** MAPP DRS Version with Generation Interconnection Customer Information masked.. **

Wilton, N.D. 100 MW Wind Turbine Addition
Generation Interconnection Request GI-0508
Network Service Transmission Request #971150

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1. Executive Summary

The Upper Great Plains Region (UGPR) of the Western Area Power Administration (Western) received a generation interconnection application (GI-0508) from an Interconnection Customer for 100MW of new wind turbine generation located in the vicinity of Wilton N.D. In addition, Interconnection Customer requested a new 230-kV tap on the Garrison-Bismarck 230-kV line to accommodate this new wind generation. For delivery, Western received application from Basin Electric Power Cooperative (Basin Electric) requesting this 100 MW of Wilton wind generation as a new network resource under Basin Electric's Network Integration Transmission Service Agreement (Open Access Same Time Information System (OASIS) Request No. 971150). The estimated in service date is December 1, 2005. The initial construction will have a maximum rating of 54MW. The wind farm will consist initially of 36 GE 1.5MW SLE Model double fed induction generators. The remaining capacity up to 100MW will need be installed pursuant to the required timeframes outlined in Western's Open Access Transmission Service Tariff (OATT). Details on the timeframe(s) for the additional capacity installations will be available in the future.

The collector substation will be located approximately four miles east of the Garrison-Bismarck 230kV line corridor. Therefore, four miles of new radial 230kV line construction will be required as part of this project. The new 230kV line to the wind farm will interconnect the Garrison-Bismarck 230kV line approximately 12 miles north of Bismarck near the town of Wilton N.D. The collector substation will consist of a 230/34.5kV transformer and multiple 34.5kV deliveries.

This study evaluates the interconnection-only impacts as well as the potential delivery issues (on an out-of-queue basis) of the request at Wilton. Depending upon the resolution of other potentially conflicting prior-queued delivery requests in the Western UGPR OASIS, additional study work may be required to address the ultimate in-queue requirements for the project. Based upon these initial study results, no system additions are proposed on the Western/Basin Electric /Heartland Consumers Power District (Heartland) Integrated System (IS) to accommodate the generation interconnection. The Wilton generation is located inside the border of the NDEX stability constrained interface, however, no increase in the NDEX transfer capability is proposed with this specific project.

These study results also indicate the addition of a 100MW wind turbine generator (WTG) facility near Wilton, North Dakota will not degrade the reliability of the Mid-Continent Area Power Pool (MAPP) system. Operation of the new generation does not result in any unacceptable loading or voltage conditions in the area. No new constrained interfaces are required to accommodate the new generation. Additional studies may be subsequently required to further evaluate the delivery component of the Network transmission service associated with the OASIS requests noted above. The timing of any subsequent study work will be

contingent upon resolution of other conflicting prior-queued transmission service requests in Western's OASIS queue. Therefore, Western will not allow Firm deliveries from these units until the prior pending conflicting requests are resolved. However, this study work may be applicable depending upon the resolution of the prior-queued requests, and sufficient information is provided herein to meet the MAPP Design Review Subcommittee (DRS) requirements for approval of new generation interconnection as a Network Resource.

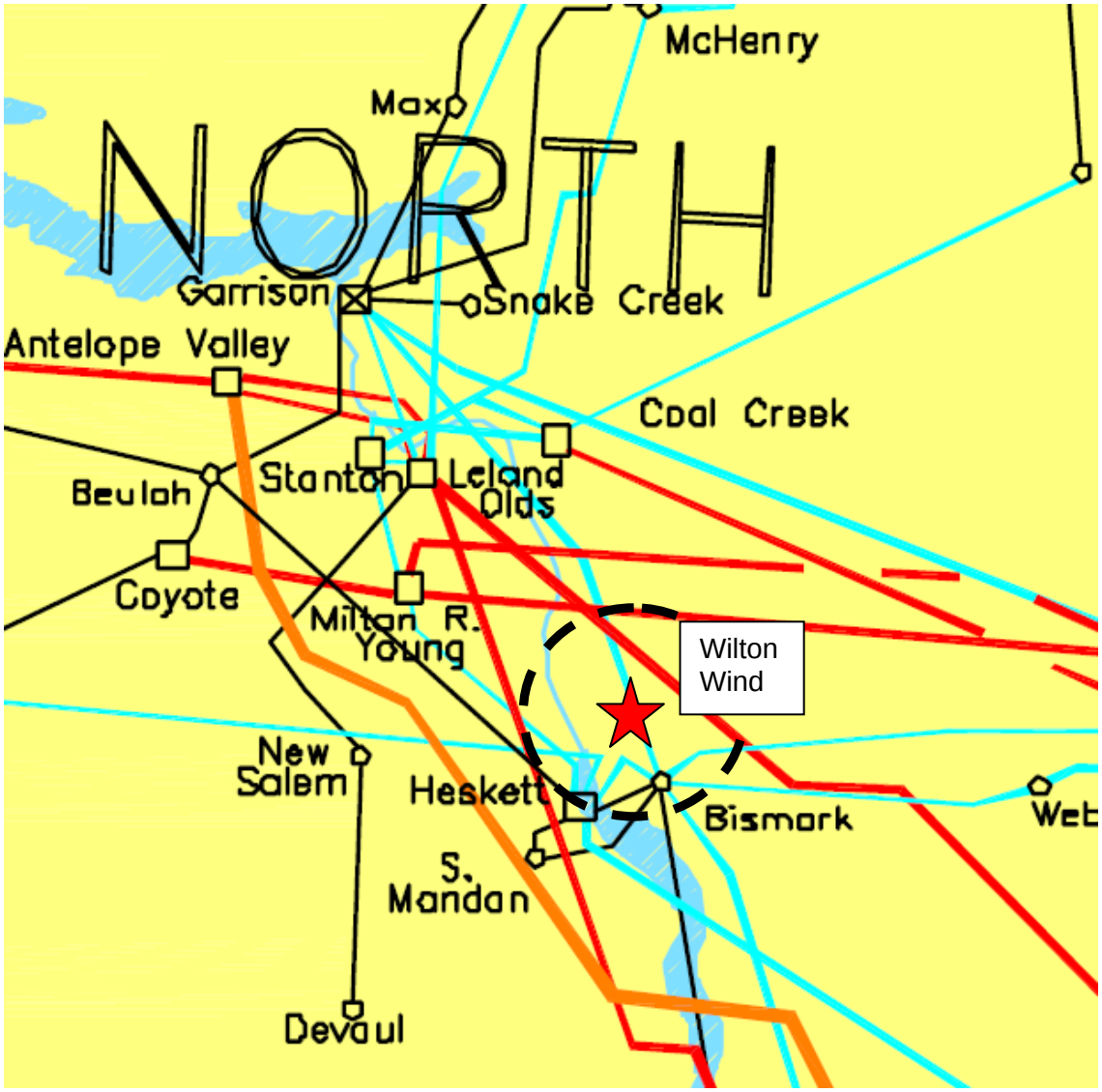

Figure #1 – Geographic Location of Wilton Wind Farm

2. Introduction

The purpose of this document is to provide information to the MAPP DRS regarding the impacts of the addition of a 100 MW wind turbine facility near Wilton, North Dakota. The Wilton WTG facility point of interconnection to the Western/Basin Electric/Heartland Integrated System is a new 230-kV tap on the Garrison-Bismarck 230-kV line near Wilton N.D. The WTG facility will initially consist of 36 individual 1.5MW Series GE double fed induction generators (model 1.5sle) for a total initial capacity of 54MW. Upgrade to 100MW capacity is expected in the near future. A one-line diagram is provided in Figure #2. The Wilton Tap arrangement may consist of either a three breaker ring or a single radial breaker pending final interconnection discussions with Western, and both scenarios are considered in this review. The Garrison-Bismarck 230kV line is one circuit of a double circuit 230kV line. The other circuit is the Garrison-Leland Olds-Washburn-Bismarck 230kV line.

The details of the Request are as follows:

Details of Request #971150

Start Date:	12/1/2005 @ 00:00
Stop Date:	1/1/2015 @ 00:00
Capacity:	100 MW
Capacity Type:	Yearly Firm Network
Path Name:	N/A
POR:	Garrison (proxy for Wilton)
POD:	AVS12LOS2
SOURCE:	BEPC
SINK:	BEPC
Deal Ref:	None
Queue Date:	4/15/2005 @ 15:45:34 CS

3. Model Development

The study includes off-peak high transfer stability and steady state analysis and on-peak steady state analysis.

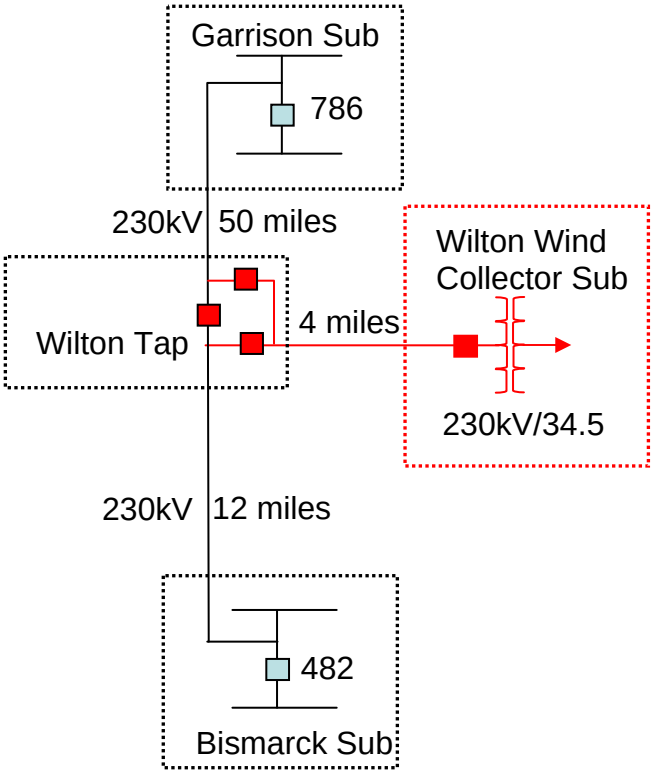

Figure #2 – One Line Diagram

3.1 – Off Peak Summer High Transfer Case

Transient stability models were developed by starting with the 2003 Northern MAPP Operating Review Working Group (NMORWG) study package. The March 2004 snapshot and the NMORWG developed "ug4" (units at URGE) power flow model were the starting points for this study. The Edgeley 40MW and Fort Thompson 40MW wind farms are added to the ug4 case. Also, 2004 series line rating changes and the Paynesville-Willmar 230kV line are added.

Two different series of off-peak high transfer cases are constructed. Refer to the case name convention table provided in Table 3.1.

The first series adds Wilton Wind to the revised base case without consideration of other queued requests. This is a generation interconnection only type analysis for the near-term time period, given the initial in-service date of December 31, 2005.

The second series adds queued requests in the area that are likely to be in service in the next two years. This is an in queue analysis. However, it is difficult to account for the impact of this request on prior queued requests as the

associated analyses for the prior queued requests are not complete and possible transmission improvements are not known. This list includes the following;

<u>IS Queue:</u>
Waste Heat Units CS7 /1, CS9 /2, CS10 /2, and CS11 /2, 30MW Total
G108 White SD Wind 200MW /2

<u>MISO Queue</u>:
G408 McHenry Wind 12MW /1
Center/Sq Butte Wind 50MW /3
G359 Ellendale 150MW /1
G248 Ellendale 20MW /1
G291 Edgeley 19MW /1
G132 Ellendale 180MW /1
G380 Rugby 150MW /1

/1 – located within NDEX and Scheduled to ND load
/2 – located outside NDEX and scheduled to system swing
/3 - located within NDEX but scheduled to system swing through DC

The proposed Center/Sq Butte 50MW wind generation is scheduled onto the Square Butte DC line by increasing DC schedules from 455MW to 505MW. The proposed generation located within the ND export boundary is scheduled to ND load when the “setexports” program adjusts NDEX powerflow. The generation outside of the ND export boundary is scheduled to the system swing.

The in-service date for the Wilton Wind project is December 1, 2005. At that time the improvements necessary to support a NDEX capability of 2080MW will not be ready. Therefore, an analysis of NDEX at 1950MW and 2080MW is performed. The NDEX at 2080MW base case will include the Groton combustion turbine operating in synchronous condenser mode, and in the event that the previously studied Leland Olds #3 unit proceeds, an additional 60MVAR of capacitors added at the Huron 345kVbus. The NDEX at 1950MW case does not include these improvements. Also, the 1950MW case has RCDC Tie at 0MW as it is presently limited to operate in the west-to east direction if NDEX is greater than 1800MW until the eastern South Dakota improvements (Groton CT) are installed. Previous analysis shows that operating RCDC Tie east-west improves ND area stability performance, therefore RCDC at 0MW is a conservative assumption.

The Wilton Wind farm model was developed using PTI’s latest GE wind modeling IPLAN program “GEWINDA”. The exact feeder arrangement has not been determined. However, for the purposes of this study three collector feeders are each modeled consisting of a four mile length of 34.5kV line. Refer to Figure #3. Equivalent wind turbine models are connected at the end of each collector feeder. The GEWINDA program creates the equivalent steady state and dynamic models. The low side of the equivalent collector feeder is 0.575kV. The

turbines control the generator step up high side voltage to 1.03p.u. Appendix A contains the steady state and dynamic model data. One line diagrams of each case listed in Table 3.1 are provided in Appendix E.

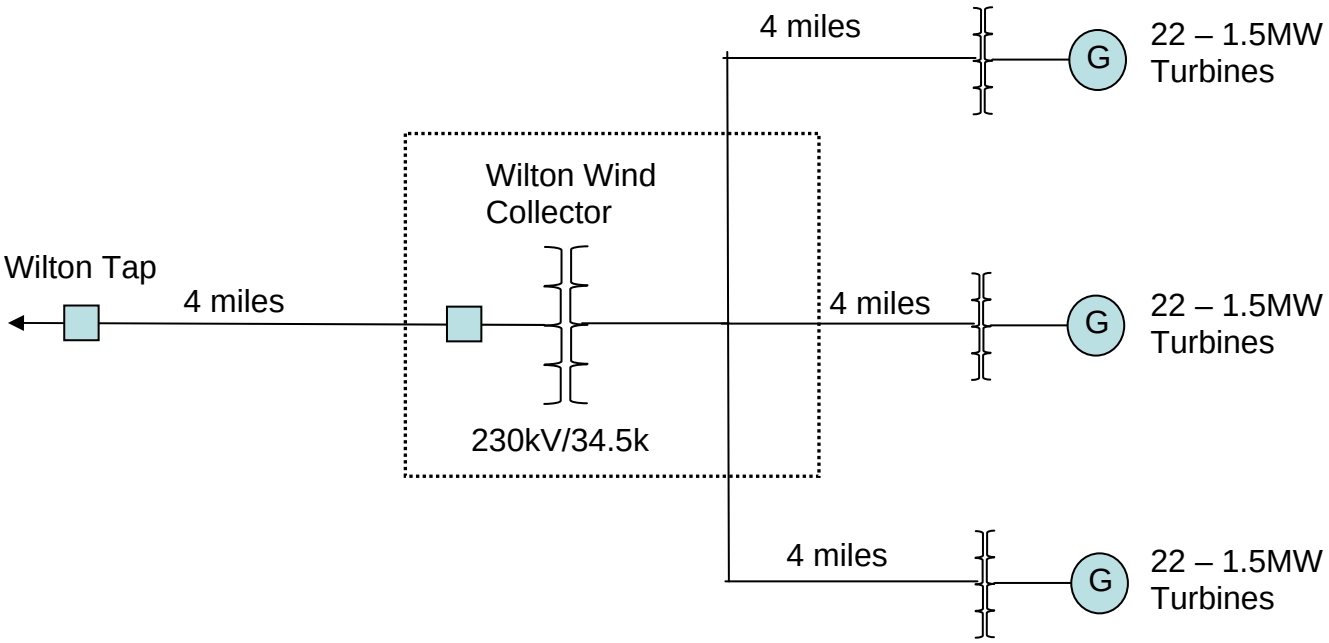

Figure #3 – Collector Substation One Line Diagram

Table 3.1 Naming Convention For Off Peak High Transfer Cases				
Title	**Case**	**Description**	**NDEX MW**	**Wilton Wind MW**
V00	v00-so03aa.xyvV4V4	UG4, Groton sync condenser and caps, Ft Tom & Edgeley Wind, 2005 updates	2080	0
V01	v01-so03aa.xyvV4V4	V00 model with Wilton scheduled to AVS	2080	100
V02	v02-so03aa.xyvV4V4	V00 model with Wilton scheduled to NDak load	2080	100
V10	v10-so03aa.uyvV4V4	UG4, Groton sync condenser and caps, Ft Tom & Edgeley Wind, 2004 updates, RCDC =0	1950	0
V11	v11-so03aa.uyvV4V4	V10 model with Wilton scheduled to AVS	1950	100
V12	v12-so03aa.uyvV4V4	V10 model with Wilton scheduled to NDak load	1950	100
W00	w00-so03aa.xzvV4V4	UG4 + Added listed Q'd items,	2080	0

		Groton sync condenser and caps, Ft Tom & Edgeley Wind, 2004 updates		
W01	w01-so03aa.xzvV4V4	W00 model with Wilton scheduled to AVS	2080	100
W02	w02-so03aa.xzvV4V4	W00 model with Wilton scheduled to NDak load	2080	100
W10	w10-so03aa.uzvV4V4	UG4 + Added listed Q'd items, Groton sync condenser and caps, Ft Tom & Edgeley Wind, 2004 updates, RCDC =0	1950	0
W11	w11-so03aa.uzvV4V4	W10 model with Wilton scheduled to AVS	1950	100
W12	w12-so03aa.uzvV4V4	W10 model with Wilton scheduled to NDak load	1950	100

3.2 – Summer Peak and Winter Peak Cases

The seasonal peak cases used for this study were the 2005 summer and winter peak cases taken from the 2004 MAPP Model Series. These cases were modified with known system improvements and modeling corrections. One line diagrams of each case listed in Table 3.2 are provided in Appendix E.

Table 3.2 Naming Convention For On Peak Cases

Title	Peak Season	Description	Wilton Wind MW's
v00-sp05aa.sav	05 Summer	2005 updates	0
v01-sp05aa.sav	05 Summer	Wilton scheduled to AVS	100
v02-sp05aa.sav	05 Summer	Wilton scheduled to Basin Load	100
w00-sp05aa.sav	05 Summer	2005 updates & Q'd items	0
w01-sp05aa.sav	05 Summer	2005 updates & Q'd items, Wilton scheduled to AVS	100
w02-sp05aa.sav	05 Summer	2005 updates & Q'd items, Wilton scheduled to Basin Load	100
v00-wp05aa.sav	05 Winter	2005 updates	0
v01-wp05aa.sav	05 Winter	Wilton scheduled to AVS	100
v02-wp05aa.sav	05 Winter	Wilton scheduled to Basin Load	100
w00-wp05aa.sav	05 Winter	2005 updates & Q'd items	0
w01-wp05aa.sav	05 Winter	2005 updates & Q'd	100

		items, Wilton scheduled to AVS	
w02-wp05aa.sav	05 Winter	2005 updates & Q'd items, Wilton scheduled to Basin Load	100

4. Study Procedure

4.1 – Steady State Analysis

Analysis of the steady state impacts of the request from the new BEPM network resources in central North Dakota to BEPM load started with performing PSS/E activity ACCC on each of the steady state models developed in Section 3 above. PSS/E rev 29.4 was used. The system and monitor files were developed with the intent of observing excursions of thermal limit over 100 percent of Rate A or voltage outside of the window from 0.95 to 1.05 per unit (pu) voltage. The contingency file was all single branches and valid multiple contingencies within area 652 (Western), zones 627 and 628 (OTP), zones 619, 620, and 621 (GRE), zones 602 and 603 (Xcel) and zone 608 (MP). The monitor file was set to observe the MAPP region within the voltage range of 110 to 500 kV.

The ACCC request impact comparison listing detail voltage impacts equal to or greater than 0.01 pu limits due to the transfer. The ACCC comparisons also include loading increases greater than 2.0MW for the 100MW incremental generation increase (2% distribution factor (DF) based upon 100MW). These impacts are noted in the discussions in Section 5.1.

4.2 – Transient Stability Analysis

The transient stability analysis uses the 2003 Northern MAPP Operating Review Working Group (NMORWG) study package and the cases developed as described in section 3.1 and listed in table 3.1.

The first step is to document transient stability performance of the existing system at high simultaneous NDEX/MHEX/MWSI conditions of 1950/2175/1480 and 2080/2175/1480 with the addition of known existing system enhancements and additions with approved generation set to URGE levels. This run consists of cases V00 and V10 and the disturbances listed in Table 4.2.

Additional permutations are studied with Wilton Wind scheduled to AVS and again scheduled to ND load within the NDEX boundary at NDEX at 1950MW and 2080MW. This run consists of cases V01, V02, V11, and V12.

Another complete set of cases is repeated with the prior queued requests added as listed in section 3.1. This run consists of all the "W" cases listed in Table 3.1 (W00 through W12).

Most of these disturbances are standard fault files used in the NMORWG study package. Additional disturbances and their descriptions may be found in the 'MAPP Members Stability Disturbance Library'. WC3 and WD3 are additional disturbances analyzing 3-phase faults at the Wilton Tap 230kV bus and loss of either the Garrison 230kV line or the Bismarck 230kV line. AV3 and AY3 simulate faults at Garrison or Bismarck with loss of the associated 230kV line to Wilton Wind. WCS and WDS are 3-phase faults at Wilton that clear sections of the Garrison-Bismarck 230kV double circuit line.

Table 4.2 – Transient Disturbances performed on cases

code	Brief description of disturbance	area tested
wc3	5 cycle 3 phase fault at Wilton Wind 230 on Bismarck line. Clear line.	N Dak
wd3	5 cycle 3 phase fault at Wilton Wind 230 on Garrison line. Clear line.	N Dak
av3	5 cycle 3 phase fault at Bismarck 230 on Wilton Wind line. Clear line.	N Dak
ay3	5 cycle 3 phase fault at Garrison 230 on Wilton Wind line. Clear line.	N Dak
wcs	5 cycle 3 phase fault at Wilton Wind 230. Clear Garrison-Wilton and Bismarck-LO 230 lines.	N Dak
wds	5 cycle 3 phase fault at Wilton Wind 230. Clear Bismarck-Wilton and Bismarck-LO 230 line.	N Dak
ag1	4 cycle slgf @ Leland Olds 345 on Fort Thompson line, Leland Olds breaker 2692 stuck. Clear @ 11 cycles by tripping faulted line.	N Dak
ag3	4 cycle 3 phase fault at Leland Olds on the Ft. Thompson 345 kV line. Clear line.	N Dak
ah1	4 cycle slgf @ Leland Olds 345 on Groton line. Leland Olds breaker 2396 stuck. Clear @ 11 cycles by tripping faulted line and Leland Olds transformer 1	N Dak
ah3	4 cycle 3 phase fault at Leland Olds 345 on Groton line. Clear line.	N Dak
al1	5 cycle slgf @ Leland Olds 230 on Stanton line, Leland Olds breaker 982 stuck. Clear @ 14 cycles by tripping Leland Olds 230 bus.	N Dak
am1	5 cycle slgf @ Leland Olds 230 on Washburn-Bismarck line, Leland Olds breaker 682 stuck. Clear @ 14 cycles by tripping Leland Olds 230 bus.	N Dak
be1	4 cycle slgf @ Leland Olds 345 on Antelope Valley #1 line, Leland Olds breaker 2796 stuck. Clear @ 11 cycles by tripping faulted line	N Dak
be3	4 cycle 3 phase fault at Leland Olds 345. Clear the Leland Olds-Antelope Valley #1 line.	N Dak
ei2	Permanent bipole fault on the CUDC line. Both Coal Creek units tripped at 0.28 sec.	N Dak
eq1	4.5 cycle slgf @ Coal Creek on pole 1. brkr 61rb1 stuck. clear @ 11 cycles by tripping faulted pole and bus 1. Cross trip CCS 2	N Dak
nbz	4 cycle 3 phase fault @ Chisago. Trip F601C, transfer trip D602F. 100% reduction initiated from Chisago. Forbes SVS trips.	500
nmz	4 cycle 3 phase fault @ Chisago. Trip F601C, transfer trip D602F. 100% reduction initiated from Chisago. Leave Forbes SVS on MP system following disturbance.	500
oas	4 cycle slgf at Dorsey with stuck brkr at Dorsey. Trip D602F at 4 cycles, clear fault at 15 cycles	500
pcs	Single line to ground fault with breaker fail at King with 8P6 stuck.	
pct	Eau Claire – Arpin 345 kV line trip without a fault.	
pys	Single line to ground fault with breaker fail at Prairie Island with 8H9 stuck.	
pyt	Prairie Island – Byron 345 kV line trip without a fault.	

Each disturbance report file was examined for violations, and results are summarized in section 5.2.

4.3 – Short Circuit Analysis

Three phase fault current at the Garrison, Bismarck, and Wilton Wind 230kV buses will be calculated with Wilton Wind in and out of service to determine the fault duty impact.

4.4 - Distribution Factor Analysis

A Distribution Factor analysis is performed on the Summer and Winter Peak cases. Gen-to-Gen and Gen-to-Load scenarios are studied. The results are presented in section 5.4.

5.0 – Study Results

5.1 – Steady State

The steady state analysis is performed with PSS/E Rev 29.4 utilizing activity ACCC. The system and monitor files were developed with the intension of observing excursions of thermal limit over 100 percent of rate A or voltage outside of the window from 0.95 to 1.05 per unit (pu) voltage. The contingency file was all single branches and valid multiple contingencies within area 652 (Western), zones 627 and 628 (OTP), zones 619, 620, and 621 (GRE), zones 602 and 603 (Xcel) and zone 608 (MP). The monitor file was set to observe the MAPP region within the voltage range of 110 to 500 kV.

5.1.1 – Wilton Wind Generation Only, No Prior Queued Requests

Off Peak Summer

CASE V01 – NDEX = 2080, GEN TO GEN
No steady state impacts are noted.

CASE V02 – NDEX = 2080, GEN TO LOAD
No steady state impacts are noted.

CASE V11 - NDEX = 1950, GEN TO GEN
No steady state impacts are noted.

CASE V12 - NDEX = 1950, GEN TO LOAD
No steady state impacts are noted.

On Peak Summer

Case v01-sp05aa, GEN TO GEN
No steady state impacts are noted.

Case v02-sp05aa, GEN TO LOAD
No steady state impacts are noted.

On Peak Winter

Case v01-wp05aa, GEN TO GEN
No steady state impacts are noted.

Case v02-wp05aa, GEN TO LOAD
No steady state impacts are noted.

5.1.2 – Wilton Wind Generation Interconnection With Prior Queued Requests

Prior Queued requests consisting of a total of 350MW of wind are modeled in the Ellendale area which cause numerous area overloads prior to the addition of Wilton Wind. Based upon recent information from MidWest ISO staff, these requests are interconnection only and no delivery analysis has been performed to date. The Oakes-Ellendale 230kV line, Oakes-Foreman 230kV line, Ellendale 230/115KV transformers are significantly impacted with large overloads without the Wilton project.

5.2 – Stability Analysis

The stability analysis summary tables and plot are provided in Appendix D.

Each case has NBZ violations in the pre-Wilton project cases, as expected, since URGE cases are used. The Forbes 500kV bus reconfiguration as modeled in the NMZ disturbance code is successful in mitigating the NBZ violations in every case, with or without the Wilton project addition.

All other disturbances are within criteria and no adverse impacts are noted.

5.3 – Short Circuit Analysis

The short circuit results are provided in the following Table 5.3. The Wilton Wind has a negligible impact on adjacent substation fault MVA's, and particularly remote buses at which the most-limiting critical disturbances exist.

Table 5.3 – 3-Phase Fault MVA Impact			
Wilton Wind MW	Garrison 230kV MVA	Bismarck 230kV MVA	Wilton Wind 230kV MVA
0MW	3962	4540	n/a
100MW	3984	4618	2590

5.4 - Distribution Factor Analysis

Tables 5.4A through 5.4D contain summary results of the Distribution Factor Analysis. Complete results are provided in Appendix B. Information is provided showing the impacts to the proposed new Coal Creek area OTDF interfaces, which currently have not been added to the MAPP request review process. There are some potential impacts during the gen to load scenario that exceed the 3% criteria on those potential flowgates. However, as these flowgates are not formally in-place, no ATC's are posted to evaluate the impacts against. All other PTDF and OTDF impacts are within criteria. This wind power will displace existing generation resources therefore the gen to load results do not apply and are provided for informational purposes only.

TABLE 5.4A Distribution Factors		
GEN TO GEN		
PTDF INTERFACE	**05 SUPK**	**05 WIPK**
COOPER_S	-0.20%	-0.20%
ECL-ARP	0.60%	0.70%
FTCAL_S	0.00%	0.10%
GGS	0.00%	0.00%
GRIS_LNC	-0.70%	-0.80%
LKM-WFB	0.10%	0.10%
MHEX_N+	1.10%	1.10%
MHEX_S+	-1.20%	-1.10%
MH_SPC_E+	-1.00%	-1.00%
MH_SPC_W+	1.00%	1.00%
MNTZUMA_W	0.40%	0.40%
MWSI	1.70%	1.80%

NDDC	0.00%	0.00%
NDEX	1.60%	1.60%
PRI-BYN	1.00%	1.10%
QUADCITY_W	0.10%	0.10%
WNE_WKS	-0.10%	-0.10%
Y2DC	0.00%	0.00%

TABLE 5.4B Distribution Factors		
GEN TO GEN		
OTDF INTERFACE	05 SUPK	05 WIPK
ARNVINARNHAZ	-0.10%	-0.10%
DAVCALQUARCK	-0.10%	-0.10%
LACWGRLACSTI	0.00%	0.00%
LKFFOXLKGWLM	-0.50%	-0.30%
LORTRKWEMPAD	-0.10%	-0.10%
POWREAMTZBON	0.10%	0.10%
S1226TEKAMAH	0.00%	0.00%
SALXFMWEMPAD	-0.10%	-0.10%
SPETRILAKRAU	-0.40%	-1.40%
CC-STANTON	-0.30%	-0.40%
STANTON-CC	0.30%	0.40%
CC-CCTAP	-0.20%	-0.20%
CCTAP-CC	0.20%	0.20%
CCTAP-STANTO	-0.50%	-0.60%
STANTON-CCTA	0.50%	0.60%

TABLE 5.4C Distribution Factors		
GEN TO LOAD		
PTDF INTERFACE	**05 SUPK**	**05 WIPK**
COOPER_S	-1.20%	-1.60%
ECL-ARP	-0.50%	-0.90%
FTCAL_S	-0.20%	-0.50%
GGS	-2.10%	-2.00%
GRIS_LNC	-1.50%	-1.50%
LKM-WFB	0.00%	0.00%
MHEX_N+	2.60%	3.00%
MHEX_S+	-2.70%	-3.10%
MH_SPC_E+	-2.90%	-3.20%
MH_SPC_W+	2.90%	3.20%

MNTZUMA_W	0.60%	0.80%
MWSI	-0.90%	-1.80%
NDDC	0.00%	0.00%
NDEX	-2.00%	-3.30%
PRI-BYN	-0.40%	-0.90%
QUADCITY_W	0.60%	0.80%
WNE_WKS	-0.70%	-0.70%
Y2DC	0.00%	0.00%

TABLE 5.4D Distribution Factors		
GEN TO LOAD		
OTDF INTERFACE	05 SUPK	05 WIPK
ARNVINARNHAZ	0.20%	0.30%
DAVCALQUARCK	0.10%	0.10%
LACWGRLACSTI	0.40%	0.60%
LKFFOXLKGWLM	-0.10%	0.00%
LORTRKWEMPAD	0.00%	0.10%
POWREAMTZBON	0.20%	0.30%
S1226TEKAMAH	0.10%	0.20%
SALXFMWEMPAD	-0.10%	0.20%
SPETRILAKRAU	0.00%	0.10%
CC-STANTON	-5.30%	-6.40%
STANTON-CC	5.30%	6.50%
CC-CCTAP	-3.50%	-4.30%
CCTAP-CC	3.50%	4.30%
CCTAP-STANTO	-7.30%	-9.10%
STANTON-CCTA	7.40%	9.10%

6.0 – Conclusions

This study evaluates the interconnection-only and delivery impacts of the 100 MW generation interconnection and network resource request at Wilton, ND. Based upon the study results, no system additions are proposed on the Western/Basin Electric/Heartland Consumers Power District (Heartland) Integrated System (IS) to accommodate the generation interconnection and associated transmission service. The Wilton generation is located inside the border of the NDEX stability constrained interface, however, no increase in the NDEX transfer capability is proposed.

These study results also indicate the addition of a 100MW wind turbine generator facility near Wilton, North Dakota will not degrade the reliability of the Mid-

Continent Area Power Pool (MAPP) system. Operation of the new generation does not result in any unacceptable loading or voltage conditions in the area. No new constrained interfaces are required to accommodate the new generation. This study has been performed on an out-of-queue basis, and therefore additional studies may be subsequently required to further evaluate the delivery component of the Network transmission service associated with the OASIS request noted above. The timing of any subsequent study work will be contingent upon resolution of other conflicting prior-queued transmission service requests in Western's OASIS queue. Therefore, Western will not allow Firm deliveries from these units until the prior pending conflicting requests are resolved. However, this study work may be applicable depending upon the resolution of the prior-queued requests, and sufficient information is provided herein to meet the MAPP Design Review Subcommittee (DRS) requirements for approval of new generation interconnections (Network Resources).

7.0 – Listing of Appendices

The following data is provided on the attached CDROM disk:

Appendix A - Wilton Wind Turbine PSSE Steady State and Dynamic Model

Appendix B - Distribution Factor Results

Appendix C - Steady State Analysis ACCC Screen Reports

Appendix D - Stability Analysis Summary Tables and Plots

Appendix E – Powerflow One Line Diagrams