



Minnesota Energy Resources Corporation
2685 145th Street West
Rosemount, MN 55068
www.minnesotaenergyresources.com

November 1, 2018

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 Minnesota Energy Resources Corporation's Petition for
Approval of a Change in Demand Entitlement for its NNG System –
November 1 Update

Docket No. G011/M-18-526

Dear Mr. Wolf:

On August 1, 2018, Minnesota Energy Resources Corporation ("MERC" or the "Company") filed its Petition for Change in Demand Entitlement for the MERC-NNG purchased gas adjustment ("PGA") area. MERC submits this update to its August 1, 2018 Demand Entitlement filing.

In its April 28, 2016 Order in Docket Nos. G011/M-15-722, G011/M-15-723, and G011/M-15-724, the Minnesota Public Utilities Commission ("Commission") required that MERC explain changes made in its compliance petitions that are different from its original petitions, and provide a redline version of both petitions identifying changes. In accordance with the Commission's Order, MERC provides redlined changes in the attached Petition and has highlighted the affected schedules.

As of the date of this filing, MERC has completed its purchases of future contracts and call options for the 2018-2019 winter period. These final financial hedge volumes and costs are shown in Attachments 5 and 11 (pages 1 and 3). The call option premium costs additionally flow through the spreadsheet in Attachment 4, pages 1 and 2 and in Attachment 8. Additionally, the rate comparisons in Attachment 4, page 1, have been updated to MERC's October 1, 2018, Purchased Gas Adjustment rates.

Mr. Daniel P. Wolf
November 1, 2018
Page 2

Please contact me at (920) 433-2926 if you have any questions regarding the information in this filing. Thank you for your attention to this matter.

Sincerely yours,

A handwritten signature in black ink that reads "Seth DeMerritt". The signature is written in a cursive, slightly slanted style.

Seth DeMerritt
Project Specialist 3
Minnesota Energy Resources Corporation

Enclosure

cc: Service List

| ~~August~~ November 1, 2018

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~~ Seth DeMerritt
Minnesota Energy Resources Corporation
2685 145th Street West
Rosemount, MN 55068
| (920) 433-2926 ~~(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~~ docket number 18-526.

**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-18-526

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, 2018.

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

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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-18-526

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, 2018.

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 2018-2019 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
2685 145th Street West
Rosemount, MN 55068
(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~~ November 1, 2018
Proposed Effective Date: November 1, 2018

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

Seth DeMerritt

~~Amber S. Lee~~Seth DeMerritt
~~Regulatory and Legislative Affairs Manager~~Project Specialist 3
~~amber.lee@wecenergygroup.com~~seth.demerritt@wecenergygroup.com
2685 145th Street West
Rosemount, MN 55068
~~(920) 433-2926~~(651) 322-8965

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

DATED: ~~November~~August 1,
2018

Respectfully submitted,
MINNESOTA ENERGY RESOURCES
CORPORATION

By: /s/ ~~Amber S. Lee~~Seth DeMerritt
~~Amber S. Lee~~Seth DeMerritt
2685 145th Street West
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STATE OF MINNESOTA
BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Nancy Lange
Dan Lipschultz
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Katie Sieben
John Tuma

Chair
Commissioner
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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-18-526

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, 2018. 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

Updates and revisions to these Attachments from MERC's August 1, 2018, Demand Entitlement filing include the following:

- Attachment 4, page 1, has been updated to reflect a comparison to MERC's October 1, 2018, purchased gas adjustment rates.
- Attachment 4, pages 1 and 2, Attachment 5, Attachment 8, and Attachment 11, pages 1-3 have been updated to reflect MERC's final future contracts, storage position, and call options for the 2018-2019 winter period. The final financial hedge volumes and costs are shown in Attachments 5 and 11 (pages 1 and 3). The call option premium costs additionally flow through the spreadsheet in Attachment 4, pages 1 and 2 and in Attachment 8.

II. Discussion

A. MERC's NNG Design-Day Requirements

Minnesota Rule 7825.2910, subpart 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 6,059 dekatherms (dth) from the November 1, 2017, filing. This represents a 2.3% increase for the 2018-2019 heating season and is consistent with the 2.1% increase in Design-Day witnessed in the 2017-2018 heating season.

**Table 1: MERC Proposed NNG Reserve Margins
For the 2018-2019 Heating Season**

	Reserve Margin 2018-2019 Heating Season	Reserve Margin 2017-2018 Heating Season	Change
NNG Zone EF	1.25%	-0.55%	1.79%

For the Demand Entitlement filing effective November 1, 2018, the total Design-Day requirement for MERC NNG is 273,842 dth (Attachment 1). The difference between the total Design-Day requirement and total Design-Day capacity results in a 1.25% 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

Minnesota Rule 7825.2910, subpart 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, 2018

See Attachment 12. MERC notes that in accordance with the Commission's April 28, 2016, Order in Docket Nos. G011/M-15-722, G011/M-15-723, and G011/M-15-724, MERC worked with the Department in developing an appropriate Design Day regression analysis methodology for this filing, and future filings, until MERC has three years of daily data for all of its interruptible customers for the NNG PGA area (i.e., until MERC has adequate data for the historic MERC-Albert Lea PGA).

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-10-1168; 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-

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

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 2.

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 a net increase of 10,939 dth/day in Design-Day Deliverability. Two components make up this increase; the Rochester expansion project begins to come online and results in a 15,939 dth/day capacity increase and, secondly, MERC chose to allow 5,000 dth/day of capacity expire in order to reduce its reserve margin in future years when additional Rochester capacity is in place.

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 a 15,939 dth/day increase in April/October Deliverability. This increase is a result of the Rochester project's November 1, 2018, annual capacity addition.

MERC-NNG contract 112495 has a base and a variable component as outlined in the FERC-approved NNG tariff. The base and variable components are set each year as a result of

MERC's use of contract 112495 during the April – October period, which is driven by customer load. The variable component of this contract increased by 2,713 dth/day, with a corresponding decrease in the base component. This change does not result in an increase or decrease in demand entitlement levels, and results in an approximately \$49,000 increase in projected contract costs.

As discussed in MERC's May 31, 2017, filing in Docket No. G011/M-16-650, effective June 1, 2017, MERC acquired released storage capacity on the NNG system. The release contracts were effective June 1, 2017, and had a total volume of 1,500,000 Dth. Contract 132024 represents 500,000 Dth of the acquired capacity and will continue through May 31, 2022. Contract 132112 for 1,000,000 Dth expired on May 31, 2017 and was re-released to MERC at the same volume and rate beginning June 1, 2018. This contract will expire concurrent to contract 132024 on May 31, 2022. The new contract number is 133736 and is shown in Attachment 4, page 2 and in Attachment 8.

E. Financial Option Units and Premiums

~~MERC is working toward completion of its purchases of future contracts and call options for the 2018-2019 winter period. Current financial hedge volumes and costs are shown in Attachments 5 and 11 (pages 1 and 3). The call option premium costs additionally flow through the spreadsheet in Attachment 4, pages 1 and 2 and in Attachment 8. MERC has completed its purchases of future contracts and call options for the 2018-2019 winter period. These final financial hedge volumes and costs are shown in Attachments 5 and 11 (page 1 and 3). The call option premium costs additionally flow through the spreadsheet in Attachment 4, pages 1 and 2, and in Attachment 8. No other changes have been made to the MERC-Consolidated demand entitlements. MERC will provide an update with its November 1, 2018, filing.~~ 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 2018-2019 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 2018-2019 winter is ~~\$2.99393~~\$3.0326/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 ~~\$2.51625729~~/dth. MERC has purchased call options at an average strike price of ~~\$3.60175965~~/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, 2018. 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 its system and upstream entitlement levels. MERC's process requires an evaluation of the system capability before a customer is allowed 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 demand entitlement levels.

H. Rochester Project Compliance

The Commission's May 8, 2018, Order in Docket No. G011/M-15-895 required MERC to (1) provide semiannual updates in Docket No. G011/M-15-895 explaining what, if any, capacity-release-related activity occurred during the previous six months (e.g., when capacity release was offered, amount accepted, prices),³ and (2) provide a detailed discussion of each capacity substitution in its annual demand entitlement filings on a going-forward basis.

The first tranche of additional capacity resulting from the NNG upgrades related to the Rochester Project approved in Docket No. G011/M-15-895 will be available on November 1, 2018. This first phase of additional capacity will result in MERC moving from a negative to a positive reserve margin of 1.25%. As this reserve margin is still well below the target of a 5-7%

³ MERC provides an update here and will also submit a compliance filing in Docket No. G011/M-15-895.

reserve margin, MERC does not intend to release any of the capacity. When the second, larger capacity addition is realized on November 1, 2019, MERC will likely be above a 5% reserve margin and will take action as laid out in the Capacity Release Plan filed on August 31, 2017, and approved by the Commission by Order dated May 8, 2018, in Docket No. G011/M-15-895.

With respect to capacity substitutions related to the additional Rochester Project capacity, as discussed in MERC's August 31, 2017, Capacity Release Plan, MERC received Commission approval to expand its service into the communities of Balaton and Esko (Docket Nos. G011/M-16-654 and G011/M-16-655, respectively). The capacity created by the Rochester Project has allowed MERC to absorb this additional firm sales load (estimated peak load of approximately 2,500 dth/day) without paying for additional pipeline investments. No additional capacity substitutions have occurred. MERC will provide updates on future capacity substitutions in future Demand Entitlement filings and updates.

IV. **Conclusion**

MERC respectfully requests that the Commission approve the requested changes to be recovered in the Purchased Gas Adjustment (PGA) beginning November 1, 2018. ~~If any changes to the entitlements for MERC-NNG are made, MERC will submit an update to this filing by November 1, 2018.~~

DATED: ~~August~~ November 1, 2018

Respectfully submitted,

MINNESOTA ENERGY RESOURCES
CORPORATION

By: /s/ Amber S. Lee Seth DeMerritt
Seth DeMerritt Amber S. Lee

2685 145th Street West

Rosemount, MN 55068

Telephone: ~~(651) 322-8965~~ (920) 433-2926

MINNESOTA ENERGY RESOURCES - NNG

DESIGN-DAY DEMAND SUMMARY

NOVEMBER 1, 2018

NNG

Design Day Requirement		273,842
Total Peak Day Entitlement		277,256
2017/18 Firm Peak Day Actual Sendout	12/31/2017	233,945
Firm Annual Throughput - Minnesota		24,507,563
No. of Firm Customers		198,628
Department Load Factor Calculation		28.70%

MINNESOTA ENERGY RESOURCES - NNG

NNG MINNESOTA DESIGN DAY REQUIREMENTS

NOVEMBER 1, 2018

NNG

Pipeline Group	2017/18 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	198,628	198,628	99	12,917	2,525	261,635	12,112	273,747	95	273,842
Total	198,628	198,628								273,842

OFF PEAK

NNG	198,628	198,628	55	12,917	2,525	151,782	12,112	163,894	95	163,989
Total	198,628	198,628								163,989

* Adjusted for customer growth

MINNESOTA ENERGY RESOURCES - NNG

DESIGN-DAY DEMAND PER CUSTOMER - GS

NOVEMBER 1, 2018

NNG

<u>Heating Season</u>	<u>No. of Firm Customers</u>	<u>Design Day Requirements</u>	<u>MMBtu /Customer /Day</u>
18/19	198,628	273,842	1.38
17/18	197,991	267,783	1.35
16/17	195,311	262,324	1.34
15/16	192,016	259,076	1.35
14/15	189,078	273,917	1.45
13/14	189,254	258,913	1.37
12/13	187,545	239,325	1.28
11/12	185,890	247,982	1.33
10/11	186,610	234,907	1.26
09/10	185,811	244,601	1.32

Attachment 2
Page 1 of 1

MINNESOTA ENERGY RESOURCES - NNG
SUMMER/WINTER USAGE - Dth
PROJECTED 12 MONTHS ENDING JUNE 2019
NNG

<u>Class</u>	<u>Summer Apr-Oct</u>	<u>Winter Nov-Mar</u>	<u>Total</u>
GS	6,779,082	17,713,972	24,493,054
SVI	492,582	1,206,754	1,699,336
SVJ	5,099	7,020	12,119
LVI	494,146	627,088	1,121,234
LVJ	765	1,625	2,390
SLV			0
Total	<u>7,771,674</u>	<u>19,556,459</u>	<u>27,328,133</u>

**Attachment 3
NNG**

MINNESOTA ENERGY RESOURCES - NNG

ENTITLEMENT LEVELS

PROPOSED TO BE EFFECTIVE NOVEMBER 1, 2018

Capacity Type	Summer			April/October			Winter		
	2017/18 MMBtu	Change MMBtu	Proposed MMBtu	2017/18 MMBtu	Change MMBtu	Proposed MMBtu	2017/18 MMBtu	Change MMBtu	Proposed MMBtu
TF-12 Base & Variable	84,709	0	84,709	84,709	0	84,709	84,709	0	84,709
TF5	0	0	0	0	0	0	36,275	0	36,275
TFX - 12	32,297	15,939	48,236	32,297	15,939	48,236	32,297	15,939	48,236
TFX - 5	0	0	0	0	0	0	109,501	(5,000)	104,501
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	120,541	15,939	136,480	122,541	15,939	138,480	266,317	10,939	277,256
Heating Season Forecasted Design Day-Adjusted							267,783	6,059	273,842
Non-Heating Season Forecasted Design Day				162,282	1,707	163,989			
Heating Season Capacity Surplus/Shortage							(1,466)	4,880	3,414
Non-Heating Season Capacity Surplus/Shortage				(39,741)	14,232	(25,509)			
*Not included in Heating Season Total entitlement									
Reserve Margin				-24.49%	8.93%	-15.56%	-0.55%	1.79%	1.25%

MINNESOTA ENERGY RESOURCES - NNG
RATE IMPACT OF THE PROPOSED DEMAND CHANGE
NOVEMBER 1, 2018

All costs in \$/Dth	Base Cost of Gas G011/MR-17-564 Jan 1, 2018	Demand Charge Oct 1, 2017	Demand Charge Demand Filing Nov 1, 2017	Most Recent PGA Oct 1, 2018	Proposed Effective Nov 1, 2018	Result of Proposed Change			
						Change from Last Rate Case	Change from Nov 1, 2017 Demand Filing	Change from Last PGA %	Change from Last PGA \$
1) General Service Residential: Avg. Annual Use: 88				Dth					
Commodity Cost	\$3.7406	\$3.2257	\$3.0201	\$3.9591	\$3.7371	(\$0.0035)	\$0.7170	-5.61%	(\$0.2220)
Demand Cost	\$0.9361	\$0.9288	\$0.9328	\$0.6797	\$1.1467	\$0.2106	\$0.2139	68.71%	\$0.4677
Commodity Margin	\$2.6284	\$2.4116	\$2.4116	\$2.5727	\$2.5727	(\$0.0557)	\$0.1611	0.00%	\$0.0000
Total Cost of Gas	\$7.3051	\$6.5661	\$6.3645	\$7.2115	\$7.4565	\$0.1514	\$1.0920	3.40%	\$0.2450
Avg Annual Cost	\$642.85	\$577.82	\$560.08	\$634.61	\$656.17	\$13.33	\$96.10	3.40%	\$21.56
Effect of proposed commodity change on average annual bills:				(\$19.54)					
Effect of proposed demand change on average annual bills:				-\$41.10					
2) Small Vol. Interruptible: Avg. Annual Use: 5,110				Dth					
Commodity Cost	\$3.7406	\$3.2257	\$3.0201	\$3.8855	\$3.7371	(\$0.0035)	\$0.7170	-3.82%	(\$0.1484)
Demand Cost									
Commodity Margin	\$1.0616	\$0.9740	\$0.9740	\$1.0391	\$1.0391	(\$0.0225)	\$0.0651	0.00%	\$0.0000
Total Cost of Gas	\$4.8022	\$4.1997	\$3.9941	\$4.9246	\$4.7762	(\$0.0260)	\$0.7821	-3.01%	(\$0.1484)
Avg Annual Cost	\$24,539.24	\$21,460.47	\$20,409.85	\$25,164.71	\$24,406.38	(\$132.86)	\$3,996.53	-3.01%	(\$758.32)
Effect of proposed commodity change on average annual bills:				(\$758.32)					
Effect of proposed demand change on average annual bills:				-\$0.00					
3) Large Vol. Interruptible: Avg. Annual Use: 16,150				Dth					
Commodity Cost	\$3.7406	\$3.2257	\$3.0201	\$3.8855	\$3.7371	(\$0.0035)	\$0.7170	-3.82%	(\$0.1484)
Demand Cost									
Commodity Margin	\$0.5808	\$0.5329	\$0.5329	\$0.5685	\$0.5685	(\$0.0123)	\$0.0356	0.00%	\$0.0000
Total Cost of Gas	\$4.3214	\$3.7586	\$3.5530	\$4.4540	\$4.3056	(\$0.0158)	\$0.7526	-3.33%	(\$0.1484)
Avg Annual Cost	\$69,790.61	\$60,701.39	\$57,380.95	\$71,932.10	\$69,535.44	(\$255.17)	\$12,154.49	-3.33%	(\$2,396.66)
Effect of proposed commodity change on average annual bills:				(\$2,396.66)					
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	\$3.7406	\$3.2257	\$3.0201	\$3.8855	\$3.7371	(\$0.0035)	\$0.7170	-3.82%	(\$0.1484)
Demand Cost	\$28.0830	\$27.8640	\$27.9840	\$2.8101	\$34.4019	\$0.0000	\$6.4179	1124.22%	\$31.5918
Commodity Margin	\$1.0616	\$0.9740	\$0.9740	\$1.0391	\$1.0391	(\$0.0225)	\$0.0651	0.00%	\$0.0000
Demand Margin	\$3.2697	\$3.0000	\$3.0000	\$3.1449	\$3.1449	\$3.1449	\$0.1449	0.00%	\$0.0000
Total Cost of Gas	\$4.8022	\$4.1997	\$3.9941	\$4.9246	\$4.7762	(\$0.0260)	\$0.7821	-3.01%	(\$0.1484)
Total Demand Cost	\$31.3527	\$30.8640	\$30.9840	\$5.9550	\$37.5468	\$6.1941	\$6.5628	530.51%	\$31.5918
Avg Annual Cost	\$25,323.06	\$22,232.07	\$21,184.45	\$25,313.58	\$25,345.05	\$21.99	\$4,160.60	0.12%	\$31.47
Effect of proposed commodity change on average annual bills:				(\$758.32)					
Effect of proposed demand change on average annual bills:				\$789.79					
5) Large Vol. Firm: Avg. Annual Use: 16,150				Dth					
75				DTh					
Commodity Cost	\$3.7406	\$3.2257	\$3.0201	\$3.8855	\$3.7371	(\$0.0035)	\$0.7170	-3.82%	(\$0.1484)
Demand Cost	\$28.0830	\$27.8640	\$27.9840	\$2.8101	\$34.4019	\$6.3189	\$6.4179	1124.22%	\$31.5918
Commodity Margin	\$0.5808	\$0.5329	\$0.5329	\$0.5685	\$0.5685	(\$0.0123)	\$0.0356	0.00%	\$0.0000
Demand Margin	\$3.2697	\$3.0000	\$3.0000	\$3.1449	\$3.1449	\$0.0000	\$0.1449	0.00%	\$0.0000
Total Cost of Gas	\$4.3214	\$3.7586	\$3.5530	\$4.4540	\$4.3056	(\$0.0158)	\$0.7526	-3.33%	(\$0.1484)
Total Demand Cost	\$31.3527	\$30.8640	\$30.9840	\$5.9550	\$37.5468	\$37.5468	\$6.5628	530.51%	\$31.5918
Avg Annual Cost	\$72,142.06	\$63,016.19	\$59,704.75	\$72,378.73	\$72,351.45	\$2,560.84	\$12,646.70	-0.04%	(\$27.28)
Effect of proposed commodity change on average annual bills:				(\$2,396.66)					
Effect of proposed demand change on average annual bills:				\$2,369.33					

Note: Average Annual Average based on NNG Annual Automatic Adjustment Report in Docket No. E,G999/AA-17-493
Note: Commodity Cost Rates do not include ACA adjustment.

Attachment 4
Page 2 of 2

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

NOVEMBER 1, 2018

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-18 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 Rochester	112486 \$	37.1175 \$	37.1175	\$37.1175	\$0.0000	\$37.1175
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						\$2.9695 /Dth
V. ANNUAL SALES -- As approved in Docket No. G011/MR-17-564						264,337,861
VI. MERC-NNG'S CURRENT COST OF GAS EFFECTIVE:						
01-Nov-18						
		Contract #	Monthly Entitlement (Dth)	Months	Rate (\$/Dth)	Contract Costs
						Rate/Therm
A. GS-NNG	TF12B (Max Rate) Winter	112495	46,506	5	\$ 10.2300	\$2,378,782 \$ 0.01004
	TF12B (Max Rate) Summer	112495	46,506	7	\$ 5.6830	\$1,850,055 \$ 0.00781
	TF12V (Max Rate)	112495	33,003	12	\$ 9.0926	\$3,600,997 \$ 0.01520
	TF5 (Max Rate)	112495	36,275	5	\$ 15.1530	\$2,748,375 \$ 0.01160
	TF12B (Discount-Winter)	112495	5,200	12	\$ 7.4951	\$467,694 \$ 0.00197
	TFX12 (Max Rate)	112486	16,261	12	\$ 9.6288	\$1,878,887 \$ 0.00793
	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	77,688	5	\$ 15.1530	\$5,886,031 \$ 0.02485
	TFX5 (Discount)	112486	1,800	5	\$ 10.0320	\$90,288 \$ 0.00038
	TFX12 (Rochester)	112486	10,500	12	\$ 37.1175	\$4,676,805 \$ 0.01974
	TFX12 (Discount)	111866	1,283	12	\$ 4.8640	\$74,886 \$ 0.00032
	TFX12 (Discount)	111866	8,271	12	\$ 5.4720	\$543,107 \$ 0.00229
	TFX12 (Discount)	111866	11,921	12	\$ 7.6025	\$1,087,553 \$ 0.00459
	TFX5 (Discount)	111866	379	5	\$ 4.8640	\$9,217 \$ 0.00004
	TFX5 (Discount)	111866	2,445	5	\$ 5.4720	\$66,895 \$ 0.00028
	TFX5 (Discount)	111866	22,189	5	\$ 15.1392	\$1,679,619 \$ 0.00709
	Windom		2,500	12	\$ -	\$0 \$ -
	Northwestern Energy		1,035	12	\$ 8.3382	\$103,560 \$ 0.00044
	Total Demand Cost					\$27,165,484 \$ 0.11467
	As proposed in Docket No. G011/MR-17-564					236,895,506
	GS-1 Demand Current Cost of Gas/therm					\$ 0.11467
	GS-1 Commodity Current Cost of Gas/therm					\$ 0.37371
	Total GS-1 Current Cost of Gas/therm					\$ 0.48838
B. GS-NNG, SVI-NNG, LVI-NNG, SJ-NNG, LJ-NNG, SLV-Commodity						
		Contract #	Monthly Entitlement (Dth)	Months	Rate (\$/Dth)	Contract Costs
						Rate (\$/therm)
	FDD - Reservation	118657	81,508	12	\$ 1.7140	\$1,676,457 \$ 0.00634
	FDD - Storage Cycle	118657	939,864	5	\$ 0.3567	\$1,676,248 \$ 0.00634
	FDD - Reservation	118657	5,550	12	\$ 3.3157	\$220,826 \$ 0.00084
	FDD - Storage Cycle	118657	64,000	5	\$ 0.6901	\$220,832 \$ 0.00084
	FDD - Reservation	133736	17,345	12	\$ 1.7140	\$356,752 \$ 0.00135
	FDD - Storage Cycle	133736	200,000	5	\$ 0.3567	\$356,700 \$ 0.00135
	FDD - Reservation	132024*	8,672	12	\$ 1.7140	\$178,366 \$ 0.00067
	FDD - Storage Cycle	132024*	100,000	5	\$ 0.3567	\$178,350 \$ 0.00067
	Firm Deferred Delivery Storage Contracts					\$4,864,530 \$ 0.01840
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.						
		Contract #	Monthly Entitlement (Dth)	Months	Rate (\$/Dth)	Contract Costs
						Rate (\$/therm)
	Bison	FT0003	50,000	12	\$ 17.4896	\$10,493,750 \$ 0.03970
	NBPL	T8673F	50,000	12	\$ 6.3905	\$3,834,300 \$ 0.01451
						\$14,328,050 \$ 0.05420
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		26,433,786	x	\$2.9695	\$78,495,128	264,337,861 \$ 0.29695
SMS-Bal Service		272,160	x	\$2.1800	\$593,309	264,337,861 \$ 0.00224
Physical Forward Start Premium				\$128,700		264,337,861 \$ 0.00049
Call Option Premium				\$378,446		264,337,861 \$ 0.00143
GS-NNG, SVI-NNG, LVI-NNG, SJ-NNG, LJ-NNG, SLV Commodity Current Cost of Gas/therm						\$84,460,112 264,337,861 \$ 0.37371
*Contract 132024 was transposed with contract 132112 in the 2017-2018 Demand Entitlement Filing (no impact to volumes or dollars in total)						

Attachment 5

MINNESOTA ENERGY RESOURCES - NNG

**Financial Options
Heating Season 2018-2019**

Units - Gas Daily Peaker Packages (Physical)

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

Premium - Gas Daily Peaker (Monthly Cost)

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

Units - Futures (Dth)

	November		December		January		February		March		Term Total
	Contract Date	Daily Volume	Contract Date	Daily Volume	Contract Date	Daily Volume	Contract Date	Daily Volume	Contract Date	Daily Volume	
1	05/03/18	1,406	05/15/18	2,667	05/17/18	2,998	05/08/18	2,700	05/10/18	532	309,397
2	05/03/18	281	06/12/18	2,401	06/13/18	2,725	06/07/18	2,400	05/10/18	1,597	284,310
3	06/05/18	1,688	07/17/18	2,401	07/19/18	2,725	06/07/18	300	06/11/18	1,863	275,948
4	07/05/18	1,688	08/14/18	2,134	08/16/18	273	07/10/18	2,400	07/12/18	1,863	250,862
5	08/02/18	844	09/13/18	1,600	08/16/18	2,180	08/07/18	2,400	08/09/18	1,597	259,224
6	08/02/18	563	09/13/18	533	09/18/18	2,453	09/06/18	2,400	09/11/18	1,597	225,776
7	09/04/18	1,406	10/18/18	2,134	10/16/18	2,453	10/10/18	2,400	10/16/18	1,597	301,034
8	10/05/18	1,125									33,448
Total		9,000		13,871		15,806		15,000		10,645	1,940,000

Units - Call Options (Dth)

	November		December		January		February		March		Term Total
	Contract Date	Daily Volume	Contract Date	Daily Volume	Contract Date	Daily Volume	Contract Date	Daily Volume	Contract Date	Daily Volume	
1	43223	3,046	43230	4,801	43228	2,972	43235	5,357	43237	3,726	597,868
2	43256	3046.153846	43262	4801.488834	43237	2701.957541	43263	5059.52381	43264	3725.806452	581158.12
3	07/05/18	3,046	07/12/18	4,535	06/07/18	5,404	07/17/18	5,060	07/19/18	3,460	648,400
4	08/02/18	3,046	08/09/18	4,535	07/10/18	5,134	08/14/18	5,060	08/16/18	3,460	640,024
5	09/04/18	3,046	09/11/18	4,535	08/07/18	5,134	09/13/18	5,060	09/18/18	3,460	640,024
6	10/05/18	2,769	10/16/18	4,535	09/06/18	5,134	10/18/18	4,762	10/10/18	3,460	623,382
7					10/10/18	5,134					159,145
8											
Total		18,000		27,742		31,613		30,357		21,290	3,890,000

Premium - Call Option (Monthly Cost)

	November		December		January		February		March		Total Option Premium	Premium
	Option Premium	Premium Cost	Option Premium	Premium Cost	Option Premium	Premium Cost	Option Premium	Premium Cost	Option Premium	Premium Cost		
1	0.095	8,682	0.09	13,396	0.095	8,753	0.093	13,950	0.098	11,319	0.09383297	56,100
2	0.1	9,138	0.1	14,885	0.098	8,209	0.097	13,742	0.1	11,550	0.09898045	57,523
3	\$ 0.1000	\$ 9,138	\$ 0.0970	\$ 13,636	\$ 0.0990	\$ 16,585	\$ 0.0940	\$ 13,317	\$ 0.0990	\$ 10,618	\$ 0.0976	\$ 63,293
4	\$ 0.0980	\$ 8,956	\$ 0.0970	\$ 13,636	\$ 0.0970	\$ 15,437	\$ 0.0970	\$ 13,742	\$ 0.0980	\$ 10,511	\$ 0.0973	\$ 62,281
5	\$ 0.1000	\$ 9,138	\$ 0.0990	\$ 13,917	\$ 0.1000	\$ 15,915	\$ 0.0980	\$ 13,883	\$ 0.1000	\$ 10,725	\$ 0.0993	\$ 63,578
6	\$ 0.0980	\$ 8,142	\$ 0.0930	\$ 13,074	\$ 0.0950	\$ 15,119	\$ 0.1000	\$ 13,333	\$ 0.1000	\$ 10,725	\$ 0.0969	\$ 60,392
7	\$ -	\$ -	\$ -	\$ -	\$ 0.0960	\$ 15,278	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 15,278
8	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total	\$ 0.0985	\$ 53,194	\$ 0.0960	\$ 82,543	\$ 0.0972	\$ 95,295	\$ 0.0964	\$ 81,967	\$ 0.0992	\$ 65,447	\$ 0.0973	\$ 378,446

Units - Collar Floor (put)

No Puts were purchased.

Attachment 6

Page 1 of 2

18/19 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			2,729,521		4,302,043		4,900,437		4,277,234		3,347,223		19,556,458	19,556,458
Daily Average			90,984		138,776		158,079		152,758		107,975		129,513	
10% Futures			272,952		430,204		490,044		427,723		334,722		1,955,646	
20% Call			545,904		860,409		980,087		855,447		669,445		3,911,292	
30% Storage			818,856		1,290,613		1,470,131		1,283,170		1,004,167		5,866,937	
40% Index			1,091,808		1,720,817		1,960,175		1,710,894		1,338,889		7,822,583	
Futures Contracts	May-18	5	50,000	8	80,000	9	90,000	7	70,000	6	60,000	35	350,000	
	Jun-18	5	50,000	7	70,000	8	80,000	7	70,000	6	60,000	33	330,000	
	Jul-18	5	50,000	7	70,000	8	80,000	7	70,000	6	60,000	33	330,000	
	Aug-18	4	40,000	7	70,000	8	80,000	7	70,000	5	50,000	31	310,000	
	Sep-18	4	40,000	7	70,000	8	80,000	7	70,000	5	50,000	31	310,000	
	Oct-18	4	40,000	7	70,000	8	80,000	7	70,000	5	50,000	31	310,000	
	Total	27	270,000	43	430,000	49	490,000	42	420,000	33	330,000	194	1,940,000	9.92%
Call Options	May-18	9	90,000	15	150,000	17	170,000	15	150,000	11	110,000	67	670,000	
	Jun-18	9	90,000	15	150,000	17	170,000	14	140,000	11	110,000	66	660,000	
	Jul-18	9	90,000	14	140,000	16	160,000	14	140,000	11	110,000	64	640,000	
	Aug-18	9	90,000	14	140,000	16	160,000	14	140,000	11	110,000	64	640,000	
	Sep-18	9	90,000	14	140,000	16	160,000	14	140,000	11	110,000	64	640,000	
	Oct-18	9	90,000	14	140,000	16	160,000	14	140,000	11	110,000	64	640,000	
	Total	54	540,000	86	860,000	98	980,000	85	850,000	66	660,000	389	3,890,000	19.89%
Collars	May-18	0	0	0	0	0	0	0	0	0	0	0	0	
	Jun-18	0	0	0	0	0	0	0	0	0	0	0	0	
	Jul-18	0	0	0	0	0	0	0	0	0	0	0	0	
	Aug-18	0	0	0	0	0	0	0	0	0	0	0	0	
	Sep-18	0	0	0	0	0	0	0	0	0	0	0	0	
	Oct-18	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Index (back financial)	Total		810,000		1,290,000		1,470,000		1,270,000		990,000		5,830,000	29.81%
Physical Hedges			0		0		0		0		0		0	
Storage			635,634		1,597,234		1,597,234		1,597,234		635,634		6,062,969	31.00%
Prepaid Obl			0		0		0		0		0		0	0.00%
			53%		67%		63%		67%		49%		61%	60.81%
Term Index		0	0	0	0	0	0	0	0	0	0		0	0.00%
		0	0	0	0	0	0	0	0	0	0		0	0.00%
Total NNG MN														
Futures													1,940,000	9.92%
Call Options													3,890,000	19.89%
Costing Collar													0	0.00%
Storage													6,062,969	31.00%
Prepaid Obl													0	0.00%
Term Index													0	0.00%
Month/Daily													7,663,489	39.19%
Total													19,556,458	100.00%

MINNESOTA ENERGY RESOURCES

**NNG WINTER PLAN
NOVEMBER 2018 THROUGH MARCH 2019**

<u>PHYSICAL FIXED PRICE HEDGES</u>				Daily Volumes						Monthly
	<u>Deal #</u>	<u>Trigger Locked</u>	<u>Trigger Exercised</u>	<u>Receipt Point</u>	<u>Nov</u>	<u>Dec</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Total</u>
No Physical Fixed Price Hedges										-
Total Actual Fixed/Option Physical					-	-	-	-	-	-
<u>INDEX</u>										
	<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>	
	64133	4/24/2018	NBPL Port of Morgan	25,000	25,000	25,000	25,000	25,000	3,775,000	
	64143	4/24/2018	NBPL Port of Morgan	15,000	15,000	15,000	15,000	15,000	2,265,000	
	64178	4/24/2018	NBPL Port of Morgan		10,000	10,000	10,000		900,000	
	64175	4/24/2018	NNG/GLGT Carlton	3,012	3,012	3,012	3,012	3,012	454,812	
	64174	4/24/2018	NNG/GLGT Grand Rapid:	6,064	6,064	6,064	6,064	6,064	915,664	
	64175	4/24/2018	NNG Demarc		5,000	5,000	5,000		450,000	
	64138	4/24/2018	NNG Ventura		15,000	15,000	15,000		1,350,000	
	64136	4/24/2018	NNG/GLGT Carlton	10,000	10,000	10,000	10,000	10,000	1,510,000	
	64134	4/24/2018	NNG Ventura	5,000	5,000	5,000	5,000	5,000	755,000	
Total Actual Seasonal Index				64,076	94,076	94,076	94,076	64,076	12,375,476	
<u>GAS DAILY PACKAGES</u>										
Physical Call Option	64139	4/24/2018	NNG Ventura	10,000	10,000	10,000	10,000	10,000		
Physical Call Option	64140	4/24/2018	NNG Ventura		10,000	10,000	10,000			
Physical Call Option	64141	4/24/2018	NNG Ventura	10,000	10,000	10,000	10,000	10,000		
Physical Call Option	64142	4/24/2018	NNG Ventura		10,000	10,000	10,000			
<u>STORAGE</u>										
	<u>K#118657</u>	<u>K#132024</u>	<u>K#133736</u>	<u>Total</u>						
<u>Injection Month</u>	<u>Volume Injected</u>	<u>Volume Injected</u>	<u>Volume Injected</u>	<u>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)	1,016,987	101,307	202,614	1,320,908						
Total	5,019,321	500,000	1,000,000	6,519,321						

MINNESOTA ENERGY RESOURCES - NNG

	2014-2015 NNG GS	2015-2016 NNG GS	2016-2017 NNG GS	2017-2018 NNG GS	2018-2019 NNG GS	Proposed Change
Design Day	261,002	259,076	262,324	267,783	273,842	6,059
Customer Requirements moving to Transportation						
Adjusted Design Day						
Design Day Percentages	28.07%	32.40%	29.71%	30.43%	28.70%	-1.73%
Total Design Day Capacity (includes non-recallable capacity)	266,385	266,317	266,317	266,317	277,256	10,939
Less: Windom	2,500	2,500	2,500	2,500	2,500	0
Less: Northwestern Energy	910	1,035	1,035	1,035	1,035	0
Total Design Day Capacity NNG Pipeline	262,975	262,782	262,782	262,782	273,721	10,939
Factors for All Winter Capacity	100.00%	100.00%	100.00%	100.00%	100.00%	
<u>Direct Assigned Entitlements in PGA</u>						
TF12B	55,019	48,183	48,183	54,419	51,706	(2,713)
TF12V	21,060	36,526	36,526	30,290	33,003	2,713
TF5	31,515	36,275	36,275	36,275	36,275	0
TFX12	32,297	32,297	32,297	32,297	48,236	15,939
TFX(5)	123,084	109,501	109,501	109,501	104,501	(5,000)
TFX(5) (12-V)						0
TFX (April Only)	2,000	2,000	2,000	2,000	2,000	0
TFX (October Only)	2,000	2,000	2,000	2,000	2,000	0
Windom	2,500	2,500	2,500	2,500	2,500	0
Northwestern Energy	910	1,035	1,035	1,035	1,035	0
NNG Zone Delivery Call Option	0	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	266,385	266,317	266,317	266,317	277,256	10,939
LP Peak Shaving						0
Total Design Day Capacity	266,385	266,317	266,317	266,317	277,256	10,939
Total Annual Transportation	111,786	120,541	120,541	120,541	136,480	15,939
Total Seasonal Transportation	154,599	145,776	145,776	145,776	140,776	(5,000)
Total Percent Seasonal	58.0%	54.7%	54.7%	54.7%	50.8%	-4.0%
Reserve Margin	2.06%	2.79%	1.52%	-0.55%	1.25%	1.8%
Total Design Day Capacity w/ contract demand	266,385	266,317	266,317	266,317	277,256	10,939
Factors	28.07%	32.40%	29.71%	30.43%	28.70%	-1.73%
<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	94,863	100,934	107,871	113,075	113,075	0
FDD Storage Capacity	1,093,864	1,163,864	1,163,864	1,303,864	1,303,864	0
FDD Maximum Storage Quantity	5,469,321	5,819,321	6,219,321	6,519,321	6,519,321	0
SMS	22,680	24,380	24,380	22,680	22,680	0

Attachment 8

MINNESOTA ENERGY RESOURCES - NNG

Change in Costs due to November 1, 2018 Change in Entitlement Levels and Related Demand Costs

Costs Assigned In Demand

	Contract	2017/18 Entitlements	2018/19 Entitlements	Entitlement Change	Months	2018/19 Rate	2017/18 Total Annual Cost	2018/19 Total Annual Cost	Total Annual Cost Change
TF12B (Max Rate) Winter	112495	49,219	46,506	(2,713)	5	\$10.2300	\$2,517,552	\$2,378,782	(\$138,770)
TF12B (Max Rate) Summer	112495	49,219	46,506	(2,713)	7	\$5.6830	\$1,957,981	\$1,850,055	(\$107,926)
TF12V (Max Rate)	112495	30,290	33,003	2,713	12	\$9.0926	\$3,304,978	\$3,600,997	\$296,019
TF5 (Max Rate)	112495	36,275	36,275	0	5	\$15.1530	\$2,748,375	\$2,748,375	\$0
TF12B (Discount-Winter)	112495	5,200	5,200	0	12	\$7.4951	\$467,694	\$467,694	\$0
TFX12 (Max Rate)	112486	10,822	16,261	5,439	12	\$9.6288	\$1,250,434	\$1,878,887	\$628,453
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	82,688	77,688	(5,000)	5	\$15.1530	\$6,264,856	\$5,886,031	(\$378,825)
TFX5 (Discount)	112486	1,800	1,800	0	5	\$10.0320	\$90,288	\$90,288	\$0
TFX12 (Rochester)	112486	0	10,500	10,500	12	\$37.1175	\$0	\$4,676,805	\$4,676,805
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		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							\$22,189,728	\$27,165,484	\$4,975,755

Costs Assigned In Commodity

		2017/18 Entitlements	2018/19 Entitlement	Entitlement Change	Months	2018/19 Rate/Dth	2017/18 Total Annual Cost	Entitlement Total Cost	Entitlement Change
<u>Upstream</u>									
<u>Surcharges:</u>									
<u>Storage (FDD)</u>									
FDD - Reservation	118657	81,508	81,508	0	12	\$ 1.7140	\$1,676,457	\$1,676,457	\$0
FDD - Storage Cycle	118657	939,864	939,864	0	5	\$ 0.3567	\$1,676,248	\$1,676,248	\$0
FDD - Reservation	118657	5,550	5,550	0	12	\$ 3.3157	\$220,826	\$220,826	\$0
FDD - Storage Cycle	118657	64,000	64,000	0	5	\$ 0.6901	\$220,832	\$220,832	\$0
FDD - Reservation	133736	17,345	17,345	0	12	\$ 1.7140	\$356,748	\$356,752	\$4
FDD - Storage Cycle	133736	200,000	200,000	0	5	\$ 0.3567	\$356,700	\$356,700	\$0
FDD - Reservation	132024*	8,672	8,672	0	12	\$ 1.7140	\$178,374	\$178,366	(\$8)
FDD - Storage Cycle	132024*	100,000	100,000	0	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	\$6.3905	\$4,197,500	\$3,834,300	(\$363,200)
SMS-Bal Service		272,160	272,160	0	1	\$2.1800	\$593,309	\$593,309	\$0
Physical Forward Start Premium							\$53,820	\$128,700	\$74,880
Financial Call Option Premium							\$713,379	\$378,446	(\$334,933)
Total Commodity Costs							\$20,916,292	\$20,293,034	(\$623,257)

*Contract 132024 was transposed with contract 132112 in the 2017-2018 Demand Entitlement Filing (no impact to volumes or dollars in total) **N8**

Attachment 9

MINNESOTA ENERGY RESOURCES - NNG

Daily Total Throughput Data - July 1, 2017 through June 30, 2018
NNG

Design Day:

Base	12,917
Variable	2,525

Date	13.98% Cloquet Adjusted HDD	29.22% Minneapolis Adjusted HDD	45.15% Rochester Adjusted HDD	11.65% Worthington Adjusted HDD	100.00% Weighted Adjusted HDD	Actual Total Through- Put *	Estimated Firm Through- Put **
7/1/17	4	0	0	0	1	134,314	14,400
7/2/17	5	0	0	0	1	134,736	14,541
7/3/17	2	0	0	0	0	143,865	13,482
7/4/17	0	0	0	0	0	136,745	12,917
7/5/17	0	0	0	0	0	182,646	12,917
7/6/17	0	0	0	0	0	175,415	12,917
7/7/17	4	0	0	0	1	154,460	14,223
7/8/17	0	0	0	0	0	143,068	12,917
7/9/17	2	0	0	0	0	145,872	13,658
7/10/17	0	0	0	0	0	172,886	12,917
7/11/17	0	0	0	0	0	167,683	12,917
7/12/17	11	0	0	0	2	162,048	16,906
7/13/17	11	0	2	4	3	160,010	19,756
7/14/17	0	0	2	0	1	160,071	14,741
7/15/17	0	0	0	0	0	148,767	12,917
7/16/17	8	0	0	0	1	138,265	15,564
7/17/17	0	0	0	0	0	173,479	12,917
7/18/17	2	0	0	0	0	186,847	13,482
7/19/17	0	0	0	0	0	186,200	12,917
7/20/17	0	0	0	0	0	179,568	12,917
7/21/17	0	0	0	0	0	163,926	12,917
7/22/17	1	0	0	0	0	146,884	13,093
7/23/17	5	0	0	0	1	141,276	14,753
7/24/17	0	0	0	0	0	163,000	12,917
7/25/17	0	0	0	0	0	164,315	12,917
7/26/17	0	0	0	0	0	175,732	12,917
7/27/17	0	0	0	0	0	178,086	12,917
7/28/17	0	0	0	0	0	164,295	12,917
7/29/17	0	0	0	0	0	138,490	12,917
7/30/17	0	0	0	0	0	150,876	12,917
7/31/17	0	0	0	0	0	167,940	12,917
8/1/17	0	0	0	0	0	162,901	12,917
8/2/17	5	0	0	0	1	161,682	14,823
8/3/17	14	10	8	10	10	146,758	37,227
8/4/17	4	0	4	2	3	139,813	19,922
8/5/17	5	0	0	2	1	133,498	15,011
8/6/17	6	0	3	2	2	135,656	18,476

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8/7/17	0	0	0	2	0	139,036	13,388
8/8/17	0	0	0	0	0	149,729	12,917
8/9/17	0	0	0	0	0	135,042	12,917
8/10/17	7	0	1	3	2	137,327	16,972
8/11/17	5	0	1	2	1	129,955	15,587
8/12/17	1	0	1	0	1	120,116	14,234
8/13/17	2	0	0	1	0	119,226	13,594
8/14/17	5	0	0	3	1	150,863	15,482
8/15/17	0	0	0	1	0	136,227	13,064
8/16/17	3	0	0	0	0	137,959	13,905
8/17/17	7	0	1	0	1	124,165	16,466
8/18/17	1	0	5	0	2	135,719	18,452
8/19/17	0	0	0	0	0	131,066	12,917
8/20/17	0	0	0	0	0	143,472	12,917
8/21/17	5	0	0	3	1	158,155	15,723
8/22/17	7	0	5	4	4	149,475	22,177
8/23/17	10	0	2	0	2	155,588	18,920
8/24/17	10	0	3	0	3	156,771	19,666
8/25/17	5	1	2	0	2	153,449	17,888
8/26/17	6	1	2	0	2	146,772	18,461
8/27/17	5	0	0	0	1	141,247	14,611
8/28/17	2	0	3	2	2	141,896	17,712
8/29/17	0	0	1	0	0	134,354	13,487
8/30/17	4	0	0	0	1	138,525	14,435
8/31/17	11	4	8	2	7	149,275	29,520
9/1/17	7	2	5	0	4	142,481	22,166
9/2/17	0	0	1	0	0	135,179	13,487
9/3/17	0	0	0	0	0	135,118	12,917
9/4/17	10	2	7	8	6	144,795	27,968
9/5/17	16	10	12	13	12	157,705	43,432
9/6/17	14	7	15	12	12	151,483	42,887
9/7/17	19	2	5	3	6	150,744	27,578
9/8/17	12	5	8	3	7	144,384	30,957
9/9/17	6	0	1	0	1	136,454	15,825
9/10/17	0	0	1	0	0	128,896	13,601
9/11/17	3	0	0	0	0	136,940	13,835
9/12/17	0	0	0	0	0	141,515	12,917
9/13/17	0	0	0	0	0	141,032	12,917
9/14/17	0	0	0	0	0	150,127	12,917
9/15/17	7	0	0	0	1	149,226	15,247
9/16/17	4	1	1	16	3	147,345	20,283
9/17/17	16	5	7	8	8	141,665	32,340
9/18/17	12	8	9	5	9	152,327	34,797
9/19/17	2	0	0	0	0	150,087	13,482
9/20/17	10	1	0	5	2	164,891	18,193
9/21/17	4	0	0	0	1	151,335	14,435
9/22/17	0	0	0	0	0	171,133	12,917
9/23/17	0	0	0	0	0	167,884	12,917
9/24/17	0	0	0	0	0	158,531	12,917

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9/25/17	11	5	0	13	4	171,764	24,260
9/26/17	15	10	12	15	12	169,258	43,638
9/27/17	13	8	12	9	10	147,982	39,177
9/28/17	11	5	6	5	6	150,031	28,274
9/29/17	20	10	14	10	13	151,618	46,294
9/30/17	11	5	8	5	7	141,518	31,096
10/1/17	9	7	3	8	6	137,165	27,376
10/2/17	8	1	0	8	2	141,678	18,210
10/3/17	13	8	7	15	9	150,330	34,961
10/4/17	18	11	13	13	13	156,078	46,514
10/5/17	21	9	11	11	12	173,544	42,357
10/6/17	17	9	8	14	10	156,925	38,194
10/7/17	11	7	13	5	10	146,242	37,981
10/8/17	11	7	5	11	7	155,896	30,240
10/9/17	29	21	19	28	22	199,006	67,694
10/10/17	25	21	22	29	23	206,337	71,060
10/11/17	19	16	17	17	17	184,858	55,440
10/12/17	15	11	12	15	12	171,461	43,800
10/13/17	24	13	18	19	17	191,403	56,620
10/14/17	21	18	21	23	21	189,832	64,857
10/15/17	25	20	24	21	23	180,544	70,125
10/16/17	16	12	14	9	13	171,847	45,568
10/17/17	9	4	6	3	6	156,185	26,838
10/18/17	12	7	12	10	10	165,544	38,738
10/19/17	10	6	7	4	7	171,916	30,408
10/20/17	1	0	0	0	0	158,481	13,305
10/21/17	11	7	9	11	9	153,012	36,184
10/22/17	14	10	14	14	13	162,202	44,734
10/23/17	21	18	20	26	20	191,341	63,582
10/24/17	28	23	28	27	26	210,022	79,622
10/25/17	22	17	20	13	19	215,235	60,182
10/26/17	28	23	27	32	26	225,555	79,278
10/27/17	39	39	41	48	41	244,996	116,747
10/28/17	40	36	40	35	38	256,473	109,919
10/29/17	35	30	33	30	32	222,605	93,514
10/30/17	38	37	40	48	40	277,342	113,469
10/31/17	43	38	41	43	41	298,621	115,555
11/1/17	39	33	35	31	34	264,164	99,879
11/2/17	37	35	34	34	34	275,859	99,898
11/3/17	39	35	36	37	36	288,520	103,792
11/4/17	34	28	28	32	29	248,739	86,904
11/5/17	48	41	40	46	42	275,257	119,082
11/6/17	48	38	38	41	39	321,192	112,299
11/7/17	46	36	40	39	39	318,725	112,340
11/8/17	50	38	38	41	40	288,598	113,773
11/9/17	66	55	56	55	57	352,636	156,273
11/10/17	55	48	51	49	50	323,627	140,376
11/11/17	39	33	38	34	36	284,439	104,388
11/12/17	43	35	37	33	37	275,278	106,303

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11/13/17	37	29	33	30	32	264,026	93,410
11/14/17	31	25	26	27	27	238,719	80,036
11/15/17	44	38	41	44	41	281,980	115,861
11/16/17	41	36	40	40	39	278,512	111,522
11/17/17	39	32	34	31	34	253,880	97,980
11/18/17	53	43	45	46	45	276,428	127,694
11/19/17	46	36	41	31	39	268,800	110,871
11/20/17	42	33	33	39	35	261,438	101,823
11/21/17	53	49	52	53	51	305,673	142,186
11/22/17	50	42	45	45	45	289,285	126,046
11/23/17	38	27	31	26	30	222,077	89,775
11/24/17	36	21	22	24	24	218,874	72,268
11/25/17	44	34	37	30	36	247,108	104,495
11/26/17	30	25	26	20	26	225,667	77,628
11/27/17	25	17	22	17	20	203,493	63,808
11/28/17	40	29	35	32	33	233,907	97,198
11/29/17	40	31	33	31	33	235,905	96,884
11/30/17	33	29	33	28	31	232,637	91,985
12/1/17	34	26	28	29	28	226,491	84,445
12/2/17	32	28	30	25	29	227,440	86,704
12/3/17	30	22	24	25	24	202,363	74,060
12/4/17	45	33	32	41	35	232,775	102,094
12/5/17	60	55	58	52	57	315,473	155,629
12/6/17	62	58	58	62	59	323,825	162,591
12/7/17	55	53	58	59	56	311,169	154,377
12/8/17	54	45	47	51	48	283,474	133,611
12/9/17	53	46	51	46	49	284,555	136,799
12/10/17	49	40	45	34	43	270,275	120,468
12/11/17	57	51	54	50	53	299,162	146,724
12/12/17	58	49	51	44	50	290,554	140,305
12/13/17	53	48	54	44	51	303,048	141,243
12/14/17	55	48	53	43	51	306,742	140,662
12/15/17	54	40	41	34	42	268,491	118,599
12/16/17	48	43	39	36	41	262,642	116,032
12/17/17	45	40	40	39	41	268,180	115,834
12/18/17	39	32	38	33	36	256,586	102,893
12/19/17	56	43	41	39	43	274,462	122,456
12/20/17	59	50	48	46	50	304,445	138,790
12/21/17	53	48	49	60	50	301,395	140,400
12/22/17	55	50	57	58	55	306,400	151,506
12/23/17	54	51	59	59	56	307,332	154,196
12/24/17	70	60	66	68	65	321,936	177,026
12/25/17	88	78	80	82	81	377,648	217,336
12/26/17	85	74	82	83	80	417,607	214,741
12/27/17	78	70	75	76	74	398,760	199,631
12/28/17	77	65	67	65	68	369,431	183,937
12/29/17	84	80	80	83	81	385,963	216,739
12/30/17	91	84	86	91	86	412,689	230,896
12/31/17	89	82	88	93	87	407,925	232,723

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November 1, 2018

1/1/18	79	75	83	89	81	400,088	217,377
1/2/18	70	71	75	72	73	367,495	196,362
1/3/18	79	70	75	75	74	378,230	199,797
1/4/18	79	72	75	71	74	396,770	200,754
1/5/18	80	71	76	72	75	396,598	201,755
1/6/18	72	66	75	67	71	338,486	192,534
1/7/18	48	43	48	44	46	270,010	129,596
1/8/18	48	37	39	38	39	259,884	112,070
1/9/18	41	32	36	35	35	237,125	102,216
1/10/18	44	44	47	53	46	246,772	129,979
1/11/18	79	74	78	83	78	346,104	208,612
1/12/18	82	75	79	78	78	358,952	210,402
1/13/18	76	70	76	68	73	347,537	197,316
1/14/18	72	62	64	71	65	317,939	177,824
1/15/18	71	72	76	87	75	349,281	202,836
1/16/18	66	65	72	74	70	336,310	188,430
1/17/18	55	51	61	55	57	276,332	155,958
1/18/18	36	34	44	40	40	235,590	112,656
1/19/18	34	33	37	32	35	235,447	101,391
1/20/18	33	30	33	30	32	229,260	92,841
1/21/18	40	33	35	37	35	227,492	101,857
1/22/18	57	47	50	53	50	263,910	140,171
1/23/18	56	48	54	48	52	298,420	143,514
1/24/18	48	44	48	47	46	310,578	130,286
1/25/18	45	35	39	41	39	270,607	110,974
1/26/18	34	34	39	39	37	237,144	106,228
1/27/18	53	44	44	54	46	267,034	129,540
1/28/18	64	57	60	72	61	318,414	166,764
1/29/18	69	60	65	62	63	354,299	172,828
1/30/18	56	52	55	46	53	313,327	146,422
1/31/18	69	61	62	57	62	309,449	168,964
2/1/18	77	72	76	71	74	378,700	200,645
2/2/18	69	65	64	58	64	340,024	175,160
2/3/18	73	66	59	62	63	332,803	173,095
2/4/18	76	71	75	73	74	378,776	199,283
2/5/18	71	66	72	71	70	382,800	189,708
2/6/18	70	66	68	70	68	367,150	184,983
2/7/18	66	59	65	66	64	350,448	173,913
2/8/18	71	61	63	64	63	350,229	172,600
2/9/18	70	64	70	71	68	350,513	184,893
2/10/18	66	63	66	69	65	339,600	177,954
2/11/18	69	60	68	63	65	346,706	177,074
2/12/18	67	60	62	66	63	349,183	171,083
2/13/18	51	47	51	51	50	298,384	139,130
2/14/18	38	36	38	38	37	247,159	107,195
2/15/18	61	53	55	60	56	301,764	153,672
2/16/18	64	55	60	60	59	316,504	162,970
2/17/18	51	40	50	45	47	284,742	130,720
2/18/18	54	37	40	46	42	267,623	118,754

Minnesota Energy Resources Corporation
2018-2019 Demand Entitlement
MERC-NNG
November 1, 2018

2/19/18	58	50	45	62	50	317,176	139,611
2/20/18	62	59	60	68	61	346,956	166,688
2/21/18	61	56	54	56	56	352,794	153,604
2/22/18	52	45	44	49	46	303,421	129,447
2/23/18	52	48	52	51	51	299,865	141,060
2/24/18	50	49	50	58	51	286,340	140,618
2/25/18	50	46	51	50	49	281,760	137,507
2/26/18	37	33	39	41	37	252,331	106,567
2/27/18	36	32	33	45	34	251,534	99,499
2/28/18	45	33	32	43	35	248,173	101,965
3/1/18	41	39	41	45	41	265,364	115,651
3/2/18	34	38	35	39	36	245,677	104,261
3/3/18	36	31	33	34	33	224,928	95,785
3/4/18	35	31	32	33	33	228,452	95,004
3/5/18	43	40	43	45	42	271,688	119,045
3/6/18	54	46	52	52	50	290,131	140,148
3/7/18	54	48	57	54	54	298,222	148,338
3/8/18	49	43	52	45	48	299,121	133,634
3/9/18	48	40	43	42	43	259,846	120,286
3/10/18	38	36	37	36	37	231,080	105,577
3/11/18	40	39	43	47	42	244,026	118,756
3/12/18	42	37	45	47	42	237,901	120,027
3/13/18	42	39	47	46	44	246,690	123,019
3/14/18	37	31	37	35	35	236,517	101,033
3/15/18	45	38	40	41	40	244,769	114,670
3/16/18	41	35	39	42	38	249,105	109,444
3/17/18	33	28	30	33	30	234,769	89,215
3/18/18	36	30	28	31	30	229,716	88,095
3/19/18	47	32	32	35	34	242,410	99,870
3/20/18	48	41	41	35	41	283,931	116,059
3/21/18	44	34	35	33	36	273,367	103,154
3/22/18	40	32	31	31	32	237,810	94,765
3/23/18	43	35	34	40	36	246,671	103,759
3/24/18	44	34	37	42	38	240,148	107,977
3/25/18	37	32	33	40	34	240,104	99,259
3/26/18	36	33	33	37	34	278,842	97,796
3/27/18	30	28	34	31	31	239,894	91,600
3/28/18	35	32	32	35	33	233,137	96,153
3/29/18	42	35	36	40	37	257,419	106,283
3/30/18	45	36	34	36	36	254,156	104,572
3/31/18	60	54	53	53	54	294,338	149,565
4/1/18	51	46	45	42	45	278,005	127,600
4/2/18	43	37	38	42	39	280,165	111,468
4/3/18	52	51	55	58	54	317,206	148,856
4/4/18	47	46	54	50	50	318,024	139,595
4/5/18	49	43	45	46	45	275,514	126,415
4/6/18	57	56	60	58	58	321,253	159,852
4/7/18	55	44	51	42	48	299,363	134,845
4/8/18	42	41	44	46	43	284,433	121,422

Minnesota Energy Resources Corporation
2018-2019 Demand Entitlement
MERC-NNG
November 1, 2018

4/9/18	40	36	40	38	38	283,062	109,453
4/10/18	38	32	37	27	34	268,619	99,500
4/11/18	26	27	28	30	28	233,665	82,375
4/12/18	34	23	23	29	25	222,597	75,977
4/13/18	40	37	40	46	40	256,656	112,987
4/14/18	50	48	50	55	50	286,089	139,779
4/15/18	47	46	50	51	48	281,030	134,839
4/16/18	44	40	45	44	43	289,133	122,413
4/17/18	33	30	37	37	34	261,728	99,720
4/18/18	35	35	44	44	40	266,441	113,790
4/19/18	23	25	34	33	30	261,325	88,357
4/20/18	25	21	28	29	26	216,396	77,772
4/21/18	24	18	23	28	22	195,696	68,526
4/22/18	20	13	17	22	17	189,265	55,588
4/23/18	16	8	11	14	11	193,186	40,973
4/24/18	26	17	15	25	18	200,784	58,939
4/25/18	19	15	19	19	18	207,229	58,070
4/26/18	23	12	18	21	17	177,190	56,051
4/27/18	32	16	22	23	22	181,846	68,106
4/28/18	28	18	23	20	22	182,116	67,600
4/29/18	14	6	11	6	10	162,210	37,192
4/30/18	7	0	0	0	1	152,357	15,211
5/1/18	16	7	4	18	8	147,833	32,943
5/2/18	17	5	9	13	9	163,237	36,431
5/3/18	11	1	6	10	5	167,948	26,720
5/4/18	11	0	4	2	4	159,370	21,825
5/5/18	11	0	1	1	2	140,195	18,378
5/6/18	16	0	6	0	5	145,782	24,659
5/7/18	0	0	0	0	0	152,906	12,917
5/8/18	17	1	3	8	5	158,119	25,602
5/9/18	25	11	12	10	13	167,779	45,897
5/10/18	23	12	16	18	16	186,085	53,984
5/11/18	26	17	25	24	22	183,107	69,630
5/12/18	19	13	15	17	15	162,783	50,844
5/13/18	1	3	12	9	8	178,545	32,034
5/14/18	2	2	8	8	5	182,595	26,195
5/15/18	13	0	1	0	2	175,815	18,866
5/16/18	1	0	0	0	0	169,060	13,129
5/17/18	23	0	0	0	3	169,659	21,142
5/18/18	12	0	0	1	2	145,607	17,406
5/19/18	24	12	8	13	12	152,047	43,307
5/20/18	13	4	13	11	10	157,136	38,016
5/21/18	4	1	11	7	7	165,529	29,437
5/22/18	4	0	1	0	1	160,494	14,758
5/23/18	0	0	0	0	0	154,554	12,917
5/24/18	0	0	0	0	0	149,555	12,917
5/25/18	0	0	0	0	0	151,185	12,917
5/26/18	0	0	0	0	0	150,722	12,917
5/27/18	0	0	0	0	0	150,257	12,917

5/28/18	0	0	0	0	0	153,825	12,917
5/29/18	2	0	0	0	0	152,978	13,482
5/30/18	5	0	0	0	1	161,840	14,541
5/31/18	6	0	0	0	1	182,230	14,858
6/1/18	20	0	0	0	3	161,486	19,871
6/2/18	21	1	1	2	4	145,262	22,966
6/3/18	12	2	6	2	5	139,250	26,353
6/4/18	9	0	0	0	1	136,558	15,988
6/5/18	11	0	0	0	2	151,936	16,906
6/6/18	5	0	0	0	1	150,767	14,611
6/7/18	9	0	0	0	1	163,799	16,235
6/8/18	6	0	0	0	1	146,050	15,176
6/9/18	12	0	0	0	2	141,460	17,259
6/10/18	8	0	2	0	2	131,257	17,538
6/11/18	8	0	0	0	1	139,187	15,670
6/12/18	3	0	1	2	1	143,916	14,911
6/13/18	0	0	0	0	0	143,870	12,917
6/14/18	2	0	0	0	0	128,824	13,482
6/15/18	2	0	0	0	0	149,806	13,482
6/16/18	0	0	0	0	0	125,699	12,917
6/17/18	0	0	0	0	0	133,017	12,917
6/18/18	0	0	0	0	0	150,706	12,917
6/19/18	0	0	2	0	1	139,130	14,855
6/20/18	0	0	2	4	2	134,674	16,775
6/21/18	6	0	5	3	3	144,284	21,551
6/22/18	3	0	0	0	0	133,759	13,799
6/23/18	3	0	0	0	0	128,931	13,870
6/24/18	13	0	0	0	2	135,422	17,471
6/25/18	10	0	0	0	1	141,321	16,341
6/26/18	10	0	0	0	1	148,095	16,306
6/27/18	0	0	0	0	0	163,163	12,917
6/28/18	0	0	0	0	0	165,398	12,917
6/29/18	0	0	0	0	0	159,145	12,917
6/30/18	0	0	0	0	0	151,136	12,917
Totals	10,422	8,446	9,229	9,322	9,177	80,165,526	27,887,755

* 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, 2017 through June 30, 2018

Tariff Rate Class	Rate Designation	Jul-17 Average Customers	Aug-17 Average Customers	Sep-17 Average Customers	Oct-17 Average Customers	Nov-17 Average Customers	Dec-17 Average Customers	Jan-18 Average Customers	Feb-18 Average Customers	Mar-18 Average Customers	Apr-18 Average Customers	May-18 Average Customers	Jun-18 Average Customers	Annual Average Customers
GS- Residential	MERC000001	170,356	169,426	170,761	170,630	171,394	171,703	172,292	172,292	172,221	172,355	172,437	173,012	171,573
GS-C&I <1,500 therms/yr (Small)	MERC000005	6,495	6,431	6,466	6,462	6,482	6,523	6,607	6,866	7,323	7,275	7,357	7,335	6,802
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	9,830	9,735	9,801	9,865	9,837	9,911	9,931	9,574	9,145	9,145	9,153	9,198	9,594
GS-C&I >1,500 therms/yr (Large) Emmons, IA	MERC000014	2	2	2	2	2	2	2	2	2	2	2	2	2
Small Volume Interruptible (SVI)	MERC000015	278	278	281	273	276	264	268	252	271	266	241	260	267
Small Volume Interruptible w/Joint (SVJ)	MERC000019	-5	2	2	2	5	2	2	2	2	2	2	2	2
Large Volume Interruptible (LVI)	MERC000022	58	50	65	70	46	80	70	59	62	52	48	60	60
Large Volume Interruptible w/Joint (LVJ)	MERC000026	2	4	3	-7	3	6	8	5	7	7	7	7	4
	MERC000101	9,440	9,425	9,435	9,397	9,412	9,421	9,431	9,423	9,452	9,420	9,423	9,417	9,425
	MERC000102	52	51	51	52	51	52	76	353	573	586	584	584	255
	MERC000103	1,116	1,132	1,136	1,137	1,128	1,131	1,103	825	578	591	594	591	922
	MERC000104	34	32	33	30	38	37	33	35	32	35	34	35	34
	MERC000106	14	14	14	14	14	13	15	15	15	15	15	14	14
		197,673	196,583	198,051	197,928	198,689	199,146	199,839	199,704	199,684	199,752	199,898	200,518	198,955
Total														

Projected Fixed Cost - November 2018 through March 2019

[illegible]

*Prices from 10/17/18 NYMEX market

MINNESOTA ENERGY RESOURCES - NNG

Projected Storage Cost - November 2018 through March 2019

Month/ Year	K#118657 NNG Storage (Dth)	LS Power K#132024 NNG Storage (Dth)	LS Power K#133736 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	ANR Storage GLGT/VT (Dth)	ANR Storage GLGT/VT WACOG	ANR Storage GLGT/VT Cost
Nov-18	489,384	48,750	97,500	635,634	\$ 2.5729	\$ 1,259,154	\$ 125,431	\$ 250,861	\$ 1,635,446	96,000	\$ 2.8102	\$ 269,779
Dec-18	1,229,734	122,500	245,000	1,597,234	\$ 2.5729	\$ 3,164,028	\$ 315,185	\$ 630,370	\$ 4,109,582	189,100	\$ 2.8102	\$ 531,408
Jan-19	1,229,734	122,500	245,000	1,597,234	\$ 2.5729	\$ 3,164,028	\$ 315,185	\$ 630,370	\$ 4,109,582	189,100	\$ 2.8102	\$ 531,408
Feb-19	1,229,734	122,500	245,000	1,597,234	\$ 2.5729	\$ 3,164,028	\$ 315,185	\$ 630,370	\$ 4,109,582	196,000	\$ 2.8102	\$ 550,799
Mar-19	489,384	48,750	97,500	635,634	\$ 2.5729	\$ 1,259,154	\$ 125,431	\$ 250,861	\$ 1,635,446	85,900	\$ 2.8102	\$ 241,396
Total	4,667,969	465,000	930,000	6,062,969		\$ 12,010,391	\$ 1,196,416	\$ 2,392,832	\$ 15,599,639	756,100		\$ 2,124,790

Month/ Year	NNG Storage Volume (Dth)	NNG Index Price	NNG Index Cost
Nov-18	635,634	\$ 3.4800	\$ 2,212,006
Dec-18	1,597,234	\$ 3.8840	\$ 6,203,655
Jan-19	1,597,234	\$ 4.1715	\$ 6,662,860
Feb-19	1,597,234	\$ 4.1370	\$ 6,607,756
Mar-19	635,634	\$ 3.0470	\$ 1,936,776
Total	6,062,969		\$ 23,623,053
			\$ 8,023,414

Month/ Year	ANR Storage Volume (Dth)	Emerson Index Price	Emerson Market Cost
Nov-18	96,000	\$ 3.3150	\$ 318,240
Dec-18	189,100	\$ 3.5715	\$ 675,371
Jan-19	189,100	\$ 3.8065	\$ 719,809
Feb-19	196,000	\$ 3.7145	\$ 728,042
Mar-19	85,900	\$ 3.3695	\$ 289,440
Total	756,100		\$ 2,730,902
			\$ 606,112

Max NNG-MERC Storage (Storage plan withdrawals through Apr 19)

6,062,969

6,519,321

06/30/18 Storage Balance - NNG-MERC

5,021,762

77.03%

4,670,239

Max ANR Storage (Storage plan withdrawals through Apr 19)

756,100

756,100

06/30/18 Storage Balance - ANR

313,222

41.43%

313,222

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-18	489,384	48,750	97,500	635,634	\$ 2.5729	\$ 2.5729	\$ 2.5729	\$ 1,635,446	\$ 3.4800	\$ 2,212,006	\$ (576,560)
Dec-18	1,229,734	122,500	245,000	1,597,234	\$ 2.5729	\$ 2.5729	\$ 2.5729	\$ 4,109,582	\$ 3.8840	\$ 6,203,655	\$ (2,094,073)
Jan-19	1,229,734	122,500	245,000	1,597,234	\$ 2.5729	\$ 2.5729	\$ 2.5729	\$ 4,109,582	\$ 4.1715	\$ 6,662,860	\$ (2,553,278)
Feb-19	1,229,734	122,500	245,000	1,597,234	\$ 2.5729	\$ 2.5729	\$ 2.5729	\$ 4,109,582	\$ 4.1370	\$ 6,607,756	\$ (2,498,173)
Mar-19	489,384	48,750	97,500	635,634	\$ 2.5729	\$ 2.5729	\$ 2.5729	\$ 1,635,446	\$ 3.0470	\$ 1,936,776	\$ (301,330)
Total	4,667,969	465,000	930,000	6,062,969				\$ 15,599,639		\$ 23,623,053	\$ (8,023,414)

*Indexes and projected WACOG based on 10/17/18 market prices

MINNESOTA ENERGY RESOURCES - NNG
Projected Call Option Costs - November 2018 through March 2019

Call/Put Options WACOG

Call/Put Options 10,000 Dth/contract

Nov-18															Dec-18															Jan-19														
Deal Number	Purchase Date	Trade Number	Number Contracts	Physical Volume	Strike Price	Strike Cost	Option Price	Option Cost	Pent Settle*	Pent Settle Cost	Over/(Under) Market	Premium Per Unit	Premium Cost	Total Cost	Deal Number	Purchase Date	Trade Number	Number Contracts	Physical Volume	Strike Price	Strike Cost	Option Price	Option Cost	Pent Settle*	Pent Settle Cost	Over/(Under) Market	Premium Per Unit	Premium Cost	Total Cost	Deal Number	Purchase Date	Trade Number	Number Contracts	Physical Volume	Strike Price	Strike Cost	Option Price	Option Cost	Pent Settle*	Pent Settle Cost	Over/(Under) Market	Premium Per Unit	Premium Cost	Total Cost
1	05/03/18	64479	11	110,000	\$ 3.0000	\$ 330,000	\$ 3.0000	\$ 330,000	\$ 3.3200	\$ 365,200	\$ (35,200)	\$ 0.0950	\$ 10,450	\$ 340,450	1	05/10/18	64773	18	180,000	\$ 3.2000	\$ 576,000	\$ 3.2000	\$ 576,000	\$ 3.3690	\$ 606,420	\$ (30,420)	\$ 0.0900	\$ 16,200	\$ 592,200	1	05/08/18	64615	11	110,000	\$ 3.5500	\$ 390,500	\$ 3.4390	\$ 378,290	\$ 3.4390	\$ 378,290	\$ -	\$ 0.0950	\$ 10,450	\$ 388,740
2	06/05/18	65873	11	110,000	\$ 3.1000	\$ 341,000	\$ 3.1000	\$ 341,000	\$ 3.3200	\$ 365,200	\$ (24,200)	\$ 0.1000	\$ 11,000	\$ 352,000	2	06/11/18	66008	18	180,000	\$ 3.3700	\$ 606,600	\$ 3.3690	\$ 606,420	\$ 3.3690	\$ 606,420	\$ -	\$ 0.1000	\$ 18,000	\$ 624,420	2	05/17/18	65168	10	100,000	\$ 3.6000	\$ 360,000	\$ 3.4390	\$ 343,900	\$ 3.4390	\$ 343,900	\$ -	\$ 0.0980	\$ 9,800	\$ 353,700
3	07/05/18	66730	11	110,000	\$ 2.9800	\$ 327,800	\$ 2.9800	\$ 327,800	\$ 3.3200	\$ 365,200	\$ (37,400)	\$ 0.1000	\$ 11,000	\$ 338,800	3	07/12/18	66970	17	170,000	\$ 3.2000	\$ 544,000	\$ 3.2000	\$ 544,000	\$ 3.3690	\$ 572,730	\$ (28,730)	\$ 0.0970	\$ 16,490	\$ 560,490	3	06/07/18	65942	20	200,000	\$ 3.7000	\$ 740,000	\$ 3.4390	\$ 687,800	\$ 3.4390	\$ 687,800	\$ -	\$ 0.0990	\$ 19,800	\$ 707,600
4	08/02/18	67749	11	110,000	\$ 2.8600	\$ 314,600	\$ 2.8600	\$ 314,600	\$ 3.3200	\$ 365,200	\$ (50,600)	\$ 0.0980	\$ 10,780	\$ 325,380	4	08/09/18	67901	17	170,000	\$ 3.3000	\$ 561,000	\$ 3.3000	\$ 561,000	\$ 3.3690	\$ 572,730	\$ (11,730)	\$ 0.0970	\$ 16,490	\$ 577,490	4	07/10/18	66845	19	190,000	\$ 3.5000	\$ 665,000	\$ 3.4390	\$ 653,410	\$ 3.4390	\$ 653,410	\$ -	\$ 0.0970	\$ 18,430	\$ 671,840
5	09/04/18	68447	11	110,000	\$ 2.8600	\$ 314,600	\$ 2.8600	\$ 314,600	\$ 3.3200	\$ 365,200	\$ (50,600)	\$ 0.1000	\$ 11,000	\$ 325,600	5	09/11/18	68647	17	170,000	\$ 2.9800	\$ 506,600	\$ 2.9800	\$ 506,600	\$ 3.3690	\$ 572,730	\$ (66,130)	\$ 0.0990	\$ 16,830	\$ 523,430	5	08/07/18	67854	19	190,000	\$ 3.5500	\$ 674,500	\$ 3.4390	\$ 653,410	\$ 3.4390	\$ 653,410	\$ -	\$ 0.1000	\$ 19,000	\$ 672,410
6	10/05/18	68569	10	100,000	\$ 3.2000	\$ 320,000	\$ 3.2000	\$ 320,000	\$ 3.3200	\$ 332,000	\$ (12,000)	\$ 0.0980	\$ 9,800	\$ 329,800	6	10/16/18	70127	17	170,000	\$ 3.5500	\$ 603,500	\$ 3.3690	\$ 572,730	\$ 3.3690	\$ 572,730	\$ -	\$ 0.0930	\$ 15,810	\$ 588,540	6	09/06/18	68508	19	190,000	\$ 3.4000	\$ 646,000	\$ 3.4000	\$ 646,000	\$ 3.4390	\$ 653,410	\$ (7,410)	\$ 0.0950	\$ 18,050	\$ 664,050
7														7															7	10/10/18	69729	19	190,000	\$ 4.1000	\$ 779,000	\$ 3.4390	\$ 653,410	\$ 3.4390	\$ 653,410	\$ -	\$ 0.0960	\$ 18,240	\$ 671,650	
8														8															8															
9														9															9															
10														10															10															
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15														15															15															
Total			65	650,000		\$ 1,948,000		\$ 1,948,000		\$ 2,158,000	\$ (210,000)		\$ 64,030	\$ 2,012,030	Total			104	1,040,000		\$ 3,397,700		\$ 3,366,750		\$ 3,503,760	\$ (137,010)		\$ 99,820	\$ 3,466,570	Total	Total		117	1,170,000		\$ 4,255,000		\$ 4,016,220		\$ 4,023,630	\$ (7,410)		\$ 113,770	\$ 4,129,990
						\$ 2,9969		\$ 2,9969		\$ 3,3200	\$ (0.3231)		\$ 0.0329	\$ 3.0954							\$ 3,397,700		\$ 3,2373		\$ 3,3690	\$ (0.1317)		\$ 0.0294	\$ 3,466,570						\$ 3,6368		\$ 3,4327		\$ 3,4390	\$ (0.0063)		\$ 0.0267	\$ 3,5299	
NNG	54	83.08%	54	540,000	\$ 2.9969	\$ 1,618,338	\$ 2.9969	\$ 1,618,338	\$ 3.3200	\$ 1,792,800	\$ (174,462)	\$ 0.0985	\$ 53,194	\$ 1,671,533	NNG	86	82.69%	86	860,000	\$ 3.2670	\$ 2,809,637	\$ 3.2373	\$ 2,784,043	\$ 3.3690	\$ 2,897,340	\$ (113,297)	\$ 0.0960	\$ 82,543	\$ 2,866,587	NNG	98	83.76%	98	980,000	\$ 3.6368	\$ 3,564,017	\$ 3.4327	\$ 3,364,013	\$ 3.4390	\$ 3,370,220	\$ (6,207)	\$ 0.0972	\$ 95,295	\$ 3,459,308
Other-Cons	11	16.92%	11	110,000	\$ 2.9969	\$ 329,662	\$ 2.9969	\$ 329,662	\$ 3.3200	\$ 365,200	\$ (35,538)	\$ 0.0985	\$ 10,836	\$ 340,497	Other-Cons	18	17.31%	18	180,000	\$ 3.2670	\$ 588,063	\$ 3.2373	\$ 582,707	\$ 3.3690	\$ 606,420	\$ (23,713)	\$ 0.0960	\$ 17,277	\$ 599,983	Other-Cons	19	16.24%	19	190,000	\$ 3.6368	\$ 690,983	\$ 3.4327	\$ 652,207	\$ 3.4390	\$ 653,410	\$ (1,203)	\$ 0.0972	\$ 18,475	\$ 670,682
Total	65	100.0%	65	650,000	\$ 2.9969	\$ 1,948,000	\$ 2.9969	\$ 1,948,000	\$ 3.3200	\$ 2,158,000	\$ (210,000)	\$ 0.0985	\$ 64,030	\$ 2,012,030	Total	104	100.0%	104	1,040,000	\$ 3.2670	\$ 3,397,700	\$ 3.2373	\$ 3,366,750	\$ 3.3690	\$ 3,503,760	\$ (137,010)	\$ 0.0960	\$ 99,820	\$ 3,466,570	Total	117	100.0%	117	1,170,000	\$ 3.6368	\$ 4,255,000	\$ 3.4327	\$ 4,016,220	\$ 3.4390	\$ 4,023,630	\$ (7,410)	\$ 0.0972	\$ 113,770	\$ 4,129,990

Feb-19															Mar-19															Total														
Deal Number	Purchase Date	Trade Number	Number Contracts	Physical Volume	Strike Price	Strike Cost	Option Price	Option Cost	Pent Settle*	Pent Settle Cost	Over/(Under) Market	Premium Per Unit	Premium Cost	Total Cost	Deal Number	Purchase Date	Trade Number	Number Contracts	Financial Volume	Strike Price	Strike Cost	Option Price	Option Cost	Pent Settle*	Pent Settle Cost	Over/(Under) Market	Premium Per Unit	Premium Cost	Total Cost	Deal Number	Purchase Date	%	Number Contracts	Physical Volume	Strike Price	Strike Cost	Option Price	Option Cost	Pent Settle*	Pent Settle Cost	Over/(Under) Market	Premium Per Unit	Premium Cost	Total Cost
1	05/15/18	65030	18	180,000	\$ 4.1500	\$ 747,000	\$ 3.3470	\$ 602,460	\$ 3.3470	\$ 602,460	\$ -	\$ 0.0930	\$ 16,740	\$ 619,200	1	05/17/18	65169	14	140,000	\$ 4.0500	\$ 567,000	\$ 3.1520	\$ 441,280	\$ 3.1520	\$ 441,280	\$ -	\$ 0.0980	\$ 13,720	\$ 455,000	1			72	720,000	\$ 3.6257	\$ 2,610,500	\$ 3.2334	\$ 2,328,030	\$ 3.3245	\$ 2,393,650	\$ (65,620)	\$ 0.0938	\$ 67,560	\$ 2,395,590
2	06/12/18	66049	17	170,000	\$ 4.1500	\$ 705,500	\$ 3.3470	\$ 568,990	\$ 3.3470	\$ 568,990	\$ -	\$ 0.0970	\$ 16,490	\$ 585,480	2	06/13/18	66145	14	140,000	\$ 4.3000	\$ 602,000	\$ 3.1520	\$ 441,280	\$ 3.1520	\$ 441,280	\$ -	\$ 0.1000	\$ 14,000	\$ 455,280	2			70	700,000	\$ 3.7359	\$ 2,615,100	\$ 3.2880	\$ 2,301,590	\$ 3.3226	\$ 2,325,790	\$ (24,200)	\$ 0.0990	\$ 69,290	\$ 2,370,880
3	07/17/18	67113	17	170,000	\$ 3.7500	\$ 637,500	\$ 3.3470	\$ 568,990	\$ 3.3470	\$ 568,990	\$ -	\$ 0.0940	\$ 15,980	\$ 584,970	3	07/19/18	67241	13	130,000	\$ 3.7000	\$ 481,000	\$ 3.1520	\$ 409,760	\$ 3.1520	\$ 409,760	\$ -	\$ 0.0990	\$ 12,870	\$ 422,630	3			78	780,000	\$ 3.5004	\$ 2,730,300	\$ 3.2543	\$ 2,538,350	\$ 3.3391	\$ 2,604,480	\$ (66,130)	\$ 0.0976	\$ 76,140	\$ 2,614,490
4	08/14/18	67971	17	170,000	\$ 4.0000	\$ 680,000	\$ 3.3470	\$ 568,990	\$ 3.3470	\$ 568,990	\$ -	\$ 0.0970	\$ 16,490	\$ 585,480	4	08/16/18	68019	13	130,000	\$ 4.0500	\$ 526,500	\$ 3.1520	\$ 409,760	\$ 3.1520	\$ 409,760	\$ -	\$ 0.0980	\$ 12,740	\$ 422,500	4			77	770,000	\$ 3.5677	\$ 2,747,100	\$ 3.2568	\$ 2,507,760	\$ 3.3378	\$ 2,570,090	\$ (62,330)	\$ 0.0973	\$ 74,930	\$ 2,582,690
5	09/13/18	68712	17	170,000	\$ 3.6500	\$ 620,500	\$ 3.3470	\$ 568,990	\$ 3.3470	\$ 568,990	\$ -	\$ 0.0980	\$ 16,660	\$ 585,650	5	09/18/18	68880	13	130,000	\$ 3.5700	\$ 464,100	\$ 3.1520	\$ 409,760	\$ 3.1520	\$ 409,760	\$ -	\$ 0.1000	\$ 13,000	\$ 422,760	5			77	770,000	\$ 3.3510	\$ 2,580,300	\$ 3.1862	\$ 2,453,360	\$ 3.3378	\$ 2,570,090	\$ (116,730)	\$ 0.0993	\$ 76,490	\$ 2,529,850
6	10/18/18	70366	16	160,000	\$ 4.2500	\$ 680,000	\$ 3.3470	\$ 535,520	\$ 3.3470	\$ 535,520	\$ -	\$ 0.1000	\$ 16,000	\$ 551,520	6	10/10/18	69730	13	130,000	\$ 4.0000	\$ 520,000	\$ 3.1520	\$ 409,760	\$ 3.1520	\$ 409,760	\$ -	\$ 0.1000	\$ 13,000	\$ 422,760	6			75	750,000	\$ 3.6927	\$ 2,769,500	\$ 3.3120	\$ 2,484,010	\$ 3.3379	\$ 2,503,420	\$ (19,410)	\$ 0.0969	\$ 72,660,	

**Attachment 12: Forecast Methodology for MERC Demand Entitlement Effective
November 1, 2018**

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) since January 1996. 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 since January 1996 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 DataMaxx then converted to HDD65 and AHDD65 in an Excel spreadsheet by MERC – Gas Supply. Temperature and 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 volumes 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 NORTHSORE 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 Worthington
- SENECA FOODS-ROCHESTER mapped to Rochester
- ENGINEERED POLYMERS mapped to Cloquet
- SANDSTONE FEDERAL CORRECTIONAL INSTITUTE mapped to Cloquet
- 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.

7. Albert Lea Telemetry Data

Order Point 11 of the Commission's April 28, 2016 Order in Docket Nos. G011/M-15-722, G011/M-15-723, and G011/M-15-724, required:

If the Commission approves MERC's general rate case proposal to consolidate its MERC-NNG and MERC-Albert Lea PGA areas into one PGA area, direct MERC to work with the Department in developing an appropriate Design Day regression analysis methodology for its subsequent demand entitlement petitions until MERC has three years daily interruptible data available for all its interruptible customers for the consolidated NNG PGA area.

MERC has worked with the Department to ensure its design day regression analysis for the NNG-PGA is reasonable. In particular, MERC has utilized daily telemetry data in its regression analysis for all of the MERC-NNG customers with adequate data available. MERC has completed installation of telemetry for its former MERC-Albert Lea customers and anticipates having sufficient data for these customers in approximately two years to utilize in MERC's

Design Day analysis. Until that time, MERC intends to utilize the same methodology it had utilized prior to having telemetry equipment for its other interruptible customers.

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-18-526

CERTIFICATE OF SERVICE

I, Kristin M. Stastny, hereby certify that on the 1st day of November, 2018, 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 November, 2018.

/s/ Kristin M. Stastny
Kristin M. Stastny

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Michael	Ahern	ahern.michael@dorsey.com	Dorsey & Whitney, LLP	50 S 6th St Ste 1500 Minneapolis, MN 554021498	Electronic Service	No	OFF_SL_18-526_M-18-526
Michael	Auger	N/A	U S Energy Services, Inc.	Suite 1200 605 Highway 169 N Minneapolis, MN 554416531	Paper Service	No	OFF_SL_18-526_M-18-526
Elizabeth	Brama	ebrama@briggs.com	Briggs and Morgan	2200 IDS Center 80 South 8th Street Minneapolis, MN 55402	Electronic Service	No	OFF_SL_18-526_M-18-526
Jeanne	Cochran	Jeanne.Cochran@state.mn.us	Office of Administrative Hearings	P.O. Box 64620 St. Paul, MN 55164-0620	Electronic Service	No	OFF_SL_18-526_M-18-526
Generic Notice	Commerce Attorneys	commerce.attorneys@ag.state.mn.us	Office of the Attorney General-DOC	445 Minnesota Street Suite 1800 St. Paul, MN 55101	Electronic Service	Yes	OFF_SL_18-526_M-18-526
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