



Minnesota Energy Resources Corporation
Suite 200
1995 Rahncliff Court
Eagan, MN 55122
www.minnesotaenergyresources.com

November 1, 2017

VIA ELECTRONIC FILING

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

Re: In the Matter 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-17-587

Dear Mr. Wolf:

On August 1, 2017, Minnesota Energy Resources ("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, 2017 Demand Entitlement filing. Additionally, MERC provides information as requested by the Department of Commerce, Division of Energy Resources (the "Department") in its October 23, 2017 Comments in Docket No. G011/GR-17-564.

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

As of the date of this filing, MERC has completed its purchases of future contracts and call options for the 2017-2018 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. No other changes have been made to the MERC-Consolidated Demand Entitlement.

Mr. Daniel P. Wolf
November 1, 2017
Page 2

In its October 23, 2017, Comments submitted in Docket No. G011/GR-17-564 on MERC's petition for approval of a base cost of gas to coincide with the implementation of interim rates, the Department requested that MERC provide an update on its plans to replace its contract with Niska Gas Storage at the AECO Hub in Alberta, Canada with a new storage contract. To date, MERC has contacted several storage providers and had high level discussions regarding the availability and viability of various options. In addition to physical storage, MERC is considering the potential benefits of a synthetic storage service such as a physical call option with summer pricing or a gas re-delivery service. The Company will continue to evaluate available options and anticipates making a decision in the first quarter of 2018, at which time MERC will notify the Commission.

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

Sincerely yours,

/s/ Amber S. Lee

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

Enclosure
cc: Service List

| ~~August~~ November 1, 2017

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

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

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

Once on the eDockets homepage, this document can be accessed through the Search Documents link and by entering ~~the date of the filing~~ the docket number 17-587.

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-17-~~587~~

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, 2017.

**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-17-~~587~~

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, 2017.

This filing includes the following attachments:

- Attachment A:** Notice of Availability.
- Attachment B:** One paragraph summary of the filing in accordance with Minn. R. 7829.1300, subp. 1.
- Attachment C:** Petition for Change in Demand with Attachments.
- Attachment D:** Certificate 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
1995 Rahnclyff Court, Suite 200
Eagan, MN 55122
(651) 322-8901

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

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

C. Date of the Filing and Proposed Effective Date

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

D. Statute Controlling Schedule for Processing the Filing

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

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



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

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

DATED: ~~August~~ November
1, 2017

Respectfully submitted,
MINNESOTA ENERGY RESOURCES
CORPORATION

By: /s/ Amber S. Lee
Amber S. Lee
1995 Rahncliff Court, Suite 200
Eagan, MN 55122
Telephone: (651) 322-8965

STATE OF MINNESOTA
BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Nancy Lange
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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-17-~~587~~

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, 2017.

Included with this filing are the following Attachments:

Attachment 1: Design-Day Demand Summary

Attachment 2: Sales Forecast

Attachment 3: Current and Proposed Entitlement Levels

Attachment 4: Rate Impact of the Proposed Demand Change

Attachment 5: Financial Option Summary

Attachment 6: Winter Plan

Attachment 7: Entitlement History

Attachment 8: Change in Entitlement Levels and Related Demand Costs

Attachment 9: Actual Throughput and Design-Day Forecast Estimated Throughput

Attachment 10: Customer Counts

Attachment 11: Hedging Summary

Attachment 12: Forecast Methodology

II. **Discussion**

A. **MERC's Consolidated Design-Day Requirements**

Minn. R. 7825.2910, subp. 2 (b) requires that a filing upon change in demand include the utility's Design-Day demand by customer class and the change in Design-Day demand, if any, necessitating the demand revision. The Consolidated Design-Day requirement has increased by 738 dekatherms (dth) since November 1, 2016.

**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	2.99%	-1.13%	4.12%

For the Demand Entitlement filing effective November 1, 2017, the total Design-Day requirement for MERC – Consolidated is 56,266 dth (Attachment 1). The difference between

the total Design-Day requirement and total Design-Day capacity results in a 2.99% 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

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

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

See Attachment 12.

III. Additional Filing Requirements

A. Daily Design-Day Estimate to Actual Comparison

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

B. Average Customer Counts

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

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

C. Balancing

Order Point 4 of the Commission's January 21, 2015, Order in MERC's 2010-2011 demand entitlement dockets, Docket Nos. G007/M-10-1166; G007/M-10-1167; G011/M-10-1168; and G011/M-10-1169, required that in future demand entitlement filings, MERC provide a clarification of its statements regarding system balancing and detailed evidence assuring the Commission that the appropriate customer group is paying for any balancing charges or penalties. Additionally, in Docket No. G-999/AA-12-756, by Order dated November 14, 2013, the Commission ordered that "prospectively, all regulated natural gas utilities shall recover balancing service costs, and shall credit the utility's penalty revenues and the pipeline's revenue credits, to the commodity portion of the PGA effective with the earliest true-up filing (for revenues) or the earliest monthly PGA (for costs) that can reasonably be implemented."

MERC subsequently revised its monthly PGA filings, beginning November 2013, to recover all balancing costs via the commodity portion of the PGA. MERC's 2014 AAA and true-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 contract for an additional 1,550 dth/day on Great Lakes Gas Transmission and an additional 1,500 dth/day on Viking Gas Transmission over the 2016-2017

entitlement. The increase on Great Lakes Gas Transmission is due to a higher peak day forecast than in the previous year. The reserve margin on Viking Gas Transmission was negative in 2016-2017 due to a lack of available forward haul capacity. However, for 2017-2018, MERC was able to secure back haul capacity from the interconnect with Northern Natural Gas pipeline at Chisago. This is firm capacity and satisfies the peak day requirements on Viking Gas Transmission.

2. Other Demand Entitlement Changes

MERC has AECO Storage contracted through the 2017-2018 winter season. As discussed in the April 20, 2017, update filing in Docket No. G011/M-16-651, MERC has released this storage contract for 2017-2018 because it is operationally difficult to move gas to the city gate station. MERC will rely on the greater use of baseload and spot gas purchases ~~to~~ replace this storage service in the short-term and plans to contract for replacement storage in the spring of 2018. To date, MERC has contacted several storage providers and had high level discussions regarding the availability and viability of various options. In addition to physical storage, MERC is considering the potential benefits of a synthetic storage service. The Company will continue to explore alternatives for acquiring functional gas storage for MERC-Consolidated customers and anticipates making a decision regarding replacement storage in the first quarter of 2018.

E. Financial Option Units and Premiums

In accordance with the Commission's May 8, 2017, Order in Docket No. G011/M-17-85 approving MERC's variance extension request to recover the costs of financial instruments through the PGA, MERC provides the following information. MERC has completed its purchases of future contracts and call options for the 2017-2018 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. No other changes have been made to the MERC-Consolidated Demand Entitlement.:

- 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 2017-2018 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 2017/18 winter is \$3.~~29453994~~/dth. Please see Attachment 11, page 1 of 3. MERC has purchased call options at an average strike price of \$3.~~83117985~~/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, 2017. 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 our 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, 2017. If any changes to the entitlements for MERC-Consolidated are made, MERC will submit an update to this filing by November 1, 2017.

| DATED: ~~August~~ November 1, 2017

Respectfully submitted,

MINNESOTA ENERGY RESOURCES
CORPORATION

By: /s/ Amber S. Lee
Amber S. Lee
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Eagan, MN 55122
Telephone: (651) 322-8965

MINNESOTA ENERGY RESOURCES - Consolidated

DESIGN-DAY DEMAND SUMMARY

November 1, 2017

Design Day Requirement		56,266
Total Peak Day Entitlement		57,949
2016/17 Firm Peak Day Actual Sendout	1/4/2017	48,796
Firm Annual Throughput - Minnesota		4,850,725
No. of Firm Customers		35,965
Department Load Factor Calculation		27.24%

MINNESOTA ENERGY RESOURCES - Consolidated

MINNESOTA DESIGN DAY REQUIREMENTS

November 1, 2017

HDD

Pipeline Group	2016/17 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	606	119	15,949	925	16,874	7	16,881
Off Peak		57	606	119	9,025	925	9,950	7	9,957
GLGT									
Peak		107	688	234	28,570	1,784	30,354	103	30,457
Off Peak		57	688	234	15,880	1,784	17,664	103	17,767
Centra									
Peak		107	275	68	8,495	433	8,928	0	8,928
Off Peak		57	275	68	4,657	433	5,090	0	5,090
Total Consolidated									
Peak	35,965	107	1,569	421	53,014	3,142	56,156	110	56,266
Off Peak	35,965	57	1,569	421	29,562	3,142	32,704	110	32,814

MINNESOTA ENERGY RESOURCES - Consolidated

DESIGN-DAY DEMAND PER CUSTOMER

November 1, 2017

<u>Heating Season</u>	<u>No. of Firm Customers</u>	<u>Design Day Requirements</u>	<u>MMBtu /Customer /Day</u>
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
08/09	32,632	59,654	1.83

MINNESOTA ENERGY RESOURCES - Consolidated

SUMMER/WINTER USAGE - Mcf
PROJECTED 12 MONTHS ENDING JUNE 2018
Consolidated

<u>Class</u>	<u>Summer Apr-Oct</u>	<u>Winter Nov-Mar</u>	<u>Total</u>
GS	1,243,629	3,582,694	4,826,323
SVI	138,686	311,483	450,169
SVJ	8,832	15,570	24,402
LVI	224,172	244,984	469,156
LVJ	0	0	0
SLV	0	0	0
IS	<u>0</u>	<u>0</u>	<u>0</u>
Total	<u>1,615,319</u>	<u>4,154,731</u>	<u>5,770,050</u>

MINNESOTA ENERGY RESOURCES - Consolidated

**ENTITLEMENT LEVELS
 November 1, 2017**

<u>Capacity Type</u>	<i>Summer</i>			<i>April/October</i>			<i>Winter</i>		
	<u>2016/17 MMBtu</u>	<u>Change MMBtu</u>	<u>Proposed MMBtu</u>	<u>2016/17 MMBtu</u>	<u>Change MMBtu</u>	<u>Proposed MMBtu</u>	<u>2016/17 MMBtu</u>	<u>Change MMBtu</u>	<u>Proposed MMBtu</u>
FT Western Zone FT0016	10,130	0	10,130	10,130	0	10,130	10,130	0	10,130
FT Western Zone FT18528 (12)	12,600	0	12,600	12,600	0	12,600	12,600	0	12,600
FT Western Zone FT18528 (5)	0	0	0	0	0	0	3,728	0	3,728
FT Western Zone (5) FTxxxx	0	0	0	0	0	0	3,350	1,550	4,900
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 Afxxxx	0	0	0	0	0	0	0	1,500	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	54,899	3,050	57,949
Forecasted Design Day-Adjusted				32,012	802	32,814	55,528	738	56,266
Capacity Surplus/Shortage				14,711	(802)	13,909	(629)	2,312	1,683
Reserve Margin				45.95%	-3.57%	42.39%	-1.13%	4.12%	2.99%

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

RATE IMPACT OF THE PROPOSED DEMAND CHANGE
NOVEMBER 1, 2017

All costs in \$/Dth	Base Cost of Gas G011/MR15-748 Jul 1, 2017	Demand Charge Oct 1, 2016	Demand Charge Demand Filing Nov 1, 2016	Most Recent PGA Jul 1, 2017	Proposed Effective Nov 1, 2017	Result of Proposed Change				
						Change from Last Rate Case	Change from Nov 1, 2016 Demand Filing	Change from Last PGA %	Change from Last PGA \$	
1) General Service Residential Avg. Annual Use:						86	Dth			
Commodity Cost	\$2.6791	\$3.8521	\$3.8521	\$2.6791	\$2.9088	8.57%	-24.49%	8.57%	\$0.2297	
Demand Cost	\$0.7996	\$0.7996	\$0.7996	\$0.7996	\$0.7345	-8.14%	-8.14%	-8.14%	(\$0.0651)	
Commodity Margin	\$2.4116	\$2.3980	\$2.3980	\$2.4116	\$2.4116	0.00%	0.57%	0.00%	\$0.0000	
Total Cost of Gas	\$5.8903	\$7.0497	\$7.0497	\$5.8903	\$6.0549	2.79%	-14.11%	2.79%	\$0.1646	
Avg Annual Cost	\$506.57	\$606.27	\$606.27	\$506.57	\$520.72	2.79%	-14.11%	2.79%	\$14.15	
Effect of proposed commodity change on average annual bills:									\$19.75	
Effect of proposed demand change on average annual bills:									(\$5.60)	
2) Large General Service: Avg. Annual Use:						623	Dth			
Commodity Cost	\$2.6791	\$3.8521	\$3.8521	\$2.6791	\$2.9088	8.57%	-24.49%	8.57%	\$0.2297	
Demand Cost	\$0.7996	\$0.7996	\$0.7996	\$0.7996	\$0.7345	-8.14%	-8.14%	-8.14%	(\$0.0651)	
Commodity Margin	\$1.6885	\$1.8232	\$1.8232	\$1.6885	\$1.6885	0.00%	-7.39%	0.00%	\$0.0000	
Total Cost of Gas	\$5.1672	\$6.4749	\$6.4749	\$5.1672	\$5.3318	3.19%	-17.65%	3.19%	\$0.1646	
Avg Annual Cost	\$3,219.17	\$4,033.86	\$4,033.86	\$3,219.17	\$3,321.70	3.19%	-17.65%	3.19%	\$102.54	
Effect of proposed commodity change on average annual bills:									\$143.10	
Effect of proposed demand change on average annual bills:									(\$40.56)	
3) SV Interruptible Service: Avg. Annual Use:						7,637	Dth			
Commodity Cost	\$2.6791	\$3.8521	\$3.8521	\$2.6791	\$2.9088	8.57%	-24.49%	8.57%	\$0.2297	
Commodity Margin	\$0.9740	\$0.9336	\$0.9336	\$0.9740	\$0.9740	0.00%	4.33%	0.00%	\$0.0000	
Total Cost of Gas	\$3.6531	\$4.7857	\$4.7857	\$3.6531	\$3.8828	6.29%	-18.87%	6.29%	\$0.2297	
Avg Annual Cost	\$27,898.72	\$36,548.39	\$36,548.39	\$27,898.72	\$29,652.86	6.29%	-18.87%	6.29%	\$1,754.14	
Effect of proposed commodity change on average annual bills:									\$1,754.14	
4) LV Interruptible Service: Avg. Annual Use:						71,526	Dth			
Commodity Cost	\$2.6791	\$3.8521	\$3.8521	\$2.6791	\$2.9088	8.57%	-24.49%	8.57%	\$0.2297	
Commodity Margin	\$0.5329	\$0.5007	\$0.5007	\$0.5329	\$0.5329	0.00%	6.43%	0.00%	\$0.0000	
Total Cost of Gas	\$3.2120	\$4.3528	\$4.3528	\$3.2120	\$3.4417	7.15%	-20.93%	7.15%	\$0.2297	
Avg Annual Cost	\$229,741.51	\$311,338.37	\$311,338.37	\$229,741.51	\$246,170.29	7.15%	-20.93%	7.15%	\$16,428.78	
Effect of proposed commodity change on average annual bills:									\$16,428.78	

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

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

RATE IMPACT OF THE PROPOSED DEMAND CHANGE

NOVEMBER 1, 2017

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	49,765,067	\$0.01527	
FT-A ZONE 1 - 1	AF0012	Winter	1,098	3	4.3706	\$ 14,397	49,765,067	\$0.00029	
FT-A ZONE 1 - 1	Afxx	Winter	1,500	3	4.3706	\$ 19,668	49,765,067	\$0.00040	
VGT Demand						\$ 794,182	49,765,067	\$0.01596	
Great Lakes (GLGT)									
FT Western Zone	FT0016	Annual	10,130	12	\$3.8490	\$ 467,884	49,765,067	\$0.00940	
FT Western Zone	FT18528 (12)	Annual	12,600	12	\$3.8490	\$ 581,969	49,765,067	\$0.01169	
FT Western Zone	FT18528 (5)	Winter	3,728	5	\$3.8490	\$ 71,745	49,765,067	\$0.00144	
FT Western Zone	FTxxx (5)	Winter	4,900	5	\$3.8490	\$ 94,301	49,765,067	\$0.00189	
GLGT Demand						\$ 1,215,899	49,765,067	\$0.02443	
Centra									
CENTRA TRANSMISSION		Annual	9,500	12	\$11.1338	\$ 1,269,253	49,765,067	\$0.02550	
CENTRA MINNESOTA PIPELINES		Annual	9,500	12	\$3.2990	\$ 376,086	49,765,067	\$0.00756	
Centra Demand						\$ 1,645,339	49,765,067	\$0.03306	
MERC-Consolidated DEMAND - \$/therm						\$ 3,655,420		\$0.07345	
<hr/>									
FOR JOINT RATE DEMAND						49,765,067	Annual Firm Sales in therms		
MERC-Consolidated Firm (GS) Sales as approved in Docket No. G011/MR-15-748									
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		Annual	10,130	12	121,560				
FT Western Zone		Annual	12,600	12	151,200				
FT Western Zone		Winter	3,728	5	18,640				
FT Western Zone		Winter	4,900	5	24,500				
Centra									
CENTRA TRANSMISSION		Annual	9,500	12	114,000				
CENTRA MINNESOTA PIPELINES		Annual	9,500	12	114,000				
Total Demand Cost			\$ 3,655,420						
Total Demand Weighted Vol in therms			6,116,100						
Total Joint Demand Rate \$/therm			\$0.59767 /therm						

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

PRESENT AVERAGE COST OF GAS COMMODITY

NOVEMBER 1, 2017

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	\$2.70290										
FUEL 1.49%	\$0.04088									Sub 16th Revised Sheet No. 5B Apr. 1, 2006	
COMMODITY TRANSPORTATION	\$0.01160									Sub 16th Revised Sheet No. 5B Apr. 1, 2006	
GRI	\$0.00000									Sub 16th Revised Sheet No. 5B Apr. 1, 2006	
ACA	\$0.00130									Sub 16th Revised Sheet No. 5B Apr. 1, 2006	
VGT Commodity	\$2.75668	2,145,731	\$57,463	\$52,700	\$89,580	\$6,114,838	\$0.10754			VGT Commodity	
GLGT											
GAS COST	\$2.70290										
FUEL 1.383%	\$0.03789									5 Revised Sheet 4 Contract	Jun 1, 1997
COMMODITY TRANSPORTATION	\$0.00394									18th Revised Sheet No. 7	Oct. 1, 2005
GRI	\$0.00000										
ACA	\$0.00130										
GLGT Commodity	\$2.74603	2,216,718	\$59,364	\$18,785	\$0	\$6,165,323	\$0.10843			GLGT Commodity	
CENTRA											
CENTRA TRANSMISSION (\$Cdn/103M3)	1.062									Sheet 1 (N.E.B.)	
Conversion	\$0.02247										
Abandonment Toll	\$0.27803									N.E.B. MO-078-2014	Jan. 1, 2015
GAS COSTS	\$2.70290										
CUSTOMS FEE	\$0.00030										
CENTRA Commodity	\$3.00371	1,323,492	\$35,444	\$0	\$54,000	\$4,064,826	\$0.07149			Centra Commodity	
Consolidated WACOG w/Premium & Balancing		5,685,941	\$152,271	\$71,485	\$143,580	\$16,344,987	\$0.28746	\$0.00342			
Total Annual Sales in therms		56,859,413									
									\$0.29088	Total Consolidated WACOG-\$/therm	

Balancing Service			Monthly Entitlement (Dth)	Months	Rate (\$/Dth)	Contract Costs
Pipeline	Description	Season				
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)
Niska Storage (AECO)	Annual	947,820	1	\$0.5170	\$489,996	56,859,413
Niska Storage Assignment	Annual	947,820	1	\$(0.3119)	-\$295,596	56,859,413
					\$194,400	56,859,413

Total Commodity Cost:

\$0.29088

* 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 2017-2018**

Units - Gas Daily Peaker Packages (Physical)

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

Premium - Gas Daily Peaker (Monthly Cost)

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

Units - Futures (Dth)

	<u>November</u>		<u>December</u>		<u>January</u>		<u>February</u>		<u>March</u>		<u>Term Total</u>
	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	
1	05/15/17	438	05/25/17	538	05/22/17	623	05/17/17	630	05/19/17	508	82,487
2	06/07/17	313	06/21/17	538	06/19/17	623	06/08/17	630	06/14/17	395	75,237
3	07/11/17	313	07/21/17	376	07/18/17	566	07/12/17	567	07/17/17	169	59,718
4	08/01/17	313	08/24/17	376	08/21/17	509	08/07/17	504	07/17/17	169	56,199
5	09/05/17	313	09/19/17	376	09/14/17	453	09/07/17	441	08/10/17	339	57,930
6	10/03/17	313	10/17/17	376	10/18/17	453	10/05/17	441	09/12/17	339	57,930
7									10/12/17	339	10,500
8											-
9											-
10											-
Total		2,000		2,581		3,226		3,214		2,258	400,000

Units - Call Options (Dth)

	<u>November</u>		<u>December</u>		<u>January</u>		<u>February</u>		<u>March</u>		<u>Term Total</u>
	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	<u>Contract Date</u>	<u>Daily Volume</u>	
1	05/15/17	688	05/19/17	951	05/18/17	1,178	05/25/17	1,123	05/22/17	896	145,871
2	06/07/17	688	06/14/17	951	06/08/17	1,122	06/21/17	1,123	06/19/17	896	144,131
3	07/11/17	630	07/17/17	951	07/12/17	1,066	07/21/17	1,123	07/18/17	896	140,674
4	08/01/17	573	08/10/17	951	08/07/17	1,066	08/24/17	1,061	08/21/17	717	131,652
5	09/05/17	573	09/12/17	895	09/07/17	1,010	09/19/17	999	09/14/17	717	126,430
6	10/03/17	516	10/12/17	783	10/05/17	1,010	10/17/17	999	10/18/17	717	121,242
7											-
8											-
Total		3,667		5,484		6,452		6,429		4,839	810,000

Premium - Call Option (Monthly Cost)

	<u>November</u>		<u>December</u>		<u>January</u>		<u>February</u>		<u>March</u>		<u>Option Premium</u>	<u>Total Premium Cost</u>
	<u>Option Premium</u>	<u>Premium Cost</u>	<u>Option Premium</u>	<u>Premium Cost</u>	<u>Option Premium</u>	<u>Premium Cost</u>	<u>Option Premium</u>	<u>Premium Cost</u>	<u>Option Premium</u>	<u>Premium Cost</u>		
1	\$ 0.3060	\$ 6,311	\$ 0.2760	\$ 8,139	\$ 0.2790	\$ 10,190	\$ 0.2670	\$ 8,399	\$ 0.2820	\$ 7,833	\$ 0.2802	\$ 40,872
2	\$ 0.2260	\$ 4,661	\$ 0.2610	\$ 7,697	\$ 0.2560	\$ 8,904	\$ 0.2710	\$ 8,525	\$ 0.2720	\$ 7,556	\$ 0.2591	\$ 37,343
3	\$ 0.1790	\$ 3,384	\$ 0.2740	\$ 8,080	\$ 0.2720	\$ 8,988	\$ 0.2590	\$ 8,147	\$ 0.3150	\$ 8,750	\$ 0.2655	\$ 37,349
4	\$ 0.1000	\$ 1,719	\$ 0.1000	\$ 2,949	\$ 0.0950	\$ 3,139	\$ 0.0970	\$ 2,882	\$ 0.1000	\$ 2,222	\$ 0.0981	\$ 12,911
5	\$ 0.0850	\$ 1,461	\$ 0.0980	\$ 2,720	\$ 0.0970	\$ 3,037	\$ 0.1000	\$ 2,796	\$ 0.0980	\$ 2,178	\$ 0.0964	\$ 12,191
6	\$ 0.0970	\$ 1,500	\$ 0.0910	\$ 2,210	\$ 0.0940	\$ 2,943	\$ 0.1000	\$ 2,796	\$ 0.0970	\$ 2,156	\$ 0.0957	\$ 11,605
7	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total	\$ 0.1731	\$ 19,037	\$ 0.1870	\$ 31,795	\$ 0.1860	\$ 37,200	\$ 0.1864	\$ 33,545	\$ 0.2046	\$ 30,694	\$ 0.1880	\$ 152,271

Units - Collar Floor (put)

No Puts were purchased.

MINNESOTA ENERGY RESOURCES - CONSOLIDATED
17/18 Winter Portfolio Plan - MERC Hedging Plan

10000 Contract Size

System	Purchase Month	Nov-17		Dec-17		Jan-18		Feb-18		Mar-18		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 CONSOLIDATED			596,018		878,466		1,012,696		875,046		758,963		4,121,189	4,121,189
			19,867		28,338		32,668		31,252		24,483		27,113	
10%	Futures		59,602		87,847		101,270		87,505		75,896		412,119	
20%	Call		119,204		175,693		202,539		175,009		151,793		824,238	
30%	Storage		0		0		0		0		0		0	
40%	Index		417,213		614,926		708,887		612,532		531,274		2,884,832	
Contracts	May-17	1	10,000	2	20,000	2	20,000	2	20,000	2	20,000	9	90,000	
	Jun-17	1	10,000	2	20,000	2	20,000	2	20,000	1	10,000	8	80,000	
	Jul-17	1	10,000	1	10,000	2	20,000	2	20,000	1	10,000	7	70,000	
	Aug-17	1	10,000	1	10,000	2	20,000	1	10,000	1	10,000	6	60,000	
	Sep-17	1	10,000	1	10,000	1	10,000	1	10,000	1	10,000	5	50,000	
	Oct-17	1	10,000	1	10,000	1	10,000	1	10,000	1	10,000	5	50,000	
	Total	6	60,000	8	80,000	10	100,000	9	90,000	7	70,000	40	400,000	9.71%
Call Options	May-17	2	20,000	3	30,000	4	40,000	3	30,000	3	30,000	15	150,000	
	Jun-17	2	20,000	3	30,000	4	40,000	3	30,000	3	30,000	15	150,000	
	Jul-17	2	20,000	3	30,000	3	30,000	3	30,000	3	30,000	14	140,000	
	Aug-17	2	20,000	3	30,000	3	30,000	3	30,000	2	20,000	13	130,000	
	Sep-17	2	20,000	3	30,000	3	30,000	3	30,000	2	20,000	13	130,000	
	Oct-17	1	10,000	2	20,000	3	30,000	3	30,000	2	20,000	11	110,000	
	Total	11	110,000	17	170,000	20	200,000	18	180,000	15	150,000	81	810,000	19.65%
Collars	May-17	0	0	0	0	0	0	0	0	0	0	0	0	
	Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	
	Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	
	Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	
	Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	
	Oct-17	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		170,000		250,000		300,000		270,000		220,000		1,210,000	29.36%
Physical Hedges			0		0		0		0		0		0	0.00%
Storage			0		0		0		0		0		0	0.00%
Prepaid Obl			28.52%		28.46%		29.62%		30.86%		28.99%		29.36%	29.36%
Term Index	Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
	Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
	Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Total CONSOLIDATED														
Contracts													400,000	9.71%
Call Options													810,000	19.65%
Costing Collar													0	0.00%
Storage													0	0.00%
Prepaid Obl													0	0.00%
Term Index													0	0.00%
Month/Daily													2,911,189	70.64%
Total													4,121,189	100.00%

NOTE:

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

**WINTER PLAN - CONSOLIDATED
 NOVEMBER, 2017 THROUGH MARCH, 2018**

<u>PHYSICAL FIXED PRICE HEDGES</u>	<u>Deal #</u>	<u>Trigger Locked</u>	<u>Trigger Exercised</u>	<u>Receipt Point</u>	<u>Nov</u>	<u>Dec</u>	<u>Daily Volumes</u>			<u>Monthly Total</u>
							<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	

No Physical Fixed Price Hedges

Total Actual Fixed/Option Physical

-	-	-	-	-	-
---	---	---	---	---	---

INDEX

<u>Contract Number</u>	<u>Date</u>	<u>Receipt Point</u>	<u>Nov</u>	<u>Dec</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Total</u>
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

<u>Injection Month</u>	<u>Contract # AECO Volume Injected</u>	<u>Total Volume Injected</u>
May - balance forward	0	0
June	0	0
July	0	0
August	0	0
Sept	0	0
Oct (est)	0	0
Total	0	0

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

	2014 Consolidated GS	2015 Consolidated GS	2016 Consolidated GS	2017 Consolidated GS	2018 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	0	1,000	0	0	1,500	1,500
Wadena Delivered GDD Option	0	0	0	0	0	0
Great Lakes Gas Transmission (GLGT)						
FT Western Zone	10,130	10,130	10,130	10,130	10,130	0
FT Western Zone	12,600	12,600	12,600	12,600	12,600	0
FT Western Zone	3,638	3,728	3,728	3,728	3,728	0
FT Western Zone	0	3,300	3,350	3,350	4,900	1,550
Centra Transmission Holding/Centra Minnesota Pipelines (CTHI/CPMI)						
Centra FT-1	9,500	9,100	9,500	9,500	9,500	0
Total VGT Transportation	16,591	15,591	15,591	15,591	17,091	1,500
Total GLGT Transportation	26,458	26,458	29,808	29,808	31,358	1,550
Total CTHI/CPMI Transportation	9,500	9,100	9,500	9,500	9,500	0
Total Transportation	52,549	51,149	54,899	54,899	57,949	3,050
Total Seasonal Transportation	1,098	2,098	1,098	1,098	2,598	1,500
Total Seasonal Transportation %	2.09%	4.10%	2.00%	2.00%	4.48%	2.48%
<u>Other Entitlements not included in Peak Day Deliverability</u>						
AECO Storage	947,820	947,820	947,820	947,820	0	-947,820
AECO/Emerson Swap	947,823	940,428	955,255	758,254	0	-758,254

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

Change in Costs due to November,1 2016 Change in Entitlement Levels and Related Demand Costs

	2016/17 Entitlements	2017/18 Entitlements	Entitlement Change	2017/18 Rate	Months	2016/17 Total Annual Cost	2017/18 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 - 1Afx	0	1,500	1,500	\$ 4.3706	3	\$0	\$19,668	\$19,668
<u>GLGTPipeline</u>								
FT Western ZoneFT0016	10,130	10,130	0	\$ 3.8490	12	\$467,884	\$467,884	\$0
FT Western ZoneFT18528 (12)	12,600	12,600	0	\$ 3.8490	12	\$581,969	\$581,969	\$0
FT Western ZoneFT18528 (5)	3,728	3,728	0	\$ 3.8490	5	\$71,745	\$71,745	\$0
FT Western Zone (5)xxxx (Nov-Mar)	3,350	4,900	1,550	\$ 3.8490	5	\$64,471	\$94,301	\$29,830
<u>CENTRA Pipeline</u>								
CENTRA TRANSMISSION	9,100	9,500	400	\$ 11.1338	12	\$1,269,253	\$1,269,253	\$0
CENTRA MINNESOTA PIPELINES	9,100	9,500	400	\$ 3.2990	12	\$376,086	\$376,086	\$0
Total Costs Assigned to Demand Charge						\$3,605,922	\$3,655,420	\$49,498
Costs Assigned in Commodity Charge								
<u>Storage Service</u>								
Niska Storage (AECO)	947,820	947,820	0	\$ 0.4308	1	\$443,205	\$408,330	-\$34,875
Niska Storage Assignment	947,820	947,820	0	\$ (0.3119)	1	\$0	(\$295,596)	-\$295,596
<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						\$52,096	\$71,485	\$19,389
Call Options Premium						\$229,055	\$152,271	-\$76,784
Total Costs Assigned to Commodity Charge						\$867,936	\$480,070	-\$387,866

MINNESOTA ENERGY RESOURCES - Consolidated

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

Design Day:

Base	1,569
Variable	421

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 **
7/1/16	5	5	0	8	4	14,270	3,159
7/2/16	0	3	0	4	1	12,366	2,064
7/3/16	0	0	0	0	0	11,440	1,569
7/4/16	0	0	0	0	0	12,174	1,569
7/5/16	0	0	0	0	0	21,314	1,569
7/6/16	0	0	0	0	0	21,990	1,569
7/7/16	2	1	0	0	1	22,507	1,789
7/8/16	3	2	0	3	2	16,492	2,295
7/9/16	0	0	0	0	0	15,040	1,569
7/10/16	0	2	0	0	0	14,841	1,659
7/11/16	0	0	0	0	0	20,586	1,569
7/12/16	0	0	0	0	0	19,332	1,569
7/13/16	5	0	0	1	2	20,366	2,216
7/14/16	7	5	7	6	7	18,946	4,344
7/15/16	4	4	0	7	3	14,173	2,852
7/16/16	0	0	0	0	0	13,102	1,569
7/17/16	0	0	0	1	0	15,066	1,617
7/18/16	0	0	0	5	1	19,322	2,024
7/19/16	0	0	0	0	0	19,453	1,569
7/20/16	0	0	0	0	0	18,217	1,569
7/21/16	0	0	0	0	0	18,781	1,569
7/22/16	0	0	0	0	0	10,561	1,569
7/23/16	0	0	0	0	0	10,116	1,569
7/24/16	0	0	0	0	0	11,198	1,569
7/25/16	0	0	0	0	0	15,577	1,569
7/26/16	0	0	0	0	0	17,092	1,569
7/27/16	0	5	0	0	1	19,570	1,833
7/28/16	3	6	0	3	2	19,341	2,535
7/29/16	0	6	0	0	1	13,455	1,889
7/30/16	0	0	0	0	0	11,178	1,569
7/31/16	0	0	0	0	0	12,811	1,569
8/1/16	0	0	0	0	0	18,327	1,569
8/2/16	0	0	0	0	0	18,758	1,569
8/3/16	0	0	0	0	0	17,938	1,569
8/4/16	1	0	0	0	0	18,251	1,641
8/5/16	3	1	0	2	1	14,624	2,182
8/6/16	5	2	0	6	3	12,805	2,833
8/7/16	0	3	0	2	1	12,430	1,913
8/8/16	0	0	0	0	0	22,122	1,569
8/9/16	0	0	0	0	0	20,894	1,569
8/10/16	0	2	0	0	0	25,005	1,659
8/11/16	0	0	0	0	0	18,474	1,569
8/12/16	0	0	0	1	0	13,881	1,617
8/13/16	1	0	0	5	1	11,734	2,084
8/14/16	0	0	0	3	1	12,269	1,821
8/15/16	0	0	0	0	0	17,815	1,569
8/16/16	0	0	0	0	0	18,735	1,569
8/17/16	0	0	0	0	0	19,707	1,569
8/18/16	0	0	0	2	0	19,713	1,772
8/19/16	1	0	0	1	1	16,344	1,808
8/20/16	12	8	8	12	10	12,292	5,751
8/21/16	3	4	0	3	2	13,195	2,499
8/22/16	0	0	0	0	0	18,151	1,569
8/23/16	0	0	0	0	0	18,284	1,569
8/24/16	2	0	0	1	1	20,269	1,940
8/25/16	11	7	6	12	9	20,359	5,216
8/26/16	0	2	0	2	1	14,980	1,847
8/27/16	6	5	0	4	3	13,055	2,933
8/28/16	0	0	0	0	0	13,335	1,569
8/29/16	4	0	0	4	2	23,510	2,372
8/30/16	7	4	0	7	4	24,697	3,370
8/31/16	8	3	0	7	4	20,399	3,320
9/1/16	2	6	0	3	2	17,382	2,425
9/2/16	0	3	0	1	1	13,842	1,792
9/3/16	0	1	0	0	0	11,740	1,597
9/4/16	0	0	0	0	0	10,622	1,569
9/5/16	0	0	2	1	1	11,929	1,976
9/6/16	7	0	1	8	4	19,948	3,400

9/7/16	3	2	0	4	2	20,892	2,363
9/8/16	5	2	1	6	3	19,887	2,947
9/9/16	10	4	6	7	7	16,365	4,553
9/10/16	6	8	1	7	5	12,856	3,540
9/11/16	1	0	0	0	0	13,247	1,701
9/12/16	12	5	9	10	9	10,732	5,548
9/13/16	26	17	18	20	21	14,261	10,279
9/14/16	13	11	8	14	11	13,059	6,246
9/15/16	4	3	0	4	2	19,055	2,546
9/16/16	4	4	5	3	4	16,281	3,326
9/17/16	11	12	1	12	8	13,513	4,852
9/18/16	5	2	2	4	3	13,676	2,929
9/19/16	7	7	0	13	6	21,835	4,041
9/20/16	10	5	5	10	8	20,381	4,861
9/21/16	9	4	4	10	7	22,369	4,519
9/22/16	8	9	4	14	8	18,730	4,992
9/23/16	7	7	1	7	5	15,453	3,542
9/24/16	3	6	0	4	3	15,210	2,751
9/25/16	15	9	12	8	12	17,477	6,475
9/26/16	17	15	14	19	16	24,793	8,325
9/27/16	24	19	15	18	18	26,738	9,332
9/28/16	13	11	12	9	11	26,814	6,360
9/29/16	15	10	7	15	12	20,215	6,417
9/30/16	12	12	2	18	10	21,490	5,712
10/1/16	8	11	0	9	6	20,616	3,960
10/2/16	5	9	0	8	4	21,101	3,399
10/3/16	1	10	0	4	2	27,323	2,548
10/4/16	7	2	9	2	6	28,327	4,076
10/5/16	25	17	24	19	22	32,721	10,917
10/6/16	26	20	25	23	24	31,696	11,662
10/7/16	31	28	31	28	30	33,514	14,100
10/8/16	31	29	27	28	28	35,728	13,509
10/9/16	21	21	17	21	19	34,501	9,776
10/10/16	8	2	7	9	7	38,325	4,524
10/11/16	29	17	31	27	28	44,182	13,190
10/12/16	35	29	31	32	32	48,551	15,038
10/13/16	24	23	21	24	23	38,506	11,216
10/14/16	16	13	9	15	13	29,931	7,063
10/15/16	19	16	11	18	16	24,883	8,191
10/16/16	15	15	9	21	14	20,299	7,604
10/17/16	21	16	17	20	19	26,821	9,521
10/18/16	22	13	17	22	19	29,307	9,698
10/19/16	32	30	29	31	31	34,847	14,422
10/20/16	31	26	25	33	29	31,415	13,617
10/21/16	29	27	24	28	27	26,412	12,845
10/22/16	22	17	17	21	19	20,589	9,676
10/23/16	34	28	27	35	31	26,529	14,658
10/24/16	27	24	25	29	26	32,105	12,637
10/25/16	24	26	19	26	23	32,627	11,331
10/26/16	28	28	21	26	25	33,157	11,979
10/27/16	23	23	15	21	19	26,059	9,772
10/28/16	16	16	15	22	17	19,869	8,740
10/29/16	29	23	29	30	28	23,861	13,519
10/30/16	28	27	30	27	28	25,251	13,491
10/31/16	21	21	10	21	17	28,528	8,730
11/1/16	27	24	20	26	24	29,732	11,726
11/2/16	22	21	19	25	21	29,595	10,585
11/3/16	24	20	17	29	22	26,366	10,887
11/4/16	17	16	12	20	16	19,379	8,168
11/5/16	12	13	6	16	11	15,871	6,236
11/6/16	5	7	3	3	4	14,155	3,237
11/7/16	22	17	21	17	20	26,282	9,914
11/8/16	22	24	19	25	22	29,938	10,789
11/9/16	14	16	15	13	14	26,316	7,477
11/10/16	26	21	25	26	25	26,643	12,036
11/11/16	29	30	29	32	30	28,850	13,992
11/12/16	19	22	19	18	19	24,139	9,620
11/13/16	17	14	17	17	17	21,879	8,518
11/14/16	27	23	25	26	25	30,473	12,262
11/15/16	25	25	20	28	24	28,570	11,628
11/16/16	23	24	21	30	24	30,441	11,636
11/17/16	35	26	35	32	33	32,259	15,535
11/18/16	47	43	47	47	46	36,839	21,128
11/19/16	48	50	41	51	47	38,001	21,181
11/20/16	47	43	42	49	45	38,255	20,679
11/21/16	44	42	39	43	42	41,872	19,142
11/22/16	37	37	32	36	35	40,051	16,337
11/23/16	35	35	32	34	34	34,640	15,701
11/24/16	35	33	32	34	33	28,479	15,595
11/25/16	37	34	30	33	33	30,835	15,536

11/26/16	36	32	30	38	34	33,120	15,700
11/27/16	36	33	31	37	34	34,217	15,864
11/28/16	28	27	29	31	29	38,286	13,626
11/29/16	31	31	33	33	32	40,217	15,179
11/30/16	37	34	36	38	36	45,161	16,830
12/1/16	42	39	38	41	40	42,341	18,479
12/2/16	44	40	40	43	42	35,832	19,053
12/3/16	42	39	39	44	41	34,143	18,891
12/4/16	38	36	41	38	39	32,733	17,801
12/5/16	44	37	40	37	40	41,879	18,475
12/6/16	54	53	61	46	54	52,309	24,512
12/7/16	56	53	60	48	55	53,539	24,834
12/8/16	58	54	60	57	58	52,456	26,067
12/9/16	72	63	70	74	71	57,845	31,288
12/10/16	75	62	66	72	69	56,118	30,769
12/11/16	68	59	66	70	67	54,374	29,648
12/12/16	75	70	74	75	74	66,353	32,624
12/13/16	76	73	73	75	75	66,152	32,942
12/14/16	85	80	79	82	81	73,961	35,838
12/15/16	75	70	71	73	72	64,237	31,973
12/16/16	71	64	76	73	72	59,254	31,959
12/17/16	86	82	86	87	86	67,390	37,656
12/18/16	76	78	73	77	75	66,550	33,296
12/19/16	46	51	44	47	46	55,843	21,021
12/20/16	49	41	42	49	45	55,378	20,616
12/21/16	44	42	42	47	44	52,698	19,913
12/22/16	43	40	42	45	43	47,128	19,477
12/23/16	41	36	46	41	42	38,643	19,413
12/24/16	56	45	53	63	55	43,495	24,752
12/25/16	45	40	38	49	43	40,549	19,585
12/26/16	57	57	59	51	56	49,865	25,235
12/27/16	56	57	52	63	56	59,764	25,289
12/28/16	47	45	43	47	45	52,780	20,642
12/29/16	56	53	48	57	53	55,008	23,899
12/30/16	62	54	53	71	60	48,723	26,706
12/31/16	58	52	52	64	57	47,069	25,401
1/1/17	57	49	50	63	55	46,385	24,562
1/2/17	58	41	61	56	56	46,212	25,215
1/3/17	86	67	80	72	78	70,482	34,505
1/4/17	86	85	79	85	83	79,306	36,505
1/5/17	89	82	81	84	84	78,127	36,940
1/6/17	82	79	75	83	79	68,353	35,014
1/7/17	80	76	77	80	78	67,584	34,545
1/8/17	70	68	69	70	69	62,417	30,807
1/9/17	63	53	64	61	62	62,367	27,486
1/10/17	73	61	71	66	69	68,118	30,566
1/11/17	79	72	74	81	77	69,701	33,786
1/12/17	87	78	81	91	85	72,569	37,197
1/13/17	80	76	77	83	79	65,305	34,966
1/14/17	62	59	64	63	63	57,699	27,918
1/15/17	51	52	56	54	53	51,359	24,088
1/16/17	53	44	56	55	53	56,195	24,055
1/17/17	53	39	55	53	52	52,514	23,269
1/18/17	36	34	41	37	38	45,137	17,403
1/19/17	31	27	30	34	31	40,730	14,417
1/20/17	35	32	31	32	32	40,948	15,077
1/21/17	33	31	29	32	31	39,226	14,607
1/22/17	34	31	32	31	32	39,525	15,049
1/23/17	38	33	35	36	36	45,394	16,639
1/24/17	43	39	41	41	41	51,929	18,873
1/25/17	50	43	48	45	47	55,353	21,399
1/26/17	56	48	52	52	53	51,043	23,684
1/27/17	51	47	44	52	48	42,904	21,807
1/28/17	53	51	39	53	48	43,786	21,729
1/29/17	55	58	41	57	51	45,987	22,953
1/30/17	41	47	34	46	41	48,481	18,623
1/31/17	62	52	54	62	58	54,698	25,814
2/1/17	74	68	67	72	70	66,032	31,054
2/2/17	73	70	65	75	70	65,397	31,160
2/3/17	62	60	57	65	61	56,360	27,105
2/4/17	59	51	55	63	57	56,913	25,740
2/5/17	65	57	57	67	62	56,588	27,573
2/6/17	58	51	62	62	60	57,519	26,642
2/7/17	75	65	75	75	74	65,321	32,670
2/8/17	77	71	73	79	75	70,499	33,348
2/9/17	64	63	63	67	64	62,206	28,604
2/10/17	39	38	34	44	38	40,342	17,662
2/11/17	47	40	41	46	44	40,586	19,946
2/12/17	46	40	37	45	42	40,970	19,211
2/13/17	38	33	34	36	35	40,998	16,505

2/14/17	57	48	45	59	52	49,407	23,354
2/15/17	50	49	41	54	48	48,894	21,577
2/16/17	36	37	30	35	34	42,133	15,765
2/17/17	24	24	25	22	24	29,803	11,599
2/18/17	30	27	26	29	28	28,900	13,276
2/19/17	28	27	19	29	25	29,286	12,109
2/20/17	31	27	26	28	28	37,061	13,301
2/21/17	27	24	27	28	26	35,866	12,721
2/22/17	39	33	38	40	38	43,683	17,616
2/23/17	52	46	47	52	49	47,833	22,295
2/24/17	57	57	52	59	56	48,123	24,990
2/25/17	49	50	48	54	50	43,219	22,642
2/26/17	57	55	52	59	55	47,024	24,853
2/27/17	46	39	43	48	45	43,981	20,329
2/28/17	46	42	48	51	47	47,845	21,492
3/1/17	56	49	54	56	55	47,351	24,515
3/2/17	67	66	55	72	64	51,926	28,410
3/3/17	55	53	47	59	53	39,899	23,744
3/4/17	38	39	33	38	36	31,431	16,907
3/5/17	26	25	22	28	25	22,643	11,944
3/6/17	39	33	28	40	35	35,530	16,164
3/7/17	64	52	58	63	60	49,366	26,849
3/8/17	61	58	52	68	59	53,293	26,433
3/9/17	72	64	67	75	70	54,918	30,868
3/10/17	68	66	65	73	68	55,259	30,148
3/11/17	62	58	57	63	60	49,209	26,881
3/12/17	61	55	63	61	61	49,060	27,245
3/13/17	58	57	55	59	57	50,229	25,616
3/14/17	51	52	51	51	51	50,532	23,056
3/15/17	45	41	46	44	44	43,210	20,188
3/16/17	37	36	33	36	35	32,124	16,441
3/17/17	45	38	43	45	43	34,170	19,795
3/18/17	42	37	39	45	41	31,941	18,780
3/19/17	26	30	20	29	25	28,380	12,102
3/20/17	39	33	33	40	36	38,069	16,865
3/21/17	52	49	49	53	51	44,841	22,960
3/22/17	45	41	42	45	43	42,502	19,865
3/23/17	32	33	30	30	31	33,777	14,608
3/24/17	30	32	35	31	32	29,060	15,078
3/25/17	31	35	32	31	32	26,757	14,918
3/26/17	27	32	27	30	28	25,759	13,476
3/27/17	24	27	22	22	23	28,700	11,333
3/28/17	22	19	21	24	22	31,519	10,776
3/29/17	26	34	21	28	26	35,449	12,328
3/30/17	26	31	22	25	25	28,906	12,139
3/31/17	19	23	15	20	19	23,919	9,378
4/1/17	25	21	18	26	22	17,808	10,953
4/2/17	22	21	18	21	20	16,439	10,081
4/3/17	24	22	19	23	22	19,091	10,671
4/4/17	26	22	19	28	23	20,528	11,414
4/5/17	35	27	30	31	31	22,300	14,718
4/6/17	32	30	21	31	28	22,490	13,182
4/7/17	18	19	13	19	17	21,840	8,708
4/8/17	15	15	10	15	13	20,441	7,068
4/9/17	25	19	32	25	26	25,394	12,724
4/10/17	33	34	33	36	34	28,676	15,886
4/11/17	26	28	22	29	26	26,036	12,348
4/12/17	19	17	14	23	18	23,578	9,007
4/13/17	12	19	12	17	14	16,797	7,554
4/14/17	10	16	4	8	8	14,136	5,091
4/15/17	14	13	15	17	15	12,776	7,802
4/16/17	25	25	22	29	25	17,098	11,952
4/17/17	27	31	25	29	27	29,599	13,073
4/18/17	34	29	28	34	31	28,052	14,666
4/19/17	24	30	21	21	23	24,925	11,277
4/20/17	26	32	21	25	25	20,856	11,980
4/21/17	17	18	14	20	17	14,645	8,611
4/22/17	19	17	17	22	18	16,194	9,342
4/23/17	38	35	30	35	34	22,732	15,801
4/24/17	27	28	26	33	28	24,491	13,360
4/25/17	39	24	38	41	37	28,860	17,171
4/26/17	44	39	44	46	44	33,073	19,999
4/27/17	44	42	35	42	40	27,727	18,441
4/28/17	33	30	27	35	31	20,333	14,580
4/29/17	21	24	19	24	21	17,052	10,564
4/30/17	19	28	15	18	19	18,125	9,360
5/1/17	28	33	18	23	24	33,550	11,678
5/2/17	14	18	10	21	15	28,353	7,818
5/3/17	19	11	16	18	17	27,789	8,525
5/4/17	15	17	7	15	13	23,639	6,845

5/5/17	11	14	4	14	10	17,241	5,660
5/6/17	10	25	2	24	12	16,927	6,783
5/7/17	11	22	0	20	10	18,753	5,971
5/8/17	9	20	10	12	12	22,676	6,469
5/9/17	14	10	7	19	12	21,839	6,772
5/10/17	26	14	18	28	22	25,442	10,886
5/11/17	19	17	4	23	14	20,263	7,625
5/12/17	9	11	5	15	9	15,317	5,509
5/13/17	6	12	0	14	7	13,285	4,369
5/14/17	5	18	0	11	6	14,659	4,261
5/15/17	3	16	0	6	4	21,928	3,338
5/16/17	10	15	9	10	11	24,141	5,991
5/17/17	20	16	19	19	19	27,936	9,443
5/18/17	24	23	16	25	22	29,244	10,636
5/19/17	17	22	13	20	17	25,377	8,793
5/20/17	24	27	23	21	23	24,632	11,324
5/21/17	24	22	21	20	22	24,922	10,683
5/22/17	19	16	13	18	16	29,410	8,503
5/23/17	22	16	19	23	20	27,839	10,082
5/24/17	12	18	7	12	11	23,902	6,336
5/25/17	8	12	7	5	7	17,181	4,680
5/26/17	7	8	5	6	6	14,470	4,153
5/27/17	4	3	2	4	3	12,923	2,857
5/28/17	13	9	5	9	8	13,690	5,132
5/29/17	19	16	12	18	16	16,816	8,195
5/30/17	19	18	12	23	17	27,972	8,749
5/31/17	13	14	3	16	10	28,873	5,911
6/1/17	1	4	0	6	2	22,259	2,383
6/2/17	0	2	0	0	0	13,831	1,659
6/3/17	0	0	0	0	0	14,595	1,569
6/4/17	5	1	0	1	2	19,111	2,352
6/5/17	0	11	0	1	2	25,623	2,235
6/6/17	0	6	0	0	1	24,902	1,917
6/7/17	2	0	0	1	1	24,971	1,870
6/8/17	4	2	0	4	2	21,287	2,462
6/9/17	0	3	0	0	0	15,062	1,721
6/10/17	0	0	0	2	0	14,982	1,724
6/11/17	3	4	0	1	2	13,535	2,204
6/12/17	1	0	0	4	1	19,074	1,987
6/13/17	4	11	0	6	4	21,232	3,197
6/14/17	0	8	0	0	1	19,654	2,035
6/15/17	1	1	0	5	1	18,843	2,194
6/16/17	0	0	0	3	1	13,844	1,821
6/17/17	5	0	0	6	3	13,537	2,707
6/18/17	7	5	3	9	6	15,191	4,088
6/19/17	7	11	3	11	7	20,582	4,499
6/20/17	10	8	0	11	7	21,025	4,366
6/21/17	1	3	0	3	1	21,153	2,037
6/22/17	1	1	0	1	1	17,950	1,836
6/23/17	11	7	9	6	9	15,627	5,174
6/24/17	12	9	14	10	12	15,725	6,654
6/25/17	17	14	10	16	14	17,032	7,328
6/26/17	9	8	2	10	6	23,231	4,238
6/27/17	0	2	0	3	1	19,685	1,920
6/28/17	5	8	0	4	3	21,400	2,995
6/29/17	1	5	0	7	3	19,414	2,624
6/30/17	6	2	4	5	4	22,497	3,384
Totals	9,596	8,980	8,461	9,802	9,162	11,208,959	4,430,034

* 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, 2015 through June 30, 2016

Tariff Rate Class	Rate Designation	Jul-16 Average Customers	Aug-16 Average Customers	Sep-16 Average Customers	Oct-16 Average Customers	Nov-16 Average Customers	Dec-16 Average Customers	Jan-17 Average Customers	Feb-17 Average Customers	Mar-17 Average Customers	Apr-17 Average Customers	May-17 Average Customers	Jun-17 Average Customers	Annual Average Customers
GS- Residential	MERC000002	30,073	30,265	30,745	30,408	30,561	30,579	30,884	30,528	30,761	30,500	30,617	30,878	30,567
GS-C&I <1,500 therms/yr (Small)	MERC000006	1,993	2,211	2,123	2,075	2,110	2,104	2,161	2,128	2,128	2,105	2,122	2,163	2,119
GS-C&I >1,500 therms/yr (Large)	MERC000010	3,130	3,393	3,318	3,254	3,264	3,284	3,322	3,292	3,284	3,258	3,253	3,305	3,280
Small Volume Interruptible (SVI)	MERC000017	50	125	59	88	71	75	72	53	90	69	103	74	77
Small Volume Interruptible w/Joint (SVJ)	MERC000021	3	9	1	15	9	0	6	6	15	4	4	4	6
Large Volume Interruptible (LVI)	MERC000024	7	9	6	12	7	9	7	6	8	7	7	7	8
Total		35,256	36,012	36,252	35,852	36,022	36,051	36,452	36,013	36,286	35,943	36,106	36,431	36,056

MINNESOTA ENERGY RESOURCES - Consolidated
Projected Fixed Cost - November 2017 through March 2018

Futures Contracts WACOG

10,000 Dth/contract										30 Nov-17										31 Dec-17										31 Jan-18									
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	05/15/17	49759	7	70,000	\$ 3,4930	\$ 244,510	\$ 2,8540	\$ 199,790	\$ 44,730	\$ -	\$ 244,510	1	05/29/17	50414	10	100,000	\$ 3,5020	\$ 350,200	\$ 3,0650	\$ 306,500	\$ 43,700	\$ -	\$ 350,200	1	05/22/17	50129	11	110,000	\$ 3,8910	\$ 428,010	\$ 3,1940	\$ 351,340	\$ 54,670	\$ -	\$ 428,010				
2	06/07/17	52816	5	50,000	\$ 3,1410	\$ 157,050	\$ 2,8540	\$ 142,700	\$ 14,350	\$ -	\$ 157,050	2	06/21/17	51426	10	100,000	\$ 3,1630	\$ 316,300	\$ 3,0650	\$ 306,500	\$ 9,800	\$ -	\$ 316,300	2	06/19/17	51285	11	110,000	\$ 3,2370	\$ 356,070	\$ 3,1940	\$ 351,340	\$ 4,730	\$ -	\$ 356,070				
3	07/11/17	52115	5	50,000	\$ 3,1320	\$ 156,600	\$ 2,8540	\$ 142,700	\$ 13,900	\$ -	\$ 156,600	3	07/21/17	52599	7	70,000	\$ 3,2220	\$ 225,540	\$ 3,0650	\$ 214,550	\$ 10,990	\$ -	\$ 225,540	3	07/18/17	52342	10	100,000	\$ 3,4030	\$ 340,300	\$ 3,1940	\$ 319,400	\$ 20,900	\$ -	\$ 340,300				
4	08/01/17	53035	5	50,000	\$ 2,9000	\$ 145,000	\$ 2,8540	\$ 142,700	\$ 2,300	\$ -	\$ 145,000	4	08/24/17	53972	7	70,000	\$ 3,1910	\$ 223,370	\$ 3,0650	\$ 214,550	\$ 8,820	\$ -	\$ 223,370	4	08/21/17	53795	9	90,000	\$ 3,2790	\$ 295,110	\$ 3,1940	\$ 287,460	\$ 7,650	\$ -	\$ 295,110				
5	09/05/17	54467	5	50,000	\$ 3,0500	\$ 152,500	\$ 2,8540	\$ 142,700	\$ 9,800	\$ -	\$ 152,500	5	09/19/17	55041	7	70,000	\$ 3,3270	\$ 233,090	\$ 3,0650	\$ 214,550	\$ 19,040	\$ -	\$ 233,090	5	09/14/17	54971	8	80,000	\$ 3,3510	\$ 268,080	\$ 3,1940	\$ 255,520	\$ 12,560	\$ -	\$ 268,080				
6	10/03/17	55666	5	50,000	\$ 2,8970	\$ 144,850	\$ 2,8540	\$ 142,700	\$ 2,150	\$ -	\$ 144,850	6	10/17/17	56048	7	70,000	\$ 3,1620	\$ 221,340	\$ 3,0650	\$ 214,550	\$ 6,790	\$ -	\$ 221,340	6	10/18/17	56094	8	80,000	\$ 3,2010	\$ 256,080	\$ 3,1940	\$ 255,520	\$ 560	\$ -	\$ 256,080				
7												7													7														
8												8														8													
9												9														9													
10												10														10													
11												11														11													
12												12														12													
13												13														13													
14												14														14													
15												15														15													
			32	320,000		\$ 1,000,510	\$ 3,1266	\$ 913,280	\$ 87,230	\$ -	\$ 1,000,510	Total				48	480,000	\$ 3,2715	\$ 1,570,340	\$ 1,471,200	\$ 99,140	\$ -	\$ 1,570,340	Total	Total		57	570,000		\$ 1,921,650	\$ 3,3713	\$ 1,820,580	\$ 1,501,180	\$ 101,070	\$ -	\$ 1,921,650			
NNG	26	81.25%	26	260,000	\$ 3,1266	\$ 812,914	\$ 2,8540	\$ 742,040	\$ 70,874	\$ -	\$ 812,914	NNG	40	83.33%	40	400,000	\$ 3,2715	\$ 1,308,617	\$ 1,226,000	\$ 82,617	\$ -	\$ 1,308,617	NNG	47	82.46%	47	470,000	\$ 3,3713	\$ 1,584,518	\$ 1,394,000	\$ 1,501,180	\$ 83,338	\$ -	\$ 1,584,518					
Other-Cons	6	18.75%	6	60,000	\$ 3,1266	\$ 187,596	\$ 2,8540	\$ 171,240	\$ 16,356	\$ -	\$ 187,596	Other-Cons	8	16.67%	8	80,000	\$ 3,2715	\$ 261,723	\$ 245,200	\$ 16,523	\$ -	\$ 261,723	Other-Cons	10	17.54%	10	100,000	\$ 3,3713	\$ 337,132	\$ 319,400	\$ 319,400	\$ 17,732	\$ -	\$ 337,132					
Total	32	100.0%	32	320,000	\$ 3,1266	\$ 1,000,510	\$ 2,8540	\$ 913,280	\$ 87,230	\$ -	\$ 1,000,510	Total	48	100.0%	48	480,000	\$ 3,2715	\$ 1,570,340	\$ 1,471,200	\$ 99,140	\$ -	\$ 1,570,340	Total	57	100.0%	57	570,000	\$ 3,3713	\$ 1,921,650	\$ 1,820,580	\$ 1,501,180	\$ 101,070	\$ -	\$ 1,921,650					

Feb-18										Mar-18										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	05/17/17	49891	10	100,000	\$ 3,5490	\$ 354,900	\$ 3,2030	\$ 320,300	\$ 34,600	\$ -	\$ 354,900	1	05/19/17	50037	9	90,000	\$ 3,5110	\$ 315,990	\$ 3,1640	\$ 284,760	\$ 31,230	\$ -	\$ 315,990	1																	
2	06/08/17	50952	10	100,000	\$ 3,3440	\$ 334,400	\$ 3,2030	\$ 320,300	\$ 14,100	\$ -	\$ 334,400	2	06/14/17	51117	7	70,000	\$ 3,1960	\$ 223,720	\$ 3,1640	\$ 221,480	\$ 2,240	\$ -	\$ 223,720	2																	
3	07/12/17	52186	9	90,000	\$ 3,3040	\$ 297,360	\$ 3,2030	\$ 288,270	\$ 9,090	\$ -	\$ 297,360	3	07/17/17	52310	3	30,000	\$ 3,2720	\$ 98,160	\$ 3,1640	\$ 94,520	\$ 3,240	\$ -	\$ 98,160	3																	
4	08/07/17	53246	8	80,000	\$ 3,1580	\$ 252,640	\$ 3,2030	\$ 286,240	\$ 3,600	\$ -	\$ 252,640	4	07/17/17	52311	3	30,000	\$ 3,2730	\$ 98,190	\$ 3,1640	\$ 94,520	\$ 3,270	\$ -	\$ 98,190	4																	
5	09/07/17	54612	7	70,000	\$ 3,3250	\$ 232,750	\$ 3,2030	\$ 224,210	\$ 8,540	\$ -	\$ 232,750	5	06/19/17	53984	6	60,000	\$ 3,1960	\$ 191,760	\$ 3,1640	\$ 189,640	\$ 1,920	\$ -	\$ 191,760	5																	
6	10/05/17	55760	7	70,000	\$ 3,2560	\$ 227,920	\$ 3,2030	\$ 224,210	\$ 3,710	\$ -	\$ 227,920	6	09/12/17	54768	6	60,000	\$ 3,3302	\$ 199,810	\$ 3,1640	\$ 189,840	\$ 9,970	\$ -	\$ 199,810	6																	
7												7													7																
8												8													8																
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15												15													15																
Total			51	510,000		\$ 1,699,970	\$ 3,3333	\$ 1,633,530	\$ 66,440	\$ -	\$ 1,699,970	Total				40	400,000	\$ 3,2976	\$ 1,319,030	\$ 1,265,600	\$ 53,430	\$ -	\$ 1,319,030	Total	Total	228	2,280,000		\$ 7,511,500	\$ 3,2945	\$ 7,104,190	\$ 5,857,841	\$ 407,310	\$ -	\$ 7,511,500						
NNG	42	82.35%	42	420,000	\$ 3,3333	\$ 1,399,975	\$ 3,2030	\$ 1,345,260	\$ 54,715	\$ -	\$ 1,399,975	NNG	33	82.50%	33	330,000	\$ 3,2976	\$ 1,088,200	\$ 1,044,120	\$ 44,080	\$ -	\$ 1,088,200	NNG	188	82.46%	188	1,880,000	\$ 3,2945	\$ 6,193,693	\$ 5,115,000	\$ 5,857,841	\$ 335,852	\$ -	\$ 6,193,693							
Other-Cons	9	17.65%	9	90,000	\$ 3,3333	\$ 299,995	\$ 3,2030	\$ 288,270	\$ 11,725	\$ -	\$ 299,995	Other-Cons	7	17.50%	7	70,000	\$ 3,2976	\$ 230,830	\$ 221,480	\$ 9,350	\$ -	\$ 230,830	Other-Cons	40	17.54%	40	400,000	\$ 3,2945	\$ 1,317,807	\$ 1,159,000	\$ 1,246,349	\$ 71,458	\$ -	\$ 1,317,807							
Total	51	100.0%	51	510,000	\$ 3,3333	\$ 1,699,970	\$ 3,2030	\$ 1,633,530	\$ 66,440	\$ -	\$ 1,699,970	Total	40	100.0%	40	400,000	\$ 3,2976	\$ 1,319,030	\$ 1,265,600	\$ 53,430	\$ -	\$ 1,319,030	Total	228	100.0%	228	2,280,000	\$ 3,2945	\$ 7,511,500	\$ 6,115,000	\$ 7,104,190	\$ 407,310	\$ -	\$ 7,511,500							

*Prices from 10/24/16 NYMEX market

MINNESOTA ENERGY RESOURCES - Consolidated

Projected Storage Cost - November 2017 through March 2018

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

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

\$ 3,219,180

Month/ Year	AECO Storage Volume (Dth)	Total AECO Market WACOG	Total AECO Market Cost
Nov-17	0		\$ -
Dec-17	0		\$ -
Jan-18	0		\$ -
Feb-18	0		\$ -
Mar-18	0		\$ -
Total	0		\$ -

\$ -

Max NNG-MERC Storage (Storage plan withdrawals through Apr 18)
 Max AECO Storage (Storage plan withdrawals through Apr 18)

6,062,969

6,519,321
 947,820

06/30/17 Storage Balance - NNG-MERC
 06/30/17 Storage Balance - AECO

1,261,867
 0

19.36%
 0.00%
 1,173,536
 0

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

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

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

1. Peak-day

a. Purpose

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

b. Background

MERC customers are served by four pipelines¹

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

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

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

	Pipeline	PGA	Weather Station(s)
1	Centra	MERC Consolidated	International Falls
2	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) in the last 20 years for the time period January 1996-December 2016. This is a change from prior analysis that used a rolling 20-year period. The change was included because many weather stations experienced historically cold weather in the January/February 1996 time period and without inclusion of that additional data from January/February 1996, AHDD65 were materially lower and not reflective of MERC’s capacity needs. The results are provided in the following table:

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

- ii. The **Regression Generation of Net Daily Metered Volumes** consisted of:
- For each of the pipelines and weather stations:

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

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

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

Exhibit 1
Pipeline and Weather Station Regression Notes

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

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

VGT Lamb Weston mapped to Fargo

NNG Taconites / Direct Connects =

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

NNG OSEU (End Users) =

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

B. Daily Firm Capacity

VGT

- DETROIT LAKES MIDDLE SCHOOL
- ROSSMAN SCHOOL

GLGT

- AMERIPRIDE
- NORTHLAND APTS

NNG

- HENDRICKS HOSPITAL
- BRAND FX BODY INC

4. Autocorrelation Review

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

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

5. Design-Day Model

Order Point 5 of the Commission's January 21, 2015, Order in MERC's 2010-2011 demand entitlement dockets, Docket Nos. G007/M-10-1166, G007/M-10-1167, G011/M-10-1168, and G011/M-10-1169, required that in future demand entitlement filings, MERC provide

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

6. Verification of Regression Analysis Results

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

ATTACHMENT D

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

Docket No. G011/M-17-~~587~~

CERTIFICATE OF SERVICE

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

| Dated this 1st day of ~~August~~, November, 2017.

/s/ Kristin M. Stastny
Kristin M. Stastny

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