



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

August 1, 2019

**VIA ELECTRONIC FILING**

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

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

**Docket No. G011/M-19- \_\_\_\_**

Dear Mr. Wolf:

In accordance with Minnesota Rule 7825.2910, subpart 2, please find enclosed Minnesota Energy Resources Corporation's (MERC or Company) request to change demand entitlements for its Consolidated purchased gas adjustment area. Please note that any updated information will be provided with MERC's November 1, 2019, filing. MERC is also filing Excel and PDF versions of the attachments.

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

Please contact me at (414) 221-2374 if you have any questions regarding the information in this filing. Thank you for your attention to this matter.

Sincerely,

/s/ Mary L. Wolter

Mary L. Wolter  
Director – Gas Regulatory Planning & Policy

Enclosures

cc: Service List

August 1, 2019

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:

Mary Wolter  
Minnesota Energy Resources Corporation  
2685 145<sup>th</sup> Street West  
Rosemount, MN 55068  
(414) 221-2374

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

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

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

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

**Katie Sieben  
Dan Lipschultz  
Matt Schuerger  
Valerie Means  
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-19-\_\_\_\_

**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, 2019.

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

**Katie Sieben  
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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-19-\_\_\_\_

**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).<sup>1</sup> MERC requests the Commission approve the requested changes to be recovered in the Purchased Gas Adjustment (PGA) beginning November 1, 2019.

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.

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<sup>1</sup> 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 2019-2020 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 145<sup>th</sup> 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](mailto:KStastny@briggs.com)  
(612) 977-8656

**C. Date of the Filing and Proposed Effective Date**

Date of filing: August 1, 2019  
Proposed Effective Date: November 1, 2019

**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**



Mary L. Wolter  
Director—Gas Regulatory Planning & Policy  
[Mary.Wolter@wecenergygroup.com](mailto:Mary.Wolter@wecenergygroup.com)  
2685 145<sup>th</sup> Street West  
Rosemount, MN 55068  
(414) 221-2374

If additional information is required, please contact Mary Wolter at (414) 221-2374.

DATED: August 1, 2019

Respectfully submitted,  
MINNESOTA ENERGY RESOURCES  
CORPORATION

By: /s/ Mary L. Wolter  
Mary L. Wolter  
2685 145<sup>th</sup> Street West  
Rosemount, MN 55068  
Telephone: (414) 221-2374

STATE OF MINNESOTA  
BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

**Katie Sieben**  
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**Chair**  
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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-19-\_\_\_\_

**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, 2019.

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**

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 312 dekatherms (dth) since November 1, 2018.

**Table 1: MERC Proposed Consolidated Reserve Margins  
For the 2019-2020 Heating Season**

	Reserve Margin 2019-2020 Heating Season	Reserve Margin 2018-2019 Heating Season	Change
Consolidated	2.06%	2.62%	-0.56%

For the Demand Entitlement filing effective November 1, 2019, the total Design-Day requirement for MERC – Consolidated is 56,782 dth (Attachment 1). The difference between



the total Design-Day requirement and total Design-Day capacity results in a 2.06% 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, 2019**

See Attachment 12.

### **III. Additional Filing Requirements**

#### **A. Daily Design-Day Estimate to Actual Comparison**

In the 2007-2008 demand entitlement dockets,<sup>2</sup> 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. 2019 Cold Weather Event**

In Docket No. E,G999/CI-19-160, the Commission initiated an investigation into utility operational experiences during the severe cold weather event that occurred between January

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

28 and February 1, 2019. As part of that proceeding, the Department requested information regarding whether each utility would have had sufficient capacity to serve its firm customers if weather conditions reached the utility’s planning objective; an updated design-day analysis for the past heating season incorporating actual data and usage from the 2018-2019 heating season; a discussion of unexpected events or usage patterns that were experienced during the extreme cold weather event; and a discussion of any improvements the utility plans to undertake as a result of the cold weather event to ensure firm reliability during a future design-day or near design-day event.

MERC has incorporated the 2018-2019 heating season data into the Design-Day analysis and forecast presented in this filing. As shown in Attachment 1, page 1, MERC-Consolidated experienced throughput at a near Design-Day level in January 2019. The data from this past winter did not significantly impact the Design-Day forecast, and MERC is confident in its ability to meet the requirements of its firm customers as shown in Attachment 3. The firm customer throughput from last winter is shown in the following table.

<u>Date</u>	<u>Capacity (dth/day)</u>	<u>Firm Customer Load (dth)</u>
1/29/19	57,949	53,653
1/30/19	57,949	50,849
1/31/19	57,949	45,367
2/1/19	57,949	35,320

**C. Average Customer Counts**

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

**D. 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. 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.

#### **E. 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 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 2018-2019; 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. MERC also entered into a four year contract effective November 1, 2018, for ANR Pipeline transportation services to move gas from ANR Storage to the interconnect with Great Lakes. These contracts are reflected in Attachments 4 (page 3 of 3), 7, and 8. There are no changes to ANR storage or associated withdrawal transport in 2019-2020.

#### **F. Financial Option Units and Premiums**

MERC has partially completed its purchases of future contracts and call options for the 2019-2020 winter period. Current 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. MERC will provide an update with its November 1, 2019, 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 2019-2020 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 2019-2020 winter is \$2.8090/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 \$2.2999/dth. MERC has purchased call options at an average strike price of \$3.6943/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.

#### **G. 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, 2019. Rate impacts associated with this change can be found in Attachment 4.

#### **H. 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, 2019.

DATED: August 1, 2019

Respectfully submitted,

MINNESOTA ENERGY RESOURCES  
CORPORATION

By: /s/ Mary L. Wolter  
Mary L. Wolter  
2685 145<sup>th</sup> Street West  
Rosemount, MN 55068  
Telephone: (414) 221-2374

**MINNESOTA ENERGY RESOURCES - Consolidated**

**DESIGN-DAY DEMAND SUMMARY**

**November 1, 2019**

Design Day Requirement		56,782
Total Peak Day Entitlement		57,949
2018/19 Firm Peak Day Actual Sendout	1/29/2019	53,653
Firm Annual Throughput - Minnesota		4,803,031
No. of Firm Customers		35,981
Department Load Factor Calculation		24.53%

**MINNESOTA ENERGY RESOURCES - Consolidated**

**MINNESOTA DESIGN DAY REQUIREMENTS**

November 1, 2019

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	391	157	16,273	1,013	17,286	7	17,293
Off Peak		57	391	157	9,243	1,113	10,356	7	10,363

**GLGT**

Peak		107	474	269	28,297	1,677	29,974	51	30,025
Off Peak		57	474	269	15,781	1,677	17,458	103	17,561

**Centra**

Peak		107	57	85	9,093	371	9,464	0	9,464
Off Peak		57	57	85	4,874	371	5,245	0	5,245

**Total Consolidated**

Peak	35,981	107	922	511	53,663	3,061	56,724	58	56,782
Off Peak	35,981	57	922	511	29,898	3,161	33,059	110	33,169



**MINNESOTA ENERGY RESOURCES - Consolidated**

**DESIGN-DAY DEMAND PER CUSTOMER**

November 1, 2019

<b><u>Heating Season</u></b>	<b><u>No. of Firm Customers</u></b>	<b><u>Design Day Requirements</u></b>	<b><u>MMBtu /Customer /Day</u></b>
19/20	35,981	56,782	1.58
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

**MINNESOTA ENERGY RESOURCES - Consolidated**

**SUMMER/WINTER USAGE - Dth**  
**PROJECTED 12 MONTHS ENDING JUNE 2020**  
**Consolidated**

<u>Class</u>	<u>Summer Apr-Oct</u>	<u>Winter Nov-Mar</u>	<u>Total</u>
GS	1,292,304	3,485,858	4,778,162
SVI	138,501	323,892	462,393
SVJ	8,580	16,289	24,869
LVI	168,071	209,413	377,484
LVJ			0
SLV			0
IS			0
<b>Total</b>	<u>1,607,456</u>	<u>4,035,453</u>	<u>5,642,908</u>

**MINNESOTA ENERGY RESOURCES - Consolidated**

**ENTITLEMENT LEVELS**

**November 1, 2019**

<u>Capacity Type</u>	<i>Summer</i>			<i>April/October</i>			<i>Winter</i>		
	<u>2018/19</u> <u>MMBtu</u>	<u>Change</u> <u>MMBtu</u>	<u>Proposed</u> <u>MMBtu</u>	<u>2018/19</u> <u>MMBtu</u>	<u>Change</u> <u>MMBtu</u>	<u>Proposed</u> <u>MMBtu</u>	<u>2018/19</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	0	0	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	15,030	0	15,030
ANR (5) * 130504	0	0	0	0	0	0	15,000	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
<b>Total Entitlement</b>	<b>46,723</b>	<b>0</b>	<b>46,723</b>	<b>46,723</b>	<b>0</b>	<b>46,723</b>	<b>57,949</b>	<b>0</b>	<b>57,949</b>
Forecasted Design Day-Adjusted				32,826	343	33,169	56,470	312	56,782
Capacity Surplus/Shortage				13,897	(343)	13,554	1,479	(312)	1,167
Reserve Margin				42.34%	-1.47%	40.86%	2.62%	-0.56%	2.06%

## MINNESOTA ENERGY RESOURCES - CONSOLIDATED

### RATE IMPACT OF THE PROPOSED DEMAND CHANGE November 1, 2019

All costs in \$/Dth	Base Cost of Gas G011/MR-17-564 1-Jul-19	Demand Charge Oct 1, 2018	Demand Charge Demand Filing Nov 1, 2018	Most Recent PGA July 1, 2019	Proposed Effective Nov 1, 2019	Result of Proposed Change				
						Change from Last Rate Case	Change from Nov 1, 2018 Demand Filing	Change from Last PGA %	Change from Last PGA \$	
<b>1) General Service Residential Avg. Annual Use:</b>						<b>86</b>	<b>Dth</b>			
Commodity Cost	\$2.8746	\$3.0522	\$3.3664	\$2.2287	\$3.0756	6.99%	-8.64%	38.00%	\$0.8469	
Demand Cost	\$0.7527	\$0.6908	\$0.8229	\$0.8229	\$0.8229	9.33%	0.00%	0.00%	\$0.0000	
Commodity Margin	\$2.4116	\$2.4116	\$2.4116	\$2.4686	\$2.4686	2.36%	2.36%	0.00%	\$0.0000	
Total Cost of Gas	\$6.0389	\$6.1546	\$6.6009	\$5.5202	\$6.3671	5.44%	-3.54%	15.34%	\$0.8469	
Avg Annual Cost	\$518.20	\$528.12	\$566.42	\$473.69	\$546.36	5.44%	-3.54%	15.34%	\$72.67	
Effect of proposed commodity change on average annual bills:									\$72.67	
Effect of proposed demand change on average annual bills:									\$0.00	
<b>2) Large C&amp;I Firm, Class 2: Avg. Annual Use:</b>						<b>608</b>	<b>Dth</b>			
Commodity Cost	\$2.8746	\$3.0522	\$3.3664	\$2.2287	\$3.0756	6.99%	-8.64%	38.00%	\$0.8469	
Demand Cost	\$0.7527	\$0.6908	\$0.8229	\$0.8229	\$0.8229	9.33%	0.00%	0.00%	\$0.0000	
Commodity Margin	\$1.6885	\$1.6885	\$1.6885	\$1.6857	\$1.6857	-0.17%	-0.17%	0.00%	\$0.0000	
Total Cost of Gas	\$5.3158	\$5.4315	\$5.8778	\$4.7373	\$5.5842	5.05%	-4.99%	17.88%	\$0.8469	
Avg Annual Cost	\$3,233.12	\$3,303.49	\$3,574.94	\$2,881.28	\$3,396.38	5.05%	-4.99%	17.88%	\$515.11	
Effect of proposed commodity change on average annual bills:									\$515.11	
Effect of proposed demand change on average annual bills:									\$0.00	
<b>3) Small C&amp;I Interruptible, Class 2: Avg. Annual Use:</b>						<b>5,627</b>	<b>Dth</b>			
Commodity Cost	\$2.8746	\$3.0522	\$3.3664	\$2.2287	\$3.0756	6.99%	-8.64%	38.00%	\$0.8469	
Commodity Margin	\$0.9740	\$0.9740	\$0.9740	\$1.0453	\$1.0453	7.32%	7.32%	0.00%	\$0.0000	
Total Cost of Gas	\$3.8486	\$4.0262	\$4.3404	\$3.2740	\$4.1209	7.08%	-5.06%	25.87%	\$0.8469	
Avg Annual Cost	\$21,657.13	\$22,656.53	\$24,424.62	\$18,423.70	\$23,189.56	7.08%	-5.06%	25.87%	\$4,765.86	
Effect of proposed commodity change on average annual bills:									\$4,765.86	
<b>4) Large C&amp;I Interruptible, Class 3: Avg. Annual Use:</b>						<b>31,604</b>	<b>Dth</b>			
Commodity Cost	\$2.8746	\$3.0522	\$3.3664	\$2.2287	\$3.0756	6.99%	-8.64%	38.00%	\$0.8469	
Commodity Margin	\$0.5329	\$0.5329	\$0.5329	\$0.9453	\$0.9453	77.39%	77.39%	0.00%	\$0.0000	
Total Cost of Gas	\$3.4075	\$3.5851	\$3.8993	\$3.1740	\$4.0209	18.00%	3.12%	26.68%	\$0.8469	
Avg Annual Cost	\$107,690.91	\$113,303.80	\$123,233.80	\$100,311.36	\$127,077.52	18.00%	3.12%	26.68%	\$26,766.16	
Effect of proposed commodity change on average annual bills:									\$26,766.16	

**Note: Average Annual Use based on new class structure found in 2018 MERC Gas Rate Design in Docket GR-17-563**

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

November 1, 2019

<b>DEMAND</b>									
Contract Type		Season	Monthly Entitlement (Dth)	Months	Rate (\$/Dth)	Contract Costs	Rate Case Sales (therms)	\$/therm	
<b>Viking (VGT)</b>									
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	
<b>VGT Demand</b>						<b>\$ 794,182</b>	<b>48,386,934</b>	<b>\$0.01641</b>	
<b>Great Lakes (GLGT)</b>									
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	
<b>GLGT Demand</b>						<b>\$ 1,203,247</b>	<b>48,386,934</b>	<b>\$0.02487</b>	
<b>Centra</b>									
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	
<b>Centra Demand</b>						<b>\$ 1,984,284</b>	<b>48,386,934</b>	<b>\$0.04101</b>	
<b>MERC-Consolidated DEMAND - \$/therm</b>						<b>\$ 3,981,713</b>		<b>\$0.08229</b>	
<b>FOR JOINT RATE DEMAND</b>						<b>48,386,934</b>	Annual Firm Sales in therms		
MERC-Consolidated Firm (GS) Sales as filed in Docket No. G011/MR-17-564									
<b>Viking (VGT)</b>									
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				
<b>Great Lakes (GLGT)</b>									
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				
<b>Centra</b>									
CENTRA TRANSMISSION		Annual	9,500	12	114,000				
CENTRA MINNESOTA PIPELINES		Annual	9,500	12	114,000				
<b>Total Demand Cost</b>			<b>\$ 3,981,713</b>						
<b>Total Demand Weighted Vol in therms</b>					<b>6,866,100</b>				
<b>Total Joint Demand Rate \$/therm</b>								<b>\$0.57991 /therm</b>	

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

PRESENT AVERAGE COST OF GAS COMMODITY

NOVEMBER 1, 2019

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
<b>VGT</b>											
GAS COST	\$2.84000										
FUEL 0.80%	\$0.02300									Sub 16th Revised Sheet No. 5B	
COMMODITY TRANSPORTATION	\$0.01160									Sub 16th Revised Sheet No. 5B	
GRI	\$0.00000									Sub 16th Revised Sheet No. 5B	
ACA	\$0.00130									Sub 16th Revised Sheet No. 5B	
<b>VGT Commodity</b>	\$2.87590	2,310,917	\$13,632	\$42,560	\$89,580	\$6,791,737	\$0.11731			<b>VGT Commodity</b>	
<b>GLGT</b>											
GAS COST	\$2.84000										
FUEL 0.453%	\$0.01301									5 Revised Sheet 4 Contract	
COMMODITY TRANSPORTATION	\$0.00288									18th Revised Sheet No. 7	
GRI	\$0.00000										
ACA	\$0.00130										
<b>GLGT Commodity</b>	\$2.85719	2,143,952	\$12,647	\$5,700	\$0	\$6,144,032	\$0.10613			<b>GLGT Commodity</b>	
<b>CENTRA</b>											
CENTRA TRANSMISSION (\$Cdn/103M3)	1.0684									Sheet 1 (N.E.B.)	
Conversion	\$0.02260										
Abandonment Toll	\$0.27454									N.E.B. MO-078-2014	
GAS COSTS	\$2.84000										
CUSTOMS FEE	\$0.00030										
<b>CENTRA Commodity</b>	\$3.13745	1,334,508	\$7,872	\$91,875	\$54,000	\$4,340,691	\$0.07498			<b>Centra Commodity</b>	
<b>Consolidated WACOG w/Premium &amp; Balancing</b>		<b>5,789,376</b>	<b>\$34,151</b>	<b>\$140,135</b>	<b>\$143,580</b>	<b>\$17,276,460</b>	<b>\$0.29842</b>	<b>\$0.00914</b>			
<b>Total Annual Sales in therms</b>		<b>57,893,756</b>									<b>\$0.30756 Total Consolidated WACOG-\$/therm</b>

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	57,893,756	\$0.00914
					\$529,270	57,893,756	\$0.00914

Total Commodity Cost:

**\$0.30756**

\* 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 2019-2020**

**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		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
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	05/02/19	313	05/14/19	558	05/16/19	551	05/07/19	514	05/09/19	452	72,069
2	06/04/19	313	06/13/19	502	6/18/19	501	06/06/19	514	06/11/19	395	67,155
3	07/02/19	313	01/00/00	-	01/00/00	-	07/09/19	457	01/00/00	-	22,931
4	01/00/00	-	01/00/00	-	01/00/00	-	01/00/00	-	01/00/00	-	-
5	01/00/00	-	01/00/00	-	01/00/00	-	01/00/00	-	01/00/00	-	-
6	01/00/00	-	01/00/00	-	01/00/00	-	01/00/00	-	01/00/00	-	-
7	01/00/00	-	01/00/00	-	01/00/00	-	01/00/00	-	01/00/00	-	-
8	01/00/00	-									-
9											
10											
Total		938		1,061		1,051		1,486		847	162,155

**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	05/02/19	621	05/09/19	1,005	05/07/19	576	05/14/19	1,071	05/16/19	790	122,132
2	06/04/19	621	06/11/19	1,005	05/17/18	524	06/13/19	1,012	06/18/19	790	118,842
3	07/02/19	621	07/11/19	949	06/06/19	1,048	01/00/00	-	01/00/00	-	80,517
4	01/00/00	-	01/00/00	-	07/09/19	995	01/00/00	-	01/00/00	-	30,855
5	01/00/00	-	01/00/00	-	01/00/00	-	01/00/00	-	01/00/00	-	-
6	01/00/00	-	01/00/00	-	01/00/00	-	01/00/00	-	01/00/00	-	-
7					01/00/00	-					-
8											-
Total		1,862		2,959		3,143		2,083		1,581	352,346

**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	\$ -	\$ -	\$ -	\$ -	\$ 0.0985	\$ 7,931
4	\$ -	\$ -	\$ -	\$ -	\$ 0.0970	\$ 2,993	\$ -	\$ -	\$ -	\$ -	\$ 0.0970	\$ 2,993
5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	#DIV/0!	\$ -
6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	#DIV/0!	\$ -
7	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total</b>	<b>\$ 0.0983</b>	<b>\$ 5,492</b>	<b>\$ 0.0956</b>	<b>\$ 8,773</b>	<b>\$ 0.0975</b>	<b>\$ 9,497</b>	<b>\$ 0.0949</b>	<b>\$ 5,538</b>	<b>\$ 0.0990</b>	<b>\$ 4,851</b>	<b>\$ 0.0969</b>	<b>\$ 34,151</b>

**Units - Collar Floor (put)**

No Puts were purchased.

**MINNESOTA ENERGY RESOURCES - CONSOLIDATED**  
**19/20 Winter Portfolio Plan - MERC Hedging Plan**

10000 Contract Size														
System	Purchase Month	Nov-19		Dec-19		Jan-20		Feb-20		Mar-20		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	
<b>MN Requirements</b>			586,442		906,950		994,551		853,214		714,557		4,055,714	4,055,714
<b>Daily Average</b>			19,548		29,256		32,082		30,472		23,050		26,682	
<b>10%</b>	Futures		58,644		90,695		99,455		85,321		71,456		405,571	
<b>20%</b>	Call		117,288		181,390		198,910		170,643		142,911		811,143	
<b>0%</b>	Storage		0		0		0		0		0		0	
<b>70%</b>	Index		410,509		634,865		696,185		597,250		500,190		2,839,000	
Contracts	May-19	1	10,000	2	20,000	2	20,000	2	20,000	2	20,000	9	90,000	
	Jun-19	1	10,000	2	20,000	2	20,000	2	20,000	1	10,000	8	80,000	
	Jul-19	1	10,000	2	20,000	2	20,000	1	10,000	1	10,000	7	70,000	
	Aug-19	1	10,000	1	10,000	1	10,000	1	10,000	1	10,000	5	50,000	
	Sep-19	1	10,000	1	10,000	1	10,000	1	10,000	1	10,000	5	50,000	
	Oct-19	0	0	1	10,000	1	10,000	1	10,000	1	10,000	4	40,000	
	<b>Total</b>	<b>5</b>	<b>50,000</b>	<b>9</b>	<b>90,000</b>	<b>9</b>	<b>90,000</b>	<b>8</b>	<b>80,000</b>	<b>7</b>	<b>70,000</b>	<b>38</b>	<b>380,000</b>	<b>9.37%</b>
Call Options	May-19	2	20,000	3	30,000	4	40,000	3	30,000	3	30,000	15	150,000	
	Jun-19	2	20,000	3	30,000	3	30,000	3	30,000	3	30,000	14	140,000	
	Jul-19	2	20,000	3	30,000	3	30,000	3	30,000	2	20,000	13	130,000	
	Aug-19	2	20,000	3	30,000	3	30,000	3	30,000	2	20,000	13	130,000	
	Sep-19	2	20,000	3	30,000	3	30,000	3	30,000	2	20,000	13	130,000	
	Oct-19	1	10,000	3	30,000	3	30,000	2	20,000	2	20,000	11	110,000	
	<b>Total</b>	<b>11</b>	<b>110,000</b>	<b>18</b>	<b>180,000</b>	<b>19</b>	<b>190,000</b>	<b>17</b>	<b>170,000</b>	<b>14</b>	<b>140,000</b>	<b>79</b>	<b>790,000</b>	<b>19.48%</b>
Collars	May-19	0	0	0	0	0	0	0	0	0	0	0	0	
	Jun-19	0	0	0	0	0	0	0	0	0	0	0	0	
	Jul-19	0	0	0	0	0	0	0	0	0	0	0	0	
	Aug-19	0	0	0	0	0	0	0	0	0	0	0	0	
	Sep-19	0	0	0	0	0	0	0	0	0	0	0	0	
	Oct-19	0	0	0	0	0	0	0	0	0	0	0	0	
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.00%</b>
Index (back financial)	<b>Total</b>		<b>160,000</b>		<b>270,000</b>		<b>280,000</b>		<b>250,000</b>		<b>210,000</b>		<b>1,170,000</b>	<b>28.85%</b>
Physical Hedges			0		0		0		0		0		0	
Storage			96,000		189,100		189,100		196,000		85,900		756,100	<b>18.64%</b>
Prepaid Obl			0		0		0		0		0		0	<b>0.00%</b>
			43.65%		50.62%		47.17%		52.27%		41.41%		47.49%	<b>47.49%</b>
Term Index	Aug-19	0	0	0	0	0	0	0	0	0	0	0	0	<b>0.00%</b>
	Sep-19	0	0	0	0	0	0	0	0	0	0	0	0	<b>0.00%</b>
	Oct-19	0	0	0	0	0	0	0	0	0	0	0	0	<b>0.00%</b>
Contracts													380,000	<b>9.37%</b>
Call Options													790,000	<b>19.48%</b>
Costing Collar													0	<b>0.00%</b>
Storage													756,100	<b>18.64%</b>
Prepaid Obl													0	<b>0.00%</b>
Term Index													0	<b>0.00%</b>
Month/Daily													2,129,614	<b>52.51%</b>
<b>Total</b>													4,055,714	<b>100.00%</b>

NOTE:





**MINNESOTA ENERGY RESOURCES - CONSOLIDATED**

	2015-2016 Consolidated GS	2016-2017 Consolidated GS	2017-2018 Consolidated GS	2018-2019 Consolidated GS	2019-2020 Consolidated GS	Proposed Change
<b>Viking Gas Transmission (VGT)</b>						
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	0	1,500	1,500	1,500	0
<b>Great Lakes Gas Transmission (GLGT)</b>						
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*	13,480	13,480	15,030	15,030	15,030	0
ANR Upstream	0	0	0	15,000	15,000	0
<b>Centra Transmission Holding/Centra Minnesota Pipelines (CTHI/CPMI)</b>						
Centra FT-1	9,500	9,500	9,500	9,500	9,500	0
Total VGT Transportation	15,591	15,591	17,091	17,091	17,091	0
Total GLGT Transportation	29,808	29,808	31,358	31,358	31,358	0
Total CTHI/CPMI Transportation	9,500	9,500	9,500	9,500	9,500	0
Total Transportation	54,899	54,899	57,949	57,949	57,949	0
Total Seasonal Transportation	8,176	8,176	11,226	11,226	11,226	0
Total Seasonal Transportation %	14.89%	14.89%	19.37%	19.37%	19.37%	0.00%
<u>Other Entitlements not included in Peak Day Deliverability</u>						
AECO Storage	947,820	947,820	0	0	0	0
AECO/Emerson Swap	955,255	758,254	0	0	0	0
ANR Storage	0	0	0	756,100	756,100	0

## MINNESOTA ENERGY RESOURCES - CONSOLIDATED

Change in Costs due to November 1, 2019 Change in Entitlement Levels and Related Demand Costs

	2018/19 Entitlements	2019/20 Entitlements	Entitlement Change	2019/20 Rate	Months	2018/19 Total Annual Cost	2019/20 Total Annual Cost	Total Annual Cost Change
<b>Costs Assigned in Demand Charge</b>								
<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	1,500	1,500	0	\$ 4.3706	3	\$19,668	\$19,668	\$0
<u>GLGTPipeline</u>								
FT Western ZoneFT19131	10,130	10,130	0	\$ 2.8100	7	\$199,257	\$199,257	\$0
FT Western ZoneFT18528	12,600	12,600	0	\$ 2.8100	12	\$424,872	\$424,872	\$0
FT Western ZoneFT18528 (5)	3,728	3,728	0	\$ 2.8100	5	\$52,378	\$52,378	\$0
FT Eastern to Western ZoneFT19129 (5)	15,030	15,030	0	\$ 6.1000	5	\$458,415	\$458,415	\$0
ANR Upstream130504	15,000	15,000	0	\$ 0.9110	5	\$68,325	\$68,325	\$0
<u>CENTRA Pipeline</u>								
CENTRA TRANSMISSION	9,500	9,500	0	\$ 14.1070	12	\$1,608,198	\$1,608,198	\$0
CENTRA MINNESOTA PIPELINES	9,500	9,500	0	\$ 3.2990	12	\$376,086	\$376,086	\$0
Total Costs Assigned to Demand Charge						<b>\$3,981,713</b>	<b>\$3,981,713</b>	<b>\$0</b>
<b>Costs Assigned in Commodity Charge</b>								
<u>Storage Service</u>								
Niska Storage (AECO)	0	0	0	\$ -	0	\$0	\$0	\$0
Niska Storage Assignment	0	0	0	\$ -	0	\$0	\$0	\$0
ANR Pipeline Storage	756,100	756,100	0	\$ 0.7000	12	\$529,270	\$529,270	\$0
<u>Balancing</u>								
VGT Balancing Agreement	7,465	7,465	0	\$ 1.0000	12	\$89,580	\$89,580	\$0
Union Balancing	10,000	10,000	0	\$ 0.4500	12	\$54,000	\$54,000	\$0
Physical Forward Start Premium						\$94,875	\$140,135	\$45,260
Call Options Premium						\$76,864	\$34,151	-\$42,713
Total Costs Assigned to Commodity Charge						<b>\$844,589</b>	<b>\$847,136</b>	<b>\$2,547</b>

**MINNESOTA ENERGY RESOURCES - Consolidated**

Daily Total Throughput Data - July 1, 2018 through June 30, 2019

Design Day:

Base	922
Variable	511

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 **
7/1/18	0	4	0	3	1	15,049	1,545
7/2/18	0	0	0	0	0	16,098	922
7/3/18	0	0	0	0	0	13,104	922
7/4/18	0	0	0	0	0	9,676	922
7/5/18	4	2	0	4	2	11,705	2,090
7/6/18	0	0	0	0	0	12,481	922
7/7/18	0	0	0	0	0	11,755	922
7/8/18	0	0	0	0	0	13,006	922
7/9/18	0	0	0	0	0	18,971	922
7/10/18	0	0	0	0	0	21,909	922
7/11/18	0	0	0	0	0	21,286	922
7/12/18	0	0	0	0	0	19,750	922
7/13/18	0	0	0	0	0	14,879	922
7/14/18	0	0	0	0	0	12,990	922
7/15/18	0	0	0	0	0	14,145	922
7/16/18	7	1	0	9	4	20,930	2,985
7/17/18	4	4	0	4	2	20,555	2,160
7/18/18	0	0	0	0	0	22,750	922
7/19/18	0	0	0	0	0	19,101	922
7/20/18	0	0	0	0	0	14,178	922
7/21/18	0	0	0	1	0	13,260	1,051
7/22/18	0	3	0	0	0	13,547	1,133
7/23/18	0	0	0	0	0	18,226	922
7/24/18	0	0	0	0	0	18,701	922
7/25/18	1	0	0	4	1	19,647	1,529
7/26/18	11	11	6	10	9	16,811	5,375
7/27/18	5	3	1	5	3	13,244	2,627
7/28/18	1	0	0	1	1	11,421	1,185
7/29/18	3	0	0	0	1	13,372	1,301
7/30/18	0	0	0	0	0	16,956	922
7/31/18	0	0	0	0	0	19,067	922
8/1/18	14	7	15	17	14	20,118	8,234
8/2/18	3	8	0	5	3	18,628	2,479
8/3/18	0	3	0	0	0	13,713	1,106
8/4/18	0	0	0	0	0	12,010	922
8/5/18	0	0	0	0	0	13,955	922
8/6/18	5	4	0	11	4	20,852	3,188
8/7/18	0	0	0	0	0	20,527	922
8/8/18	0	0	0	0	0	19,935	922
8/9/18	0	0	0	0	0	18,469	922

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8/10/18	0	0	0	0	0	13,143	922
8/11/18	0	0	0	0	0	10,774	922
8/12/18	0	0	0	0	0	11,562	922
8/13/18	0	0	0	0	0	16,576	922
8/14/18	8	0	4	8	6	19,833	3,906
8/15/18	4	0	0	4	2	21,303	1,931
8/16/18	0	0	0	0	0	19,574	922
8/17/18	0	0	0	0	0	13,966	922
8/18/18	0	0	0	0	0	12,433	922
8/19/18	1	0	4	3	2	13,919	2,159
8/20/18	2	4	0	2	1	19,296	1,596
8/21/18	4	5	1	6	4	21,350	2,714
8/22/18	0	0	0	0	0	21,642	922
8/23/18	0	0	0	0	0	17,200	922
8/24/18	0	2	0	2	1	20,538	1,271
8/25/18	0	0	0	0	0	13,491	922
8/26/18	4	0	2	0	2	14,545	1,781
8/27/18	11	0	8	11	9	21,086	5,355
8/28/18	15	14	12	18	15	21,712	8,417
8/29/18	6	7	1	9	5	20,656	3,571
8/30/18	0	2	0	0	0	17,417	1,031
8/31/18	0	0	0	0	0	11,944	922
9/1/18	3	0	0	4	2	10,444	1,783
9/2/18	9	5	4	10	7	10,992	4,433
9/3/18	0	0	0	1	0	11,647	981
9/4/18	4	2	2	4	3	20,200	2,380
9/5/18	16	14	8	18	13	21,432	7,751
9/6/18	5	6	0	7	4	18,520	2,942
9/7/18	4	3	0	5	2	14,355	2,191
9/8/18	3	10	0	3	3	13,787	2,361
9/9/18	2	8	0	2	2	15,563	1,989
9/10/18	3	2	0	4	2	19,934	1,904
9/11/18	0	0	0	0	0	19,551	922
9/12/18	3	0	0	1	1	19,431	1,459
9/13/18	1	0	2	0	1	17,972	1,300
9/14/18	0	0	0	3	1	15,365	1,298
9/15/18	2	2	0	0	1	13,281	1,352
9/16/18	0	0	0	0	0	13,996	922
9/17/18	16	8	14	14	14	18,144	7,987
9/18/18	13	13	8	16	12	17,237	7,016
9/19/18	12	12	9	9	10	17,045	6,115
9/20/18	19	14	18	18	18	19,830	10,003
9/21/18	17	20	13	21	17	20,931	9,503
9/22/18	14	12	9	19	13	18,176	7,584
9/23/18	19	17	10	21	16	19,746	9,016
9/24/18	17	9	20	15	17	25,265	9,366
9/25/18	25	23	18	24	22	31,813	12,168
9/26/18	20	17	15	20	18	25,994	9,968
9/27/18	27	20	23	23	24	25,331	13,116
9/28/18	35	27	30	31	31	26,606	16,903
9/29/18	29	27	27	27	28	24,009	15,059
9/30/18	26	20	25	29	25	23,179	13,930

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10/1/18	23	21	20	27	23	29,082	12,502
10/2/18	16	17	16	19	17	26,656	9,402
10/3/18	28	25	27	26	27	32,309	14,590
10/4/18	30	26	29	30	29	32,460	15,732
10/5/18	32	26	29	28	29	28,816	15,787
10/6/18	31	26	31	30	30	30,223	16,145
10/7/18	27	24	25	26	25	36,757	13,912
10/8/18	29	21	27	27	27	42,229	14,646
10/9/18	33	27	32	30	31	44,875	16,732
10/10/18	40	34	42	38	39	51,238	20,955
10/11/18	45	38	44	38	42	44,464	22,545
10/12/18	37	35	35	37	36	30,105	19,187
10/13/18	33	28	30	33	31	29,626	16,974
10/14/18	39	35	42	36	39	37,183	20,753
10/15/18	33	33	32	33	33	38,386	17,584
10/16/18	38	33	32	37	35	49,096	18,746
10/17/18	33	34	28	37	32	40,396	17,499
10/18/18	10	16	11	9	11	25,079	6,556
10/19/18	27	25	25	29	26	26,247	14,400
10/20/18	38	37	33	37	36	31,865	19,352
10/21/18	25	28	22	28	25	28,006	13,645
10/22/18	31	25	31	28	30	36,475	16,097
10/23/18	31	32	31	33	32	37,318	17,045
10/24/18	28	25	24	26	26	31,549	13,974
10/25/18	21	23	18	20	20	27,969	11,007
10/26/18	22	22	24	23	23	24,722	12,631
10/27/18	23	23	27	23	24	24,937	13,441
10/28/18	29	24	25	28	27	29,395	14,634
10/29/18	28	27	25	27	27	34,864	14,552
10/30/18	26	26	25	26	26	34,520	14,017
10/31/18	34	32	32	33	33	32,861	17,606
11/1/18	37	32	31	35	34	35,533	18,164
11/2/18	35	35	27	32	31	30,761	17,010
11/3/18	34	32	27	37	32	29,664	17,231
11/4/18	29	32	27	29	29	29,747	15,559
11/5/18	31	30	31	30	31	39,422	16,614
11/6/18	43	36	45	38	42	43,492	22,191
11/7/18	51	45	51	46	49	57,033	26,121
11/8/18	56	50	56	48	53	55,490	28,069
11/9/18	64	57	60	59	60	55,118	31,708
11/10/18	57	50	55	54	54	50,846	28,736
11/11/18	58	48	52	51	53	48,985	28,045
11/12/18	67	61	57	62	62	60,755	32,509
11/13/18	57	56	54	57	56	61,944	29,483
11/14/18	40	43	36	40	39	50,820	20,834
11/15/18	45	38	41	39	41	44,712	21,987
11/16/18	57	49	60	56	57	48,314	29,994
11/17/18	61	56	62	58	60	50,853	31,656
11/18/18	53	49	54	54	53	48,042	28,162
11/19/18	66	64	65	65	65	59,239	34,079
11/20/18	53	53	45	65	53	54,384	28,051
11/21/18	56	54	48	57	53	49,644	28,083

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11/22/18	42	41	40	40	41	37,792	21,816
11/23/18	34	27	40	32	35	32,449	18,678
11/24/18	53	43	55	50	52	43,972	27,363
11/25/18	60	55	61	59	60	55,590	31,340
11/26/18	62	57	63	59	61	67,343	31,992
11/27/18	57	54	55	54	55	65,745	29,102
11/28/18	49	49	46	49	48	59,441	25,451
11/29/18	41	40	36	41	39	53,084	20,995
11/30/18	40	38	38	42	39	45,833	21,037
12/1/18	47	42	45	46	46	46,710	24,208
12/2/18	48	45	47	47	47	48,223	24,848
12/3/18	48	50	46	48	48	58,179	25,231
12/4/18	48	47	43	47	46	56,903	24,424
12/5/18	63	48	61	60	60	60,566	31,397
12/6/18	63	61	60	69	63	64,387	33,100
12/7/18	58	55	51	60	56	57,300	29,479
12/8/18	53	52	51	51	52	49,757	27,345
12/9/18	50	46	50	55	51	49,278	26,806
12/10/18	51	51	43	52	49	51,745	25,722
12/11/18	52	49	44	51	49	52,451	25,741
12/12/18	45	40	41	40	42	52,165	22,312
12/13/18	38	44	40	42	40	49,209	21,580
12/14/18	37	33	39	38	37	41,918	19,854
12/15/18	32	33	33	31	32	38,460	17,399
12/16/18	52	40	45	51	48	44,961	25,334
12/17/18	49	44	46	53	48	51,966	25,568
12/18/18	37	36	38	42	38	44,699	20,402
12/19/18	37	34	37	38	37	41,948	19,680
12/20/18	51	46	49	51	49	48,100	26,173
12/21/18	52	51	47	58	52	45,150	27,301
12/22/18	46	43	45	48	46	41,366	24,354
12/23/18	56	51	56	51	54	44,943	28,602
12/24/18	54	47	51	55	52	42,225	27,503
12/25/18	57	48	62	63	59	44,018	31,114
12/26/18	51	48	57	58	54	48,171	28,561
12/27/18	56	46	70	56	60	49,384	31,360
12/28/18	75	69	78	76	75	59,781	39,478
12/29/18	67	62	68	66	66	54,271	34,864
12/30/18	53	46	63	56	56	46,723	29,669
12/31/18	80	67	88	82	82	61,435	42,632
1/1/19	80	71	78	82	78	65,141	40,935
1/2/19	52	59	50	53	52	58,128	27,663
1/3/19	38	38	38	36	37	50,572	20,062
1/4/19	36	35	37	40	37	49,151	19,894
1/5/19	46	45	46	46	46	48,469	24,425
1/6/19	48	43	43	48	46	49,759	24,202
1/7/19	47	39	45	44	44	53,090	23,610
1/8/19	73	63	70	64	69	68,502	35,964
1/9/19	69	64	65	70	67	69,579	35,175
1/10/19	59	56	57	60	58	62,814	30,619
1/11/19	53	47	57	49	52	51,342	27,739
1/12/19	44	41	43	47	44	47,484	23,334

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1/13/19	45	40	46	44	44	48,373	23,500
1/14/19	48	49	49	52	50	57,076	26,257
1/15/19	66	62	62	70	65	67,197	34,102
1/16/19	70	66	66	71	68	72,177	35,836
1/17/19	71	68	66	74	70	71,724	36,556
1/18/19	86	77	82	90	84	73,895	44,025
1/19/19	83	78	75	87	80	73,323	41,893
1/20/19	84	72	73	86	79	72,524	41,442
1/21/19	66	64	61	66	64	68,781	33,569
1/22/19	65	57	65	60	63	63,865	33,064
1/23/19	68	56	72	63	67	66,680	35,024
1/24/19	94	80	82	91	87	79,333	45,492
1/25/19	85	85	80	91	85	78,190	44,231
1/26/19	87	83	82	93	86	75,643	44,893
1/27/19	86	82	80	94	85	75,452	44,467
1/28/19	85	75	82	85	82	79,794	43,058
1/29/19	110	104	105	103	106	99,262	55,193
1/30/19	98	97	94	102	97	96,765	50,651
1/31/19	88	84	82	89	86	86,105	44,756
2/1/19	62	64	63	64	63	69,297	33,026
2/2/19	49	52	59	53	54	57,972	28,459
2/3/19	62	47	80	63	66	59,308	34,858
2/4/19	77	67	83	78	78	76,237	40,696
2/5/19	71	64	76	66	70	75,615	36,936
2/6/19	65	54	81	61	68	70,718	35,735
2/7/19	84	72	96	77	85	77,691	44,373
2/8/19	91	80	86	91	88	78,437	45,664
2/9/19	79	70	76	79	77	72,316	40,147
2/10/19	66	57	72	75	69	65,122	36,174
2/11/19	56	53	57	57	56	66,513	29,474
2/12/19	58	54	64	57	60	67,559	31,348
2/13/19	55	51	67	52	58	62,899	30,632
2/14/19	79	65	81	66	75	68,882	39,168
2/15/19	73	65	75	73	72	67,074	37,878
2/16/19	65	59	64	66	64	59,233	33,735
2/17/19	64	61	72	71	68	59,572	35,653
2/18/19	71	63	73	68	70	69,962	36,644
2/19/19	66	58	66	62	64	67,500	33,600
2/20/19	53	50	57	52	54	60,035	28,359
2/21/19	52	48	61	47	53	54,840	28,241
2/22/19	51	50	57	47	52	52,312	27,505
2/23/19	54	45	57	47	52	51,852	27,603
2/24/19	87	76	84	81	83	70,669	43,387
2/25/19	82	75	76	84	79	80,909	41,511
2/26/19	69	66	74	72	71	74,284	37,363
2/27/19	68	68	76	64	70	72,842	36,594
2/28/19	63	59	61	59	61	62,372	31,926
3/1/19	69	60	68	68	67	59,257	35,179
3/2/19	79	74	81	81	80	64,031	41,579
3/3/19	83	79	83	80	82	67,669	42,651
3/4/19	73	72	70	69	71	68,513	37,101
3/5/19	73	68	67	70	70	64,488	36,464



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3/6/19	73	66	70	76	72	66,365	37,565
3/7/19	57	56	64	57	59	56,815	31,182
3/8/19	43	43	46	46	45	50,185	23,762
3/9/19	44	37	50	38	44	47,586	23,266
3/10/19	62	54	62	59	60	55,519	31,697
3/11/19	52	49	62	52	55	56,455	29,032
3/12/19	34	38	38	32	36	47,735	19,119
3/13/19	33	31	42	30	35	47,610	18,830
3/14/19	46	36	49	41	45	50,412	23,732
3/15/19	54	44	53	52	52	52,565	27,454
3/16/19	48	44	54	49	50	47,361	26,432
3/17/19	43	39	45	41	43	46,608	22,776
3/18/19	38	36	46	36	40	48,522	21,375
3/19/19	35	32	38	35	36	45,476	19,100
3/20/19	36	33	40	34	37	48,297	19,696
3/21/19	37	26	40	31	35	41,044	19,028
3/22/19	37	37	39	38	38	41,207	20,301
3/23/19	27	26	35	29	30	36,905	16,251
3/24/19	45	47	44	48	45	48,581	24,143
3/25/19	40	37	40	42	40	49,893	21,378
3/26/19	35	31	35	34	34	46,156	18,340
3/27/19	28	23	31	24	27	43,218	14,940
3/28/19	42	37	38	42	40	44,256	21,205
3/29/19	41	38	39	42	40	41,985	21,313
3/30/19	46	45	42	47	45	45,611	23,828
3/31/19	40	39	35	39	38	43,270	20,206
4/1/19	35	33	33	35	34	47,801	18,390
4/2/19	41	34	36	42	39	51,507	20,686
4/3/19	42	35	35	45	39	49,356	20,875
4/4/19	33	33	35	33	33	43,885	17,967
4/5/19	28	26	26	27	27	36,653	14,695
4/6/19	26	28	20	20	22	34,161	12,407
4/7/19	30	25	14	25	22	33,981	12,418
4/8/19	28	22	21	34	26	38,510	14,240
4/9/19	42	37	38	42	40	44,720	21,433
4/10/19	36	42	37	36	37	48,302	19,861
4/11/19	44	45	43	40	43	47,872	22,872
4/12/19	43	36	42	42	41	43,129	22,016
4/13/19	42	41	35	37	38	46,542	20,468
4/14/19	32	35	34	28	32	43,215	17,311
4/15/19	32	30	30	29	30	47,889	16,432
4/16/19	15	15	15	16	15	35,919	8,697
4/17/19	25	26	23	24	24	42,689	13,229
4/18/19	27	27	23	25	25	42,354	13,723
4/19/19	14	15	13	12	13	30,960	7,678
4/20/19	12	7	10	21	12	24,998	7,288
4/21/19	21	24	12	20	18	28,925	10,301
4/22/19	19	30	16	17	19	35,746	10,600
4/23/19	9	16	6	9	9	33,784	5,515
4/24/19	12	7	9	16	11	30,694	6,537
4/25/19	20	13	20	18	19	35,149	10,406
4/26/19	28	26	18	30	25	31,703	13,513

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4/27/19	29	28	19	28	25	32,409	13,611
4/28/19	27	24	26	26	26	33,394	14,273
4/29/19	31	33	27	34	31	44,003	16,593
4/30/19	31	32	24	30	29	44,400	15,517
5/1/19	29	32	27	30	29	43,614	15,814
5/2/19	27	29	20	29	25	37,957	13,700
5/3/19	25	20	16	18	20	32,370	10,918
5/4/19	26	11	24	24	23	30,995	12,461
5/5/19	31	23	26	26	27	31,599	14,799
5/6/19	33	26	32	34	32	38,723	17,219
5/7/19	20	20	16	23	19	36,894	10,740
5/8/19	25	28	26	19	24	38,668	13,200
5/9/19	27	26	25	29	27	34,268	14,532
5/10/19	15	18	12	21	16	25,677	9,022
5/11/19	17	15	10	11	13	20,289	7,414
5/12/19	16	17	11	14	14	20,272	8,120
5/13/19	10	10	2	7	6	22,455	4,216
5/14/19	17	9	9	14	13	23,514	7,353
5/15/19	6	15	1	12	7	23,507	4,320
5/16/19	21	16	17	19	18	26,872	10,279
5/17/19	16	21	14	17	16	23,322	9,123
5/18/19	26	30	24	19	24	28,849	13,340
5/19/19	22	29	23	23	23	29,406	12,787
5/20/19	16	16	11	18	15	28,613	8,337
5/21/19	11	14	9	9	10	28,906	6,131
5/22/19	21	19	18	20	19	32,379	10,707
5/23/19	16	15	14	17	15	26,549	8,658
5/24/19	15	18	7	16	13	22,607	7,539
5/25/19	18	15	15	14	15	19,063	8,800
5/26/19	10	7	8	20	11	17,764	6,636
5/27/19	24	25	14	22	20	21,931	11,096
5/28/19	9	11	6	10	9	19,160	5,320
5/29/19	3	3	0	6	3	23,103	2,221
5/30/19	0	13	0	4	3	26,332	2,250
5/31/19	11	5	5	15	9	21,985	5,470
6/1/19	18	12	7	20	14		7,907
6/2/19	12	11	0	12	7		4,693
6/3/19	0	11	0	8	3		2,619
6/4/19	0	3	0	0	0		1,140
6/5/19	1	16	0	9	5		3,293
6/6/19	0	1	0	0	0		956
6/7/19	0	5	0	0	1		1,283
6/8/19	0	0	0	0	0		922
6/9/19	13	9	6	18	11		6,630
6/10/19	10	11	0	16	8		4,979
6/11/19	11	8	5	5	7		4,540
6/12/19	18	16	8	17	14		8,138
6/13/19	2	5	0	2	2		1,829
6/14/19	0	5	0	9	3		2,307
6/15/19	8	11	6	6	7		4,557
6/16/19	9	12	6	11	9		5,329
6/17/19	7	8	8	11	8		5,208

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6/18/19	5	9	3	8	6		3,780
6/19/19	3	3	0	6	3		2,335
6/20/19	0	3	3	6	3		2,306
6/21/19	1	9	0	1	1		1,673
6/22/19	2	8	6	0	4		2,815
6/23/19	0	9	0	0	1		1,522
6/24/19	3	3	0	4	2		1,935
6/25/19	2	0	0	3	1		1,473
6/26/19	0	0	0	1	0		981
6/27/19	2	1	0	1	1		1,414
6/28/19	0	0	0	0	0		922
6/29/19	0	0	0	0	0		922
6/30/19	0	0	0	0	0		922
Totals	11,506	10,672	10,993	11,480	11,208	13,230,760	6,064,003

\* 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, 2018 through June 30, 2019

Tariff Rate Class	Rate Designation	Jul-18 Average Customers	Aug-18 Average Customers	Sep-18 Average Customers	Oct-18 Average Customers	Nov-18 Average Customers	Dec-18 Average Customers	Jan-19 Average Customers	Feb-19 Average Customers	Mar-19 Average Customers	Apr-19 Average Customers	May-19 Average Customers	Jun-19 Average Customers	Annual Average Customers
GS- Residential	MERC000002	30,277	30,357	30,331	30,362	30,573	29,253	32,378	30,542	30,850	30,713	30,750	30,724	30,592
GS-C&I <1,500 therms/yr (Small)	MERC000006	2,362	2,359	2,347	2,338	2,349	2,275	2,478	2,353	2,165	2,157	2,156	2,156	2,291
GS-C&I >1,500 therms/yr (Large)	MERC000010	3,003	3,008	2,985	3,023	3,011	2,860	3,222	3,055	3,246	3,265	3,248	3,238	3,097
Small Volume Interruptible (SVI)	MERC000017	67	67	69	71	67	64	62	63	63	64	70	63	66
Small Volume Interruptible w/Joint (SVJ)	MERC000021	3	3	3	4	9	4	3	3	3	3	3	4	4
Large Volume Interruptible (LVI)	MERC000024	5	5	7	3	6	5	5	5	5	5	5	5	5
<b>Total</b>		<b>35,717</b>	<b>35,800</b>	<b>35,743</b>	<b>35,800</b>	<b>36,015</b>	<b>34,460</b>	<b>38,149</b>	<b>36,021</b>	<b>36,332</b>	<b>36,207</b>	<b>36,232</b>	<b>36,191</b>	<b>36,055</b>



## MINNESOTA ENERGY RESOURCES - Consolidated

Projected Storage Cost - November 2019 through March 2020

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#133736 NNG Storage Cost	Total NNG Storage Cost	ANR Storage GLGT/VGT (Dth)	ANR Storage GLGT/VGT WACOG	ANR Storage GLGT/VGT Cost
Nov-19	489,384	48,750	97,500	635,634	\$ 2.1616	\$ 1,057,840	\$ 105,377	\$ 210,754	\$ 1,373,970	96,000	\$ 2.2999	\$ 220,793
Dec-19	1,229,734	122,500	245,000	1,597,234	\$ 2.1616	\$ 2,658,162	\$ 264,793	\$ 529,586	\$ 3,452,541	189,100	\$ 2.2999	\$ 434,916
Jan-20	1,229,734	122,500	245,000	1,597,234	\$ 2.1616	\$ 2,658,162	\$ 264,793	\$ 529,586	\$ 3,452,541	189,100	\$ 2.2999	\$ 434,916
Feb-20	1,229,734	122,500	245,000	1,597,234	\$ 2.1616	\$ 2,658,162	\$ 264,793	\$ 529,586	\$ 3,452,541	196,000	\$ 2.2999	\$ 450,786
Mar-20	489,384	48,750	97,500	635,634	\$ 2.1616	\$ 1,057,840	\$ 105,377	\$ 210,754	\$ 1,373,970	85,900	\$ 2.2999	\$ 197,564
<b>Total</b>	<b>4,667,969</b>	<b>465,000</b>	<b>930,000</b>	<b>6,062,969</b>		<b>\$ 10,090,166</b>	<b>\$ 1,005,133</b>	<b>\$ 2,010,265</b>	<b>\$ 13,105,563</b>	<b>756,100</b>		<b>\$ 1,738,976</b>

Month/ Year	NNG Storage Volume (Dth)	NNG Index Price	NNG Index Cost	Month/ Year	ANR Storage Volume (Dth)	Emerson Index Price	Emerson Market Cost
Nov-19	635,634	\$ 2.4275	\$ 1,543,001	Nov-19	96,000	\$ 2.3975	\$ 230,160
Dec-19	1,597,234	\$ 3.2905	\$ 5,255,697	Dec-19	189,100	\$ 2.8330	\$ 535,720
Jan-20	1,597,234	\$ 3.5985	\$ 5,747,645	Jan-20	189,100	\$ 2.9710	\$ 561,816
Feb-20	1,597,234	\$ 3.5490	\$ 5,668,582	Feb-20	196,000	\$ 2.9440	\$ 577,024
Mar-20	635,634	\$ 2.6135	\$ 1,661,229	Mar-20	85,900	\$ 2.7260	\$ 234,163
<b>Total</b>	<b>6,062,969</b>		<b>\$ 19,876,155</b>	<b>Total</b>	<b>756,100</b>		<b>\$ 2,138,884</b>
<b>Storage Savings (Cost):</b>			<b>\$ 6,770,592</b>				<b>\$ 399,908</b>

\*Indexes and projected WACOG based on 7/15/19 market prices



**Attachment 12: Forecast Methodology for MERC Demand Entitlement Effective  
 November 1, 2019**

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 pipelines<sup>1</sup>

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 nine demand areas:

	<b>Pipeline</b>	<b>PGA</b>	<b>Weather Station(s)</b>
1	Centra	MERC Consolidated	International Falls
2	GLGT	MERC Consolidated	Bemidji
3	GLGT	MERC Consolidated	Cloquet
4	VGT	MERC Consolidated	Fargo
5	NNG	MERC NNG	Cloquet
6	NNG	MERC NNG	Minneapolis
7	NNG	MERC NNG	Ortonville
8	NNG	MERC NNG	Rochester
9	NNG	MERC NNG	Worthington

<sup>1</sup> 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, MERC now submits only two demand entitlement petitions (NNG and Consolidated) each heating season.



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 consisted of:

- Identify the coldest Adjusted Heating Degree Day (AHDD) since January 1996 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. Many weather stations experienced historically cold weather in the January/February 1996 time period: without inclusion of that additional data from January/February 1996, AHDD65 were materially lower and not reflective of MERC's capacity needs. The coldest AHDD65 data since 1996 is included in the table below, along with the AHDD65 conditions on the day prior ("AHDD65-1").

<u>Station</u>	<u>Date</u>	<u>Avg. Temp</u>	<u>Avg. Wind</u>	<u>HDD65</u>	<u>AHDD65</u>	<u>AHDD65-1</u>
Bemidji	1/29/2019	-32	14	97	110	84
Cloquet	1/29/2019	-24	16	89	103	74
Fargo	1/18/1996	-16	34	81	109	85
International Falls	2/2/1996	-34	8	99	107	107
Minneapolis	1/29/2019	-20	17	85	100	71
Rochester	1/29/2019	-20	21	85	104	76
Worthington	1/29/2019	-20	21	85	103	81
Ortonville	1/29/2019	-23	14	88	101	77

This data by weather station was then compared to the AHDD65 data used in the previous demand entitlement filing:

<u>Station</u>	<u>Date</u>	<u>Avg. Temp</u>	<u>Avg. Wind</u>	<u>HDD65</u>	<u>AHDD65</u>	<u>AHDD65-1</u>
Bemidji	2/1/1996	-34	8	99	107	94
Cloquet	2/2/1996	-31	7	96	103	100
Fargo	1/18/1996	-16	34	81	109	85
International Falls	2/2/1996	-34	8	99	107	107
Minneapolis	2/2/1996	-25	8	90	97	92
Rochester	2/2/1996	-27	10	92	101	94
Worthington	1/18/1996	-8	32	73	96	74
Ortonville	1/14/2009	-21	11	86	96	86

While the January, 2019 cold weather outbreak was significant, it was not considered to be as severe as the weather conditions experienced in 1996. With the exception of Worthington, the 1996 weather conditions overall were colder when considering both the current day and the prior day weather conditions. Following is the data by weather station that was ultimately used in MERC's current analysis:

<u>Station</u>	<u>Date</u>	<u>Avg. Temp</u>	<u>Avg. Wind</u>	<u>HDD65</u>	<u>AHDD65</u>	<u>AHDD65-1</u>
Bemidji	2/1/1996	-34	8	99	107	94
Cloquet	2/2/1996	-31	7	96	103	100
Fargo	1/18/1996	-16	34	81	109	85
International Falls	2/2/1996	-34	8	99	107	107
Minneapolis	2/2/1996	-25	8	90	97	92
Rochester	2/2/1996	-27	10	92	101	94
Worthington	1/29/2019	-20	21	85	103	81
Ortonville	1/14/2009	-21	11	86	96	86

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.<sup>2</sup>
  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.

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<sup>2</sup> 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 = 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 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

- 
- NORTHLAND APTS

NNG

- HENDRICKS HOSPITAL
- BRAND FX BODY INC

#### 4. Autocorrelation Review

The Commission's February 4, 2015, Order in MERC's 2012-2013 demand entitlement dockets<sup>3</sup> 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<sup>4</sup> 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

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<sup>3</sup> Docket Nos. G011/M-12-1192, G011/M-12-1193, G011/M-12-1194, and G011/M-12-1195

<sup>4</sup> Docket Nos. G007/M-10-1166, G007/M-10-1167, G011/M-10-1168, and G011/M-10-1169

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-19-\_\_\_\_

CERTIFICATE OF SERVICE

I, Kristin M. Stastny, hereby certify that on the 1st day of August, 2019, 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](http://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 1<sup>st</sup> day of August, 2019.

/s/ Kristin M. Stastny  
Kristin M. Stastny

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Tamie A.	Aberle	tamie.aberle@mdu.com	Great Plains Natural Gas Co.	400 North Fourth Street Bismarck, ND 585014092	Electronic Service	No	GEN_SL_Minnesota Energy Resources Corporation (HOLDING)_2019 Demand Entitlement
Michael	Ahern	ahern.michael@dorsey.com	Dorsey & Whitney, LLP	50 S 6th St Ste 1500 Minneapolis, MN 554021498	Electronic Service	No	GEN_SL_Minnesota Energy Resources Corporation (HOLDING)_2019 Demand Entitlement
Kristine	Anderson	kanderson@greatermngas.com	Greater Minnesota Gas, Inc.	202 S. Main Street Le Sueur, MN 56058	Electronic Service	No	GEN_SL_Minnesota Energy Resources Corporation (HOLDING)_2019 Demand Entitlement
Christopher	Anderson	canderson@allete.com	Minnesota Power	30 W Superior St Duluth, MN 558022191	Electronic Service	No	GEN_SL_Minnesota Energy Resources Corporation (HOLDING)_2019 Demand Entitlement
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Elizabeth	Brama	ebrama@briggs.com	Briggs and Morgan	2200 IDS Center 80 South 8th Street Minneapolis, MN 55402	Electronic Service	No	GEN_SL_Minnesota Energy Resources Corporation (HOLDING)_2019 Demand Entitlement
Robert S.	Carney, Jr.			4232 Colfax Ave. S. Minneapolis, MN 55409	Paper Service	No	GEN_SL_Minnesota Energy Resources Corporation (HOLDING)_2019 Demand Entitlement
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Generic Notice	Commerce Attorneys	commerce.attorneys@ag.state.mn.us	Office of the Attorney General-DOC	445 Minnesota Street Suite 1800 St. Paul, MN 55101	Electronic Service	No	GEN_SL_Minnesota Energy Resources Corporation (HOLDING)_2019 Demand Entitlement

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
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George	Crocker	gwillc@nawo.org	North American Water Office	PO Box 174  Lake Elmo, MN 55042	Electronic Service	No	GEN_SL_Minnesota Energy Resources Corporation (HOLDING)_2019 Demand Entitlement
Ian	Dobson	residential.utilities@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012131	Electronic Service	No	GEN_SL_Minnesota Energy Resources Corporation (HOLDING)_2019 Demand Entitlement
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