



Minnesota Energy Resources Corporation
Suite 200
1995 Rahnclyff Court
Eagan, MN 55122
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August 1, 2017

VIA ELECTRONIC FILING

Daniel P. Wolf
Executive Secretary
Minnesota Public Utilities Commission
121 Seventh Place East, Suite 350
St. Paul, MN 55101

Re: In the Matter of the Petition of Minnesota Energy Resources Corporation for Approval of a Change in Demand Entitlement for its NNG System

Docket No. G011/M-17-____

Dear Mr. Wolf:

In accordance with Minnesota Rule 7825.2910, subpart 2, please find enclosed Minnesota Energy Resources Corporation's (MERC or Company) request to change demand entitlement. Please note that any updated information will be provided with MERC's November 1, 2017 filing. MERC is also filing Excel and PDF versions of the attachments.

Pursuant to Minnesota Rule 7825.2910, subpart 3, a Notice of Availability has been sent to all intervenors in the Company's previous two rate cases.

Please contact me at (651) 322-8965 if you have any questions regarding the information in this filing. Thank you for your attention to this matter.

Sincerely yours,

/s/ Amber S. Lee

Amber S. Lee
Regulatory and Legislative Affairs Manager
Minnesota Energy Resources Corporation

cc: Service List

August 1, 2017

To: Service List

RE: Minnesota Energy Resources Corporation-NNG Petition for Approval of Change in Demand Entitlement

Notice of Availability

Please take notice that Minnesota Energy Resources Corporation has filed a petition with the Minnesota Public Utilities Commission for approval of a change in demand entitlement for its NNG Purchased Gas Adjustment system.

To obtain copies, or if you have any questions, please contact:

Amber Lee
Minnesota Energy Resources Corporation
1995 Rahncliff Court, Suite 200
Eagan, MN 55122
(651) 322-8965

Please note that this filing is also available through the eDockets system maintained by the Minnesota Department of Commerce and the Minnesota Public Utilities Commission. You can access this document by going to eDockets through the websites of the Department of Commerce or the Public Utilities Commission or going to the eDockets homepage at:

<https://www.edockets.state.mn.us/EFiling/home.jsp>

Once on the eDockets homepage, this document can be accessed through the Search Documents link and by entering the date of the filing.

**STATE OF MINNESOTA
BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION**

**Nancy Lange
Dan Lipschultz
Matt Schuerger
Katie Sieben
John Tuma**

**Chair
Commissioner
Commissioner
Commissioner
Commissioner**

In the Matter of the Petition of Minnesota
Energy Resources Corporation for Approval of
a Change in Demand Entitlement for its NNG
System

Docket No. G011/M-17-____

SUMMARY OF FILING

Pursuant to Minnesota Rule 7825.2910, subpart 2 (Filing Upon Change in Demand), Minnesota Energy Resources Corporation – NNG (MERC or the Company), hereby petitions the Minnesota Public Utilities Commission (Commission) for approval of changes in demand entitlements for MERC customers served off of the Northern Natural Gas (NNG) system. MERC requests the Commission approve the requested changes to be recovered in the Purchased Gas Adjustment (PGA) beginning November 1, 2017.

**STATE OF MINNESOTA
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In the Matter of the Petition of Minnesota
Energy Resources Corporation for Approval of
a Change in Demand Entitlement for its NNG
System

Docket No. G011/M-17-____

FILING UPON CHANGE IN DEMAND

Pursuant to Minnesota Rule 7825.2910, subpart 2 (Filing Upon Change in Demand), Minnesota Energy Resources Corporation - NNG (MERC or the Company), a subsidiary of WEC Energy Group, hereby petitions the Minnesota Public Utilities Commission (Commission) for approval of changes in demand entitlements for MERC-NNG customers served off the Northern Natural Gas interstate pipeline system.¹ MERC requests the Commission approve the requested changes to be recovered in the Purchased Gas Adjustment (PGA) beginning November 1, 2017.

This filing includes the following attachments:

- Attachment A:** Notice of Availability.
- Attachment B:** One paragraph summary of the filing in accordance with Minn. R. 7829.1300, subp. 1.
- Attachment C:** Petition for Change in Demand with Attachments.
- Attachment D:** Affidavit of Service and Service List.

The following information is provided in accordance with Minn. R. 7829.1300:

¹ MERC also serves certain of its Minnesota customers off of the Viking, Great Lakes and Centra pipeline systems. MERC requests approval of a demand entitlement change for the 2017-2018 heating season for its MERC-CONSOLIDATED PGA in a separate docket.

I. Summary of Filing

Pursuant to Minn. R. 7829.1300, subp. 1, a one-paragraph summary of the filing is attached.

II. Service

Pursuant to Minn. R. 7829.1300, subp. 2, MERC has served a copy of this filing on the Department of Commerce, Division of Energy Resources and the Office of the Attorney General — Residential Utilities and Antitrust Division. The summary of filing has been served on all parties on the attached service list. Additionally, pursuant to Minn. R. 7825.2910, subp. 3, a Notice of Availability has been sent to all intervenors in the Company's previous two rate cases.

III. General Filing Information

A. Name, Address, and Telephone Number of the Utility

Minnesota Energy Resources Corporation
1995 Rahnclyff Court, Suite 200
Eagan, MN 55122
(651) 322-8901

B. Name, Address, Electronic Address, and Telephone Number of Attorney for the Utility

Kristin M. Stastny
Briggs and Morgan, P.A.
2200 IDS Center
80 South 8th Street
Minneapolis, MN 55402
KStastny@briggs.com
(612) 977-8656

C. Date of the Filing and Proposed Effective Date

Date of filing: August 1, 2017
Proposed Effective Date: November 1, 2017

D. Statute Controlling Schedule for Processing the Filing

Minnesota Statutes and related rules do not provide an explicit time frame for action by the Commission. Under Minn. R. 7829.1400, initial comments are due within 30 days of filing, with reply comments due 10 days thereafter.

E. Signature, Electronic Address, and Title of Utility Employee Responsible for the Filing



Amber S. Lee
Regulatory and Legislative Affairs Manager
ASLee@minnesotaenergyresources.com
1995 Rahncliff Court, Suite 200
Eagan, MN 55122
(651) 322-8965

If additional information is required, please contact Amber S. Lee at (651) 322-8965.

DATED: August 1, 2017

Respectfully submitted,
MINNESOTA ENERGY RESOURCES
CORPORATION

By: /s/ Amber S. Lee
Amber S. Lee
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Telephone: (651) 322-8965

STATE OF MINNESOTA
BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Nancy Lange
Dan Lipschultz
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In the Matter of the Petition of Minnesota
Energy Resources Corporation for Approval of
a Change in Demand Entitlement for its NNG
System

Docket No. G011/M-17-____

PETITION OF MINNESOTA ENERGY RESOURCES CORPORATION-NNG FOR CHANGE IN
DEMAND

I. **Introduction**

Pursuant to Minnesota Rule 7825.2910, subpart 2 (Filing Upon Change in Demand), Minnesota Energy Resources Corporation - NNG (MERC or the Company), a subsidiary of WEC Energy Group, hereby petitions the Minnesota Public Utilities Commission (Commission) for approval of changes in demand entitlements for MERC-NNG customers served off the Northern Natural Gas interstate pipeline system. MERC requests the Commission approve the requested changes to be recovered in the Purchased Gas Adjustment (PGA) beginning November 1, 2017.

Included with this filing are the following Attachments:

Attachment 1: Design-Day Demand Summary

Attachment 2: Sales Forecast

Attachment 3: Current and Proposed Entitlement Levels

Attachment 4: Rate Impact of the Proposed Demand Change

Attachment 5: Financial Option Summary

Attachment 6: Winter Plan

Attachment 7: Entitlement History

Attachment 8: Change in Entitlement Levels and Related Demand Costs

Attachment 9: Actual Throughput and Design Day Forecast Estimated Throughput

Attachment 10: Customer Counts

Attachment 11: Hedging Summary

Attachment 12: Forecast Methodology

II. Discussion

A. MERC's NNG Design-Day Requirements

Minn. R. 7825.2910, subp. 2 (b) requires that a filing upon change in demand include the utility's Design-Day demand by customer class and the change in Design-Day demand, if any, necessitating the demand revision. The NNG Design-Day requirement has increased by 18,029 dekatherms (dth) from the November 1, 2016, filing. The larger than usual increase in Design-Day requirement is attributable to combining the MERC-Albert Lea PGA into the MERC-NNG PGA and new town growth load. The addition of MERC-Albert Lea alone accounts for 14,819 dth of the increase over the last heating season.

**Table 1: MERC Proposed NNG Reserve Margins
For the 2017-2018 Heating Season**

	Reserve Margin 2017-2018 Heating Season	Reserve Margin 2016-2017 Heating Season	Change
NNG Zone EF	-0.19%	1.34%	-1.53%

For the Demand Entitlement filing effective November 1, 2017, the total Design-Day requirement for MERC NNG is 266,825 dth (Attachment 1). The difference between the total Design-Day requirement and total Design-Day capacity results in a 0.19% negative reserve margin (Attachment 3). As required by Order Point 9 of the Commission's Order in Docket No.

G011/M-15-723, Attachment 3 reflects the separate summer and winter demand entitlements for MERC-NNG.

B. Gas Supply

Minn. R. 7825.2910, subp. 2, requires a description of Design-Day gas supply from all sources under the new level, allocation, or form of demand. This information is provided in Attachment 3.

C. Forecast Methodology for MERC Demand Entitlement November 1, 2017

See Attachment 12.

III. Additional Filing Requirements

A. Daily Design-Day Estimate to Actual Comparison

In the 2007-2008 demand entitlement dockets,² MERC agreed to include a daily estimate utilizing the Design-Day model, which is calculated in Attachment 9. The daily estimate is compared to actual consumption. The actual volumes are total throughput which includes interruptible and transportation volumes that are located behind MERC citygates. The Design-Day model only calculates firm volumes. MERC does not forecast on a daily/monthly basis utilizing the Design-Day model. The Design-Day model is utilized to calculate the theoretical peak day.

B. Average Customer Counts

In the 2007-2008 demand entitlement dockets, MERC agreed to include average customer counts which are provided in Attachment 10.

C. Balancing

Order Point 4 of the Commission's January 21, 2015, Order in MERC's 2010-2011 demand entitlement dockets, Docket Nos. G007/M-10-1166; G007/M-10-1167; G011/M-10-

² Docket Nos. G007/M-07-1402; G007/M-07-1403; G007/M-07-1404; and G007/M-07-1405.

1168; and G011/M-10-1169, required that in future demand entitlement filings, MERC provide a clarification of its statements regarding system balancing and detailed evidence assuring the Commission that the appropriate customer group is paying for any balancing charges or penalties. Additionally, in Docket No. G-999/AA-12-756, by Order dated November 14, 2013, the Commission ordered that “prospectively, all regulated natural gas utilities shall recover balancing service costs, and shall credit the utility’s penalty revenues and the pipeline’s revenue credits, to the commodity portion of the PGA effective with the earliest true-up filing (for revenues) or the earliest monthly PGA (for costs) that can reasonably be implemented.”

MERC subsequently revised its monthly PGA filings, beginning November 2013, to recover all balancing costs via the commodity portion of the PGA. MERC’s 2014 AAA and true-up filings, as well as the 2014 Demand Entitlement filing, also reflected this change. The current MERC-NNG demand entitlement filing includes detailed evidence of the allocation of balancing costs to the commodity portion of the PGA in Attachment 4, page 2 of 3.

D. MERC’s Proposed NNG System Demand-Related Changes

There are two types of demand entitlement changes. The first type is Design-Day Deliverability, which quantifies the amount of firm transportation and storage capacity actually available to MERC’s NNG customers during winter peak periods. The second type does not affect Design-Day Deliverability levels, but alters the capacity portfolio and the PGA costs recovered from customers.

1. Design-Day Deliverability Changes

As shown in Attachment 3, MERC-NNG proposes no change in Design-Day Deliverability. The reserve margin for 2017-2018 is slightly negative. MERC will purchase city gate delivered supply to cover 0.19% of peak day throughput if necessary. T This reserve margin is appropriate because incremental NNG capacity will come on line in 2018 as a result of the Rochester expansion project.

MERC contracted for capacity on the Bison Pipeline for 50,000 dth/day, which went into service on January 14, 2011. The contracted capacity with Northern Border Pipeline (NBPL) went into effect at the in-service of Bison. This capacity does not add any incremental capacity but is utilized to deliver supply to NNG customers at NBPL interconnects with NNG.

2. Other Demand Entitlement Changes

As shown in Attachment 3, MERC–NNG proposes no change in April/October Deliverability. However, MERC requests changes to increase Firm Deferred Delivery (storage) pipeline entitlements that are not included in peak day deliverability. MERC has increased the volume of capacity release NNG storage acquired from a total of 1,200,000 dth in 2016-2017 to 1,500,000 dth in 2017-2018 as discussed in the update filing for Docket No. G011/M-16-650. MERC will utilize this incremental storage to ensure supply price and reliability during the winter. MERC is targeting 30% of NNG winter forecast usage to be supplied from storage as discussed in the hedging explanation below.

E. Financial Option Units and Premiums

In accordance with the Commission's May 8, 2017, Order in Docket No. G011/M-17-85 approving MERC's variance extension request to recover the costs of financial instruments through the PGA, MERC provides the following information:

- i. a list of all financial instruments purchased for the upcoming heating season (see Attachment 11);
- ii. the cost premium associated with each contract (see Attachment 5);
- iii. the size (in dth) of each contract (see Attachments 5 and 11);
- iv. the contract date (see Attachment 5);
- v. the contract price (see Attachment 11);
- vi. an attachment that details the projected total system sales estimates for the upcoming heating season, including all supporting data and

assumptions used when calculating the sales forecast, and the total number of volumes hedged using financial instruments for the upcoming heating season (see Attachment 2 and Attachment 6, page 1 of 2); and

vii. a detailed discussion of the anticipated benefits to ratepayers related to MERC's financial instrument contracts, discussed below.

The NNG 2017-2018 Winter Portfolio Hedging Plans - Minnesota Energy Resources Corporation for gas supply purchases is shown in Attachment 6. MERC's hedging strategy covers 60% of normal winter volumes; 30% through physical storage; and 30% through financial instruments (10% futures and 20% options). The weighted average price of currently purchased futures contracts of natural gas for the 2017/18 winter is \$3.3991/dth. Please see Attachment 11, page 1 of 3. As shown in Attachment 11, page 2 of 3, MERC projects the NNG storage WACOG to be \$2.6781/dth. MERC has purchased call options at an average strike price of \$3.7985/dth, which means if NYMEX contract(s) settle above that price, the options are exercised and MERC customers' gas cost is capped at the average strike price. Please see Attachment 11, page 3 of 3. The remaining 40% of normal winter volumes are purchased at index or market prices. All numbers reflected are natural gas costs only and do not include any transportation, storage, hedge premium, or margin costs.

F. PGA Cost Recovery

MERC proposes to begin recovering the costs associated with the change in demand-related costs in its monthly PGA effective November 1, 2017. Rate impacts associated with this change can be found on Attachment 4.

G. Impacts of Telemetry

Throughout the course of the year, a number of customers request to switch from interruptible to firm service. MERC evaluates these requests to determine the impact to our system and our upstream entitlement levels and our process requires us to evaluate the system

capability before we allow a customer to switch to firm. As a result, the firm volumes associated with a customer switch fall within the Design-Day parameters and do not impact our demand entitlement levels.

IV. Conclusion

If any changes to the entitlements for MERC-NNG are made, MERC will submit an update to this filing by November 1, 2017.

DATED: August 1, 2017

Respectfully submitted,

MINNESOTA ENERGY RESOURCES
CORPORATION

By: /s/ Amber S. Lee
Amber S. Lee
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Telephone: (651) 322-8965

MINNESOTA ENERGY RESOURCES - NNG

DESIGN-DAY DEMAND SUMMARY

NOVEMBER 1, 2017

NNG

Design Day Requirement		266,825
Total Peak Day Entitlement		266,317
2016/17 Firm Peak Day Actual Sendout	1/5/2017	212,653
Firm Annual Throughput - Minnesota		23,618,091
No. of Firm Customers		187,194
Department Load Factor Calculation		30.43%

MINNESOTA ENERGY RESOURCES - NNG

NNG MINNESOTA DESIGN DAY REQUIREMENTS

NOVEMBER 1, 2017

NNG

Pipeline Group	2016/17 Customer Count	Zone Total Customer Count	1/20 Design DDD	Regression Factors		Regression Total	Regression Adjustment	1/20 Requirements Regression Load	Estimated Contract Demand Units	Total *
				Intercept	Slope					

PEAK										
NNG Total	187,194	187,194	98	17,443	2,139	251,482	15,248	266,730	95	266,825
	187,194	187,194								266,825

OFF PEAK										
NNG Total	187,194	187,194	55	17,443	2,139	146,377	15,248	161,625	95	161,720
	187,194	187,194								161,720

* Adjusted for customer growth

MINNESOTA ENERGY RESOURCES - NNG

DESIGN-DAY DEMAND PER CUSTOMER - GS

NOVEMBER 1, 2017

NNG

<u>Heating Season</u>	<u>No. of Firm Customers</u>	<u>Design Day Requirements</u>	<u>MMBtu /Customer /Day</u>
17/18	187,194	266,825	1.43
16/17	184,577	248,796	1.35
15/16	181,326	245,263	1.35
14/15	178,388	261,002	1.38
13/14	178,578	245,878	1.28
12/13	176,937	225,883	1.34
11/12	175,241	235,055	1.24
10/11	176,027	218,213	1.30
09/10	175,228	228,040	1.42
08/09	173,962	247,188	1.30

MINNESOTA ENERGY RESOURCES - NNG
SUMMER/WINTER USAGE - Mcf
PROJECTED 12 MONTHS ENDING JUNE 2018
NNG

<u>Class</u>	<u>Summer Apr-Oct</u>	<u>Winter Nov-Mar</u>	<u>Total</u>
GS	6,013,697	17,589,346	23,603,043
SVI	436,673	1,255,514	1,692,187
SVJ	5,791	9,257	15,048
LVI	552,509	568,478	1,120,987
LVJ			0
SLV			0
Total	<u>7,008,670</u>	<u>19,422,595</u>	<u>26,431,265</u>

MINNESOTA ENERGY RESOURCES - NNG

ENTITLEMENT LEVELS

PROPOSED TO BE EFFECTIVE NOVEMBER 1, 2017

<u>Capacity Type</u>	<i>Summer</i>			<i>April/October</i>			<i>Winter</i>		
	<u>2016/17</u> <u>MMBtu</u>	<u>Change</u> <u>MMBtu</u>	<u>Proposed</u> <u>MMBtu</u>	<u>2016/17</u> <u>MMBtu</u>	<u>Change</u> <u>MMBtu</u>	<u>Proposed</u> <u>MMBtu</u>	<u>2016/17</u> <u>MMBtu</u>	<u>Change</u> <u>MMBtu</u>	<u>Proposed</u> <u>MMBtu</u>
TF-12 Base & Variable	75,316	9,393	84,709	75,316	9,393	84,709	75,316	0	75,316
TF5	0	0	0	0	0	0	32,278	13,390	45,668
TFX - 12	32,297	0	32,297	32,297	0	32,297	32,297	0	32,297
TFX - 5	0	0	0	0	0	0	108,701	800	109,501
TFX- (Apr/Oct) Offpeak*	0	0	0	2,000	0	2,000	0	0	0
Bison	50,000	0	50,000	50,000	0	50,000	50,000	0	50,000
NBPL	50,000	0	50,000	50,000	0	50,000	50,000	0	50,000
Northwest Gas (Windom)	2,500	0	2,500	2,500	0	2,500	2,500	0	2,500
Northwestern Energy (Ortonville)	1,035	0	1,035	1,035	0	1,035	1,035	0	1,035
NNG Zone Delivery Call Option	0	0	0	0	0	0	0	0	0
Total	111,148	9,393	120,541	113,148	9,393	122,541	252,127	14,190	266,317
Heating Season Forecasted Design Day-Adjusted							248,796	18,029	266,825
Non-Heating Season Forecasted Design Day				152,070	9,650	161,720			
Heating Season Capacity Surplus/Shortage							3,331	(3,839)	(508)
Non-Heating Season Capacity Surplus/Shortage				(38,922)	(257)	(39,179)			
*Not included in Heating Season Total entitlement									
Reserve Margin			N3	-25.59%	1.37%	-24.23%	1.34%	-1.53%	-0.19%

MINNESOTA ENERGY RESOURCES - NNG
RATE IMPACT OF THE PROPOSED DEMAND CHANGE
NOVEMBER 1, 2017

All costs in \$/Dth	Base Cost of Gas G011/MR15-748 Jul 1, 2017	Demand Charge Oct 1, 2016	Demand Charge Demand Filing Nov 1, 2016	Most Recent PGA Jul 1, 2017	Proposed Effective Nov 1, 2017	Result of Proposed Change				
						Change from Last Rate Case	Change from Nov 1, 2016 Demand Filing	Change from Last PGA %	Change from Last PGA \$	
1) General Service Residential: Avg. Annual Use:		88	Dth							
Commodity Cost	\$3.2257	\$4.3217	\$4.3217	\$3.2257	\$3.0479	(\$0.1778)	(\$1.2738)	-5.51%	(\$0.1778)	
Demand Cost	\$0.9288	\$0.9226	\$0.9226	\$0.9288	\$0.9860	\$0.0572	\$0.0634	6.15%	\$0.0572	
Commodity Margin	\$2.4116	\$2.3980	\$2.3980	\$2.4116	\$2.4116	\$0.0000	\$0.0136	0.00%	\$0.0000	
Total Cost of Gas	\$6.5661	\$7.6423	\$7.6423	\$6.5661	\$6.4455	(\$0.1206)	(\$1.1968)	-1.84%	(\$0.1206)	
Avg Annual Cost	\$577.82	\$672.52	\$672.52	\$577.82	\$567.20	(\$10.62)	(\$105.32)	-1.84%	(\$10.62)	
Effect of proposed commodity change on average annual bills:									(\$15.65)	
Effect of proposed demand change on average annual bills:									\$5.03	
2) Small Vol. Interruptible: Avg. Annual Use:		5,110	Dth							
Commodity Cost	\$3.2257	\$4.3217	\$4.3217	\$3.2257	\$3.0479	(\$0.1778)	(\$1.2738)	-5.51%	(\$0.1778)	
Demand Cost										
Commodity Margin	\$0.9740	\$0.9336	\$0.9336	\$0.9740	\$0.9740	\$0.0000	\$0.0404	0.00%	\$0.0000	
Total Cost of Gas	\$4.1997	\$5.2553	\$5.2553	\$4.1997	\$4.0219	(\$0.1778)	(\$1.2334)	-4.23%	(\$0.1778)	
Avg Annual Cost	\$21,460.47	\$26,854.58	\$26,854.58	\$21,460.47	\$20,551.91	(\$908.56)	(\$6,302.67)	-4.23%	(\$908.56)	
Effect of proposed commodity change on average annual bills:									(\$908.56)	
Effect of proposed demand change on average annual bills:									\$0.00	
3) Large Vol. Interruptible: Avg. Annual Use:		16,150	Dth							
Commodity Cost	\$3.2257	\$4.3217	\$4.3217	\$3.2257	\$3.0479	(\$0.1778)	(\$1.2738)	-5.51%	(\$0.1778)	
Demand Cost										
Commodity Margin	\$0.5329	\$0.5007	\$0.5007	\$0.5329	\$0.5329	\$0.0000	\$0.0322	0.00%	\$0.0000	
Total Cost of Gas	\$3.7586	\$4.8224	\$4.8224	\$3.7586	\$3.5808	(\$0.1778)	(\$1.2416)	-4.73%	(\$0.1778)	
Avg Annual Cost	\$60,701.39	\$77,881.76	\$77,881.76	\$60,701.39	\$57,829.92	(\$2,871.47)	(\$20,051.84)	-4.73%	(\$2,871.47)	
Effect of proposed commodity change on average annual bills:									(\$2,871.47)	
Effect of proposed demand change on average annual bills:									\$0.00	
4) Small Vol. Firm: Avg. Annual Use:		5,110	Dth							
		25	DTh							
Commodity Cost	\$3.2257	\$4.3217	\$4.3217	\$3.2257	\$3.0479	(\$0.1778)	(\$1.2738)	-5.51%	(\$0.1778)	
Demand Cost	\$27.6780	\$10.1722	\$10.1722	\$27.6780	\$10.1817	\$0.0000	\$0.0095	-63.21%	(\$17.4963)	
Commodity Margin	\$0.9740	\$0.9336	\$0.9336	\$0.9740	\$0.9740	\$0.0000	\$0.0404	0.00%	\$0.0000	
Demand Margin	\$3.0000	\$2.7493	\$2.7493	\$3.0000	\$3.0000	\$3.0000	\$0.2507	0.00%	\$0.0000	
Total Cost of Gas	\$4.1997	\$5.2553	\$5.2553	\$4.1997	\$4.0219	(\$0.1778)	(\$1.2334)	-4.23%	(\$0.1778)	
Total Demand Cost	\$30.6780	\$12.9215	\$12.9215	\$30.6780	\$13.1817	(\$17.4963)	\$0.2602	-57.03%	(\$17.4963)	
Avg Annual Cost	\$22,227.42	\$27,177.62	\$27,177.62	\$22,227.42	\$20,881.45	(\$1,345.97)	(\$6,296.17)	-6.06%	(\$1,345.97)	
Effect of proposed commodity change on average annual bills:									(\$908.56)	
Effect of proposed demand change on average annual bills:									(\$437.41)	
5) Large Vol. Firm: Avg. Annual Use:		16,150	Dth							
		75	DTh							
Commodity Cost	\$3.2257	\$4.3217	\$4.3217	\$3.2257	\$3.0479	(\$0.1778)	(\$1.2738)	-5.51%	(\$0.1778)	
Demand Cost	\$27.6780	\$10.1722	\$10.1722	\$27.6780	\$10.1817	(\$17.4963)	\$0.0095	-63.21%	(\$17.4963)	
Commodity Margin	\$0.5329	\$0.5007	\$0.5007	\$0.5329	\$0.5329	\$0.0000	\$0.0322	0.00%	\$0.0000	
Demand Margin	\$3.0000	\$2.7493	\$2.7493	\$3.0000	\$3.0000	\$0.0000	\$0.2507	0.00%	\$0.0000	
Total Cost of Gas	\$3.7586	\$4.8224	\$4.8224	\$3.7586	\$3.5808	(\$0.1778)	(\$1.2416)	-4.73%	(\$0.1778)	
Total Demand Cost	\$30.6780	\$12.9215	\$12.9215	\$30.6780	\$13.1817	\$13.1817	\$0.2602	-57.03%	(\$17.4963)	
Avg Annual Cost	\$63,002.24	\$78,850.87	\$78,850.87	\$63,002.24	\$58,818.55	(\$1,882.84)	(\$20,032.32)	-6.64%	(\$4,183.69)	
Effect of proposed commodity change on average annual bills:									(\$2,871.47)	
Effect of proposed demand change on average annual bills:									(\$1,312.22)	

Note: Average Annual Average based on NNG Annual Automatic Adjustment Report in Docket No. E,G999/AA-17-XXX

MINNESOTA ENERGY RESOURCES - NNG
RATE IMPACT OF THE PROPOSED DEMAND CHANGE

NOVEMBER 1, 2017

NNG

IV. NORTHERN NATURAL GAS COMPANY'S RATES -- CURRENT COST OF GAS EFFECTIVE						
	Tariff-Summer(7 mths)	Tariff-Winter(5 mths)	Wt. Annual	GRI	01-Nov-17	
					Total	
TF-12B	112495 \$	5.6830 \$	10.2300	\$7.5776	\$0.0000	\$7.5776
TF-12B Discount	112495 \$	5.6830 \$	10.0320	\$7.4951	\$0.0000	\$7.4951
TF-12V	112495 \$	5.6830 \$	13.8660	\$9.0926	\$0.0000	\$9.0926
TF-5	112495 \$	- \$	15.1530	\$15.1530	\$0.0000	\$15.1530
TFX	112486 \$	5.6830 \$	15.1530	\$9.6288	\$0.0000	\$9.6288
TFX-5	112486 \$	- \$	15.1530	\$15.1530	\$0.0000	\$15.1530
TFX-5 Discount	112486 \$	- \$	10.0320	\$10.0320	\$0.0000	\$10.0320
TFX - Discount	111866 \$	2.2192 \$	15.1392	\$7.6025	\$0.0000	\$7.6025
TFX - Discount	111866 \$	4.8640 \$	4.8640	\$4.8640	\$0.0000	\$4.8640
TFX - Discount	111866 \$	5.4720 \$	5.4720	\$5.4720	\$0.0000	\$5.4720
TFX-5	127852 \$	- \$	15.1530	\$15.1530	\$0.0000	\$15.1530
Gas Cost						\$2.2444 /Dth

V. ANNUAL SALES -- As approved in Docket No. G011/MR-15-748

253,351,745

VI. MERC-NNG'S CURRENT COST OF GAS EFFECTIVE:

01-Nov-17

		Contract #s)	Monthly Entitlements (Dth)	Months	Rate (\$/Dth)		Contract Costs	Rate/Therm	
A. GS-NNG									
TF12B (Max Rate) Winter	112495	49,219	5	\$ 10.2300	=	\$2,517,552	\$ 0.01119		
TF12B (Max Rate) Summer	112495	49,219	7	\$ 5.6830	=	\$1,957,981	\$ 0.00870		
TF12V (Max Rate)	112495	30,290	12	\$ 9.0926	=	\$3,304,978	\$ 0.01469		
TF5 (Max Rate)	112495	36,275	5	\$ 15.1530	=	\$2,748,375	\$ 0.01221		
TF12B (Discount-Winter)	112495	5,200	12	\$ 7.4951	=	\$467,694	\$ 0.00208		
TFX12 (Max Rate)	112486	10,822	12	\$ 9.6288	=	\$1,250,434	\$ 0.00556		
TFX Apr (Max Rate)	112486	2,000	1	\$ 5.6830	=	\$11,366	\$ 0.00005		
TFX Oct (Max Rate)	112486	2,000	1	\$ 5.6830	=	\$11,366	\$ 0.00005		
TFX5 (Max Rate)	112486	82,688	5	\$ 15.1530	=	\$6,264,856	\$ 0.02784		
TFX5 (Discount)	112486	1,800	5	\$ 10.0320	=	\$90,288	\$ 0.00040		
TFX12 (Discount)	111866	1,283	12	\$ 4.8640	=	\$74,886	\$ 0.00033		
TFX12 (Discount)	111866	8,271	12	\$ 5.4720	=	\$543,107	\$ 0.00241		
TFX12 (Discount)	111866	11,921	12	\$ 7.6025	=	\$1,087,553	\$ 0.00483		
TFX5 (Discount)	111866	379	5	\$ 4.8640	=	\$9,217	\$ 0.00004		
TFX5 (Discount)	111866	2,445	5	\$ 5.4720	=	\$66,895	\$ 0.00030		
TFX5 (Discount)	111866	22,189	5	\$ 15.1392	=	\$1,679,619	\$ 0.00746		
Windom	118657	2,500	12	\$ -	=	\$0	\$ -		
Northwestern Energy		1,035	12	\$ 8.3382	=	\$103,560	\$ 0.00046		
Total Demand Cost							\$22,189,727	\$ 0.09860	
As approved in Docket No. G011/MR-15-748							225,057,235		
GS-1 Demand Current Cost of Gas/therm								\$ 0.09860	
GS-1 Commodity Current Cost of Gas/therm								\$ 0.30479	
Total GS-1 Current Cost of Gas/therm								\$ 0.40339	
B. GS-NNG, SVI-NNG, LVI-NNG, SJ-NNG, LJ-NNG, SLV-Commodity									
		Monthly Entitlement (Dth)	Months	Rate (\$/Dth)	Contract Costs	Contract Costs	Rate (\$/therm)		
FDD - Reservation	118657	87,058	12	\$ 1.7140	=	\$1,790,633	\$ 0.00707		
FDD - Storage Cycle	118657	1,003,864	5	\$ 0.3567	=	\$1,790,392	\$ 0.00707		
FDD - Reservation	132024	17,345	12	\$ 1.7140	=	\$356,748	\$ 0.00141		
FDD - Storage Cycle	132024	200,000	5	\$ 0.3567	=	\$356,700	\$ 0.00141		
FDD - Reservation	132112	8,672	12	\$ 1.7140	=	\$178,374	\$ 0.00070		
FDD - Storage Cycle	132112	100,000	5	\$ 0.3567	=	\$178,350	\$ 0.00070		
Firm Deferred Delivery Storage Contracts							\$4,651,197	\$ 0.01836	
Per Docket No. G-007/M-07-1402-05 dated August 6, 2014, storage demand charges will be allocated through the commodity charge effective 11/1/2014.									
		Monthly Entitlement (Dth)	Months	Rate (\$/Dth)	Contract Costs	Contract Costs	Rate (\$/therm)		
Bison	FT003	50,000	12	\$ 17.4896	=	\$10,493,750	\$ 0.04142		
NBPL	T8673F	50,000	12	\$ 6.9958	=	\$4,197,500	\$ 0.01657		
							\$14,691,250	\$ 0.05799	
Per Doct No. G-007/M-10-1166 and G-011/M-10-1168 dated January 26, 2015, recover the costs associated with Bison contract through commodity effective									
		Annual Sales (Dth)		Rate (\$/Dth)	Commodity Cost	Rate Case Sales (therm)	Rate (\$/therm)		
CD-1 Commodity		25,335,175	x	\$2.2444	\$56,862,266	253,351,745	\$ 0.22444		
SMS-Bal Service		272,160	x	\$2.1800	\$593,309	253,351,745	\$ 0.00234		
Physical Forward Start Premium					\$53,820	253,351,745	\$ 0.00021		
Call Option Premium					\$366,645	253,351,745	\$ 0.00145		
GS-NNG, SVI-NNG, LVI-NNG, SJ-NNG, LJ-NNG, SLV Commodity Current Cost of Gas/therm					\$62,527,236	253,351,745	\$ 0.30479		

MINNESOTA ENERGY RESOURCES - NNG
RATE IMPACT OF THE PROPOSED DEMAND CHANGE

NOVEMBER 1, 2017

NNG

COSTS ASSIGNED IN JOINT RATE:							
	Units	Contract #	Month	\$/Dth	=	Cost	\$/therm
TF12B (Max Rate) Winter	49,219	112495	5	\$10.2300	=	\$2,517,552	\$0.11552
TF12B (Max Rate) Summer	49,219	112495	7	\$5.6830	=	\$1,957,981	\$0.08984
TF12V (Max Rate)	30,290	112495	12	\$9.0926	=	\$3,304,978	\$0.15165
TF5 (Max Rate)	36,275	112495	5	\$15.1530	=	\$2,748,375	\$0.12611
TF12B (Discount-Winter)	5,200	112495	12	\$7.4951	=	\$467,694	\$0.02146
TFX12 (Max Rate)	10,822	112486	12	\$9.6288	=	\$1,250,434	\$0.05738
TFX Apr (Max Rate)	2,000	112486	1	\$5.6830	=	\$11,366	\$0.00052
TFX Oct (Max Rate)	2,000	112486	1	\$5.6830	=	\$11,366	\$0.00052
TFX5 (Max Rate)	82,688	112486	5	\$15.1530	=	\$6,264,856	\$0.28746
TFX5 (Discount)	1,800	112486	5	\$10.0320	=	\$90,288	\$0.00414
TFX12 (Discount)	1,283	111866	12	\$4.8640	=	\$74,886	\$0.00344
TFX12 (Discount)	8,271	111866	12	\$5.4720	=	\$543,107	\$0.02492
TFX12 (Discount)	11,921	111866	12	\$7.6025	=	\$1,087,553	\$0.04990
TFX5 (Discount)	379	111866	5	\$4.8640	=	\$9,217	\$0.00042
TFX5 (Discount)	2,445	111866	5	\$5.4720	=	\$66,895	\$0.00307
TFX5 (Discount)	22,189	111866	5	\$15.1392	=	\$1,679,619	\$0.07707
Windom	2,500	118657	12	\$0.0000	=	\$0	\$0.00000
Northwestern Energy	1,035		12	\$8.3382	=	\$103,560	\$0.00475
TOTAL						\$22,189,728	
Annualized Entitlement						21,793,720	
Demand Component						<u>\$1,01817</u>	\$1.01817

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

**Financial Options
 Heating Season 2017-2018**

Units - Gas Daily Peaker Packages (Physical)

<u>November</u>		<u>December</u>		<u>January</u>		<u>February</u>		<u>March</u>		<u>Daily Total</u>	<u>Term Total</u>
<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>		
N/A		N/A		N/A		N/A		N/A			

Premium - Gas Daily Peaker (Monthly Cost)

<u>November</u>		<u>December</u>		<u>January</u>		<u>February</u>		<u>March</u>		<u>Option Premium</u>	<u>Total Premium Cost</u>
<u>Option Premium</u>	<u>Premium Cost</u>	<u>Option Premium</u>	<u>Premium Cost</u>	<u>Option Premium</u>	<u>Premium Cost</u>	<u>Option Premium</u>	<u>Premium Cost</u>	<u>Option Premium</u>	<u>Premium Cost</u>		
N/A		N/A		N/A		N/A		N/A			

Units - Futures (Dth)

	<u>November</u>		<u>December</u>		<u>January</u>		<u>February</u>		<u>March</u>		<u>Term Total</u>
	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	
1	05/15/17	1,896	05/25/17	2,688	05/22/17	2,926	05/17/17	2,941	05/19/17	2,395	387,513
2	06/07/17	1,354	06/21/17	2,688	06/19/17	2,926	06/08/17	2,941	06/14/17	1,863	354,763
3											-
4											-
5											-
6											-
7											-
8											-
9											-
10											-
Total		3,250		5,376		5,852		5,882		4,258	742,276

Units - Call Options (Dth)

	<u>November</u>		<u>December</u>		<u>January</u>		<u>February</u>		<u>March</u>		<u>Term Total</u>
	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	
1	05/15/17	3,313	05/19/17	4,533	05/18/17	5,596	05/25/27	5,305	05/22/17	3,943	684,129
2	06/07/17	3,313	06/14/17	4,533	06/08/17	5,330	06/21/17	5,305	06/19/17	3,943	675,869
3											-
4											-
5											-
6											-
7											-
8											-
Total		6,625		9,065		10,926		10,610		7,885	1,359,998

Premium - Call Option (Monthly Cost)

	<u>November</u>		<u>December</u>		<u>January</u>		<u>February</u>		<u>March</u>		<u>Option Premium</u>	<u>Total Premium Cost</u>
	<u>Option Premium</u>	<u>Premium Cost</u>	<u>Option Premium</u>	<u>Premium Cost</u>	<u>Option Premium</u>	<u>Premium Cost</u>	<u>Option Premium</u>	<u>Premium Cost</u>	<u>Option Premium</u>	<u>Premium Cost</u>		
1	\$ 0.3060	\$ 30,409	\$ 0.2760	\$ 38,781	\$ 0.2790	\$ 48,400	\$ 0.2670	\$ 39,661	\$ 0.2820	\$ 34,467	\$ 0.2802	\$ 191,718
2	\$ 0.2260	\$ 22,459	\$ 0.2610	\$ 36,673	\$ 0.2560	\$ 42,296	\$ 0.2710	\$ 40,255	\$ 0.2720	\$ 33,244	\$ 0.2588	\$ 174,927
3	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	#DIV/0!	\$ -
4	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	#DIV/0!	\$ -
5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	#DIV/0!	\$ -
6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	#DIV/0!	\$ -
7	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total	\$ 0.2660	\$ 52,868	\$ 0.2685	\$ 75,454	\$ 0.2678	\$ 90,696	\$ 0.2690	\$ 79,917	\$ 0.2770	\$ 67,711	\$ 0.2696	\$ 366,645

Units - Collar Floor (put)

No Puts were purchased.

Attachment 6
Page 1 of 2

17/18 Winter Portfolio Plan - NNG MERC Hedging Plan

10,000 Contract Size

System	Purchase Month	Contracts		Contracts		Contracts		Contracts		Contracts		Total		Percent of Requirements
		Number Contracts	Contract Volume	Number Contracts	Contract Volume	Number Contracts	Contract Volume	Number Contracts	Contract Volume	Number Contracts	Contract Volume	Number Contracts	Contract Volume	
MN Requirements			2,666,421		4,073,091		4,832,256		4,255,202		3,347,470		19,174,439	19,174,439
NNG -MERC			88,881		131,390		155,879		151,971		107,983		126,942	
10%	Futures		266,642		407,309		483,226		425,520		334,747		1,917,444	
20%	Call		533,284		814,618		966,451		851,040		669,494		3,834,888	
30%	Storage		799,926		1,221,927		1,449,677		1,276,561		1,004,241		5,752,332	
40%	Index		1,066,568		1,629,236		1,932,902		1,702,081		1,338,988		7,669,776	
Futures Contracts	May-17	6	60,000	8	80,000	9	90,000	8	80,000	7	70,000	38	380,000	
	Jun-17	4	40,000	8	80,000	9	90,000	8	80,000	6	60,000	35	350,000	
	Jul-17	4	40,000	6	60,000	8	80,000	7	70,000	5	50,000	30	300,000	
	Aug-17	4	40,000	6	60,000	7	70,000	7	70,000	5	50,000	29	290,000	
	Sep-17	4	40,000	6	60,000	7	70,000	6	60,000	5	50,000	28	280,000	
	Oct-17	4	40,000	6	60,000	7	70,000	6	60,000	5	50,000	28	280,000	
	Total	26	260,000	40	400,000	47	470,000	42	420,000	33	330,000	188	1,880,000	9.80%
Call Options	May-17	10	100,000	14	140,000	17	170,000	15	150,000	12	120,000	68	680,000	
	Jun-17	10	100,000	14	140,000	16	160,000	15	150,000	12	120,000	67	670,000	
	Jul-17	9	90,000	14	140,000	16	160,000	15	150,000	12	120,000	66	660,000	
	Aug-17	8	80,000	14	140,000	16	160,000	14	140,000	10	100,000	62	620,000	
	Sep-17	8	80,000	13	130,000	15	150,000	13	130,000	10	100,000	59	590,000	
	Oct-17	8	80,000	12	120,000	15	150,000	13	130,000	10	100,000	58	580,000	
	Total	53	530,000	81	810,000	95	950,000	85	850,000	66	660,000	380	3,800,000	19.82%
Collars	May-17													
	Jun-17													
	Jul-17													
	Aug-17													
	Sep-17													
	Oct-17													
	Total													0.00%
Index (back financial)	Total		790,000		1,210,000		1,420,000		1,270,000		990,000		5,680,000	29.62%
Physical Hedges														
Storage			586,884		1,474,734		1,474,734		1,474,734		586,884		5,597,969	29.19%
Prepaid Obl														0.00%
Term Index														0.00%
Total NNG MN														
Futures													1,880,000	9.80%
Call Options													3,800,000	19.82%
Costing Collar														0.00%
Storage													5,597,969	29.19%
Prepaid Obl														0.00%
Term Index														0.00%
Month/Daily													7,896,471	41.18%
Total													19,174,439	100.00%

NOTE:

MINNESOTA ENERGY RESOURCES

**NNG WINTER PLAN
 NOVEMBER, 2015 THROUGH MARCH, 2016**

<u>PHYSICAL FIXED PRICE HEDGES</u>	<u>Deal #</u>	<u>Trigger Locked</u>	<u>Trigger Exercised</u>	<u>Receipt Point</u>	<u>Daily Volumes</u>					<u>Monthly Total</u>
					<u>Nov</u>	<u>Dec</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	
No Physical Fixed Price Hedges										-
Total Actual Fixed/Option Physical					-	-	-	-	-	-

INDEX

<u>Contract Number</u>	<u>Date</u>	<u>Receipt Point</u>	<u>Nov</u>	<u>Dec</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Total</u>
48980	4/28/2017	NBPL Port of Morgan		10,000	10,000	10,000		900,000
48982	4/28/2017	NBPL Port of Morgan	20,000	20,000	20,000	20,000	20,000	3,020,000
49012	4/28/2017	NBPL Port of Morgan		10,000	10,000	10,000		900,000
49014	4/28/2017	NBPL Port of Morgan		10,000	10,000	10,000		900,000
48981	4/28/2017	NNG Ventura	10,846	10,846	10,846	10,846	10,846	1,637,746
49013	4/28/2017	NNG Demarc		5,000	5,000	5,000		450,000
49017	4/28/2017	NNG/GLGT Carlton	8,000	8,000	8,000	8,000	8,000	1,208,000
49018	4/28/2017	NNG/GLGT Grand Rapids	6,064	6,064	6,064	6,064	6,064	915,664
49019	4/28/2017	NNG/GLGT Carlton		5,000	5,000	5,000		450,000
Total Actual Seasonal Index			44,910	84,910	84,910	84,910	44,910	4,661,410

GAS DAILY PACKAGES

Physical Call Option	49015	4/28/2017	NNG Ventura	-	10,000	10,000	10,000	-
Physical Call Option	49016	4/28/2017	NNG Ventura	-	20,000	20,000	20,000	-

STORAGE

<u>Injection Month</u>	<u>K#118657 Volume Injected</u>	<u>K#132024 Volume Injected</u>	<u>K#132112 Volume Injected</u>	<u>Total Volume Injected</u>
May - balance forward	0	0	0	0
June	984,181	98,039	196,078	1,278,298
July	1,016,987	101,307	202,614	1,320,908
August	1,016,987	101,307	202,614	1,320,908
Sept	984,181	98,039	196,078	1,278,298
Oct (est)	<u>1,016,987</u>	<u>101,307</u>	<u>202,614</u>	<u>1,320,908</u>
Total	5,019,321	500,000	1,000,000	6,519,321

MINNESOTA ENERGY RESOURCES - NNG

	2013 NNG GS	2014 NNG GS	2015 NNG GS	2016 NNG GS	2017 NNG GS	Proposed Change
Design Day	245,878	261,002	245,263	248,796	266,825	18,029
Customer Requirements moving to Transportation 2005-6						
Adjusted Design Day						
Design Day Percentages	28.43%	28.07%	32.40%	29.71%	30.43%	0.71%
Total Design Day Capacity (includes non-recallable capacity)	256,385	266,385	252,127	252,127	266,317	14,190
Less: Windom	2,500	2,500	2,500	2,500	2,500	0
Less: Northwestern Energy	910	910	1,035	1,035	1,035	0
Total Design Day Capacity	252,975	262,975	248,592	248,592	262,782	14,190
Factors for All Winter Capacity	100.00%	100.00%	100.00%	100.00%	100.00%	
<u>Direct Assigned Entitlements in PGA</u>						
TF12B	49153	55019	45,026	45,026	54,419	9,393
TF12V	26926	21060	30,290	30,290	30,290	0
TF5	31515	31515	32,278	32,278	36,275	3,997
TFX12	32297	32297	32,297	32,297	32,297	0
TFX(5)	93084	123084	108,701	108,701	109,501	800
TFX(5) (12-V)						0
TFX (April Only)	2000	2000	2,000	2,000	2,000	0
TFX (October Only)	2000	2000	2,000	2,000	2,000	0
Windom	2,500	2,500	2,500	2,500	2,500	0
Northwestern Energy	910	910	1,035	1,035	1,035	0
NNG Zone Delivery Call Option	20,000	0	0	0	0	0
Bison *	50,000	50,000	50,000	50,000	50,000	0
NBPL *	50,000	50,000	50,000	50,000	50,000	0
Total Direct Assignments	256,385	266,385	252,127	252,127	266,317	14,190
LP Peak Shaving	0					0
Total Design Day Capacity	256,385	266,385	252,127	252,127	266,317	14,190
Total Annual Transportation	111,786	111,786	111,148	111,148	120,541	9,393
Total Seasonal Transportation	144,599	154,599	140,979	140,979	145,776	4,797
Total Percent Seasonal	56.4%	58.0%	55.9%	55.9%	54.7%	-1.2%
Reserve Margin	4.27%	2.06%	2.80%	1.34%	-0.19%	-1.5%
Total Design Day Capacity w/ contract demand	256,385	266,385	252,127	252,127	266,317	14,190
Factors	28.43%	28.07%	32.40%	29.71%	30.43%	0.71%
<u>Other Entitlements not included in Peak Day Deliverability</u>						
TFX Oct	2,000	2,000	2,000	2,000	2,000	0
TFX Apr	2,000	2,000	2,000	2,000	2,000	0
FDD Storage Reservation	97,463	94,863	94,863	101,800	113,075	11,275
FDD Storage Capacity	1,123,864	1,093,864	1,093,864	1,093,864	1,303,864	130,000
FDD Maximum Storage Quantity	5,619,321	5,469,321	5,469,321	5,869,321	6,519,321	650,000
SMS	22,680	22,680	22,680	272,160	272,160	0

MINNESOTA ENERGY RESOURCES - NNG

Change in Costs due to November 1, 2017 Change in Entitlement Levels and Related Demand Costs

Costs Assigned In Demand

	Contract	2016/17 Entitlements	2017/18 Entitlements	Entitlement Change	Months	2017/18 Rate	2016/17 Total Annual Cost	2017/18 Total Annual Cost	Total Annual Cost Change
TF12B (Max Rate) Winter	112495	39,826	49,219	9,393	5	\$10.2300	\$2,037,100	\$2,517,552	\$480,452
TF12B (Max Rate) Summer	112495	39,826	49,219	9,393	7	\$5.6830	\$1,584,318	\$1,957,981	\$373,663
TF12V (Max Rate)	112495	30,290	30,290	0	12	\$9.0926	\$3,304,978	\$3,304,978	\$0
TF5 (Max Rate)	112495	32,278	36,275	3,997	5	\$15.1530	\$2,445,543	\$2,748,375	\$302,833
TF12B (Discount-Winter)	112495	5,200	5,200	0	12	\$7.4951	\$467,694	\$467,694	\$0
TFX12 (Max Rate)	112486	10,822	10,822	0	12	\$9.6288	\$1,250,434	\$1,250,434	\$0
TFX Apr (Max Rate)	112486	2,000	2,000	0	1	\$5.6830	\$11,366	\$11,366	\$0
TFX Oct (Max Rate)	112486	2,000	2,000	0	1	\$5.6830	\$11,366	\$11,366	\$0
TFX5 (Max Rate)	112486	81,888	82,688	800	5	\$15.1530	\$6,204,244	\$6,264,856	\$60,612
TFX5 (Discount)	112486	1,800	1,800	0	5	\$10.0320	\$90,288	\$90,288	\$0
TFX12 (Discount)	111866	1,283	1,283	0	12	\$4.8640	\$74,886	\$74,886	\$0
TFX12 (Discount)	111866	8,271	8,271	0	12	\$5.4720	\$543,107	\$543,107	\$0
TFX12 (Discount)	111866	11,921	11,921	0	12	\$7.6025	\$1,087,553	\$1,087,553	\$0
TFX5 (Discount)	111866	379	379	0	5	\$4.8640	\$9,217	\$9,217	\$0
TFX5 (Discount)	111866	2,445	2,445	0	5	\$5.4720	\$66,895	\$66,895	\$0
TFX5 (Discount)	111866	22,189	22,189	0	5	\$15.1392	\$1,679,619	\$1,679,619	\$0
Windom	118657	2,500	2,500	0	12	\$0.0000	\$0	\$0	\$0
Northwestern Energy		1,035	1,035	0	12	\$8.3382	\$103,560	\$103,560	\$0
Total Demand Cost							\$20,972,169	\$22,189,728	\$1,217,560

Costs Assigned In Commodity

		2016/17 Entitlements	2017/18 Entitlement	Entitlement Change	Months	2017/18 Rate/Dth	2016/17 Total Annual Cost	Entitlement Total Cost	Entitlement Change
<u>Upstream</u>									
<u>Surcharges:</u>									
<u>Storage (FDD)</u>									
FDD - Reservation	118657	75,437	87,058	11,621	12	\$ 1.7140	\$1,551,588	\$1,790,633	\$239,045
FDD - Storage Cycle	118657	869,864	1,003,864	134,000	5	\$ 0.3567	\$1,551,402	\$1,790,392	\$238,989
FDD - Reservation	132024	2,602	17,345	14,743	12	\$ 1.7140	\$249,716	\$356,748	\$107,032
FDD - Storage Cycle	132024	30,000	200,000	170,000	5	\$ 0.3567	\$249,690	\$356,700	\$107,010
FDD - Reservation	132112	11,274	8,672	(2,602)	12	\$ 1.7140	\$178,366	\$178,374	\$8
FDD - Storage Cycle	132112	130,000	100,000	(30,000)	5	\$ 0.3567	\$178,350	\$178,350	\$0
<u>Pipeline</u>									
Bison	FT0003	50,000	50,000	0	12	\$17.4896	\$10,493,750	\$10,493,750	\$0
NBPL	T8673F	50,000	50,000	0	12	\$6.9958	\$4,197,500	\$4,197,500	\$0
SMS-Bal Service		272,160	272,160	0	1	\$2.1800	\$593,309	\$593,309	\$0
Physical Forward Start Premium							\$175,451	\$53,820	(\$121,631)
Producer Demand Payments/Option Premium							\$1,352,456	\$366,645	(\$985,811)
Total Commodity Costs							\$20,771,578	\$20,356,221	(\$415,358)

MINNESOTA ENERGY RESOURCES - NNG

Daily Total Throughput Data - July 1, 2016 through June 30, 2017

NNG

Design Day:

Base	17,443
Variable	2,139

Minnesota Energy Resources Corporation
2017-2018 Demand Entitlement
MERC-NNG
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Date	13.98%	29.22%	45.15%	11.65%	100.00%	Actual Total Through- Put *	Estimated Firm Through- Put **
	Cloquet Adjusted HDD	Minneapolis Adjusted HDD	Rochester Adjusted HDD	Worthington Adjusted HDD	Weighted Adjusted HDD		
7/1/16	5	0	3	1	2	138,989	21,634
7/2/16	3	0	2	1	1	119,267	20,040
7/3/16	0	0	0	0	0	118,351	17,443
7/4/16	0	0	0	0	0	124,073	17,443
7/5/16	0	0	0	0	0	155,167	17,443
7/6/16	0	0	0	0	0	150,273	17,443
7/7/16	1	0	0	0	0	151,894	17,593
7/8/16	2	0	0	0	0	145,046	17,921
7/9/16	0	0	0	0	0	125,662	17,443
7/10/16	2	0	0	0	0	114,313	17,921
7/11/16	0	0	0	0	0	121,087	17,443
7/12/16	0	0	0	0	0	133,973	17,443
7/13/16	0	0	0	0	0	120,877	17,443
7/14/16	5	0	0	2	1	117,143	19,272
7/15/16	4	0	1	0	1	137,475	19,002
7/16/16	0	0	0	0	0	115,536	17,443
7/17/16	0	0	0	0	0	120,474	17,443
7/18/16	0	0	0	0	0	164,474	17,443
7/19/16	0	0	0	0	0	149,523	17,443
7/20/16	0	0	0	0	0	159,411	17,443
7/21/16	0	0	0	0	0	169,741	17,443
7/22/16	0	0	0	0	0	159,383	17,443
7/23/16	0	0	0	0	0	137,119	17,443
7/24/16	0	0	0	0	0	128,533	17,443
7/25/16	0	0	0	0	0	159,618	17,443
7/26/16	0	0	0	0	0	157,013	17,443
7/27/16	5	0	0	0	1	152,327	18,848
7/28/16	6	0	0	0	1	147,173	19,327
7/29/16	6	0	0	2	1	144,825	19,546
7/30/16	0	0	0	0	0	133,540	17,443
7/31/16	0	0	0	0	0	124,401	17,443
8/1/16	0	0	0	0	0	152,800	17,443
8/2/16	0	0	0	0	0	165,672	17,443
8/3/16	0	0	0	0	0	152,176	17,443
8/4/16	0	0	0	0	0	138,146	17,443
8/5/16	1	0	0	0	0	122,449	17,772
8/6/16	2	0	0	0	0	118,320	17,921
8/7/16	3	0	0	0	0	107,876	18,191
8/8/16	0	0	0	0	0	128,201	17,443
8/9/16	0	0	0	0	0	136,909	17,443
8/10/16	2	0	0	0	0	136,607	17,921
8/11/16	0	0	0	0	0	137,271	17,443
8/12/16	0	0	0	0	0	119,752	17,443
8/13/16	0	0	0	0	0	109,044	17,443
8/14/16	0	0	0	0	0	96,958	17,443
8/15/16	0	0	0	0	0	115,444	17,443
8/16/16	0	0	0	0	0	121,417	17,443
8/17/16	0	0	0	0	0	116,285	17,443
8/18/16	0	0	0	0	0	108,754	17,443
8/19/16	0	0	0	0	0	103,462	17,443
8/20/16	8	3	6	7	5	90,642	28,829
8/21/16	4	0	3	0	2	102,420	21,789
8/22/16	0	0	0	0	0	114,711	17,443
8/23/16	0	0	0	0	0	124,458	17,443
8/24/16	0	0	0	0	0	134,269	17,443
8/25/16	7	0	0	5	1	137,157	20,558
8/26/16	2	0	1	2	1	118,876	18,898
8/27/16	5	0	1	0	1	104,042	19,301
8/28/16	0	0	0	0	0	124,833	17,443
8/29/16	0	0	0	0	0	158,567	17,443
8/30/16	4	0	0	0	1	147,238	18,549
8/31/16	3	0	0	0	0	135,047	18,220
9/1/16	6	0	3	1	2	120,978	22,059
9/2/16	3	0	3	0	2	113,860	20,978
9/3/16	1	0	0	0	0	107,434	17,593
9/4/16	0	0	0	0	0	97,344	17,443
9/5/16	0	0	0	0	0	101,559	17,443
9/6/16	0	0	0	0	0	138,653	17,443
9/7/16	2	0	0	0	0	127,110	17,921
9/8/16	2	0	0	0	0	125,226	18,071
9/9/16	4	0	3	5	3	101,279	23,165
9/10/16	8	1	6	3	4	97,358	26,132
9/11/16	0	0	0	0	0	94,085	17,443
9/12/16	5	0	0	6	1	112,136	20,453
9/13/16	17	9	8	17	10	112,697	39,578
9/14/16	11	4	3	6	5	111,904	27,978

MERC

9/15/16	3	0	0	3	1	95,472	19,167
9/16/16	4	0	0	2	1	95,632	18,943
9/17/16	12	2	5	1	5	94,526	27,371
9/18/16	2	0	0	0	0	90,576	17,921
9/19/16	7	0	0	0	1	119,108	19,387
9/20/16	5	0	0	0	1	113,338	18,848
9/21/16	4	0	0	0	1	109,618	18,759
9/22/16	9	0	0	0	1	113,478	20,134
9/23/16	7	0	1	0	1	108,287	20,479
9/24/16	6	0	0	0	1	94,908	19,357
9/25/16	9	8	8	13	9	96,494	35,894
9/26/16	15	9	10	13	11	123,792	40,304
9/27/16	19	11	10	10	12	127,224	42,467
9/28/16	11	12	10	16	11	123,921	41,860
9/29/16	10	6	7	12	8	128,198	34,206
9/30/16	12	4	3	5	5	121,543	27,400
10/1/16	11	3	6	6	6	129,385	29,474
10/2/16	9	1	4	1	3	129,498	24,687
10/3/16	10	0	1	0	2	131,294	21,376
10/4/16	2	0	0	10	1	125,955	20,314
10/5/16	17	10	9	13	11	151,183	40,010
10/6/16	20	15	15	24	17	145,758	53,002
10/7/16	28	25	25	26	26	157,338	72,251
10/8/16	29	22	20	24	22	154,969	64,674
10/9/16	21	17	15	14	16	143,895	52,046
10/10/16	2	1	4	7	3	140,791	23,714
10/11/16	17	8	6	19	10	145,564	37,946
10/12/16	29	24	30	31	28	175,486	77,755
10/13/16	23	21	23	21	22	174,460	65,008
10/14/16	13	11	14	9	13	149,216	44,350
10/15/16	16	8	7	11	9	140,215	36,976
10/16/16	15	6	3	4	6	134,911	29,806
10/17/16	16	4	5	10	7	167,367	31,687
10/18/16	13	9	10	13	10	178,397	39,681
10/19/16	30	19	17	26	21	203,088	61,524
10/20/16	26	21	26	26	25	210,708	70,286
10/21/16	27	20	23	18	22	175,613	64,631
10/22/16	17	12	12	10	12	153,898	43,842
10/23/16	28	21	21	23	22	160,729	64,789
10/24/16	24	19	20	22	20	175,000	60,966
10/25/16	26	20	24	18	22	179,338	64,991
10/26/16	28	22	24	22	24	192,371	68,224
10/27/16	23	20	25	14	22	185,294	64,220
10/28/16	16	4	8	5	8	149,938	33,489
10/29/16	23	17	17	23	18	160,032	56,716
10/30/16	27	22	24	25	24	173,131	68,966
10/31/16	21	13	14	18	15	169,962	50,281
11/1/16	24	14	11	16	14	183,410	47,300
11/2/16	21	13	15	16	16	190,222	50,870
11/3/16	20	12	16	11	15	198,342	48,489
11/4/16	16	10	12	8	12	168,867	42,107
11/5/16	13	6	10	6	9	151,412	36,569
11/6/16	7	7	13	9	10	147,862	38,986
11/7/16	17	12	17	19	16	166,101	50,845
11/8/16	24	19	23	24	22	180,011	63,821
11/9/16	16	15	18	17	17	176,530	53,084
11/10/16	21	13	17	16	16	171,771	52,096
11/11/16	30	25	29	29	28	196,137	77,117
11/12/16	22	20	24	24	22	182,285	65,317
11/13/16	14	15	17	19	16	164,931	51,955
11/14/16	23	24	27	23	25	183,955	70,772
11/15/16	25	21	22	20	22	174,735	64,237
11/16/16	24	15	18	15	18	164,123	55,257
11/17/16	26	15	12	30	17	167,660	53,652
11/18/16	43	34	29	51	35	219,713	91,638
11/19/16	50	42	46	50	46	239,663	115,052
11/20/16	43	41	42	42	42	251,845	107,157
11/21/16	42	35	37	38	37	232,672	97,134
11/22/16	37	34	35	35	35	234,728	92,742
11/23/16	35	33	34	35	34	218,519	89,826
11/24/16	33	32	32	37	32	217,703	86,838
11/25/16	34	35	35	28	34	225,346	89,999
11/26/16	32	29	31	30	30	208,686	82,302
11/27/16	33	27	29	29	29	200,666	79,357
11/28/16	27	23	28	35	27	203,478	75,846
11/29/16	31	31	34	38	33	219,158	88,566
11/30/16	34	31	34	39	34	218,927	89,260
12/1/16	39	34	36	37	36	233,555	93,706
12/2/16	40	37	39	40	38	242,710	99,700
12/3/16	39	37	38	38	38	226,037	98,073
12/4/16	36	34	39	32	37	227,289	95,636
12/5/16	37	39	42	45	40	229,031	103,978
12/6/16	53	53	59	64	57	274,909	138,639
12/7/16	53	55	60	66	58	288,743	141,655
12/8/16	54	52	59	64	57	310,657	139,263
12/9/16	63	58	61	60	60	335,218	146,032
12/10/16	62	57	59	58	59	301,660	143,080
12/11/16	59	59	58	65	59	301,565	143,855
12/12/16	70	71	74	66	71	336,250	170,059

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12/13/16	73	70	75	70	73	334,866	172,708
12/14/16	80	77	80	78	79	382,958	185,704
12/15/16	70	69	72	69	71	373,684	168,313
12/16/16	64	62	61	68	63	339,779	151,199
12/17/16	82	80	85	89	84	360,409	196,309
12/18/16	78	75	88	85	82	372,217	193,409
12/19/16	51	48	63	57	56	292,146	137,662
12/20/16	41	38	41	40	40	245,841	103,282
12/21/16	42	39	45	45	42	242,668	108,284
12/22/16	40	39	44	43	42	240,206	107,238
12/23/16	36	32	37	42	36	224,996	94,011
12/24/16	45	34	38	41	38	221,052	98,925
12/25/16	40	41	43	49	42	224,669	107,898
12/26/16	57	54	56	58	56	282,403	136,215
12/27/16	57	46	50	45	49	274,849	122,388
12/28/16	45	38	43	40	41	251,797	106,012
12/29/16	53	44	51	47	49	267,237	122,084
12/30/16	54	44	47	44	46	259,010	116,690
12/31/16	52	45	53	50	50	262,238	124,475
1/1/17	49	41	45	46	45	247,788	112,757
1/2/17	41	43	41	53	43	247,341	109,391
1/3/17	67	71	72	79	71	336,838	170,345
1/4/17	85	75	78	78	78	361,714	184,057
1/5/17	82	75	80	78	79	377,996	185,605
1/6/17	79	71	76	66	73	372,143	174,597
1/7/17	76	68	74	69	72	347,734	170,677
1/8/17	68	61	67	60	65	312,905	155,837
1/9/17	53	46	47	52	48	274,677	120,758
1/10/17	61	54	54	63	56	288,371	137,482
1/11/17	72	63	64	69	66	320,488	157,627
1/12/17	78	68	69	67	70	333,973	166,777
1/13/17	76	66	65	63	67	327,130	159,946
1/14/17	59	54	58	48	56	288,652	136,629
1/15/17	52	48	56	41	51	262,697	127,240
1/16/17	44	43	40	41	41	251,591	105,788
1/17/17	39	37	41	42	40	242,487	102,422
1/18/17	34	32	41	34	37	224,359	95,526
1/19/17	27	32	37	33	34	218,820	89,776
1/20/17	32	31	34	33	33	211,290	87,457
1/21/17	31	30	34	34	32	205,484	86,175
1/22/17	31	30	35	36	33	209,273	88,103
1/23/17	33	33	36	36	35	223,841	91,388
1/24/17	39	37	38	43	39	227,675	99,845
1/25/17	43	41	43	49	43	243,285	109,570
1/26/17	48	46	49	56	49	277,125	121,885
1/27/17	47	45	52	52	49	278,216	122,443
1/28/17	51	43	48	44	46	260,048	116,799
1/29/17	58	46	58	40	52	275,720	129,645
1/30/17	47	37	45	37	42	260,326	107,357
1/31/17	52	45	45	46	46	261,934	116,156
2/1/17	68	60	65	61	63	313,686	152,606
2/2/17	70	59	64	60	63	330,316	151,640
2/3/17	60	53	60	58	58	305,202	140,765
2/4/17	51	44	46	48	46	269,236	116,603
2/5/17	57	46	50	48	49	279,677	123,002
2/6/17	51	41	41	39	42	257,489	107,740
2/7/17	65	59	54	65	58	302,300	142,231
2/8/17	71	64	67	62	66	328,498	158,804
2/9/17	63	56	61	57	59	300,081	144,612
2/10/17	38	32	40	28	36	229,113	93,689
2/11/17	40	31	32	34	33	217,001	88,421
2/12/17	40	35	42	34	38	232,926	99,772
2/13/17	33	28	37	32	33	226,315	88,639
2/14/17	48	39	42	39	42	243,849	106,260
2/15/17	49	40	42	37	41	251,141	106,094
2/16/17	37	32	36	22	33	222,754	88,733
2/17/17	24	18	27	22	23	184,413	67,325
2/18/17	27	20	24	19	23	182,839	65,712
2/19/17	27	17	21	16	20	171,856	59,895
2/20/17	27	24	27	22	25	195,159	71,642
2/21/17	24	19	22	16	21	184,610	61,712
2/22/17	33	23	23	23	24	199,557	68,979
2/23/17	46	39	39	49	41	248,770	105,017
2/24/17	57	53	56	58	55	285,199	135,813
2/25/17	50	44	54	49	50	264,213	124,292
2/26/17	55	37	49	42	45	258,707	114,600
2/27/17	39	29	40	31	36	234,088	94,040
2/28/17	42	33	37	37	36	236,467	95,174
3/1/17	49	43	50	43	47	270,425	118,374
3/2/17	66	47	53	48	53	304,960	130,133
3/3/17	53	46	52	45	50	272,707	123,552
3/4/17	39	35	41	34	38	227,605	98,692
3/5/17	25	15	25	14	21	191,123	61,641
3/6/17	33	21	22	21	23	192,953	67,049
3/7/17	52	38	35	35	38	235,468	99,448
3/8/17	58	42	41	39	43	265,340	110,030
3/9/17	64	54	52	58	55	296,833	134,533
3/10/17	66	57	57	59	58	334,351	142,083
3/11/17	58	54	53	55	54	295,897	132,907

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MERC

3/12/17	55	52	51	58	53	295,291	130,229
3/13/17	57	51	57	63	56	317,540	137,169
3/14/17	52	47	56	56	53	306,564	130,657
3/15/17	41	45	51	52	48	275,983	119,700
3/16/17	36	37	44	34	40	230,838	102,599
3/17/17	38	33	35	36	35	227,775	92,331
3/18/17	37	31	36	30	34	231,427	90,172
3/19/17	30	23	27	16	25	201,700	70,727
3/20/17	33	26	24	29	27	218,433	74,221
3/21/17	49	39	41	41	42	269,330	106,770
3/22/17	41	37	41	38	40	233,366	102,211
3/23/17	33	30	32	29	31	225,923	84,206
3/24/17	32	27	31	32	30	213,289	81,984
3/25/17	35	28	33	32	32	217,906	85,580
3/26/17	32	26	29	29	29	227,909	78,820
3/27/17	27	18	27	25	24	238,211	69,283
3/28/17	19	12	18	18	17	202,283	53,203
3/29/17	34	23	29	28	28	212,228	76,322
3/30/17	31	28	32	31	30	224,663	82,011
3/31/17	23	20	24	24	23	215,256	66,471
4/1/17	21	12	17	16	16	176,176	51,398
4/2/17	21	15	21	17	19	189,568	57,473
4/3/17	22	19	22	21	21	201,340	62,466
4/4/17	22	15	18	20	18	189,286	55,722
4/5/17	27	21	26	27	25	213,172	70,720
4/6/17	30	22	28	26	26	202,723	73,601
4/7/17	19	16	18	14	17	180,241	54,456
4/8/17	15	5	6	3	7	157,204	32,017
4/9/17	19	7	8	17	10	160,268	39,467
4/10/17	34	29	28	36	30	226,894	81,551
4/11/17	28	23	26	21	25	226,771	70,296
4/12/17	17	16	17	18	17	197,384	53,394
4/13/17	19	16	17	18	17	178,338	53,600
4/14/17	16	8	11	7	10	158,406	39,894
4/15/17	13	6	10	12	9	151,602	37,247
4/16/17	25	11	12	13	13	164,762	46,252
4/17/17	31	13	13	14	16	190,517	50,842
4/18/17	29	11	13	13	15	192,190	48,757
4/19/17	30	22	22	25	23	216,157	67,170
4/20/17	32	23	29	27	27	208,955	75,846
4/21/17	18	14	17	19	16	182,615	52,048
4/22/17	17	6	12	10	11	156,442	40,723
4/23/17	35	6	8	6	11	161,998	40,381
4/24/17	28	2	5	16	9	151,105	35,787
4/25/17	24	20	10	33	18	183,696	55,160
4/26/17	39	31	31	38	33	215,391	87,488
4/27/17	42	33	37	34	36	252,464	94,488
4/28/17	30	22	27	28	26	210,704	73,007
4/29/17	24	19	24	26	23	187,498	66,769
4/30/17	28	26	30	37	29	209,696	79,901
5/1/17	33	30	30	32	31	241,418	83,205
5/2/17	18	12	21	14	17	210,879	54,563
5/3/17	11	11	14	17	13	194,248	45,574
5/4/17	17	7	10	11	10	173,639	39,724
5/5/17	14	5	7	7	7	155,534	32,800
5/6/17	25	7	12	6	12	157,963	42,147
5/7/17	22	9	12	0	11	157,401	41,383
5/8/17	20	5	7	0	7	168,829	32,773
5/9/17	10	3	3	7	5	159,263	27,203
5/10/17	14	8	11	14	11	164,609	40,916
5/11/17	17	9	13	13	12	168,511	43,419
5/12/17	11	0	1	0	2	155,737	21,215
5/13/17	12	0	0	0	2	137,320	21,091
5/14/17	18	0	0	0	2	143,267	22,766
5/15/17	16	0	0	0	2	142,168	22,198
5/16/17	15	0	0	0	2	139,069	22,048
5/17/17	16	6	6	9	8	137,063	34,176
5/18/17	23	17	21	20	20	158,477	60,022
5/19/17	22	17	24	26	22	166,236	64,013
5/20/17	27	20	23	27	23	164,141	66,879
5/21/17	22	19	24	20	22	175,587	63,656
5/22/17	16	8	8	10	9	159,277	37,249
5/23/17	16	13	18	18	16	163,269	51,669
5/24/17	18	10	13	14	13	156,335	44,925
5/25/17	12	1	5	3	4	146,454	26,864
5/26/17	8	0	3	4	3	153,256	23,484
5/27/17	3	1	4	6	3	132,197	24,211
5/28/17	9	1	5	5	5	133,295	27,146
5/29/17	16	7	11	12	10	144,950	39,709
5/30/17	18	11	13	13	13	155,479	44,990
5/31/17	14	3	4	6	5	149,145	28,653
6/1/17	4	0	0	0	1	140,085	18,520
6/2/17	2	0	0	0	0	148,479	17,921
6/3/17	0	0	0	0	0	144,740	17,443
6/4/17	1	0	0	0	0	139,494	17,593
6/5/17	11	0	0	0	2	141,945	20,732
6/6/17	6	0	0	0	1	136,644	19,297
6/7/17	0	0	0	0	0	142,843	17,443
6/8/17	2	0	0	0	0	151,905	17,921

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MERC

6/9/17	3	0	0	0	0	141,382	18,250
6/10/17	0	0	0	0	0	123,115	17,443
6/11/17	4	0	0	0	1	136,630	18,520
6/12/17	0	0	0	0	0	155,388	17,443
6/13/17	11	0	0	0	1	145,683	20,613
6/14/17	8	0	0	0	1	156,104	19,925
6/15/17	1	0	0	0	0	155,694	17,593
6/16/17	0	0	0	0	0	152,134	17,443
6/17/17	0	0	0	0	0	125,647	17,443
6/18/17	5	0	2	3	2	130,630	21,248
6/19/17	11	0	2	0	2	137,406	22,284
6/20/17	8	0	1	0	2	149,785	20,868
6/21/17	3	0	0	0	0	136,017	18,220
6/22/17	1	0	1	0	0	142,105	18,075
6/23/17	7	1	6	11	5	139,479	28,300
6/24/17	9	6	10	9	9	137,320	35,654
6/25/17	14	6	10	8	9	136,451	36,620
6/26/17	8	2	8	7	6	150,841	30,228
6/27/17	2	0	0	0	0	136,929	17,921
6/28/17	8	0	0	0	1	138,237	19,686
6/29/17	5	0	0	0	1	135,881	18,848
6/30/17	2	0	0	2	0	131,639	18,290
Totals	8,980	7,127	7,918	7,915	7,835	69,179,284	23,126,133

* Volumes include interruptible and transportation volumes

** Design Model numbers are used to calculate firm volumes only

MINNESOTA ENERGY RESOURCES - NNG

Customer Counts by PGAC Class - July 1, 2015 through June 30, 2016

Tariff Rate Class	Rate Designation	Jul-16 Average Customers	Aug-16 Average Customers	Sep-16 Average Customers	Oct-16 Average Customers	Nov-16 Average Customers	Dec-16 Average Customers	Jan-17 Average Customers	Feb-17 Average Customers	Mar-17 Average Customers	Apr-17 Average Customers	May-17 Average Customers	Jun-17 Average Customers	Annual Average Customers
GS- Residential	MERC000001	169,238	169,904	170,514	169,770	170,562	170,112	171,193	170,326	170,589	170,973	171,673	172,370	170,602
GS-C&I <1,500 therms/yr (Small)	MERC000005	6,268	6,809	6,576	6,550	6,611	6,611	6,643	6,596	6,608	6,569	6,569	6,674	6,590
GS-C&I <1,500 therms/yr (Small) Emmons, IA	MERC000013	1	1	1	1	1	1	1	1	1	1	1	1	1
GS-C&I >1,500 therms/yr (Large)	MERC000009	9,694	10,294	10,067	9,905	9,946	9,916	10,072	9,953	10,009	10,003	10,042	10,019	9,993
GS-C&I >1,500 therms/yr (Large) Emmons, IA	MERC000014	3	3	3	4	3	3	3	3	2	2	2	2	3
Small Volume Interruptible (SVI)	MERC000015	271	412	249	352	296	305	295	260	329	285	282	289	302
Small Volume Interruptible w/Joint (SVJ)	MERC000019	2	6	3	5	6	2	5	3	3	3	3	3	4
Large Volume Interruptible (LVI)	MERC000022	42	88	39	74	62	66	62	53	68	59	57	58	61
Large Volume Interruptible w/Joint (LVJ)	MERC000026	2	0	0	1	1	1	1	1	1	1	2	2	1
Total		185,521	187,517	187,452	186,662	187,488	187,017	188,275	187,196	187,610	187,896	188,631	189,418	187,557

MINNESOTA ENERGY RESOURCES - NNG

Projected Storage Cost - November 2017 through March 2018

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Month/ Year	K#118657 NNG Storage (Dth)	LS Power K#132024 NNG Storage (Dth)	LS Power K#132112 NNG Storage (Dth)	Total NNG Storage (Dth)	Projected NNG WACOG	K#118657 NNG Storage Cost	K#132024 NNG Storage Cost	K#132112 NNG Storage Cost	Total NNG Storage Cost	AECO Storage GLGT/VGT Centra Emerson	AECO Storage GLGT/VGT Centra Emerson WACOG	AECO Storage GLGT/VGT Centra Emerson Cost
Nov-17	489,384	48,750	97,500	635,634	\$ 2.6781	\$ 1,310,638	\$ 130,559	\$ 261,119	\$ 1,702,316			
Dec-17	1,229,734	122,500	245,000	1,597,234	\$ 2.6781	\$ 3,293,398	\$ 328,072	\$ 656,144	\$ 4,277,614			
Jan-18	1,229,734	122,500	245,000	1,597,234	\$ 2.6781	\$ 3,293,398	\$ 328,072	\$ 656,144	\$ 4,277,614			
Feb-18	1,229,734	122,500	245,000	1,597,234	\$ 2.6781	\$ 3,293,398	\$ 328,072	\$ 656,144	\$ 4,277,614			
Mar-18	489,384	48,750	97,500	635,634	\$ 2.6781	\$ 1,310,638	\$ 130,559	\$ 261,119	\$ 1,702,316			
Total	4,667,969	465,000	930,000	6,062,969	\$ 2.6781	\$ 12,501,469	\$ 1,245,335	\$ 2,490,669	\$ 16,237,473	-		

Month/ Year	NNG Storage Volume (Dth)	NNG Indexes Price	NNG Indexes Cost	Month/ Year	AECO Storage Volume (Dth)	Total AECO Market WACOG	Total AECO Market Cost
Nov-17	635,634	\$ 2.8170	\$ 1,790,580	Nov-17	0		\$ -
Dec-17	1,597,234	\$ 3.0785	\$ 4,917,084	Dec-17	0		\$ -
Jan-18	1,597,234	\$ 3.4065	\$ 5,440,976	Jan-18	0		\$ -
Feb-18	1,597,234	\$ 3.3700	\$ 5,382,677	Feb-18	0		\$ -
Mar-18	635,634	\$ 3.0290	\$ 1,925,335	Mar-18	0		\$ -
Total	6,062,969	\$ 3.2091	\$ 19,456,653	Total	0		\$ -

\$ 3,219,180

Max NNG-MERC Storage (Storage plan withdrawals through Apr 18)	6,062,969	6,519,321	06/30/17 Storage Balance - NNG-MERC	1,261,867	19.36%	1,173,536
Max AECO Storage (Storage plan withdrawals through Apr 18)	-	947,820	06/30/17 Storage Balance - AECO	0	0.00%	0

Month/ Year	K#118657 NNG Storage (Dth)	LS Power K#132024 NNG Storage (Dth)	LS Power K#132112 NNG Storage (Dth)	Total NNG Storage (Dth)	Projected K#118657 NNG WACOG	Projected K#132024 NNG WACOG	Projected K#132112 NNG WACOG	WACOG NNG Cost	Projected NNG Indexes Price	Projected NNG Index Cost	Projected Storage (Savings)/ Cost
Nov-17	489,384	48,750	97,500	635,634	\$ 2.6781	\$ 2.6781	\$ 2.6781	\$ 1,702,316	\$ 2.8170	\$ 1,790,580	\$ (88,265)
Dec-17	1,229,734	122,500	245,000	1,597,234	\$ 2.6781	\$ 2.6781	\$ 2.6781	\$ 4,277,614	\$ 3.0785	\$ 4,917,084	\$ (639,470)
Jan-18	1,229,734	122,500	245,000	1,597,234	\$ 2.6781	\$ 2.6781	\$ 2.6781	\$ 4,277,614	\$ 3.4065	\$ 5,440,976	\$ (1,163,363)
Feb-18	1,229,734	122,500	245,000	1,597,234	\$ 2.6781	\$ 2.6781	\$ 2.6781	\$ 4,277,614	\$ 3.3700	\$ 5,382,677	\$ (1,105,064)
Mar-18	489,384	48,750	97,500	635,634	\$ 2.6781	\$ 2.6781	\$ 2.6781	\$ 1,702,316	\$ 3.0290	\$ 1,925,335	\$ (223,019)
Total	4,667,969	465,000	930,000	6,062,969	\$ 2.8092	\$ 2.8092	\$ 2.8092	\$ 16,237,473	\$ 3.1285	\$ 19,456,653	\$ (3,219,180)

*Indexes and projected WACOG based on 7/14/16 market prices

**Attachment 12: Forecast Methodology for MERC Demand Entitlement Effective
 November 1, 2017**

1. Peak-day

a. Purpose

Gather data and perform analysis used in the “Petition for Change in Demand” for MERC, otherwise known as the “MERC Demand Entitlement Filings.”

b. Background

MERC customers are served by four pipelines¹

1. VGT - Viking Gas Transmission system
2. NNG - Northern Natural Gas pipeline
3. GLGT - Great Lakes Gas Transmission pipeline
4. Centra - Centra pipeline

Weather data is obtained from eight weather stations: International Falls, Bemidji, Cloquet, Fargo, Minneapolis, Rochester, Worthington, and Ortonville.

For analytical purposes, data is subdivided, analyzed, and regressed by the following demand areas:

	Pipeline	PGA	Weather Station(s)
1	Centra	MERC Consolidated	International Falls
2	Great Lakes Gas Transmission (GLGT)	MERC Consolidated	Bemidji
3	GLGT	MERC Consolidated	Cloquet

¹ MERC acquired Interstate Power & Light Company’s Minnesota natural gas operations and customers in 2015. The Commission’s Order Approving Sale Subject to Conditions in Docket No. G-001,011/PA-14-107 required MERC to maintain the transitioned customers on a separate PGA (MERC – NNG – Albert Lea). Pursuant to the Commission’s Order in Docket No. G011/GR-15-736, the NNG and NNG – Albert Lea PGAs were consolidated effective July 1, 2017, and MERC is submitting two demand entitlement petitions (NNG and Consolidated) for the 2017-2018 heating season.

4	Viking Gas Transmission (VGT)	MERC Consolidated	Fargo
5	NNG	MERC NNG	Cloquet
6	NNG	MERC NNG	Minneapolis
7	NNG	MERC NNG	Ortonville
8	NNG	MERC NNG	Rochester
9	NNG	MERC NNG	Worthington

2. Analytical Approach

a. Summary

1. Obtain daily weather data for each weather station.
2. Obtain daily total throughput volumes by pipeline and by weather station.
3. Obtain daily large volume transportation, interruptible, and joint interruptible volumes by pipeline and by weather station (Data A).
4. Obtain daily small volume interruptible volumes by pipeline and by weather station (Data B).
5. Calculate daily “firm” volumes by subtracting both Data A and Data B from total throughput volumes.
6. Perform quality control on volumetric data (e.g., identify missing or bad reads, and, to the extent possible, fix missing or bad reads).
7. Perform firm peak day regressions. In response to comments from the Minnesota Department of Commerce, Division of Energy Resources (Department):
 - a. Incorporate a methodology to mitigate the impact of autocorrelation.
 - b. Provide a reasonable explanation whenever a regression model is selected that does not have an intercept.

8. Add back Daily Firm Capacity (DFC) customer selections.

3. Process

The Peak Day Process consisted of:

- I. Data Preparation
- II. Regression Generation of Net Daily Metered Volumes
- III. Volume Risk Adjustments
- IV. Adjusting the Regression Results to a Firm Peak Day Estimate

- i. The **Data Preparation** Steps consisted of:

- Identify the coldest Adjusted Heating Degree Day (AHDD) for the time period January 1996-December 2016 for each weather station. Note, this is a change in practice from prior analysis that used a rolling 20-year period. The change was included because many weather stations experienced historically cold weather in the January/February 1996 time period and without inclusion of that additional data from January/February 1996, AHDD were materially lower and not reflective of MERC's capacity needs.
- Determine the most recent three years of December through February daily total metered throughput by pipeline and by weather station.
- Determine the most recent three years of December through February daily large volume transportation, interruptible, and joint interruptible volumes by pipeline and by weather station (Data A).
- Determine the most recent three years of December through February daily small volume interruptible volumes by pipeline and by weather station (Data B).

- Review daily total metered throughput, Data A, and Data B, and identify missing or bad reads, and to the extent possible, fix missing or bad reads. To the extent that the data could not be fixed, it was not included in the regressions.
- Subtract both Data A and Data B daily meter readings for all three December through February years from the total throughput for each pipeline and each weather station. Use the resulting net daily metered volumes for regressions. Examples of transportation, interruptible, and joint interruptible meter readings subtracted are paper mills, direct-connects, taconites, and off-system end users. See “Adjusting the Regression Results to a Firm Peak Day Estimate” below.

Each daily weather station data file was searched to find the coldest Adjusted Heating Degree Day (AHDD65) in the last 20 years for the time period January 1996-December 2016. This is a change from prior analysis that used a rolling 20-year period. The change was included because many weather stations experienced historically cold weather in the January/February 1996 time period and without inclusion of that additional data from January/February 1996, AHDD65 were materially lower and not reflective of MERC’s capacity needs. The results are provided in the following table:

<u>Station</u>	<u>Date</u>	<u>Avg. Temp</u>	<u>Avg. Wind</u>	<u>HDD65</u>	<u>AHDD65</u>
Bemidji	2/1/1996	-34	8	99	107
Cloquet	2/2/1996	-31	7	96	103
Fargo	1/18/1996	-16	34	81	109
International Falls	2/2/1996	-34	8	99	107
Minneapolis	2/2/1996	-25	8	90	97
Rochester	2/2/1996	-27	10	92	101
Worthington	1/18/1996	-8	32	73	96
Ortonville	1/14/2009	-21	11	86	96

ii. The **Regression Generation of Net Daily Metered Volumes** consisted of:

- For each of the pipelines and weather stations:

1. Gather the net daily metered volumes and weather station data including AHDD65.²
2. Add indicator variables for day-type and month. Day-type variables are used to isolate load that changes by day of the week, such as commercial or industrial customers who may change their consumption on weekends when they run fewer shifts. Month indicator variables are used to isolate load that changes based on winter months, such as businesses that are open extra hours in December and resume normal operating hours in January.
3. Perform ordinary least squares linear regressions for the 3-year time frame using the AHDD65 weather variable and the significant indicator variables.
4. In response to comments from the Department, the regression methodology incorporates a process to mitigate the impact of autocorrelation. See section below on autocorrelation.
5. In response to comments from the Department, provide an explanation whenever we choose to use a regression model that does not have an intercept.
6. Summarize the Baseload and Use/AHDD65 and Use/Prior Day AHDD65 from each regression.
7. Calculate a point estimate from each regression based on the baseload value plus the Use/AHDD65 coefficient times the coldest AHDD65 in 20 years and the Use/Prior Day AHDD65 coefficient times the AHDD65 on the day prior to the coldest AHDD65 since January 1996.

iii. **Volume Risk Adjustments**

² Temperature and weather data were obtained from DTN (formerly Schneider Electric) via TherMaxx then converted to HDD65 and AHDD65 in an Excel spreadsheet by MERC – Gas Supply. Temperature data is the average of the high and low temperature based on the 9am to 9am gas day. Wind data is the 24-hour average based on the 9am to 9am gas day.

Volume risk adjustments were incorporated into the forecast to provide a confidence level that the daily metered load under design conditions would not exceed the daily metered regression estimate. An appropriate volume risk adjustment was determined for each regression group by multiplying the standard error of each regression analysis (sigma) by a factor needed to attain a desired confidence level. The desired confidence level chosen was 97.5%.

iv. **Adjusting the Regression Results to a Firm Peak Day Estimate** consisted of:

1. Add back DFC customer selections

While transportation, interruptible, and joint interruptible customer volumes were removed (as described above), in order to determine firm peak day load, daily firm capacity selections needed to be added back. The Regulatory Affairs department provided historical monthly DFC data for the joint service customers from the prior winter that showed the volume that each customer has selected to receive as firm service from MERC each month. Based on direction from the Company's Gas Supply department, the Joint Firm/ Interruptible customers who were relying on MERC to provide peak day firm supply were identified and their daily firm capacity volumes were summed by month for each pipeline. The total volumes were then added back to the regression results.

**Exhibit 1
Pipeline and Weather Station Regression Notes**

A. Large Volume Transportation, Interruptible, and Joint Interruptible Customers

GLGT Paper Mills = Bandon mapped to Bemidji, and Sappi and USG mapped to Cloquet

VGT Lamb Weston mapped to Fargo

NNG Taconites / Direct Connects =

- CCI EMPIRE IND DEL PT 2 TILDEN mapped to Cloquet
- CCI NORTHSHORE mapped to Cloquet

- UNITED TACONITE (was EVELETH TACONITE) mapped to Cloquet
- HIBBING TACONITE CO. mapped to Cloquet
- U.S. STEEL #1 & #2 mapped to Cloquet
- NATIONAL STEEL PELLET mapped to Cloquet
- COTTAGE GROVE TBS LS POWER mapped to Minneapolis
- INLAND STEEL mapped to Cloquet
- HANNA MINING mapped to Cloquet

NNG OSEU (End Users) =

- ARKEMA INC. mapped to Rochester
- MAYO Clinic 1 Fairmount mapped to Worthington
- MAYO Clinic 2 (Franklin Htg) mapped to Rochester
- MAYO Clinic 3 (St Mary's) mapped to Rochester
- ARCHER DANIELS MIDLAND, CO. mapped to Minneapolis
- ASSOCIATED MILK PRODUCTS, INC. mapped to Rochester
- Hawkins Inc. mapped to Minneapolis
- CORRECTIONAL CTR mapped to Minneapolis
- DAIRY FARMERS OF AMERICA mapped to Rochester
- Dick's Sanitation mapped to Minneapolis
- KEMPS LLC mapped to Rochester
- KERRY BIO-SCIENCE mapped to Rochester
- LAKESIDE mapped to Rochester
- MILK SPECIALTIES mapped to Worthington
- LAND OF LAKES mapped to Rochester
- PRO-CORN mapped to Rochester
- SWIFT mapped to Rochester
- SENECA FOODS-ROCHESTER mapped to Rochester
- ENGINEERED POLYMERS mapped to Cloquet
- SANDSTONE FEDERAL CORRECTIONAL INSTITUTE mapped to Cloquet
- Glenville #1 mapped to Rochester
- Agra Resources(Exol) mapped to Rochester
- Halcon Corporation mapped to Rochester
- REG ALBERT LEA, LLC mapped to Rochester
- Zinpro North Branch mapped to Minneapolis

B. Daily Firm Capacity

VGT

- DETROIT LAKES MIDDLE SCHOOL
- ROSSMAN SCHOOL

GLGT

- AMERIPRIDE
- NORTHLAND APTS

NNG

- HENDRICKS HOSPITAL

- BRAND FX BODY INC

4. Autocorrelation Review

The Commission's February 4, 2015, Order in Docket Nos. G011/M-12-1192, G011/M-12-1193, G011/M-12-1194, and G011/M-12-1195, MERC's 2012-2013 demand entitlement dockets, required MERC to check its regression models for autocorrelation and correct the model if autocorrelation is present and to provide a reasonable explanation of its use of no-intercept models if it chooses to use one again in the future.

In a regression analysis, using time series data, autocorrelation of the errors is a problem. Autocorrelation of the errors, which themselves are unobserved, can generally be detected because it produces autocorrelation in the observable residuals. (Errors are also known as "error terms" in econometrics.) Autocorrelation violates the ordinary least squares (OLS) assumption that the error terms are uncorrelated. While it does not bias the OLS coefficient estimates, the standard errors tend to be underestimated (and the t-scores overestimated) when the autocorrelations of the errors at low lags are positive. The traditional test for the presence of first-order autocorrelation is the Durbin-Watson statistic or, if the explanatory variables include a lagged dependent variable, Durbin's h statistic. To correct for this use, we used the Yule-Walker estimation method within the SAS software package to employ an AR(1) regression which then showed that the Durbin-Watson statistics are all either close to 2 or above.

5. Design-Day Model

Order Point 5 of the Commission's January 21, 2015, Order in MERC's 2010-2011 demand entitlement dockets, Docket Nos. G007/M-10-1166, G007/M-10-1167, G011/M-10-1168, and G011/M-10-1169, required that in future demand entitlement filings, MERC provide (1) the determinants used in its Design-Day models that account for each and every impact on

usage associated with economic conditions, and (2) a detailed explanation of each and every cause of unexpected changes in usage that might impact the Design-Day calculation, and what, if any, modifications the Company made to its Design-Day numbers. MERC does not forecast its Design Day using economic variables. Additionally, there were no unexpected changes in the Design-Day forecast.

6. Verification of Regression Analysis Results

Order Point 10 of the Commission's April 28, 2016, Order in Docket No. G011/M-15-722 required that MERC verify its regression analysis results in future demand entitlement filings to ensure the results are consistent with the underlying theory the analysis attempts to explain. MERC has carefully reviewed the results of its regression analysis and verified that the results are consistent with the underlying theory the analysis attempts to explain. Please see the May 31, 2016, compliance filing in Docket Nos. G011/M-15-722, G011/M-15-723, and G011/M-15-724 for further discussion of this issue.

ATTACHMENT D

In the Matter of the Petition of Minnesota
Energy Resources Corporation for Approval of
a Change in Demand Entitlement for its NNG
System

Docket No. G011/M-17-____

CERTIFICATE OF SERVICE

I, Kristin M. Stastny, hereby certify that on the 1st day of August, 2017, on behalf of Minnesota Energy Resources Corporation (MERC) I electronically filed a true and correct copy of MERC's Petition for Approval of a Change in Demand Entitlement on www.edockets.state.mn.us. Said documents were also served via U.S. mail and electronic service as designated on the attached service list.

Dated this 1st day of August, 2017.

/s/ Kristin M. Stastny
Kristin M. Stastny

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