2.2
1750	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601048 LYON CO 3 345 601049 FRANKLN 3 345 1 Open 601048 LYON CO 3 345 601049 FRANKLN 3 345 2	16.4		
1755	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV	12.6		

1790	Fargo-Moorhead 230 kV at 110% of 240 MVA (602 amps) Owner(s): WAPA ~11 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	5.9	Upgrade to 702 Amps (336 ACSS) - $13.86M	13.86
1800	Frontier-Maple River 230 kV at 100% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	System Intact	7.6		
1820	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	11.2		
1820	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	11.2		
1825	Wahpeton-Frontier 230 kV at 100% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	System Intact	7.6		
1830	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601031 BRKNGCO3 345 601067 BISON 3 345 1	9.8		
1840	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	6.4	Upgrade to 1250 Amps (636 ACSS)	$8.91M
1850	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Arpin-Rocky run 345 kV Open 699241 POE 138 138 699939 SAL 138 138 1 Open 698948 HOLYWOOD 138 699241 POE 138 138 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 699706 WIEN 115 699710 STRATFRD 115 1	12.7		
1855	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open 601028 EAU CL 3 345 602021 EAU CLA5 161 9	12.3		
1855	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open Wahpeton-Fergus Falls 230 kV Open Wahpeton-Frontier 230 kV Open 620191 WAHPET1Y 230 620329 WAHPETN4 230 1 Open 620191 WAHPET1Y 230 620229 WAHPETN7 115 1 Open 620129 WAHPETN9 41.6 620191 WAHPET1Y 230 1	6.3		
1865	Split Rock-White 345 kV line 1 at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~4 Miles	Open 601049 FRANKLN 3 345 601050 HELENAS 3 345 1 Open 601049 FRANKLN 3 345 601050 HELENAS 3 345 2	16.5		
1900	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open Sheyenne-Maple River 230	9.1		
1905	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Change bus 667033 DORSEYS4 230 load by 454.5 MW dispatch	10.0		
1940	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open Sheyenne-Audubon 230 kV	8.5		

Case File - C:\MP-MH-EHV\Work\Bison-Zion\Bison-Zion-PF\MH_SUPK_B_W5Ar.sav
Sub File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV.sub
Mon File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH.mon
Con File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV-W5A.con
Exc File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH-Exclude.exc

Transfer From: BisonGen
Transfer To: EAST_MISO
Transfer Level: 3000 MW
Transfer Goal: 2000 MW
System Intact DF 5.%
Contingency DF 5.%

Tue, 05 Jun 2012 16:10:21

Transfer MW	Limiting Facility	Outage	DF%	Remedy	Upgrade Estimate
760	Arpin 345/138 kV Tx at 113% of 336 MVA Owner(s): 691	Open Arpin-Rocky run 345 kV	6.0	Upgrade To 550 MVA - $7.5M	7.5
930	Coon Creek-Kohlman Lake 345 kV at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~15 Miles	Open Coon Creek-Terminal 345 kV	8.0	Upgrade to 1337 Amps (Terminal Equipment) - $0.5M	0.5
1015	Sigel-Arpin 138 kV at 100% of 287 MVA (1201 amps) Owner(s): 691 5.23 Miles	Open Arpin-Rocky run 345 kV	5.2	Upgrade to 1411 Amps (795 ACSS) - $4.18M	4.18
1090	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601057 MIDCOMP-N 500 601060 BISON 500 1	21.4	DC Runback	
1095	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601058 BRKNGCO2 500 601059 MIDCOMP-S 500 1	21.4		
1095	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601057 MIDCOMP-N 500 601059 MIDCOMP-S 500 1	21.4		
1190	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	14.1	Reconductor to 1510 Amps (1272 ACSS) - $2.59M	2.59
1190	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV	14.1		
1250	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	17.6		
1355	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	6.1	DC Runback	
1355	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	13.0	Roseau Series Cap 2000 A Limit	
1455	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601057 MIDCOMP-N 500 601060 BISON 500 1	16.1	DC Runback	
1460	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601058 BRKNGCO2 500 601059 MIDCOMP-S 500 1	16.1		
1460	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601057 MIDCOMP-N 500 601059 MIDCOMP-S 500 1	16.1		
1490	Coon Creek-Kohlman Lake 345 kV at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~15 Miles	Open Coon Creek-Terminal 345 kV Open 601024 TERMINL3 345 605585 TERMID1Y 110 10 Open 603110 TERMINL7 115 605585 TERMID1Y 110 10 Open 605516 TERTER19 34.5 605585 TERMID1Y 110 10	8.0		
1535	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601047 QUARRY3 345 2	17.0		
1550	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601057 MIDCOMP-N 500 601060 BISON 500 1	23.0	DC Runback	
1555	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601058 BRKNGCO2 500 601059 MIDCOMP-S 500 1	23.0	DC Runback	
1555	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601057 MIDCOMP-N 500 601059 MIDCOMP-S 500 1	23.0	DC Runback	
1580	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 603152 T-CRNRS7 115 699706 WIEN 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1	13.0	Upgrade to 2157 Amps (2 x795 ACSS) - $159.04M	159.04
1585	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open 603152 T-CRNRS7 115 699706 WIEN 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1	13.0		
1600	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1 Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1615	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	13.5		
1625	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open 698342 COC 69 69.0 699901 TIMBERWOLF 69.0 1 Open 680121 MAUSTON 69.0 698333 HLT 69 69.0 1 Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		

1640	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~10 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	19.7	DC Runback	
1645	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2 Change bus 667033 DORSEYS4 230 load by 564.3 MW dispatch	6.1	Upgrade to 1309 Amps (636 ACSS)	$8.91M
1670	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 2	10.9	Upgrade To 448 MVA - $6M	6
1670	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 1	10.9	Upgrade To 448 MVA - $6M	6
1720	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601057 MIDCOMP-N 500 601060 BISON 500 1 Change bus 667033 DORSEYS4 230 load by 564.3 MW dispatch	16.1	Upgrade to (2-795 ACSS)	$9.45M
1800	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601057 MIDCOMP-N 500 601060 BISON 500 1 Change bus 667033 DORSEYS4 230 load by 564.3 MW dispatch	23.0	Uprate to 2500 Amps (Conductor Rating)	$1.00M
1800	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 564.3 MW dispatch	13.5		
1805	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 564.3 MW dispatch	19.7		

Case File - C:\MP-MH-EHV\Work\Bison-Zion\Bison-Zion-PF\MH_SUPK_B_W6Br.sav
Sub File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV.sub
Mon File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH.mon
Con File - C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP_MH_EHV-W6B.con
C:\MP-MH-EHV\Work\Bison-Zion\MUST-Input\MP-MH-Exclude-NO-
Exc File - RUNBACK.exc

Transfer From: BisonGen
Transfer To: EAST_MISO
Transfer Level: 3000 MW
Transfer Goal: 3000 MW
System Intact DF 5.%
Contingency DF 5.%

Thu, 14 Jun 2012 13:59:51

Transfer MW	Limiting Facility	Outage	DF%	Remedy	Upgrade Estimate
-6010	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601061 DBCOMPN 500 667500 DORSEY 2 500 1	6.1	DC Runback	
-5890	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601060 BISON 500 601062 DBCOMPS 500 1	6.1	DC Runback	
-5890	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601061 DBCOMPN 500 601062 DBCOMPS 500 1	6.1	DC Runback	
-5775	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open Bison 500/345 kV Tx #1	6.1	DC Runback	
-925	Alexandria-Alex SS 115 kV at 100% of 160 MVA (809 amps) Owner(s): 658, OTP 2.13 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601047 QUARRY3 345 2	5.9	DC Runback	
-85	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	32.8	DC Runback	
120	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	24.8	DC Runback	
130	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Roseau-Riel 500 kV	18.7		
145	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	35.9	DC Runback	
160	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open Roseau-Riel 500 kV	26.8		
165	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV	23.2	Upgrade to 2956 Amps (2 x 795 ACSS) - $14M	14
165	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	23.2		
165	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Roseau N-Roseau S Series Caps 500 kV	18.7		
190	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601047 QUARRY3 345 2	30.8	DC Runback	
195	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open Roseau N-Roseau S Series Caps 500 kV	26.8		
195	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Forbes-Roseau 500 kV	18.7		
230	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open Forbes-Roseau 500 kV	26.8		
280	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	17.9	DC Runback	
280	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	17.9	DC Runback	
315	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	10.0	DC Runback	
315	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	21.4	Construct Bison-Brookings 345 kV line (to get 545.1 MW transfer) $270M	$270.00M
495	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV Open Maple River 345/230 kV tx 2 Open Maple River 345/230 kV tx 1	18.6	Reconductor to (1272 ACSS)	$2.59M
495	Bison-Maple River 230 kV at 100% of 520 MVA (1305 amps) Owner(s): MPC 10.37 Miles	Open Bison-Maple River 345 kV	18.6		
565	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601047 QUARRY3 345 2	24.7	DC Runback	
580	Roseau N-Roseau S Series Caps 500 kV at 100% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	System Intact	18.2	Roseau Series Cap 2000 A Limit	
630	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	18.8	DC Runback	
655	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	8.0	DC Runback	
665	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	27.2	DC Runback	
690	Arpin 345/138 kV Tx at 113% of 336 MVA Owner(s): 691	Open Arpin-Rocky run 345 kV	6.3	Upgrade To 550 MVA	$7.50M
805	Coon Creek-Kohlman Lake 345 kV at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~15 Miles	Open Coon Creek-Terminal 345 kV	8.3	Upgrade (Terminal Equipment)	$.50M

Transfer MW	Limiting Facility	Outage	DF%	Remedy	Upgrade Estimate
840	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	13.6	DC Runback	
840	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	13.6	DC Runback	
860	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.8 MW dispatch	18.8	Upgrade to (2-795 ACSS)	$9.45M
880	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.8 MW dispatch	27.2	Uprate to 2500 Amps (Conductor Rating)	$1.00M
890	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 2	14.1	Upgrade To 672 MVA	$8.00M
890	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Maple River 345/230 kV tx 1	14.1	Upgrade To 672 MVA	$8.00M
920	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open Ridgeway-Richer 230 kV	18.9	DC Runback	
925	Sigel-Arpin 138 kV at 100% of 287 MVA (1201 amps) Owner(s): 691 5.23 Miles	Open Arpin-Rocky run 345 kV	5.4	Upgrade to 1445 Amps (795 ACSS)	$7.85M
945	Roseau N-Roseau S Series Caps 500 kV at 110% of 1732 MVA (2000 amps) Owner(s): XCEL Zero Miles	Open Shannon-Running 230 kV	18.9	DC Runback	
950	Quarry-St. Cloud 115 kV at 100% of 239 MVA (1200 amps) Owner(s): XCEL ~9 Miles	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2 Change bus 667033 DORSEYS4 230 load by 486.8 MW dispatch	8.0	Upgrade to 1741 Amps (954 ACSS)	$9.09M
1035	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open Bison-Maple River 230 kV	24.3		
1055	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.8 MW dispatch	13.6		
1055	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.8 MW dispatch	13.6		
1165	Quarry 345/115 kV Tx at 115% of 448 MVA Owner(s): XCEL	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2	12.5	DC Runback	
1205	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601047 QUARRY3 345 2	16.4		
1230	Maple River 345/230 kV tx 1 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	12.2		
1230	Maple River 345/230 kV tx 2 at 125% of 336 MVA Owner(s): OTP	Open Bison-Maple River 230 kV	12.2		
1310	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601047 QUARRY3 345 2	23.3		
1325	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open Maple River-Red River 115 1	13.6		
1345	Sheyenne-Maple River 230 at 110% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	15.1		
1350	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	10.0	DC Runback	
1365	Coon Creek-Kohlman Lake 345 kV at 100% of 717 MVA (1200 amps) Owner(s): XCEL ~15 Miles	Open Coon Creek-Terminal 345 kV Open 601024 TERMINL3 345 605585 TERMID1Y 110 10 Open 603110 TERMINL7 115 605585 TERMID1Y 110 10 Open 605516 TERTER19 34.5 605585 TERMID1Y 110 10	8.2		
1400	Bison-Maple River 345 kV at 110% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	Open 601046 ALEXSS3 345 601047 QUARRY3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open Alexandria 345/115 kV Tx	21.7		
1450	Quarry 345/115 kV Tx at 115% of 448 MVA Owner(s): XCEL	Open 601010 MNTCELO3 345 601047 QUARRY3 345 1 Open 601010 MNTCELO3 345 601047 QUARRY3 345 2 Change bus 667033 DORSEYS4 230 load by 486.8 MW dispatch	12.5	Upgrade To 672 MVA	$8.00M
1470	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	7.3	DC Runback	
1525	Maple River 345/230 kV tx 1 at 100% of 336 MVA Owner(s): OTP	System Intact	9.3		
1525	Maple River 345/230 kV tx 2 at 100% of 336 MVA Owner(s): OTP	System Intact	9.3		
1585	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open T-Corners-Wien 115 kV Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV	13.0	Upgrade to (2-795 ACSS)	$159.04M
1595	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open T-Corners-Wien 115 kV Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV	13.0		
1610	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1610	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open AS King-Eau Claire 345 kV Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1630	Wahpeton-Frontier 230 kV at 123% of 265 MVA (665 amps) Owner(s): MPC ~44 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.8 MW dispatch	10.0	Reconductor to (795 ACSS)	$8.80M

Transfer MW	Limiting Facility	Outage	DF%	Remedy	Upgrade Estimate
1635	Electric Jct-Nelson 345 kV at 100% of 1234 MVA (2065 amps) Owner(s): N/A ~56 Miles	Open Eau Claire-Arpin 345 kV Open 699706 WIEN 115 699710 STRATFRD 115 1 Open Council Creek-Timberwolf 69 kV Open Mauston-Hilltop 69 kV Open 680242 LUBLIN 69.0 680505 LAKEHEAD 69.0 1	12.8		
1665	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	10.0	DC Runback	
1695	Fargo-Moorhead 230 kV at 110% of 240 MVA (602 amps) Owner(s): WAPA ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	6.0	DC Runback	
1700	Sheyenne-Audubon 230 kV at 110% of 350 MVA (879 amps) Owner(s): OTP, XCEL 43.88 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.8 MW dispatch	7.3	Upgrade to 1064 Amps (477 ACSS)	$68.89M
1705	Sheyenne-Maple River 230 at 100% of 459 MVA (1152 amps) Owner(s): XCEL ~7 Miles	System Intact	13.1		
1780	Bison-Maple River 345 kV at 100% of 720 MVA (1205 amps) Owner(s): MPC ~3 Miles	System Intact	18.6		
1925	Eau Claire 345/161 kv Tx at 115% of 300 MVA Owner(s): XCEL	Open AS King-Eau Claire 345 kV Open 601028 EAU CL 3 345 602021 EAU CLAS 161 9	7.0	Upgrade To 448 MVA	$6.00M
1950	Chisago County 500/345/34.5 kV Tx #10 at 115% of 1203 MVA Owner(s): XCEL	Open Chisago County 500/345/34.5 kV Tx #9	15.3	Upgrade To Beyond Single Tx	$25.00M
1950	Chisago County 500/345/34.5 kV Tx #9 at 115% of 1203 MVA Owner(s): XCEL	Open Chisago County 500/345/34.5 kV Tx #10	15.3	Upgrade To Beyond Single Tx	$25.00M
1950	Frontier-Maple River 230 kV at 136% of 265 MVA (665 amps) Owner(s): MPC ~11 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2 Change bus 667033 DORSEYS4 230 load by 486.8 MW dispatch	10.0	Reconductor to (795 ACSS)	$2.20M
1965	Moorhead-Morris 230 kV at 110% of 239 MVA (600 amps) Owner(s): WAPA ~96 Miles	Open 601046 ALEXSS3 345 601067 BISON 3 345 1 Open 601046 ALEXSS3 345 601067 BISON 3 345 2	6.5	DC Runback	