



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 Consolidated
System – November 1 Update

Docket No. G011/M-18-527

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-Consolidated purchased gas adjustment ("PGA"). 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 changes in the affected schedules.

As of the date of this filing, MERC has completed its purchases of future contracts and call options for the 2018-19 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.

MERC has updated the demand costs for Centra pipeline capacity in Attachment 4 (page 2) and Attachment 8, for rates effective November 1, 2018. These updated rates were not available at the time of MERC's August 1, 2018 Demand Entitlement

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

filing. Additionally, Attachment 8 reflects a correction to the historic Centra volumes for 2017-2018.

Furthermore, MERC entered into an ANR upstream contract that facilitates withdrawals from ANR storage during the winter months effective November 1, 2018, which has been added to Attachments 3, 4 (page 2), 7, and 8. This contract had not been reflected in the August 1, 2018, filing. MERC also corrected for a formula error in Attachment 8 for ANR Storage. Finally, rate comparisons in Attachment 4, page 1, have been updated to MERC's October 1, 2018, Purchased Gas Adjustment rates.

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-Consolidated 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 Consolidated 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
(~~920654~~) 433322-29268965

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 18-527.

ATTACHMENT B

**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
Consolidated System

Docket No. G011/M-18-~~527~~

SUMMARY OF FILING

Pursuant to Minnesota Rule 7825.2910, subpart 2 (Filing Upon Change in Demand), Minnesota Energy Resources Corporation – Consolidated (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 Consolidated 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**

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

Docket No. G011/M-18-~~527~~

FILING UPON CHANGE IN DEMAND

Pursuant to Minnesota Rule 7825.2910, subpart 2 (Filing Upon Change in Demand), Minnesota Energy Resources Corporation – Consolidated (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-Consolidated customers served off Centra Pipeline, Viking Gas Transmission, and Great Lakes Gas Transmission (collectively the “Consolidated” pipelines).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. |

¹ MERC also serves certain of its Minnesota customers off the Northern Natural Gas (“NNG”) system. MERC requests approval of a demand entitlement change for the 2017-2018 heating season for its MERC-NNG PGA in a separate docket.

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

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: ~~August~~November
1, 2018

Respectfully submitted,
MINNESOTA ENERGY RESOURCES
CORPORATION

By: /s/ ~~Amber S. Lee~~Seth DeMerritt
~~Amber S. Lee~~Seth DeMerritt
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STATE OF MINNESOTA
BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Nancy Lange
Dan Lipschultz
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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
Consolidated System

Docket No. G011/M-18-527

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

I. Introduction

Pursuant to Minnesota Rule 7825.2910, subpart 2 (Filing Upon Change in Demand), Minnesota Energy Resources Corporation - Consolidated (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-Consolidated customers served off Centra Pipeline, Viking Gas Transmission, and Great Lakes Gas Transmission (the “Consolidated” pipelines). MERC requests that the Commission approve the requested changes to be recovered in the Purchased Gas Adjustment (PGA) effective on 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:

- Attachments 3, 4 page 2, 7, and 8 have been revised to incorporate an ANR upstream contract that facilitates withdrawals from ANR storage during the winter months. This contract is effective November 1, 2018.
- Attachment 4, page 1, has been updated to reflect a comparison to MERC's October 1, 2018, purchased gas adjustment rates.
- Attachment 4, page 2 and Attachment 8 have been updated to reflect updated demand costs for the Centra pipeline effective November 1, 2018.
- Attachment 8 has been revised to correct for a formula error for ANR Storage and to correct the Centra volumes for the historic 2017-2018 period.
- 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, physical 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. No other changes have been made to the MERC-Consolidated Demand Entitlement.

II. Discussion

A. MERC's Consolidated 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 Consolidated Design-Day requirement has increased by 204 dekatherms (dth) since November 1, 2017.

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

	Reserve Margin 2017-2018 Heating Season	Reserve Margin 2016-2017 Heating Season	Change
Consolidated	2.62%	2.99%	-0.37%

For the Demand Entitlement filing effective November 1, 2018, the total Design-Day requirement for MERC – Consolidated is 56,470 dth (Attachment 1). The difference between the total Design-Day requirement and total Design-Day capacity results in a 2.62% reserve margin (Attachment 3).

As required by Order Point 9 of the Commission's Order in Docket No. G011/M-15-722, Attachment 3 reflects separate summer and winter demand entitlements for MERC-Consolidated.

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.

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

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

Commission that the appropriate customer group is paying for any balancing charges or penalties. Additionally, in Docket No. G999/AA-12-756, by Order dated November 14, 2013, the Commission ordered that “prospectively, all regulated natural gas utilities shall recover balancing service costs, and shall credit the utility’s penalty revenues and the pipeline’s revenue credits, to the commodity portion of the PGA effective with the earliest true-up filing (for revenues) or the earliest monthly PGA (for costs) that can reasonably be implemented.”

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

D. MERC’s Proposed Consolidated 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 Consolidated 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

MERC-Consolidated will maintain the same deliverability levels as 2017-2018; there are no changes to the level of capacity.

2. Other Demand Entitlement Changes

MERC entered into a four year contract for natural gas storage with ANR Pipeline Storage effective April 1, 2018, to replace the Company’s previous contract for natural gas storage with Niska Gas Storage. MERC submitted a request for approval of its ANR Storage Contract on January 8, 2018, in Docket No. G011/M-17-587, which was approved by the

Commission by Order dated May 25, 2018. Effective November 1, 2018, MERC has entered into a four year contract for ANR Pipeline transportation services to move gas from ANR Storage to the interconnect with Great Lakes. The impacts of the ANR storage contract, and its associated transportation contract are reflected in Attachments 4 (page 3 of 3), 7, and 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 Consolidated 2018-2019 Winter Portfolio Hedging Plans - Minnesota Energy Resources Corporation for GLGT, VGT, and Centra gas supply purchases are shown on Attachment 6. MERC's hedging strategy covers up to 60% of normal winter volumes; up to 30% through physical storage; and 30% through financial instruments. 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 ANR storage WACOG to be \$2.~~67478~~102/dth. MERC has purchased call options at an average strike price of \$3.~~60175~~965/dth, which means if NYMEX contract(s) settle above that price, the options are exercised and MERC customer gas cost is capped at the average strike price. Please see Attachment 11, page 3 of 3. The remaining 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 in Attachment 4.

G. Impacts of Telemetry

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

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

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.

| DATED: ~~November~~ August 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: (~~920~~ 651) ~~433~~ 322-~~292~~ 689 65

MINNESOTA ENERGY RESOURCES - Consolidated

DESIGN-DAY DEMAND SUMMARY November 1, 2018

Design Day Requirement		56,470
Total Peak Day Entitlement		57,949
2017/18 Firm Peak Day Actual Sendout	12/30/2017	46,438
Firm Annual Throughput - Minnesota		4,825,697
No. of Firm Customers		35,653
Department Load Factor Calculation		28.47%

MINNESOTA ENERGY RESOURCES - Consolidated

MINNESOTA DESIGN DAY REQUIREMENTS

November 1, 2018

HDD

Pipeline Group	2017/18 Customer Count	1/20 Design DDD	Regression Factors		Regression Total	Add Adjustment	1/20 Requirements Regression Load	Estimated Contract Demand Units	Total
			Intercept	Slope					

VGT

Peak		109	65	119	16,122	1,018	17,140	7	17,147
Off Peak		57	65	119	8,963	1,018	9,981	7	9,988

GLGT

Peak		107	500	222	28,107	1,976	30,083	103	30,186
Off Peak		57	500	222	15,600	1,976	17,576	103	17,679

Centra

Peak		107	144	67	8,663	474	9,137	0	9,137
Off Peak		57	144	67	4,685	474	5,159	0	5,159

Total Consolidated

Peak	35,653	107	709	408	52,892	3,468	56,360	110	56,470
Off Peak	35,653	57	709	408	29,248	3,468	32,716	110	32,826

MINNESOTA ENERGY RESOURCES - Consolidated

DESIGN-DAY DEMAND PER CUSTOMER

November 1, 2018

<u>Heating Season</u>	<u>No. of Firm Customers</u>	<u>Design Day Requirements</u>	<u>MMBtu /Customer /Day</u>
18/19	35,653	56,470	1.58
17/18	35,965	56,266	1.56
16/17	35,499	55,528	1.56
15/16	34,799	53,075	1.53
14/15	34,397	48,706	1.42
13/14	34,007	50,048	1.47
12/13	33,630	52,289	1.55
11/12	33,384	50,366	1.51
10/11	33,399	50,779	1.52
09/10	34,053	53,931	1.58

MINNESOTA ENERGY RESOURCES - Consolidated

SUMMER/WINTER USAGE - Dth PROJECTED 12 MONTHS ENDING JUNE 2019 Consolidated

<u>Class</u>	<u>Summer Apr-Oct</u>	<u>Winter Nov-Mar</u>	<u>Total</u>
GS	1,296,215	3,505,000	4,801,214
SVI	140,899	324,638	465,537
SVJ	8,548	15,935	24,483
LVI	171,057	210,141	381,197
LVJ	0	0	0
SLV	0	0	0
IS	0	0	0
Total	<u>1,616,718</u>	<u>4,055,714</u>	<u>5,672,431</u>

MINNESOTA ENERGY RESOURCES - Consolidated

ENTITLEMENT LEVELS

November 1, 2018

<u>Capacity Type</u>		<i>Summer</i>			<i>April/October</i>			<i>Winter</i>		
		<u>2017/18</u> <u>MMBtu</u>	<u>Change</u> <u>MMBtu</u>	<u>Proposed</u> <u>MMBtu</u>	<u>2017/18</u> <u>MMBtu</u>	<u>Change</u> <u>MMBtu</u>	<u>Proposed</u> <u>MMBtu</u>	<u>2017/18</u> <u>MMBtu</u>	<u>Change</u> <u>MMBtu</u>	<u>Proposed</u> <u>MMBtu</u>
FT Western Zone	FT19131	10,130	0	10,130	10,130	0	10,130	10,130	(10,130)	0
FT Western Zone	FT18528	12,600	0	12,600	12,600	0	12,600	12,600	0	12,600
FT Western Zone (5)	FT18528 (5)	0	0	0	0	0	0	3,728	0	3,728
FT Western Zone (5)	FT19129 (5)	0	0	0	0	0	0	4,900	10,130	15,030
ANR (5) *	130504	0	0	0	0	0	0	0	0	15,000
FT-A ZONE 1 - 1	AF0012	14,493	0	14,493	14,493	0	14,493	15,591	0	15,591
FT-A ZONE 1 - 1	AF0321	0	0	0	0	0	0	1,500	0	1,500
CENTRA FT-1		9,500	0	9,500	9,500	0	9,500	9,500	0	9,500
Total Entitlement		46,723	0	46,723	46,723	0	46,723	57,949	0	57,949
Forecasted Design Day-Adjusted					32,814	12	32,826	56,266	204	56,470
Capacity Surplus/Shortage					13,909	(12)	13,897	1,683	(204)	1,479
Reserve Margin					42.39%	-0.05%	42.34%	2.99%	-0.37%	2.62%

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

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:				86	Dth				
Commodity Cost	\$3.1575	\$2.6791	\$2.9088	\$3.2575	\$3.3664	6.62%	25.65%	3.34%	\$0.1089
Demand Cost	\$0.7415	\$0.7996	\$0.7345	\$0.6908	\$0.8229	10.98%	2.91%	19.12%	\$0.1321
Commodity Margin	\$2.6284	\$2.4116	\$2.4116	\$2.5727	\$2.5727	-2.12%	6.68%	0.00%	\$0.0000
Total Cost of Gas	\$6.5274	\$5.8903	\$6.0549	\$6.5210	\$6.7620	3.59%	14.80%	3.70%	\$0.2410
Avg Annual Cost	\$561.36	\$506.57	\$520.72	\$560.81	\$581.53	3.59%	14.80%	3.70%	\$20.73
Effect of proposed commodity change on average annual bills:									\$9.37
Effect of proposed demand change on average annual bills:									\$11.36
2) Large General Service: Avg. Annual Use:				624	Dth				
Commodity Cost	\$3.1575	\$2.6791	\$2.9088	\$3.2575	\$3.3664	6.62%	25.65%	3.34%	\$0.1089
Demand Cost	\$0.7415	\$0.7996	\$0.7345	\$0.6908	\$0.8229	10.98%	2.91%	19.12%	\$0.1321
Commodity Margin	\$1.8403	\$1.6885	\$1.6885	\$1.8013	\$1.8013	-2.12%	6.68%	0.00%	\$0.0000
Total Cost of Gas	\$5.7393	\$5.1672	\$5.3318	\$5.7496	\$5.9906	4.38%	15.94%	4.19%	\$0.2410
Avg Annual Cost	\$3,578.45	\$3,221.75	\$3,324.38	\$3,584.88	\$3,735.15	4.38%	15.94%	4.19%	\$150.28
Effect of proposed commodity change on average annual bills:									\$67.91
Effect of proposed demand change on average annual bills:									\$82.36
3) SV Interruptible Service: Avg. Annual Use:				7,637	Dth				
Commodity Cost	\$3.1575	\$2.6791	\$2.9088	\$3.3558	\$3.3664	6.62%	25.65%	0.32%	\$0.0106
Commodity Margin	\$1.0616	\$0.9740	\$0.9740	\$1.0391	\$1.0391	-2.12%	6.68%	0.00%	\$0.0000
Total Cost of Gas	\$4.2191	\$3.6531	\$3.8828	\$4.3949	\$4.4055	4.42%	20.60%	0.24%	\$0.0106
Avg Annual Cost	\$32,222.53	\$27,899.82	\$29,654.11	\$33,565.17	\$33,646.28	4.42%	20.60%	0.24%	\$81.12
Effect of proposed commodity change on average annual bills:									\$81.12
4) LV Interruptible Service: Avg. Annual Use:				71,526	Dth				
Commodity Cost	\$3.1575	\$2.6791	\$2.9088	\$3.3558	\$3.3664	6.62%	25.65%	0.32%	\$0.0106
Commodity Margin	\$0.5808	\$0.5329	\$0.5329	\$0.5685	\$0.5685	-2.12%	6.68%	0.00%	\$0.0000
Total Cost of Gas	\$3.7383	\$3.2120	\$3.4417	\$3.9243	\$3.9349	5.26%	22.51%	0.27%	\$0.0106
Avg Annual Cost	\$267,386.77	\$229,742.48	\$246,172.07	\$280,690.66	\$281,450.33	5.26%	22.51%	0.27%	\$759.67
Effect of proposed commodity change on average annual bills:									\$759.67

Note: Average Annual Average based on Consolidated Annual Automatic Adjustment Report in Docket No. E,G999/AA-17-493

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

RATE IMPACT OF THE PROPOSED DEMAND CHANGE

NOVEMBER 1, 2018

DEMAND								
Contract Type		Season	Monthly Entitlement (Dth)	Months	Rate (\$/Dth)	Contract Costs	Rate Case Sales (therms)	\$/therm
Viking (VGT)								
FT-A ZONE 1 - 1	AF0012	Annual	14,493	12	4.3706	\$ 760,117	48,386,934	\$0.01571
FT-A ZONE 1 - 1	AF0012	Winter	1,098	3	4.3706	\$ 14,397	48,386,934	\$0.00030
FT-A ZONE 1 - 1	AF0321	Winter	1,500	3	4.3706	\$ 19,668	48,386,934	\$0.00041
VGT Demand						\$ 794,182	48,386,934	\$0.01641
Great Lakes (GLGT)								
FT Western Zone	FT19131	Summer	10,130	7	\$2.8100	\$ 199,257	48,386,934	\$0.00412
FT Western Zone	FT18528	Annual	12,600	12	\$2.8100	\$ 424,872	48,386,934	\$0.00878
FT Western Zone	FT18528 (5)	Winter	3,728	5	\$2.8100	\$ 52,378	48,386,934	\$0.00108
FT Eastern to Western Zone	FT19129 (5)	Winter	15,030	5	\$6.1000	\$ 458,415	48,386,934	\$0.00947
ANR Upstream	130504	Winter	15,000	5	\$0.9110	\$ 68,325	48,386,934	\$0.00141
GLGT Demand						\$ 1,203,247	48,386,934	\$0.02487
Centra								
CENTRA TRANSMISSION	Annual	9,500	12	\$14.1070	\$ 1,608,198	48,386,934	\$0.03324	
CENTRA MINNESOTA PIPELINES	Annual	9,500	12	\$3.2990	\$ 376,086	48,386,934	\$0.00777	
Centra Demand						\$ 1,984,284	48,386,934	\$0.04101
MERC-Consolidated DEMAND - \$/therm						\$ 3,981,713		\$0.08229
FOR JOINT RATE DEMAND				48,386,934		Annual Firm Sales in therms		
MERC-Consolidated Firm (GS) Sales as filed in Docket No. G011/MR-17-564								
Viking (VGT)								
FT-A ZONE 1 - 1	Annual	14,493	12	173,916				
FT-A ZONE 1 - 1	Winter	1,098	3	3,294				
FT-A ZONE 1 - 1	Winter	1,500	3	4,500				
Great Lakes (GLGT)								
FT Western Zone	Summer	10,130	7	70,910				
FT Western Zone	Annual	12,600	12	151,200				
FT Western Zone	Winter	3,728	5	18,640				
FT Eastern to Western Zone	Winter	15,030	5	75,150				
ANR Upstream	Winter	15,000	5	75,000				
Centra								
CENTRA TRANSMISSION	Annual	9,500	12	114,000				
CENTRA MINNESOTA PIPELINES	Annual	9,500	12	114,000				
Total Demand Cost		\$	3,981,713					
Total Demand Weighted Vol in therms			6,866,100					
Total Joint Demand Rate \$/therm				\$0.57991	/therm			

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

RATE IMPACT OF THE PROPOSED DEMAND CHANGE

PRESENT AVERAGE COST OF GAS COMMODITY

NOVEMBER 1, 2018

WACOG		Rate	Annual Dth	Call Option Premium	Physical Forward Start Premium	Balancing Service	Total Annual Cost	System Cost/therm	Storage Comm Rate	Total Comm Rate	REFERENCE	Effective
VGT												
GAS COST		\$3.12825										
FUEL	1.49%	\$0.01765										
COMMODITY TRANSPORTATION		\$0.01160										
GRI		\$0.00000										
ACA		\$0.00130										
VGT Commodity		\$3.15880	2,184,765	\$27,645	\$21,140	\$89,580	\$7,039,601	\$0.12160				
GLGT												
GAS COST		\$3.12825										
FUEL	1.383%	\$0.02536										
COMMODITY TRANSPORTATION		\$0.00288										
GRI		\$0.00000										
ACA		\$0.00130										
GLGT Commodity		\$3.15779	2,257,043	\$34,849	\$3,775	\$0	\$7,165,892	\$0.12378				
CENTRA												
CENTRA TRANSMISSION (\$Cdn/103M3)		1.062										
Conversion		\$0.02260										
Abandonment Toll		\$0.27454										
GAS COSTS		\$3.12825										
CUSTOMS FEE		\$0.00030										
CENTRA Commodity		\$3.42569	1,347,568	\$14,370	\$69,960	\$54,000	\$4,754,683	\$0.08213				
Consolidated WACOG w/Premium & Balancing			5,789,376	\$76,864	\$94,875	\$143,580	\$18,960,175	\$0.32750	\$0.00914			
Total Annual Sales in therms			57,893,760									
										\$0.33664 Total Consolidated WACOG-\$/therm		

Balancing Service						
Pipeline	Description	Season	Monthly Entitlement (Dth)	Months	Rate (\$/Dth)	Contract Costs
VGT	Balancing Agreement	Annual	7,465	12	\$1.0000	\$89,580
GLGT	---		0	0	\$0.0000	\$0
Centra	Union Balancing	Annual	10,000	12	\$0.4500	\$54,000

Storage Service							
	Season	Monthly Entitlement (Dth)	Months	Rate (\$/Dth)	Contract Costs	Annual Sales (therms)	Rate (\$/therm)
ANR Pipeline Storage	Annual	756,100	1	\$ 0.7000	\$529,270	57,893,760	\$0.00914
					\$529,270	57,893,760	\$0.00914

Total Commodity Cost:

\$0.33664

* Per Docket No. G-007/M-07-1402-05 dated August 6th, 2014, storage demand charges will be allocated through the commodity charge effective 11/01/2014.

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

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
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	260	05/15/18	558	05/17/18	551	05/08/18	514	05/10/18	113	60,603
2	05/03/18	52	06/12/18	502	06/13/18	501	06/07/18	457	05/10/18	339	55,690
3	06/05/18	313	07/17/18	502	07/19/18	501	06/07/18	57	06/11/18	395	54,052
4	07/05/18	313	08/14/18	447	08/16/18	50	07/10/18	457	07/12/18	395	49,138
5	08/02/18	156	09/13/18	335	08/16/18	400	08/07/18	457	08/09/18	339	50,776
6	08/02/18	104	09/13/18	112	09/18/18	451	09/06/18	457	09/11/18	339	44,224
7	09/04/18	260	10/18/18	447	10/16/18	451	10/10/18	457	10/16/18	339	58,966
8	10/05/18	208									6,552
9											
10											
Total		1,667		2,903		2,903		2,857		2,258	380,000

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	05/03/18	621	05/10/18	1,005	05/08/18	576	05/15/18	1,071	05/17/18	790	122,132
2	06/05/18	621	06/11/18	1,005	05/17/18	524	06/12/18	1,012	06/13/18	790	118,842
3	07/05/18	621	07/12/18	949	06/07/18	1,048	07/17/18	1,012	07/19/18	734	131,600
4	08/02/18	621	08/09/18	949	07/10/18	995	08/14/18	1,012	08/16/18	734	129,976
5	09/04/18	621	09/11/18	949	08/07/18	995	09/13/18	1,012	09/18/18	734	129,976
6	10/05/18	564	10/16/18	949	09/06/18	995	10/18/18	952	10/10/18	734	126,618
7					10/10/18	995					30,855
8											-
Total		3,667		5,806		6,129		6,071		4,516	790,000

Premium - Call Option (Monthly Cost)

	November		December		January		February		March		Total	
	Option Premium	Premium Cost	Option Premium	Premium Cost	Option Premium	Premium Cost	Option Premium	Premium Cost	Option Premium	Premium Cost	Option Premium	Premium Cost
1	\$ 0.0950	\$ 1,768	\$ 0.0900	\$ 2,804	\$ 0.0950	\$ 1,697	\$ 0.0930	\$ 2,790	\$ 0.0980	\$ 2,401	\$ 0.0938	\$ 11,460
2	\$ 0.1000	\$ 1,862	\$ 0.1000	\$ 3,115	\$ 0.0980	\$ 1,591	\$ 0.0970	\$ 2,748	\$ 0.1000	\$ 2,450	\$ 0.0990	\$ 11,767
3	\$ 0.1000	\$ 1,862	\$ 0.0970	\$ 2,854	\$ 0.0990	\$ 3,215	\$ 0.0940	\$ 2,663	\$ 0.0990	\$ 2,252	\$ 0.0976	\$ 12,847
4	\$ 0.0980	\$ 1,824	\$ 0.0970	\$ 2,854	\$ 0.0970	\$ 2,993	\$ 0.0970	\$ 2,748	\$ 0.0980	\$ 2,230	\$ 0.0973	\$ 12,649
5	\$ 0.1000	\$ 1,862	\$ 0.0990	\$ 2,913	\$ 0.1000	\$ 3,085	\$ 0.0980	\$ 2,777	\$ 0.1000	\$ 2,275	\$ 0.0993	\$ 12,912
6	\$ 0.0980	\$ 1,658	\$ 0.0930	\$ 2,736	\$ 0.0950	\$ 2,931	\$ 0.1000	\$ 2,667	\$ 0.1000	\$ 2,275	\$ 0.0969	\$ 12,268
7	\$ -	\$ -	\$ -	\$ -	\$ 0.0960	\$ 2,962	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,962
8	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total	\$ 0.0985	\$ 10,836	\$ 0.0960	\$ 17,277	\$ 0.0972	\$ 18,475	\$ 0.0964	\$ 16,393	\$ 0.0992	\$ 13,883	\$ 0.0973	\$ 76,864

Units - Collar Floor (put)

No Puts were purchased.

MINNESOTA ENERGY RESOURCES - CONSOLIDATED
18/19 Winter Portfolio Plan - MERC Hedging Plan

10000 Contract Size

System	Purchase Month	Nov-18		Dec-18		Jan-19		Feb-19		Mar-19		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			586,442		906,950		994,551		853,214		714,557		4,055,714	4,055,714
Daily Average			19,548		29,256		32,082		30,472		23,050		26,682	
10%	Futures		58,644		90,695		99,455		85,321		71,456		405,571	
20%	Call		117,288		181,390		198,910		170,643		142,911		811,143	
0%	Storage		0		0		0		0		0		0	
70%	Index		410,509		634,865		696,185		597,250		500,190		2,839,000	
Contracts	May-18	1	10,000	2	20,000	2	20,000	2	20,000	2	20,000	9	90,000	
	Jun-18	1	10,000	2	20,000	2	20,000	2	20,000	1	10,000	8	80,000	
	Jul-18	1	10,000	2	20,000	2	20,000	1	10,000	1	10,000	7	70,000	
	Aug-18	1	10,000	1	10,000	1	10,000	1	10,000	1	10,000	5	50,000	
	Sep-18	1	10,000	1	10,000	1	10,000	1	10,000	1	10,000	5	50,000	
	Oct-18	0	0	1	10,000	1	10,000	1	10,000	1	10,000	4	40,000	
	Total	5	50,000	9	90,000	9	90,000	8	80,000	7	70,000	38	380,000	9.37%
Call Options	May-18	2	20,000	3	30,000	4	40,000	3	30,000	3	30,000	15	150,000	
	Jun-18	2	20,000	3	30,000	3	30,000	3	30,000	3	30,000	14	140,000	
	Jul-18	2	20,000	3	30,000	3	30,000	3	30,000	2	20,000	13	130,000	
	Aug-18	2	20,000	3	30,000	3	30,000	3	30,000	2	20,000	13	130,000	
	Sep-18	2	20,000	3	30,000	3	30,000	3	30,000	2	20,000	13	130,000	
	Oct-18	1	10,000	3	30,000	3	30,000	2	20,000	2	20,000	11	110,000	
	Total	11	110,000	18	180,000	19	190,000	17	170,000	14	140,000	79	790,000	19.48%
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		160,000		270,000		280,000		250,000		210,000		1,170,000	28.85%
Physical Hedges			0		0		0		0		0		0	
Storage			96,000		189,100		189,100		196,000		85,900		756,100	18.64%
Prepaid Obl			0		0		0		0		0		0	0.00%
			43.65%		50.62%		47.17%		52.27%		41.41%		47.49%	47.49%
Term Index	Aug-18	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
	Sep-18	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
	Oct-18	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Total NNG MN														
Contracts													380,000	9.37%
Call Options													790,000	19.48%
Costing Collar													0	0.00%
Storage													756,100	18.64%
Prepaid Obl													0	0.00%
Term Index													0	0.00%
Month/Daily													2,129,614	52.51%
Total													4,055,714	100.00%

NOTE:

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

**WINTER PLAN - CONSOLIDATED
NOVEMBER 2018 THROUGH MARCH 2019**

PHYSICAL FIXED PRICE HEDGES				Nov	Dec	Daily Volumes			Monthly Total
Deal #	Trigger Locked	Trigger Exercised	Receipt Point			Jan	Feb	Mar	
No Physical Fixed Price Hedges									-
Total Actual Fixed/Option Physical				-	-	-	-	-	-
INDEX									
Contract Number	Date	Receipt Point	Nov	Dec	Jan	Feb	Mar	Total	
49022	4/28/2017	VGT Emerson 1	4,000	4,000	4,000	4,000	4,000	604,000	
49052	4/28/2017	VGT Emerson 1		4,000	4,000	4,000		360,000	
49053	4/28/2017	GLGT Emerson 2	7,500	7,500	7,500	7,500	7,500	1,132,500	
49054	4/28/2017	GLGT Emerson 2		3,500	3,500	3,500		315,000	
49021	4/28/2017	CTHI-Spruce		1,500	1,500	1,500		135,000	
50650	4/28/2017	CTHI-Spruce	3,500	3,500	3,500	3,500	3,500	528,500	
Total Actual Seasonal Index			15,000	24,000	24,000	24,000	15,000	3,075,000	
GAS DAILY PACKAGES									
Physical Call Option	49059	4/28/2017	VGT Emerson 1	2,000	2,000	2,000	2,000	2,000	
Physical Call Option	49058	4/28/2017	VGT Emerson 1		5,000	5,000	5,000		
Physical Call Option	49056	5/1/2017	GLGT Emerson 2	7,000	7,000	7,000	7,000	7,000	
Physical Call Option	49057	5/1/2017	GLGT Emerson 2		6,000	6,000	6,000		
STORAGE									
Injection Month	Contract # ANR	Total Volume	Volume Injected						
May - balance forward	209,962	209,962							
June	103,260	103,260							
July	106,702	106,702							
August	106,702	106,702							
Sept	122,772	122,772							
Oct	106,702	106,702							
Total	756,100	756,100							

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

	2014-2015 Consolidated GS	2015-2016 Consolidated GS	2016-2017 Consolidated GS	2017-2018 Consolidated GS	2018-2019 Consolidated GS	Proposed Change
Viking Gas Transmission (VGT)						
FT-A ZONE 1 - 1	14,493	14,493	14,493	14,493	14,493	0
FT-A ZONE 1 - 1 Winter Only	1,098	1,098	1,098	1,098	1,098	0
FA-A ZONE 1 - 1 Winter Only	1,000	0	0	1,500	1,500	0
Great Lakes Gas Transmission (GLGT)						
FT Western Zone- Summer Only	10,130	10,130	10,130	10,130	10,130	0
FT Western Zone- Annual	12,600	12,600	12,600	12,600	12,600	0
FT Western Zone- Winter Only	3,728	3,728	3,728	3,728	3,728	0
FT Western Zone- Winter Only*	13,430	13,480	13,480	15,030	15,030	0
ANR Upstream	0	0	0	0	15,000	15,000
Centra Transmission Holding/Centra Minnesota Pipelines (CTHI/CPMI)						
Centra FT-1	9,100	9,500	9,500	9,500	9,500	0
Total VGT Transportation	15,591	15,591	15,591	17,091	17,091	0
Total GLGT Transportation	26,458	29,808	29,808	31,358	31,358	0
Total CTHI/CPMI Transportation	9,100	9,500	9,500	9,500	9,500	0
Total Transportation	51,149	54,899	54,899	57,949	57,949	0
Total Seasonal Transportation	9,126	8,176	8,176	11,226	11,226	0
Total Seasonal Transportation %	17.84%	14.89%	14.89%	19.37%	19.37%	0.00%
<u>Other Entitlements not included in Peak Day Deliverability</u>						
AECO Storage	947,820	947,820	947,820	0	0	0
AECO/Emerson Swap	940,428	955,255	758,254	0	0	0
ANR Storage	0	0	0	0	756,100	756,100

*GLGT Summer only capacity was not held previously, so the highlighted values have had 10,130 dth/day added for consistent comparison with the new contract structure. GLGT capacity has not changed. See Attachment 3 for additional detail.

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

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

	2017/18 Entitlements	2018/19 Entitlements	Entitlement Change	2018/19 Rate	Months	2017/18 Total Annual Cost	2018/19 Total Annual Cost	Total Annual Cost Change
Costs Assigned in Demand Charge								
<u>Viking Pipeline</u>								
FT-A ZONE 1 - 1AF0012	14,493	14,493	0	\$ 4.3706	12	\$760,117	\$760,117	\$0
FT-A ZONE 1 - 1AF0012	1,098	1,098	0	\$ 4.3706	3	\$14,397	\$14,397	\$0
FT-A ZONE 1 - 1AF0321	0	1,500	1,500	\$ 4.3706	3	\$19,668	\$19,668	\$0
<u>GLGTPipeline</u>								
FT Western ZoneFT19131	10,130	10,130	0	\$ 2.8100	7	\$467,884	\$199,257	-\$268,627
FT Western ZoneFT18528	12,600	12,600	0	\$ 2.8100	12	\$581,969	\$424,872	-\$157,097
FT Western ZoneFT18528 (5)	3,728	3,728	0	\$ 2.8100	5	\$71,745	\$52,378	-\$19,367
FT Eastern to Western ZoneFT19129 (5)	3,350	15,030	11,680	\$ 6.1000	5	\$94,301	\$458,415	\$364,114
ANR Upstream130504	0	15,000	15,000	\$ 0.9110	5	\$0	\$68,325	\$68,325
<u>CENTRA Pipeline</u>								
CENTRA TRANSMISSION	9,500	9,500	0	\$ 14.1070	12	\$1,269,253	\$1,608,198	\$338,945
CENTRA MINNESOTA PIPELINES	9,500	9,500	0	\$ 3.2990	12	\$376,086	\$376,086	\$0
Total Costs Assigned to Demand Charge						\$3,655,420	\$3,981,713	\$326,293
Costs Assigned in Commodity Charge								
<u>Storage Service</u>								
Niska Storage (AECO)	947,820	0	-947,820	\$ -	0	\$244,998	\$0	-\$244,998
Niska Storage Assignment	947,820	0	-947,820	\$ -	0	-\$147,798	\$0	\$147,798
ANR Pipeline Storage	0	756,100	756,100	\$ 0.7000	12	\$309,772	\$529,270	\$219,498
<u>Balancing</u>								
VGT Balancing Agreement	7,465	7,465	0	\$ 1.0000	12	\$89,580	\$89,580	\$0
Union Balancing	4,453	10,000	5,547	\$ 0.4500	12	\$54,000	\$54,000	\$0
Physical Forward Start Premium						\$71,485	\$94,875	\$23,390
Call Options Premium						\$152,271	\$76,864	-\$75,407
Total Costs Assigned to Commodity Charge						\$774,308	\$844,589	\$70,281

MINNESOTA ENERGY RESOURCES - Consolidated

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

Design Day:

Base	709
Variable	408

Date	28.53% Bemidji Adjusted HDD	13.34% Cloquet Adjusted HDD	35.13% Fargo Adjusted HDD	23.00% Intl. Falls Adjusted HDD	100.00% Weighted Adjusted HDD	Actual Total Through- Put *	Estimated Firm Through- Put **
7/1/17	7	4	3	11	6	20,904	3,160
7/2/17	6	5	0	8	4	14,745	2,472
7/3/17	0	2	0	0	0	9,665	796
7/4/17	0	0	0	0	0	9,921	709
7/5/17	0	0	0	0	0	15,195	709
7/6/17	0	0	0	0	0	18,682	709
7/7/17	4	4	0	5	3	20,046	1,782
7/8/17	0	0	0	1	0	16,160	756
7/9/17	0	2	0	0	0	17,541	823
7/10/17	0	0	0	1	0	23,004	803
7/11/17	0	0	0	3	1	22,091	1,028
7/12/17	8	11	4	12	8	23,459	3,856
7/13/17	13	11	7	11	10	19,890	4,844
7/14/17	0	0	0	0	0	14,223	709
7/15/17	4	0	0	4	2	12,315	1,592
7/16/17	0	8	0	1	1	13,036	1,164
7/17/17	0	0	0	0	0	20,250	709
7/18/17	1	2	0	4	1	18,934	1,248
7/19/17	0	0	0	2	0	18,539	850
7/20/17	0	0	0	0	0	17,232	709
7/21/17	0	0	0	0	0	12,509	709
7/22/17	0	1	0	0	0	12,673	736
7/23/17	2	5	0	1	2	13,540	1,330
7/24/17	0	0	0	0	0	16,651	709
7/25/17	0	0	0	0	0	16,003	709
7/26/17	0	0	0	1	0	17,324	756
7/27/17	0	0	0	0	0	19,274	709
7/28/17	0	0	0	0	0	13,003	709
7/29/17	0	0	0	0	0	11,973	709
7/30/17	0	0	0	0	0	12,629	709
7/31/17	0	0	0	0	0	17,383	709
8/1/17	0	0	0	2	0	19,038	859
8/2/17	2	5	0	5	2	19,780	1,679
8/3/17	8	14	5	7	7	19,619	3,760
8/4/17	5	4	0	7	4	14,343	2,177
8/5/17	5	5	0	7	4	12,365	2,170
8/6/17	6	6	0	6	4	14,245	2,308
8/7/17	0	0	0	0	0	19,907	709
8/8/17	0	0	0	0	0	19,176	709
8/9/17	0	0	0	0	0	18,067	709
8/10/17	5	7	1	6	4	17,297	2,365
8/11/17	4	5	0	6	3	12,951	2,014
8/12/17	0	1	0	2	0	13,004	877
8/13/17	9	2	3	2	4	12,641	2,379
8/14/17	5	5	0	3	3	17,067	1,804
8/15/17	0	0	0	0	0	16,869	709
8/16/17	3	3	1	0	1	17,881	1,262
8/17/17	4	7	0	7	3	18,314	2,132
8/18/17	0	1	0	1	0	13,910	830
8/19/17	0	0	0	0	0	13,645	709
8/20/17	5	0	0	6	3	14,916	1,859
8/21/17	8	5	3	5	5	19,545	2,845
8/22/17	8	7	4	9	7	20,899	3,381
8/23/17	12	10	0	16	8	22,558	4,137
8/24/17	4	10	0	12	5	22,044	2,902
8/25/17	1	5	0	4	2	16,025	1,429
8/26/17	5	6	3	5	5	14,866	2,563
8/27/17	12	5	3	11	8	16,354	3,777
8/28/17	0	2	0	1	0	20,826	838
8/29/17	0	0	0	0	0	20,287	709
8/30/17	4	4	0	5	3	20,543	1,871
8/31/17	6	11	0	8	5	21,380	2,704
9/1/17	2	7	2	4	3	15,026	1,852
9/2/17	4	0	0	5	2	11,590	1,581
9/3/17	0	0	0	0	0	10,329	709
9/4/17	10	10	5	8	8	12,408	3,957
9/5/17	17	16	14	18	16	20,929	7,281
9/6/17	12	14	6	13	11	22,385	5,069

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9/7/17	13	19	1	18	11	22,503	5,130
9/8/17	12	12	3	14	9	22,734	4,403
9/9/17	2	6	0	5	3	18,195	1,815
9/10/17	0	0	0	0	0	17,287	709
9/11/17	4	3	0	6	3	24,929	1,825
9/12/17	0	0	0	0	0	24,570	709
9/13/17	0	0	0	0	0	23,100	709
9/14/17	3	0	0	7	2	25,327	1,633
9/15/17	10	7	11	13	11	24,134	5,091
9/16/17	15	4	17	15	14	22,913	6,591
9/17/17	19	16	10	22	16	25,769	7,340
9/18/17	6	12	1	10	6	26,103	3,036
9/19/17	3	2	0	2	2	22,594	1,351
9/20/17	11	10	2	13	8	22,477	3,940
9/21/17	1	4	0	2	1	24,550	1,208
9/22/17	0	0	0	0	0	18,380	709
9/23/17	9	0	9	8	7	19,292	3,757
9/24/17	6	0	14	4	7	20,896	3,756
9/25/17	15	11	15	13	14	24,126	6,499
9/26/17	19	15	16	19	17	24,857	7,846
9/27/17	12	13	6	16	11	23,886	5,217
9/28/17	19	11	14	13	15	24,082	6,676
9/29/17	18	20	12	21	17	18,914	7,563
9/30/17	10	11	5	11	8	16,174	4,138
10/1/17	11	9	8	10	9	17,742	4,501
10/2/17	12	8	11	11	11	22,277	5,043
10/3/17	17	13	14	19	16	24,722	7,179
10/4/17	21	18	14	23	18	25,166	8,251
10/5/17	22	21	16	22	20	26,361	8,684
10/6/17	21	17	13	23	18	21,240	8,158
10/7/17	9	11	3	12	8	21,710	3,911
10/8/17	21	11	17	20	18	27,398	8,095
10/9/17	33	29	27	33	30	41,356	13,068
10/10/17	23	25	18	24	22	37,045	9,582
10/11/17	20	19	17	20	18	32,758	8,237
10/12/17	18	15	17	17	17	29,405	7,483
10/13/17	27	24	19	27	24	26,348	10,434
10/14/17	30	21	27	27	27	21,381	11,760
10/15/17	30	25	24	27	26	23,550	11,411
10/16/17	18	16	12	20	16	25,355	7,359
10/17/17	10	9	7	10	9	21,582	4,239
10/18/17	21	12	17	15	17	25,295	7,698
10/19/17	11	10	6	12	10	22,243	4,622
10/20/17	2	1	0	0	1	13,288	1,037
10/21/17	15	11	15	12	14	17,305	6,304
10/22/17	16	14	14	15	15	19,222	6,733
10/23/17	31	21	25	26	26	31,229	11,450
10/24/17	30	28	27	28	28	33,668	12,173
10/25/17	23	22	16	26	21	30,001	9,253
10/26/17	32	28	38	36	35	38,557	14,850
10/27/17	41	39	46	38	42	35,843	17,716
10/28/17	39	40	37	38	38	32,385	16,262
10/29/17	32	35	27	34	31	32,662	13,457
10/30/17	46	38	48	43	45	44,016	19,040
10/31/17	45	43	45	47	45	42,444	19,056
11/1/17	39	39	35	39	37	65,521	15,953
11/2/17	43	37	40	39	40	68,041	17,061
11/3/17	41	39	38	43	40	56,490	17,201
11/4/17	40	34	38	40	39	51,050	16,503
11/5/17	52	48	50	51	51	61,337	21,371
11/6/17	52	48	52	56	52	75,547	22,058
11/7/17	53	46	48	54	51	79,535	21,326
11/8/17	57	50	56	56	55	80,101	23,305
11/9/17	70	66	59	70	66	85,936	27,467
11/10/17	58	55	54	58	56	72,897	23,701
11/11/17	46	39	40	41	42	58,932	17,733
11/12/17	44	43	38	45	42	62,868	17,883
11/13/17	37	37	28	40	34	59,284	14,755
11/14/17	35	31	33	33	33	64,276	14,222
11/15/17	47	44	46	46	46	82,010	19,423
11/16/17	44	41	42	44	43	95,711	18,129
11/17/17	43	39	42	43	42	75,855	17,866
11/18/17	56	53	52	58	54	89,108	22,835
11/19/17	44	46	35	52	43	83,566	18,117
11/20/17	43	42	36	43	40	91,788	17,214
11/21/17	60	53	55	59	57	101,768	24,006
11/22/17	51	50	44	53	49	85,412	20,574
11/23/17	37	38	29	35	34	56,396	14,535
11/24/17	41	36	31	43	37	57,389	15,918
11/25/17	44	44	39	48	43	65,923	18,373

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11/26/17	35	30	32	42	35	57,185	15,009
11/27/17	28	25	24	32	27	63,659	11,825
11/28/17	45	40	37	47	42	77,872	17,735
11/29/17	37	40	29	41	35	71,015	15,136
11/30/17	38	33	31	38	35	61,636	14,955
12/1/17	38	34	36	37	36	52,241	15,569
12/2/17	35	32	30	34	33	48,221	14,034
12/3/17	36	30	33	33	34	46,222	14,392
12/4/17	53	45	52	48	51	68,040	21,358
12/5/17	67	60	57	66	62	86,672	26,061
12/6/17	68	62	62	66	65	97,276	27,127
12/7/17	56	55	52	56	54	84,703	22,867
12/8/17	52	54	48	56	52	87,026	21,746
12/9/17	52	53	47	55	51	85,092	21,522
12/10/17	46	49	42	56	47	82,810	19,957
12/11/17	61	57	57	63	59	104,847	24,903
12/12/17	55	58	41	61	52	96,709	21,812
12/13/17	54	53	47	53	51	95,623	21,665
12/14/17	59	55	46	59	54	86,659	22,546
12/15/17	57	54	44	63	53	76,025	22,453
12/16/17	47	48	40	57	47	67,236	20,005
12/17/17	40	45	41	41	41	62,402	17,604
12/18/17	42	39	38	40	40	72,277	16,893
12/19/17	63	56	48	66	57	92,832	24,097
12/20/17	66	59	64	68	65	105,952	27,185
12/21/17	69	53	71	69	67	97,451	28,173
12/22/17	63	55	61	62	61	80,667	25,538
12/23/17	61	54	62	73	63	74,933	26,437
12/24/17	81	70	80	84	80	88,321	33,364
12/25/17	90	88	84	92	88	106,889	36,741
12/26/17	90	85	83	92	87	120,485	36,398
12/27/17	83	78	76	88	81	113,309	33,784
12/28/17	75	77	72	78	75	105,879	31,206
12/29/17	91	84	86	86	87	110,194	36,276
12/30/17	94	91	91	92	92	115,852	38,219
12/31/17	91	89	87	89	89	113,454	36,988
1/1/18	80	79	84	81	81	67,671	33,865
1/2/18	76	70	71	76	73	70,169	30,525
1/3/18	84	79	74	86	80	76,640	33,346
1/4/18	83	79	76	84	80	78,551	33,398
1/5/18	81	80	81	84	82	72,792	33,998
1/6/18	72	72	66	67	69	60,538	28,734
1/7/18	49	48	42	48	46	47,761	19,572
1/8/18	52	48	40	62	49	50,884	20,881
1/9/18	42	41	35	49	41	45,547	17,442
1/10/18	54	44	61	52	55	51,705	23,046
1/11/18	88	79	86	86	86	73,769	35,664
1/12/18	86	82	79	85	83	71,249	34,457
1/13/18	82	76	77	81	79	67,666	33,013
1/14/18	71	72	76	69	73	63,362	30,305
1/15/18	82	71	90	75	82	72,892	34,099
1/16/18	71	66	78	71	73	67,270	30,374
1/17/18	46	55	51	45	49	52,680	20,651
1/18/18	39	36	42	41	40	46,401	17,097
1/19/18	38	34	36	33	36	42,224	15,287
1/20/18	45	33	40	42	41	41,606	17,489
1/21/18	49	40	45	45	45	43,818	19,231
1/22/18	49	57	46	60	51	52,880	21,592
1/23/18	49	56	45	59	51	54,336	21,407
1/24/18	46	48	47	47	47	51,187	19,812
1/25/18	46	45	44	45	45	49,973	19,151
1/26/18	46	34	48	42	44	42,870	18,697
1/27/18	61	53	63	62	61	53,050	25,591
1/28/18	70	64	72	76	71	60,344	29,831
1/29/18	72	69	63	81	71	66,863	29,479
1/30/18	57	56	53	65	57	60,349	24,135
1/31/18	75	69	67	76	71	69,978	29,856
2/1/18	82	77	73	83	78	74,346	32,723
2/2/18	68	69	62	75	68	61,386	28,298
2/3/18	80	73	80	85	80	64,341	33,407
2/4/18	84	76	79	83	81	64,913	33,631
2/5/18	79	71	75	83	78	69,645	32,345
2/6/18	73	70	71	75	73	67,703	30,291
2/7/18	74	66	72	73	72	69,716	30,120
2/8/18	76	71	75	80	76	71,428	31,596
2/9/18	76	70	75	76	75	63,926	31,182
2/10/18	66	66	71	67	68	59,682	28,542
2/11/18	78	69	73	78	75	61,859	31,239
2/12/18	73	67	72	74	72	69,208	30,092
2/13/18	52	51	53	52	52	54,161	22,115

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2/14/18	35	38	48	36	40	43,044	16,954
2/15/18	67	61	74	69	69	58,895	28,797
2/16/18	61	64	57	61	60	52,113	25,145
2/17/18	57	51	53	65	56	48,921	23,729
2/18/18	60	54	64	63	61	52,782	25,761
2/19/18	63	58	69	63	64	60,948	26,968
2/20/18	68	62	70	71	69	62,205	28,698
2/21/18	65	61	66	68	65	63,408	27,341
2/22/18	53	52	54	50	53	50,359	22,179
2/23/18	61	52	64	58	60	48,121	25,132
2/24/18	59	50	60	52	57	45,505	23,774
2/25/18	51	50	51	51	51	46,671	21,388
2/26/18	40	37	50	39	43	45,808	18,205
2/27/18	44	36	52	52	48	49,611	20,094
2/28/18	45	45	50	44	46	46,419	19,641
3/1/18	51	41	46	48	47	48,273	19,966
3/2/18	40	34	42	39	40	41,634	16,861
3/3/18	35	36	30	32	33	33,901	14,066
3/4/18	39	35	36	35	36	36,093	15,554
3/5/18	47	43	43	49	45	43,968	19,135
3/6/18	54	54	58	55	56	48,401	23,429
3/7/18	56	54	57	56	56	52,370	23,526
3/8/18	55	49	54	52	53	47,543	22,458
3/9/18	50	48	48	52	49	47,340	20,822
3/10/18	42	38	37	41	39	42,484	16,755
3/11/18	49	40	48	44	46	50,876	19,629
3/12/18	51	42	50	52	49	57,490	20,905
3/13/18	45	42	49	44	46	53,256	19,284
3/14/18	41	37	48	43	44	48,890	18,482
3/15/18	45	45	43	52	46	50,833	19,504
3/16/18	43	41	43	41	42	39,774	17,980
3/17/18	36	33	42	38	38	35,242	16,260
3/18/18	34	36	31	34	33	36,883	14,251
3/19/18	40	47	33	41	39	44,624	16,568
3/20/18	43	48	37	41	41	44,490	17,447
3/21/18	38	44	32	42	38	42,455	16,119
3/22/18	40	40	31	36	36	41,278	15,255
3/23/18	41	43	37	41	40	40,280	16,931
3/24/18	39	44	38	40	39	39,341	16,815
3/25/18	36	37	37	35	36	38,522	15,417
3/26/18	37	36	37	37	37	41,380	15,723
3/27/18	29	30	31	30	30	36,518	13,011
3/28/18	42	35	40	44	41	44,199	17,297
3/29/18	50	42	48	56	50	42,103	20,948
3/30/18	52	45	57	57	54	40,815	22,686
3/31/18	61	60	62	59	61	46,674	25,613
4/1/18	54	51	53	49	52	45,086	22,060
4/2/18	50	43	57	56	53	46,920	22,222
4/3/18	57	52	60	60	58	54,307	24,379
4/4/18	48	47	50	52	49	49,723	20,878
4/5/18	56	49	57	53	55	48,732	23,004
4/6/18	61	57	60	61	60	48,206	25,282
4/7/18	58	55	52	57	55	44,061	23,239
4/8/18	42	42	45	46	44	42,329	18,713
4/9/18	42	40	41	46	42	44,692	17,918
4/10/18	40	38	35	41	38	44,792	16,217
4/11/18	30	26	31	32	30	36,398	13,084
4/12/18	37	34	34	37	36	38,066	15,195
4/13/18	42	40	40	43	41	36,869	17,476
4/14/18	44	50	40	44	43	41,093	18,383
4/15/18	43	47	43	43	43	42,361	18,450
4/16/18	39	44	37	39	39	41,946	16,622
4/17/18	31	33	30	30	30	33,968	13,109
4/18/18	32	35	27	33	31	33,083	13,296
4/19/18	26	23	22	27	25	26,754	10,716
4/20/18	25	25	23	23	24	24,353	10,465
4/21/18	21	24	18	19	20	28,938	8,818
4/22/18	14	20	13	12	14	27,359	6,444
4/23/18	14	16	12	19	15	29,318	6,643
4/24/18	30	26	26	34	29	34,528	12,536
4/25/18	18	19	15	16	16	29,789	7,435
4/26/18	24	23	16	22	21	29,059	9,101
4/27/18	28	32	28	33	30	27,628	12,851
4/28/18	22	28	16	22	21	23,865	9,122
4/29/18	7	14	4	8	7	17,994	3,564
4/30/18	9	7	8	3	7	19,502	3,600
5/1/18	26	16	28	26	25	29,538	10,973
5/2/18	14	17	10	19	14	27,158	6,457
5/3/18	14	11	9	16	12	22,328	5,643
5/4/18	14	11	0	17	9	17,372	4,504

5/5/18	12	11	3	18	10	16,898	4,852
5/6/18	8	16	1	16	9	18,947	4,187
5/7/18	0	0	0	0	0	21,442	709
5/8/18	16	17	8	18	14	26,739	6,304
5/9/18	24	25	17	20	21	32,274	9,126
5/10/18	29	23	24	29	27	30,241	11,523
5/11/18	21	26	9	21	17	23,428	7,779
5/12/18	12	19	6	12	11	19,649	5,070
5/13/18	5	1	1	7	3	18,635	2,009
5/14/18	12	2	0	13	7	24,717	3,443
5/15/18	0	13	0	1	2	22,001	1,480
5/16/18	1	1	0	9	3	23,159	1,752
5/17/18	20	23	8	18	16	22,730	7,097
5/18/18	6	12	8	11	8	18,103	4,150
5/19/18	20	24	13	21	18	17,958	8,244
5/20/18	13	13	7	10	10	17,719	4,896
5/21/18	7	4	2	8	5	22,526	2,829
5/22/18	4	4	0	3	2	20,300	1,568
5/23/18	0	0	0	0	0	21,053	709
5/24/18	0	0	0	0	0	20,055	709
5/25/18	0	0	0	0	0	14,421	709
5/26/18	0	0	0	0	0	13,229	709
5/27/18	0	0	0	0	0	10,640	709
5/28/18	0	0	0	0	0	11,785	709
5/29/18	0	2	0	0	0	19,298	796
5/30/18	0	5	0	0	1	19,946	959
5/31/18	3	6	0	6	3	20,194	1,897
6/1/18	12	20	0	13	9		4,349
6/2/18	15	21	8	14	13		5,978
6/3/18	10	12	3	13	8		4,171
6/4/18	4	9	0	13	5		2,856
6/5/18	1	11	0	6	3		1,996
6/6/18	10	5	3	11	7		3,560
6/7/18	4	9	0	2	3		1,801
6/8/18	0	6	0	0	1		1,057
6/9/18	0	12	0	4	3		1,735
6/10/18	0	8	0	0	1		1,123
6/11/18	8	8	8	1	6		3,287
6/12/18	6	3	4	7	5		2,865
6/13/18	0	0	0	3	1		1,000
6/14/18	0	2	0	0	0		796
6/15/18	0	2	0	0	0		796
6/16/18	0	0	0	0	0		709
6/17/18	2	0	0	3	1		1,197
6/18/18	1	0	0	3	1		1,058
6/19/18	1	0	0	1	1		919
6/20/18	0	0	0	0	0		709
6/21/18	0	6	0	0	1		1,052
6/22/18	0	3	0	0	0		845
6/23/18	0	3	0	0	0		856
6/24/18	1	13	0	5	3		1,941
6/25/18	0	10	0	1	1		1,284
6/26/18	0	10	0	0	1		1,232
6/27/18	0	0	0	2	0		859
6/28/18	0	0	0	0	0		709
6/29/18	0	0	0	0	0		709
6/30/18	0	0	0	0	0		709
Totals	10,917	10,422	9,996	11,205	10,594	13,975,857	4,580,946

* Volumes include interruptible and transportation volumes

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

MINNESOTA ENERGY RESOURCES - Consolidated

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	MERC000002	30,102	30,016	30,231	30,211	30,298	30,416	30,441	30,449	30,407	30,409	30,485	30,278	30,312
GS-C&I <1,500 therms/yr (Small)	MERC000006	2,099	2,065	2,070	2,088	2,111	2,138	2,122	2,234	2,352	2,346	2,359	2,338	2,194
GS-C&I >1,500 therms/yr (Large)	MERC000010	3,242	3,155	3,226	3,276	3,234	3,219	3,243	3,152	3,007	3,015	3,002	2,996	3,147
Small Volume Interruptible (SVI)	MERC000017	72	70	77	73	74	68	73	72	70	70	70	68	71
Small Volume Interruptible w/Joint (SVJ)	MERC000021	5	4	4	4	10	4	3	4	4	4	4	4	5
Large Volume Interruptible (LVI)	MERC000024	7	6	6	20	19	-10	5	5	5	5	5	5	7
Total		35,527	35,316	35,614	35,672	35,746	35,835	35,887	35,916	35,845	35,849	35,925	35,689	35,735

MINNESOTA ENERGY RESOURCES - Consolidated
Projected Fixed Cost - November 2018 through March 2019

Futures Contracts WACOG

10/200													31													31												
Dec-18													Dec-18													Jan-19												
Deal Number	Purchase Date	Trade Number	Number Contracts	Physical Volume	Strike Price	Strike Cost	LDS Settle*	LDS 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	LDS Settle*	LDS 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	LDS Settle*	LDS Settle Cost	Over/Under Market	Premium Per Unit	Premium Cost	Total Cost
1	05/03/18	64480	5	50,000	\$ 2,8150	\$ 140,750	\$ 3,3200	\$ 166,000	\$ (25,250)	\$ -	\$ -	\$ 140,750	1	05/15/18	65032	10	100,000	\$ 3,0000	\$ 300,300	\$ 3,3690	\$ 336,900	\$ (36,600)	\$ -	\$ -	\$ 300,300	1	05/17/18	65170	11	110,000	\$ 3,0470	\$ 335,170	\$ 3,4390	\$ 378,290	\$ (43,120)	\$ -	\$ -	\$ 335,170
2	05/03/18	64481	1	10,000	\$ 2,8160	\$ 28,160	\$ 3,3200	\$ 33,300	\$ (5,040)	\$ -	\$ -	\$ 28,160	2	06/12/18	66051	9	90,000	\$ 3,0770	\$ 276,930	\$ 3,3690	\$ 303,210	\$ (26,280)	\$ -	\$ -	\$ 276,930	2	06/13/18	66146	10	100,000	\$ 3,1620	\$ 316,200	\$ 3,4390	\$ 343,900	\$ (26,700)	\$ -	\$ -	\$ 316,200
3	06/05/18	65874	6	60,000	\$ 2,8300	\$ 176,100	\$ 3,3200	\$ 198,200	\$ (22,100)	\$ -	\$ -	\$ 176,100	3	07/17/18	67114	9	90,000	\$ 2,8880	\$ 259,920	\$ 3,3690	\$ 303,210	\$ (43,290)	\$ -	\$ -	\$ 259,920	3	07/18/18	67242	10	100,000	\$ 2,9480	\$ 294,800	\$ 3,4390	\$ 343,900	\$ (48,300)	\$ -	\$ -	\$ 294,800
4	07/05/18	66721	6	60,000	\$ 2,8620	\$ 171,600	\$ 3,3200	\$ 198,200	\$ (26,260)	\$ -	\$ -	\$ 171,600	4	08/14/18	67672	6	60,000	\$ 3,0910	\$ 247,260	\$ 3,3690	\$ 269,520	\$ (22,240)	\$ -	\$ -	\$ 247,260	4	08/16/18	68000	1	10,000	\$ 3,1640	\$ 31,640	\$ 3,4390	\$ 34,390	\$ (2,750)	\$ -	\$ -	\$ 31,640
5	08/02/18	67750	3	30,000	\$ 2,8150	\$ 84,450	\$ 3,3200	\$ 99,600	\$ (15,150)	\$ -	\$ -	\$ 84,450	5	09/13/18	68713	6	60,000	\$ 2,9230	\$ 175,380	\$ 3,3690	\$ 202,140	\$ (26,760)	\$ -	\$ -	\$ 175,380	5	09/18/18	69021	8	80,000	\$ 3,1680	\$ 253,280	\$ 3,4390	\$ 318,120	\$ (21,840)	\$ -	\$ -	\$ 253,280
6	08/02/18	67751	2	20,000	\$ 2,8170	\$ 56,340	\$ 3,3200	\$ 66,400	\$ (10,060)	\$ -	\$ -	\$ 56,340	6	09/13/18	68714	2	20,000	\$ 2,9230	\$ 58,460	\$ 3,3690	\$ 67,380	\$ (8,940)	\$ -	\$ -	\$ 58,460	6	09/18/18	68881	9	90,000	\$ 2,9690	\$ 267,210	\$ 3,4390	\$ 309,510	\$ (42,300)	\$ -	\$ -	\$ 267,210
7	08/04/18	68448	5	50,000	\$ 2,8610	\$ 143,050	\$ 3,3200	\$ 166,000	\$ (22,950)	\$ -	\$ -	\$ 143,050	7	10/18/18	70370	6	60,000	\$ 3,2970	\$ 263,760	\$ 3,3690	\$ 269,520	\$ (5,760)	\$ -	\$ -	\$ 263,760	7	10/18/18	70128	9	90,000	\$ 3,3610	\$ 302,490	\$ 3,4390	\$ 309,510	\$ (7,020)	\$ -	\$ -	\$ 302,490
8	10/05/18	69571	4	40,000	\$ 3,1960	\$ 127,840	\$ 3,3200	\$ 132,800	\$ (4,960)	\$ -	\$ -	\$ 127,840	8													8												
9													9													9												
10													10													10												
11													11													11												
12													12													12												
13													13													13												
14													14													14												
15													15													15												
Total			32	320,000		\$ 929,610	\$ 1,062,400	\$ (132,790)	\$ -	\$ -	\$ 929,610	Total			52	520,000		\$ 1,582,010	\$ 1,751,880	\$ (169,870)	\$ -	\$ -	\$ 1,582,010	Total	Total	58	580,000		\$ 1,802,590	\$ 1,994,620	\$ (192,030)	\$ -	\$ -	\$ 1,802,590				
NNG	27	84.38%	27	270,000	\$ 2,9050	\$ 784,358	\$ 3,3200	\$ 896,400	\$ (112,042)	\$ -	\$ -	\$ 784,358	NNG	43	82.69%	43	430,000	\$ 3,0423	\$ 1,308,201	\$ 1,448,670	\$ (140,469)	\$ -	\$ -	\$ 1,308,201	NNG	49	84.48%	49	490,000	\$ 3,1079	\$ 1,522,878	\$ 3,4390	\$ 1,685,110	\$ (162,232)	\$ -	\$ -	\$ 1,522,878	
Other-Cons	5	15.63%	5	50,000	\$ 2,9050	\$ 145,252	\$ 3,3200	\$ 166,000	\$ (20,748)	\$ -	\$ -	\$ 145,252	Other-Cons	9	17.31%	9	90,000	\$ 3,0423	\$ 273,809	\$ 3,3690	\$ 303,210	\$ (29,401)	\$ -	\$ -	\$ 273,809	Other-Cons	9	15.52%	9	90,000	\$ 3,1079	\$ 279,712	\$ 3,4390	\$ 309,510	\$ (29,798)	\$ -	\$ -	\$ 279,712
Total	32	100.0%	32	320,000	\$ 2,9050	\$ 929,610	\$ 3,3200	\$ 1,062,400	\$ (132,790)	\$ -	\$ -	\$ 929,610	Total	52	100.0%	52	520,000	\$ 3,0423	\$ 1,582,010	\$ 1,751,880	\$ (169,870)	\$ -	\$ -	\$ 1,582,010	Total	58	100.0%	58	580,000	\$ 3,1079	\$ 1,802,590	\$ 3,4390	\$ 1,994,620	\$ (192,030)	\$ -	\$ -	\$ 1,802,590	

Feb-19													Mar-19													Total												
Deal Number	Purchase Date	Trade Number	Number Contracts	Physical Volume	Strike Price	Strike Cost	LDS Settle*	LDS 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	LDS Settle*	LDS 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	LDS Settle*	LDS Settle Cost	Over/Under Market	Premium Per Unit	Premium Cost	Total Cost
1	05/08/18	64616	9	90,000	\$ 2,9520	\$ 265,680	\$ 3,3470	\$ 301,230	\$ (35,550)	\$ -	\$ -	\$ 265,680	1	05/10/18	64777	2	20,000	\$ 2,8960	\$ 57,120	\$ 3,1520	\$ 63,040	\$ (5,920)	\$ -	\$ -	\$ 57,120	1												
2	06/07/18	65943	8	80,000	\$ 3,1410	\$ 251,280	\$ 3,3470	\$ 267,760	\$ (16,480)	\$ -	\$ -	\$ 251,280	2	05/10/18	64778	6	60,000	\$ 2,8570	\$ 171,420	\$ 3,1520	\$ 188,120	\$ (17,700)	\$ -	\$ -	\$ 171,420	2												
3	06/07/18	65944	1	10,000	\$ 3,1400	\$ 31,400	\$ 3,3470	\$ 33,470	\$ (2,070)	\$ -	\$ -	\$ 31,400	3	06/11/18	66009	7	70,000	\$ 3,0400	\$ 212,800	\$ 3,1520	\$ 220,640	\$ (7,840)	\$ -	\$ -	\$ 212,800	3												
4	07/10/18	66846	8	80,000	\$ 3,0000	\$ 240,400	\$ 3,3470	\$ 267,760	\$ (27,360)	\$ -	\$ -	\$ 240,400	4	07/12/18	66971	7	70,000	\$ 2,9200	\$ 204,400	\$ 3,1520	\$ 220,640	\$ (16,240)	\$ -	\$ -	\$ 204,400	4												
5	08/01/18	67656	6	60,000	\$ 3,0710	\$ 245,660	\$ 3,3470	\$ 267,760	\$ (22,090)	\$ -	\$ -	\$ 245,660	5	08/08/18	67962	6	60,000	\$ 3,0160	\$ 180,960	\$ 3,1520	\$ 188,120	\$ (7,160)	\$ -	\$ -	\$ 180,960	5												
6	08/08/18	68509	8	80,000	\$ 2,9550	\$ 236,400	\$ 3,3470	\$ 267,760	\$ (31,360)	\$ -	\$ -	\$ 236,400	6	09/11/18	68848	6	60,000	\$ 2,8470	\$ 170,820	\$ 3,1520	\$ 188,120	\$ (17,300)	\$ -	\$ -	\$ 170,820	6												
7	10/10/18	69731	8	80,000	\$ 3,3420	\$ 267,360	\$ 3,3470	\$ 267,760	\$ (400)	\$ -	\$ -	\$ 267,360	7	10/16/18	70129	6	60,000	\$ 3,0980	\$ 185,760	\$ 3,1520	\$ 188,120	\$ (3,360)	\$ -	\$ -	\$ 185,760	7												
8							\$ 3,3470	\$ -		\$ -	\$ -		8													8												
9													9													9												
10													10													10												
11													11													11												
12													12													12												
13													13													13												
14													14													14												
15													15													15												
Total			50	500,000		\$ 1,538,200	\$ 1,673,500	\$ (135,300)	\$ -	\$ -	\$ 1,538,200	Total			40	400,000		\$ 1,183,280	\$ 1,260,800	\$ (77,520)	\$ -	\$ -	\$ 1,183,280	Total			232	2,320,000		\$ 7,036,690	\$ 7,743,200	\$ (707,510)	\$ -	\$ -	\$ 7,036,690			
NNG	42	84.00%	42	420,000	\$ 3,0794	\$ 1,282,088	\$ 3,3470	\$ 1,403,740	\$ (113,652)	\$ -	\$ -	\$ 1,282,088	NNG	33	82.50%	33	330,000	\$ 2,9582	\$ 976,208	\$ 3,1520	\$ 1,040,160	\$ (63,954)	\$ -	\$ -	\$ 976,208	NNG	194	83.82%	194	1,940,000.00	\$ 3,0328	\$ 5,863,268	\$ 3,3376	\$ 6,474,917	\$ (611,650)	\$ -	\$ -	\$ 5,863,268
Other-Cons	8	16.00%	8	80,000	\$ 3,0794	\$ 246,112	\$ 3,3470	\$ 267,760	\$ (21,648)	\$ -	\$ -	\$ 246,112	Other-Cons	7	17.50%	7	70,000	\$ 2,9582	\$ 207,074	\$ 3,1520	\$ 220,640	\$ (13,566)	\$ -	\$ -	\$ 207,074	Other-Cons	38	16.38%	38	380,000	\$ 3,0328	\$ 1,152,398	\$ 3,3376	\$ 1,268,283	\$ (115,885)	\$ -	\$ -	\$ 1,152,398
Total	50	100.0%	50	500,000	\$ 3,0794	\$ 1,538,200	\$ 3,3470	\$ 1,673,500	\$ (135,300)	\$ -	\$ -	\$ 1,538,200	Total	40	100.0%	40	400,000	\$ 2,9582	\$ 1,073,282	\$ 3,1520	\$ 1,260,800	\$ (77,520)	\$ -	\$ -	\$ 1,073,282	Total	232	100.0%	232	2,320,000	\$ 3,0328	\$ 7,036,690	\$ 3,3376	\$ 7,743,200	\$ (707,510)	\$ -	\$ -	\$ 7,036,690

MINNESOTA ENERGY RESOURCES - Consolidated

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/VGT (Dth)	ANR Storage GLGT/VGT WACOG	ANR Storage GLGT/VGT 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

Projected Call Option Costs - November 2018 through March 2019

Call/Put Options	10,000	Dth/contract
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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	66479	11	110,000	\$ 3,000	\$ 330,000	\$ 3,000	\$ 330,000	\$ 3,320	\$ 365,200	\$ (35,200)	\$ 0.0950	\$ 10,450	\$ 340,450	1	05/10/18	66473	16	180,000	\$ 3,200	\$ 576,000	\$ 3,200	\$ 576,000	\$ 3,360	\$ 606,420	\$ (30,420)	\$ 0.0900	\$ 16,200	\$ 592,200	1	05/08/18	66415	11	110,000	\$ 3,500	\$ 390,500	\$ 3,430	\$ 378,290	\$ 3,430	\$ 378,290	\$ -	\$ 0.0950	\$ 10,450	\$ 388,740																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
			11	110,000	\$ 3,000	\$ 330,000	\$ 3,000	\$ 330,000	\$ 3,320	\$ 365,200	\$ (35,200)	\$ 0.0950	\$ 10,450	\$ 340,450	2	05/10/18	66473	16	180,000	\$ 3,200	\$ 576,000	\$ 3,200	\$ 576,000	\$ 3,360	\$ 606,420	\$ (30,420)	\$ 0.0900	\$ 16,200	\$ 592,200	2	05/08/18	66415	11	110,000	\$ 3,500	\$ 390,500	\$ 3,430	\$ 378,290	\$ 3,430	\$ 378,290	\$ -	\$ 0.0950	\$ 10,450	\$ 388,740																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
			3	110,000	\$ 2,860	\$ 327,800	\$ 2,860	\$ 327,800	\$ 3,320	\$ 365,200	\$ (37,400)	\$ 0.0900	\$ 11,000	\$ 338,800	3	07/12/18	66970	17	170,000	\$ 3,200	\$ 544,000	\$ 3,200	\$ 544,000	\$ 3,360	\$ 572,730	\$ (28,730)	\$ 0.0970	\$ 16,490	\$ 560,490	3	07/11/18	66942	20	200,000	\$ 3,700	\$ 740,000	\$ 3,430	\$ 687,800	\$ 3,430	\$ 687,800	\$ -	\$ 0.0990	\$ 18,800	\$ 707,600																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
			4	110,000	\$ 2,860	\$ 314,600	\$ 2,860	\$ 314,600	\$ 3,320	\$ 365,200	\$ (35,800)	\$ 0.0980	\$ 10,780	\$ 325,380	4	08/09/18	67901	17	170,000	\$ 3,200	\$ 544,000	\$ 3,300	\$ 561,000	\$ 3,360	\$ 572,730	\$ (11,730)	\$ 0.0970	\$ 16,490	\$ 577,490	4	07/11/18	66942	20	200,000	\$ 3,500	\$ 650,000	\$ 3,430	\$ 653,410	\$ 3,430	\$ 653,410	\$ -	\$ 0.0970	\$ 18,430	\$ 671,840																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
			5	110,000	\$ 2,860	\$ 314,600	\$ 2,860	\$ 314,600	\$ 3,320	\$ 365,200	\$ (35,800)	\$ 0.0980	\$ 10,780	\$ 325,380	5	09/11/18	69647	17	170,000	\$ 3,200	\$ 544,000	\$ 3,360	\$ 588,000	\$ 3,360	\$ 572,730	\$ (66,130)	\$ 0.0980	\$ 16,930	\$ 604,930	5	08/11/18	67954	19	190,000	\$ 3,500	\$ 675,000	\$ 3,430	\$ 653,410	\$ 3,430	\$ 653,410	\$ -	\$ 0.1000	\$ 19,000	\$ 672,410																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
			6	100,000	\$ 3,200	\$ 320,000	\$ 3,200	\$ 320,000	\$ 3,320	\$ 332,000	\$ (12,000)	\$ 0.0980	\$ 9,800	\$ 329,800	6	10/16/18	70127	17	170,000	\$ 3,500	\$ 605,000	\$ 3,360	\$ 572,730	\$ 3,360	\$ 572,730	\$ -	\$ 0.0930	\$ 15,810	\$ 588,540	6	09/06/18	68508	19	190,000	\$ 3,400	\$ 646,000	\$ 3,400	\$ 646,000	\$ 3,430	\$ 653,410	\$ (7,410)	\$ 0.0950	\$ 18,050	\$ 664,050																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
			7													7														7	10/11/18	69729	19	190,000	\$ 4,100	\$ 779,000	\$ 3,430	\$ 653,410	\$ 3,430	\$ 653,410	\$ -	\$ 0.0960	\$ 18,240	\$ 671,650																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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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	Total																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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1	05/15/18	66530	18	180,000	\$ 4,1500	\$ 747,000	\$ 3,3470	\$ 602,460	\$ 3,3470	\$ 602,460	\$ -	\$ 0.0930	\$ 16,740	\$ 619,200	1	06/17/18	66169	14	140,000	\$ 4,0500	\$ 567,000	\$ 3,1520	\$ 441,280	\$ 3,1520	\$ 441,280	\$ -	\$ 0.0980	\$ 13,720	\$ 455,000	1	06/17/18	66169	14	140,000	\$ 4,0500	\$ 567,000	\$ 3,1520	\$ 441,280	\$ 3,1520	\$ 441,280	\$ -	\$ 0.0980	\$ 13,720	\$ 455,000	\$ 2,393,650	\$ (65,620)	\$ 0.0938	\$ 67,560	\$ 2,395,690																																																																																																																																																																																																																																																																																																																																																																																																																																																															
2	06/12/18	66649	17	170,000	\$ 4,1500	\$ 705,500	\$ 3,3470	\$ 568,990	\$ 3,3470	\$ 568,990	\$ -	\$ 0.0970	\$ 16,490	\$ 585,480	2	07/19/18	67241	13	130,000	\$ 4,0500	\$ 528,500	\$ 3,1520	\$ 409,760	\$ 3,1520	\$ 409,760	\$ -	\$ 0.0980	\$ 12,740	\$ 422,630	2	07/19/18	67241	13	130,000	\$ 4,0500	\$ 528,500	\$ 3,1520	\$ 409,760	\$ 3,1520	\$ 409,760	\$ -	\$ 0.0980	\$ 12,740	\$ 422,630	\$ 2,370,880	\$ (69,200)	\$ 0.0990	\$ 76,140	\$ 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	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	\$ 2,614,400	\$ (66,130)	\$ 0.0976	\$ 76,140	\$ 2,614,400																																																																																																																																																																																																																																																																																																																																																																																																																																																															
4	08/14/18	67971	17	170,000	\$ 4,0000	\$ 680,000	\$ 3,3470	\$ 568,990	\$ 3,3470	\$ 568,990	\$ -	\$ 0.0940	\$ 16,490	\$ 585,480	4	08/16/18	68018	13	130,000	\$ 4,0500	\$ 528,500	\$ 3,1520	\$ 409,760	\$ 3,1520	\$ 409,760	\$ -	\$ 0.0980	\$ 12,740	\$ 422,630	4	08/16/18	68018	13	130,000	\$ 4,0500	\$ 528,500	\$ 3,1520	\$ 409,760	\$ 3,1520	\$ 409,760	\$ -	\$ 0.0980	\$ 12,740	\$ 422,630	\$ 2,582,690	\$ (74,930)	\$ 0.0973	\$ 76,140	\$ 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	\$ 16,490	\$ 585,480	5	09/18/18	68860	13	130,000	\$ 3,5700	\$ 464,100	\$ 3,1520	\$ 409,760	\$ 3,1520	\$ 409,760	\$ -	\$ 0.1000	\$ 13,000	\$ 422,760	5	09/18/18	68860	13	130,000	\$ 3,5700	\$ 464,100	\$ 3,1520	\$ 409,760	\$ 3,1520	\$ 409,760	\$ -	\$ 0.1000	\$ 13,000	\$ 422,760	\$ 2,556,670	\$ (72,660)	\$ 0.0969	\$ 76,140	\$ 2,556,670																																																																																																																																																																																																																																																																																																																																																																																																																																																															
6	10/18/18	70366	16	160,000	\$ 4,2500	\$ 680,000	\$ 3,3470	\$ 535,520	\$ 3,3470	\$ 535,520	\$ -	\$ -	\$ -	\$ 15,510	6	10/18/18	69730	13	130,000	\$ 4,0000	\$ 520,000	\$ 3,1520	\$ 409,760	\$ 3,1520	\$ 409,760	\$ -	\$ -	\$ -	\$ 13,000	\$ 422,760	6	10/18/18	69730	13	130,000	\$ 4,0000	\$ 520,000	\$ 3,1520	\$ 409,760	\$ 3,1520	\$ 409,760	\$ -	\$ -	\$ -	\$ 13,000	\$ 422,760	\$ 1,820,000	\$ (40,000)	\$ 0.0980	\$ 65,410	\$ 1,820,000																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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*Prices from 10/17/18 NYMEX market

**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	GLGT	MERC Consolidated	Bemidji
3	GLGT	MERC Consolidated	Cloquet
4	VGT	MERC Consolidated	Fargo

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. G001,011/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.

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.

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.

iii. **Volume Risk Adjustments**

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

VGIT 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.

ATTACHMENT D

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

Docket No. G011/M-18-527

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

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