

Minnesota Energy Resources Corporation

2685 145th Street West Rosemount, MN 55068 www.minnesotaenergyresources.com

VIA ELECTRONIC FILING

November 1, 2019

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-19-497

Dear Mr. Wolf:

On August 1, 2019, Minnesota Energy Resources Corporation ("MERC" or the "Company") filed its Petition for Change in Demand Entitlement for the MERC-Consolidated purchased gas adjustment ("PGA"). MERC submits this update to its August 1, 2019 Demand Entitlement filing.

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

As of the date of this filing, MERC has completed its purchases of future contracts and call options for the 2019-2020 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 3 and in Attachment 8. Finally, rate comparisons in Attachment 4, page 1, have been updated to MERC's October 1, 2019, Purchased Gas Adjustment rates.

Mr. Daniel P. Wolf November 1, 2019 Page 2

Please contact me at (414) 221-4208 if you have any questions regarding the information in this filing. Thank you for your attention to this matter.

Sincerely yours,

/s/Joylyn Hoffman Malueg
Joylyn Hoffman Malueg
Project Specialist 3
Minnesota Energy Resources Corporation

Enclosure cc: Service List

August 1, 2019 November 1, 2019

To: <u>Docket No. G011/M-19-497</u> 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 Joylyn Hoffman Malueg

Minnesota Energy Resources Corporation 2685 145th 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 Docket Number 19-497. the date of the filing.

ATTACHMENT B

STATE OF MINNESOTA BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Katie Sieben Chair
Dan Lipschultz Commissioner
Matt Schuerger Commissioner
Valerie Means Commissioner
John Tuma 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-19-497____

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 Chair
Dan Lipschultz Commissioner
Matt Schuerger Commissioner
Valerie Means Commissioner
John Tuma 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-19-497____

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). 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.

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

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 2019-2020 heating season for its MERC-NNG PGA in a separate docket.

I. Summary of Filing

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

II. Service

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

III. General Filing Information

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

Minnesota Energy Resources Corporation 2685 145th Street West Rosemount, MN 55068 (651) 322-8901

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

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

C. Date of the Filing and Proposed Effective Date

Date of filing: August 1, 2019 November 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

/s/Joylyn Hoffman Malueg
Mary L. WolterJoylyn Hoffman Malueg
Director—Gas Regulatory Planning & PolicyProject Specialist 3
joylyn.hoffmanmalueg@wecenergygroup.com_Mary.Wolter@wecenergygroup.com
2685 145th Street West
Rosemount, MN 55068
(414) 221-42082374

If additional information is required, please contact Mary Wolter Joylyn Hoffman Malueg at (414) 221-42082374.

DATED: August 1, 2019November 1, 2019

Respectfully submitted, MINNESOTA ENERGY RESOURCES CORPORATION

By: /s/ Mary L. WolterJoylyn Hoffman Malueg Joylyn Hoffman MaluegMary L. Wolter 2685 145th Street West Rosemount, MN 55068

Telephone: (414) 221-42082374

STATE OF MINNESOTA BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Katie Sieben Chair
Dan Lipschultz Commissioner
Matt Schuerger Commissioner
Valerie Means Commissioner
John Tuma 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-19-497____

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

I. <u>Introduction</u>

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 0 For the 2019-20	Consolidated Reserve Ma 20 Heating Season	rgins
Reserve Marg	,	
2019-2020		Changa

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,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. 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

 $^{^2}$ 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>	Capacity (dth/day)	Firm Customer Load (dth)
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.

<u>Finally, MERC points out that Viking Gas Transmission filed a rate case with the Federal Energy Regulatory Commission (FERC) on June 28, 2019. Viking has requested a modest rate increase, to be effective January 1, 2020. Since the result of the rate case is unknown at this time, MERC has held rates at current levels for determining its demand rate in this proceeding. In accordance with Minn. R. 7825.2910, MERC will reflect actual rate increases in its monthly PGA filing when those rates go into effect.</u>

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 f inancial 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
\$2.80902.6753/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 \$2.29992.2000/dth. MERC has
purchased call options at an average strike price of \$3.69433.5753/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 November 1, 2019

Respectfully submitted,

MINNESOTA ENERGY RESOURCES

CORPORATION

By: /s/ Joylyn Hoffman Malueg

Joylyn Hoffman MaluegBy: /s/ Mary L.

Wolter

Mary L. Wolter

2685 145th Street West

Rosemount, MN 55068

Telephone: (414) 221-42082374

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Attachment 1 Page 1 of 3

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%

> Attachment 1 Page 2 of 3

MINNESOTA ENERGY RESOURCES - Consolidated

MINNESOTA DESIGN DAY REQUIREMENTS

November 1, 2019

HDD

Pipeline	2017/18	1/20	Regression	Factors	Regression	Add	1/20 Requirements	Estimated	
Group	Customer	Design	Intercept	Slope	Total	Adjustment	Regression Load	Contract	Total
	Count	DDD						Demand Units	
		V	GT						
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
		GL	.GT						
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
		Ce	ntra						
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 Cor	nsolidated	_	_	_		_	
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

Attachment 1 Page 3 of 3

MINNESOTA ENERGY RESOURCES - Consolidated

DESIGN-DAY DEMAND PER CUSTOMER November 1, 2019

Heating <u>Season</u>	No. of Firm <u>Customers</u>	Design Day <u>Requirements</u>	MMBtu /Customer <u>/Day</u>
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

Attachment 2 Page 1 of 1

MINNESOTA ENERGY RESOURCES - Consolidated

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

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

Attachment 3

Page 1 of 1

MINNESOTA ENERGY RESOURCES - Consolidated

ENTITLEMENT LEVELS November 1, 2019

			Summer		A	oril/Octol	ber		Winter	
		2018/19	Change	Proposed	2018/19	Change	Proposed	2018/19	Change	Proposed
Capacity Type		<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
Total Entitlement		46,723	0	46,723	46,723	0	46,723	57,949	0	57,949
Forecasted Design Day-	Adjusted				32,826	343	33,169	56,470	312	56,782
Capacity Surplus/Shorta	ge				13,897	(343)	13,554	1,479	(312)	1,167
Reserve Margin					42.34%	-1.47%	40.86%	2.62%	-0.56%	2.06%

Attachment 4 Page 1 of 3

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

RATE IMPACT OF THE PROPOSED DEMAND CHANGE November 1, 2019

All costs in	Base	Demand	Demand	Most	Proposed		Result of Propo	seed Change	
\$/Dth	Cost of Gas G011/MR-17-564	Charge			Effective	Change from Last	Change from Nov 1, 2018	Change from Last	Change from Last
	1-Jul-19	Oct 1, 2018	Nov 1, 2018	Oct 1, 2019	Nov 1, 2019	Rate	Demand	PGA	PGA
						Case	Filing	%	\$
1) General Service R	esidential Avg. Annua	al Use:		86	Dth				
Commodity Cost	\$2.8746	\$3.0522	\$3.3664	\$2.1687	\$2.7837	-3.16%	-17.31%	28.36%	\$0.615
Demand Cost	\$0.7527	\$0.6908	\$0.8229	\$0.8229	\$0.8229	9.33%	0.00%	0.00%	\$0.000
Commodity Margin	\$2.4116	\$2.4116	\$2.4116	\$2.4686	\$2.4686	2.36%	2.36%	0.00%	\$0.000
Total Cost of Gas	\$6.0389	\$6.1546	\$6.6009	\$5.4602	\$6.0752	0.60%	-7.96%	11.26%	\$0.615
Avg Annual Cost	\$518.20	\$528.12	\$566.42	\$468.54	\$521.31	0.60%	-7.96%	11.26%	\$52.7
	ommodity change on				+				\$52.7
	emand change on av								\$0.0
<u>' '</u>									•
2) Large C&I Firm, C	lass 2: Avg. Annual U	se:		608	Dth				
Commodity Cost	\$2.8746	\$3.0522	\$3.3664	\$2.1687	\$2.7837	-3.16%	-17.31%	28.36%	\$0.615
Demand Cost	\$0.7527	\$0.6908	\$0.8229	\$0.8229	\$0.8229	9.33%	0.00%	0.00%	\$0.000
Commodity Margin	\$1.6885	\$1.6885	\$1.6885	\$1.6857	\$1.6857	-0.17%	-0.17%	0.00%	\$0.000
Total Cost of Gas	\$5.3158	\$5.4315	\$5.8778	\$4.6773	\$5.2923	-0.44%	-9.96%	13.15%	\$0.615
Avg Annual Cost	\$3,233.12	\$3,303.49	\$3,574.94	\$2,844.78	\$3,218.84	-0.44%	-9.96%	13.15%	\$374.0
Effect of proposed c	ommodity change on	average annual l	oills:			*			\$374.0
Effect of proposed d	emand change on av	erage annual bills	s:						\$0.0
	otible, Class 2: Avg. A	nnual Use:		5,627	Dth				
Commodity Cost	\$2.8746	\$3.0522	\$3.3664	\$2.1687	\$2.7837	-3.16%	-17.31%	28.36%	\$0.615
Commodity Margin	\$0.9740	\$0.9740	\$0.9740	\$1.0453	\$1.0453	7.32%	7.32%	0.00%	\$0.000
Total Cost of Gas	\$3.8486	\$4.0262	\$4.3404	\$3.2140	\$3.8290	-0.51%	-11.78%	19.14%	\$0.615
Avg Annual Cost	\$21,657.13	\$22,656.53	\$24,424.62	\$18,086.06	\$21,546.95	-0.51%	-11.78%	19.14%	\$3,460.8
Effect of proposed c	ommodity change on	average annual l	oills:						\$3,460.8
4) Large C&I Interrur	otible, Class 3: Avg. A	nnual Use:		31,604	Dth				
Commodity Cost	\$2.8746	\$3.0522	\$3.3664	\$2.1687	\$2.7837	-3.16%	-17.31%	28.36%	\$0.615
Commodity Margin	\$0.5329	\$0.5329	\$0.5329	\$0.9453	\$0.9453	77.39%	77.39%	0.00%	\$0.000
Total Cost of Gas	\$3.4075	\$3.5851	\$3.8993	\$3.1140	\$3.7290	9.44%	-4.37%	19.75%	\$0.61
Avg Annual Cost	\$107,690.91	\$113,303.80	\$123,233.80	\$98,415.11	\$117,852.29	9.44%	-4.37%	19.75%	\$19,437.
	ommodity change on			ψου, ποιπ	Ψ117,002.20	0.1770	1.07 70	10.70	\$19,437.

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

Attachment 4 Page 2 of 3

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

RATE IMPACT OF THE PROPOSED DEMAND CHANGE:

November 1, 2019

DEMAND									
Contract Type		Season	Monthly Entitlement (Dth)	Months	Rate (\$/Dth)		Contract Costs	Rate Case Sales (therms)	\$/therm
Viking (VGT)									
FT-A ZONE 1 - 1	AF0012	Annual	14,493	12	4.3706		760,117	48,386,934	\$0.01571
FT-A ZONE 1 - 1	AF0012	Winter	1,098	3	4.3706		14,397	48,386,934	\$0.00030
FT-A ZONE 1 - 1	AF0321	Winter	1,500	3	4.3706	\$	19,668	48,386,934	\$0.00041
VGT Demand	•					\$	794,182	48,386,934	\$0.01641
Great Lakes (GLGT)									
FT Western Zone	FT19131	Summer	10,130	7	\$2.8100	\$	199,257	48,386,934	\$0.00412
FT Western Zone	FT18528	Annual	12,600	12	\$2.8100	\$	424,872	48,386,934	\$0.00878
FT Western Zone	FT18528 (5)	Winter	3,728	5	\$2.8100	\$	52,378	48,386,934	\$0.00108
FT Eastern to Western Zone	FT19129 (5)	Winter	15,030	5	\$6.1000	\$	458,415	48,386,934	\$0.00947
ANR Upstream	130504	Winter	15,000	5	\$0.9110		68,325	48,386,934	\$0.00141
Aivit opstream	130304	Wille	13,000	3	ψ0.9110	Ψ	00,323	40,000,904	ψ0.00141
GLGT Demand						\$	1,203,247	48,386,934	\$0.02487
Centra		A	0.500	40	6444070	Φ.	4 000 400	40.000.004	# 0.0000.4
CENTRA TRANSMISSION		Annual	9,500	12	\$14.1070		1,608,198	48,386,934	\$0.03324
CENTRA MINNESOTA PIPELIN	ES	Annual	9,500	12	\$3.2990	\$	376,086	48,386,934	\$0.00777
						_			
Centra Demand MERC-Consolidated DEMAND -	\$/therm					\$	1,984,284 3,981,713	48,386,934	\$0.04101 \$0.08229
MERC-Consolidated DEMAND -	\$/therm				10.000.004	\$	3,981,713	48,386,934	
	\$/therm			L	-,,	\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND	\$/therm			MERC-Consolida		\$ Annua	3,981,713		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT)	\$/therm					\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND	\$/therm	Annual	14,493	MERC-Consolida		\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT)	\$/therm	Annual Winter	14,493 1,098		ated Firm (GS) Sal	\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT) FT-A ZONE 1 - 1	\$/therm			12	ated Firm (GS) Sa 173,916	\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT) FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 FT-A ZONE 1 - 1	\$/therm	Winter	1,098	12 3	ated Firm (GS) Sal 173,916 3,294	\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT) FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 Great Lakes (GLGT)	\$/therm	Winter Winter	1,098 1,500	12 3 3	ated Firm (GS) Sal 173,916 3,294 4,500	\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT) FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 Great Lakes (GLGT) FT Western Zone	\$/therm	Winter Winter	1,098 1,500 10,130	12 3 3	ated Firm (GS) Sal 173,916 3,294 4,500 70,910	\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT) FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 Great Lakes (GLGT) FT Western Zone FT Western Zone	\$/therm	Winter Winter Summer Annual	1,098 1,500 10,130 12,600	12 3 3 7 12	ated Firm (GS) Sal 173,916 3,294 4,500 70,910 151,200	\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT) FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 Great Lakes (GLGT) FT Western Zone FT Western Zone FT Western Zone	\$/therm	Winter Winter Summer Annual Winter	1,098 1,500 10,130 12,600 3,728	12 3 3 7 12 5	70,910 151,200 18,640	\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT) FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 Great Lakes (GLGT) FT Western Zone FT Western Zone FT Western Zone FT Eastern to Western Zone	\$/therm	Winter Winter Summer Annual Winter Winter	1,098 1,500 10,130 12,600 3,728 15,030	12 3 3 7 12 5 5	70,910 151,200 18,640 75,150	\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT) FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 Great Lakes (GLGT) FT Western Zone FT Western Zone FT Western Zone	\$/therm	Winter Winter Summer Annual Winter	1,098 1,500 10,130 12,600 3,728	12 3 3 7 12 5	70,910 151,200 18,640	\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT) FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 Great Lakes (GLGT) FT Western Zone FT Western Zone FT Western Zone FT Western Zone FT Sastern to Western Zone ANR Upstream Centra	\$/therm	Winter Winter Summer Annual Winter Winter Winter	1,098 1,500 10,130 12,600 3,728 15,030 15,000	12 3 3 7 12 5 5 5	70,910 151,200 18,640 75,150 75,000	\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT) FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 Great Lakes (GLGT) FT Western Zone FT Western Zone FT Western Zone FT Western Zone FT Eastern to Western Zone ANR Upstream	\$/therm	Winter Winter Summer Annual Winter Winter	1,098 1,500 10,130 12,600 3,728 15,030	12 3 3 7 12 5 5	70,910 151,200 18,640 75,150	\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT) FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 Great Lakes (GLGT) FT Western Zone FT Western Zone FT Western Zone FT Western Zone FT Sastern to Western Zone ANR Upstream Centra		Winter Winter Summer Annual Winter Winter Winter	1,098 1,500 10,130 12,600 3,728 15,030 15,000	12 3 3 7 12 5 5 5	70,910 151,200 18,640 75,150 75,000	\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT) FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 Great Lakes (GLGT) FT Western Zone FT Western Zone FT Western Zone FT Western Zone FT Eastern to Western Zone ANR Upstream Centra CENTRA TRANSMISSION		Winter Winter Summer Annual Winter Winter Winter Annual	1,098 1,500 10,130 12,600 3,728 15,030 15,000 9,500	12 3 3 7 12 5 5 5 5	70,910 151,200 18,640 75,150 75,000	\$ Annua	3,981,713 Il Firm Sales in therms		
MERC-Consolidated DEMAND - FOR JOINT RATE DEMAND Viking (VGT) FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 FT-A ZONE 1 - 1 Great Lakes (GLGT) FT Western Zone FT Western Zone FT Western Zone FT Western Zone FT Eastern to Western Zone ANR Upstream Centra CENTRA TRANSMISSION CENTRA MINNESOTA PIPELIN	ES	Winter Winter Summer Annual Winter Winter Winter Annual	1,098 1,500 10,130 12,600 3,728 15,030 15,000 9,500	12 3 3 7 12 5 5 5 5	70,910 151,200 18,640 75,150 75,000	\$ Annua	3,981,713 Il Firm Sales in therms		

Attachment 4 Page 3 of 3

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

RATE IMPACT OF THE PROPOSED DEMAND CHANGE

PRESENT AVERAGE COST OF GAS COMMODITY

NOVEMBER 1, 2019

WACOG		Annual	Call Option	Physical Forward	Balancing	Total Annual	System	Storage	Total		
VGT	Rate	Dth	Premium	Start Premium	Service	Cost	Cost/therm	Comm Rate	Comm Rate	REFERENCE	Effective
GAS COST	\$2.61150										="
FUEL 0.09%	\$0.00235									Sub 16th Revised Sheet No. 5E	3
COMMODITY TRANSPORTATION	\$0.01160									Sub 16th Revised Sheet No. 5E	3
GRI	\$0.00000									Sub 16th Revised Sheet No. 5E	3
ACA	<u>\$0.00130</u>									Sub 16th Revised Sheet No. 5E	3
VGT Commodity	\$2.62675	2,310,917	\$31,152	\$42,560	\$89,580	\$6,233,491	\$0.10767			VGT Commodity	
GLGT											
GAS COST	\$2.61150										
FUEL 0.547%	\$0.01436										
COMMODITY TRANSPORTATION	\$0.00288									5 Revised Sheet 4	
GRI	\$0.00000									Contract	
ACA	<u>\$0.00130</u>									18th Revised Sheet No. 7	
GLGT Commodity	\$2.63004	2,143,952	\$28,901	\$5,700	\$0	\$5,673,279	\$0.09799			GLGT Commodity	
CENTRA											
CENTRA TRANSMISSION (\$Cdn/103M3)	1.0684									Sheet 1 (N.E.B.)	
Conversion	\$0.02313										
Abandonment Toll	\$0.00000									N.E.B. MO-078-2014	
GAS COSTS	\$2.61150										
CUSTOMS FEE	<u>\$0.00030</u>										
CENTRA Commodity	\$2.63493	1,334,508	\$17,989	\$91,875	\$54,000	\$3,680,198	\$0.06357			Centra Commodity	
Consolidated WACOG w/Premium & Balancing	·	<u>5,789,376</u>	\$78,042	\$140,135	\$143,580	<u>\$15,586,969</u>	<u>\$0.26923</u>	\$0.00914	•	·	
	Total Annual Sales in therms	57,893,756		·			·		•	·	
	·	·							\$0.2783	7 Total Consolidated WACOG-	/therm
								•			

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

Storage Service								
	Monthly Entitlement			Data	C	Annual	5	
	Season	(Dth)	Months	Rate (\$/Dth)	Contract Costs	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:

\$0.27837

^{*} 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.

Attachment 5

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

Financial Options Heating Season 2019-2020

					F	leating Seas	son 2019-20	J20				
Units -		aker Package ember		ember	lan	uary	Fol	bruary	M	arch		
	Contract Date N/A	Daily <u>Volume</u>	Contract Date N/A	Daily <u>Volume</u>	Contract Date N/A	Daily <u>Volume</u>	Contract Date N/A	Daily Daily <u>Volume</u>	Contract Date N/A	Daily <u>Volume</u>	Daily <u>Total</u>	Term <u>Total</u>
Premi	um - Gas Daily	y Peaker (Mon	thly Cost)									
	Nove	ember	Dec	<u>ember</u>		uary		bruar <u>y</u>		arch		Total
	Option <u>Premium</u> N/A	Premium <u>Cost</u>	Option <u>Premium</u> N/A	Premium <u>Cost</u>	Option <u>Premium</u> N/A	Premium <u>Cost</u>	Option <u>Premium</u> N/A	Premium <u>Cost</u>	Option <u>Premium</u> N/A	Premium <u>Cost</u>	Option <u>Premium</u>	Premium <u>Cost</u>
Units -	Futures (Dth)										
	Nove	<u>ember</u>	<u>Dec</u>	<u>ember</u>	<u>Jan</u>	<u>uary</u>	<u>Fel</u>	<u>bruary</u>	<u>Ma</u>	arch		
	Contract	Daily	Contract	Daily	Contract	Daily	Contract	Daily	Contract	Daily	Term	
	Date	<u>Volume</u>	Date Date	Volume	Date OF (4.0)	<u>Volume</u>	Date Date	<u>Volume</u>	Date Date	Volume	<u>Total</u>	
1 2	05/02/19 06/04/19	313 313	05/14/19 06/13/19	558 502	05/16/19 06/18/19	551 501	05/07/19 06/06/19	514 514	05/09/19 06/11/19	452 395	72,069 67,155	
<u>2</u> 3	06/04/19	313	06/13/19	502	06/18/19	200	06/06/19	457	06/11/19	395	67,155 55,690	l
ı L	08/01/19	260	08/20/19	447	07/18/19	300	08/06/19	457	08/08/19	339	54,052	
	09/05/19	104	09/17/19	447	08/22/19	451	09/10/19	457	09/12/19	339	54,052	
6	09/05/19	156	10/17/19	447	09/19/19	50	10/10/19	457	10/15/19	339	42,586	
7	10/08/19	208	01/00/00	-	09/19/19	400	01/00/00	-	01/00/00	-	19,655	
3	01/00/00	-			10/22/19	250					8,190	
9 10					10/22/19	200					6,552	
Total		1,667		2,903		2,903		2,857		2,258	380,000	
l Inite .	Call Options	(Dth)										
Ullits -		ember	Dec	ember	Jar	nuary	Fel	bruary	M	arch		
	Contract	Daily	Contract	Daily	Contract	Daily	Contract	Daily	Contract	Daily	Term	
	Date	Volume	Date	Volume	Date	Volume	Date	Volume	Date	Volume	Total	
I	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	05/16/19	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	07/16/19	1,012	07/18/19	734	131,600	
‡ 5	08/01/19	621 621	08/08/19 09/12/19	949 949	07/09/19	995	08/20/19 09/17/19	1,012	08/22/19 09/19/19	734 734	129,976	
6	09/05/19 10/08/19	564	10/15/19	949	08/06/19 09/10/19	995 995	10/17/19	1,012 952	10/22/19	734	129,976 126,618	
7	10/00/13	304	10/13/19	343	10/10/19	995	10/17/19	332	10/22/19	754	30,855	
8 Total		3,667		5,806		6,129		6,071		4,516	- 790,000	
Premi	um - Call Optio	on (Monthly C	ost)									
		ember		ember	Jar	nuary	Fel	bruary	M	arch		Total
	Option	Premium	Option	Premium	Option	Premium	Option	Premium	Option	Premium	Option	Premium
	Premium	Cost	Premium	Cost	Premium	Cost	Premium	Cost	Premium	Cost	Premium	Cost
1		\$ 1,824								\$ 2,450		
2	\$ 0.0930 \$ 0.0950	\$ 1,731 \$ 1,768	\$ 0.0980 \$ 0.1000	\$ 3,053 \$ 2,942	\$ 0.1000 \$ 0.0950	\$ 1,624 \$ 3,085	\$ 0.1000 \$ 0.1000			\$ 2,450 \$ 2,275	\$ 0.0984 \$ 0.0981	\$ 11,690 \$ 12,900
3 4		\$ 1,768	\$ 0.1000	\$ 2,942	\$ 0.0950	\$ 3,085	\$ 0.1000		\$ 0.1000	\$ 2,275 \$ 2,275	\$ 0.0981	\$ 12,90
† 5		\$ 1,767	\$ 0.1000	\$ 2,942	\$ 0.1000	\$ 3,085	\$ 0.1000			\$ 2,275	\$ 0.0999	\$ 12,97
6	\$ 0.0900	\$ 1,523	\$ 0.0960	\$ 2,825	\$ 0.1000	\$ 3,085	\$ 0.1000		\$ 0.1000	\$ 2,275	\$ 0.0977	\$ 12,37
7	\$ -	\$ -	\$ -	\$ -	\$ 0.0980	\$ 3,024	\$ -	\$ -	\$ -	\$ -		\$ 3,024
<u>8</u>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		-
Total	\$ 0.0952	\$ 10,477	\$ 0.0988	\$ 17,789	\$ 0.0988	\$ 18,776	\$ 0.1000	\$ 17,000	\$ 0.1000	\$ 14,000	\$ 0.0988	\$ 78,042

Units - Collar Floor (put)

No Puts were purchased.

Attachment 6

Page 1 of 2

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

19/20 Winter Portfolio Plan - MERC Hedging Plan

10000	Contract Size

10000	Oomitact		v-19	De	c-19	la	n-20	Fel	b-20	Ma	ır-20		Total	Percent
	Purchase	Number	Contract	of										
System	Month	Contracts	Volume	Requirements										
MN Requirements	Wierith	Contracto	586,442	Contracto	906,950	Contracto	994,551	Contracto	853,214	Contracto	714,557	Contracto	4,055,714	4,055,714
Daily Average			19,548		29,256		32,082		30,472		23,050		26,682	1,000,1 1
10%	Futures		58,644		90,695		99,455		85,321		71,456		405,571	
20%			117,288		181,390		198,910		170,643		142,911		811,143	
0%			0		0		0		0		0		0	
70%			410,509		634,865		696,185		597,250		500,190		2,839,000	
10%	IIIdex		410,505		004,000		030,103		337,230		300,130		2,000,000	
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	
	Total	5	50,000	9	90,000	9	90,000	8	80,000	7	70,000	38	380,000	9.37%
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	
	Total	11	110,000	18	180,000	19	190,000	17	170,000	14	140,000	79	790,000	19.48%
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	
Index (back financial)	Total	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
,	Total		160,000		270,000		280,000		250,000		210,000		1,170,000	28.85%
Physical Hedges			0		0		0		0		0		0	40.040/
Storage			96,000		189,100		189,100		196,000		85,900		756,100	18.64%
Prepaid Obl			0		0		0		0		0		0	0.00%
			43.65%		50.62%		47.17%		52.27%		41.41%		47.49%	47.49%
Term Index	Aug-19	0	0	0	0	0	0	0	0	0	0		0	0.00%
	Sep-19 Oct-19	0	0 0		0	0.00% 0.00%								
Cantracta													200,000	0.070/
Contracts													380,000	9.37%
Call Options													790,000 0	19.48% 0.00%
Costing Collar													_	
Storage													756,100	18.64%
Prepaid Obl													0	0.00%
Term Index													ŭ	0.00%
Month/Daily													2,129,614	52.51%
Total	1												4,055,714	100.00%

Attachment 6 Page 2 of 2

MINNESOTA ENERGY RESOURCES - CONSOLIDATED

WINTER PLAN - CONSOLIDATED NOVEMBER 2019 THROUGH MARCH 2020

PHYSICAL FIXED PRICE HEDGE	<u>:S</u>	Trigger	Trigger		<u>Nov</u>	Dec	Daily Volumes <u>Jan</u>	<u>Feb</u>	<u>Mar</u>	Monthly <u>Total</u>
	Deal #	Locked	Exercised	Receipt Point						
No Physical Fixed Price Hedges										- - -
	Total Actual	Fixed/Option I	Physical	_	-	-	-	-	-	-
INDEX	Contract									
	Number	<u>Date</u>	Receipt Point	<u>Nov</u>	Dec	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Total</u>	
	77622	4/23/2019	VGT Emerson 1	4,000	4,000	4,000	4,000	4,000	608,000	
	77623	4/23/2019	VGT Emerson 1		4,000	4,000	4,000		364,000	
	77528	4/24/2019	Chisago		1,530	1,530	1,530		139,230	
	77631	4/23/2019	GLGT Emerson 2	5,000	5,000	5,000	5,000	5,000	760,000	
	77636	4/23/2019	GLGT Emerson 2	2,500	2,500	2,500	2,500	2,500	380,000	
	77638	4/23/2019	GLGT Emerson 2		3,500	3,500	3,500		318,500	
	77613	4/23/2019	CTHI-Spruce	2,000	2,000	2,000	2,000	2,000	304,000	
	77616	4/23/2019	CTHI-Spruce		2,000	2,000	2,000		182,000	
	Total Actual	Seasonal Inde	ЭХ	13,500	24,530	24,530	24,530	13,500	3,055,730	
GAS DAILY PACKAGES										
Physical Call Option	77625	4/23/2019	VGT Emerson 1	7,000	7,000	7,000	7,000	7,000		
Physical Call Option	77617	4/23/2019	CTHI-Spruce	2,500	2,500	2,500	2,500	2,500		
Physical Call Option	77621	4/23/2019	CTHI-Spruce		2,500	2,500	2,500			
Physical Call Option	77640	4/23/2019	GLGT Emerson 2	5,000	5,000	5,000	5,000	5,000		

STORAGE

	Contract #	
	ANR	Total
Injection	Volume	Volume
<u>Month</u>	<u>Injected</u>	<u>Injected</u>
May - balance forward	216,029	216,029
June	108,014	108,014
July	108,014	108,014
August	108,014	108,014
Sept	108,014	108,014
Oct	108,014	108,014
Total	756,100	756,100

Attachment 7

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
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	0
FA-A ZONE 1 - 1 Winter Only	0	0	1,500	1,500	1,500	0
Great Lakes Gas Transmission (GLGT)						
FT Western Zone- Summer Only	10,130	10,130	10,130	10,130	10,130	0
FT Western Zone- Annual	12,600	12,600	12,600	12,600	12,600	0
FT Western Zone- Winter Only	3,728	3,728	3,728	3,728	3,728	0
FT Western Zone- Winter Only*	13,480	13,480	15,030	15,030	15,030	0
ANR Upstream	0	0	0	15,000	15,000	0
Centra Transmission Holding/Centra Minnesota Pipeli	ines (CTHI/CPM	I)				
Centra FT-1	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%
Other Entitlements not included in Peak Day Deliverability	, _					
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

Attachment 8

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/ Rate		Months	2018/19 Total Annual Cost	2019/20 Total Annual Cost	Total Annual Cost Change
Costs Assigned in Demand Charge									
Viking Pipeline									
FT-A ZONE 1 - 1AF0012	14,493	14,493	0	•	3706	12	\$760,117		\$0
FT-A ZONE 1 - 1AF0012	1,098	1,098		•	3706	3	\$14,397		\$0
FT-A ZONE 1 - 1AF0321	1,500	1,500	0	\$ 4.3	3706	3	\$19,668	\$19,668	\$0
<u>GLGTPipeline</u>									
FT Western ZoneFT19131	10,130	10,130	0	\$ 2.8	3100	7	\$199,257	\$199,257	\$0
FT Western ZoneFT18528	12,600	12,600	0	\$ 2.8	3100	12	\$424,872	\$424,872	\$0
FT Western ZoneFT18528 (5)	3,728	3,728	0	\$ 2.8	3100	5	\$52,378	\$52,378	\$0
FT Eastern to Western ZoneFT19129 (5)	15,030	15,030	0	\$ 6.1	1000	5	\$458,415	\$458,415	\$0
ANR Upstream130504	15,000	15,000	0	\$ 0.9	9110	5	\$68,325	\$68,325	\$0
CENTRA Pipeline									
CENTRA TRANSMISSION	9,500	9,500	0	\$ 14.1	1070	12	\$1,608,198	\$1,608,198	\$0
CENTRA MINNESOTA PIPELINES	9,500	9,500	0	\$ 3.2	2990	12	\$376,086	\$376,086	\$0
Total Costs Assigned to Demand Charge							\$3,981,713	\$3,981,713	\$0
Costs Assigned in Commodity Charge									
Storage Service									
Niska Storage (AECO)	0	0	0	\$	-	0	\$0	\$0	\$0
Niska Storage Assignment	0			\$	-	0	\$0		\$0
ANR Pipeline Storage	756,100	756,100			7000	12	\$529,270		\$0
Balancing									
VGT Balancing Agreement	7,465	7,465	0	\$ 1.0	0000	12	\$89,580	\$89,580	\$0
Union Balancing	10,000	10,000	0	\$ 0.4	4500	12	\$54,000	\$54,000	\$0
Physical Forward Start Premium							\$94,875	\$140,135	\$45,260
Call Options Premium							\$76,864	\$78,042	\$1,178
Total Costs Assigned to Commodity Charg	ae						\$844,589	\$891,027	\$46,438

Attachment 9

MINNESOTA ENERGY RESOURCES - Consolidated

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

Design Day:	
Base	922
Variable	511

					L	variable	311
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 8/5/18	0	0	0	0 0	0	12,010 13,955	922 922
	0	0	0		0		
8/6/18 8/7/18	5 0	4 0	0	11 0	4	20,852 20,527	3,188 922
8/7/18 8/8/18	0	0	0 0	0	0 0	20,52 <i>1</i> 19,935	922 922
8/9/18	0	0	0	0	0	18,469	922
0/3/10	U	U	U	U	U	10,409	922

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	10	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
9/26/18	20 27	20	23	23	24	25,331	13,116
9/27/18	27 35	20 27	23 30	23 31	2 4 31	26,606	16,903
9/29/18	35 29	27 27	30 27	27	28	24,009	
9/29/18	29 26	2 <i>1</i> 20	27 25	27 29	28 25	2 4 ,009 23,179	15,059 13,930
3/3U/10	20	20	20	29	20	23,179	13,930

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

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
1/20/19	86	82	80	93 94	85	75,452	44,467
1/28/19	85	75	82	85	82	79,794	
	110	75 104	02 105	103	02 106	•	43,058
1/29/19						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 73	68	67	70	70	64,488	36,464
0,0,10	7.5	00	O1	7.0	70	57,700	50,404

3/6/19								
3/8/19	3/6/19	73	66	70	76	72	66,365	37,565
399/19	3/7/19	57	56	64	57	59	56,815	31,182
3/10/19	3/8/19	43	43	46	46	45	50,185	23,762
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 52,565 27,454 3/16/19 48 44 45 49 50 47,361 26,432 3/17/19 43 39 45 41 43 46,608 22,776 3/18/19 36 36 46 36 40 48,522 21,375 3/19/19 36 32 38 35 36 45,476 19,100 3/20/19 36 33 40 34 37 48,297 19,696 3/21/19 37 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 28 23 31 24 27 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 41 38 39 42 40 41,985 21,313 3/30/19 46 45 42 47 45 45,611 23,828 4/1/19 35 33 33 35 34 47,801 18,390 4/2/19 41 34 36 42 39 51,507 20,866 4/1/19 35 33 33 35 34 47,801 18,390 4/2/19 41 34 36 42 39 51,507 20,866 4/1/19 35 33 33 35 34 47,801 18,390 4/2/19 41 34 36 42 39 51,507 20,866 4/1/19 35 33 33 35 34 47,801 18,390 4/2/19 41 34 36 42 39 51,507 20,866 4/1/19 33 33 33 35 34 47,801 18,390 4/2/19 41 34 36 42 39 51,507 20,866 4/1/19 36 42 37 38 42 40 41,985 21,313 3/30/19 46 45 42 47 45 45,611 23,828 4/1/19 33 33 33 35 34 47,801 18,390 4/2/19 41 34 36 42 39 51,507 20,866 4/1/19 36 42 37 38 42 40 41,985 21,313 3/30/19 46 45 42 47 45 45,611 23,828 4/1/19 33 33 33 35 34 47,801 18,390 4/2/19 41 34 36 42 39 51,507 20,866 4/1/19 36 42 37 38 42 40 41,935 20,875 4/4/19 33 33 33 35 33 33 43,885 17,967 4/5/19 28 26 26 26 27 27 36,653 14,695 4/1/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 43,270 20,206 4/11/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19	3/9/19	44	37	50	38	44	47,586	23,266
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 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 19,686 3/21/19 37 26 40 31 35 41,044 19,028 3/22/19 37 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 45,881 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 41 38 39 42 40 41,985 21,313 3/29/19 41 38 39 42 40 41,985 21,313 3/29/19 41 38 39 42 40 41,985 21,313 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 33 35 39 38 43,270 20,206 4/1/19 36 33 33 35 35 47,801 23,828 3/31/19 40 39 35 39 38 38 43,270 20,206 4/1/19 36 38 33 33 35 36 47,810 20,206 4/1/19 37 38 39 38 42 40 41,985 21,313 3/29/19 41 38 39 42 40 41,985 21,313 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 36 28 26 26 27 27 36,653 14,695 4/4/19 33 33 33 35 34 47,801 12,403 4/2/19 41 34 36 42 39 51,507 20,886 4/3/19 42 37 38 42 40 44,720 21,343 4/17/19 30 25 14 25 22 33,981 12,418 4/8/19 28 26 26 26 27 27 36,653 14,695 4/4/19 33 33 33 35 34 47,801 12,407 4/17/19 30 25 14 25 22 33,981 12,418 4/18/19 28 26 28 20 20 22 34,161 12,407 4/17/19 30 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 47,802 21,433 4/10/19 37 38 42 40 47,802 21,433 4/10/19 38 42 41 43,129 22,016 4/10/19 36 42 42 41 43,129 22,016 4/10/19 36 42 42 41 43,129 22,016 4/10/19 36 42 41 43 40 43 47,872 22,872 4/12/19 41 43 46 42 42 41 43,129 22,016 4/13/19 42 41 35 37 38 42 40 44,720 21,433 4/10/19 36 42 42 42 41 43,129 22,016 4/10/19 36 42 42 41 43,129 22,016 4/10/19 36 42 43 44 48 48 48 48 48 48 48 48 48 48 48 48	3/10/19	62	54	62	59	60	55,519	31,697
3/13/19	3/11/19	52	49	62	52	55	56,455	29,032
3/14/19	3/12/19	34	38	38	32	36	47,735	19,119
3/15/19 54 44 53 52 52 52 52,565 27,454 3/16/19 48 44 54 49 50 47,361 26,432 3/17/19 43 39 46 41 43 46,608 22,776 3/18/19 35 32 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 21,986 3/21/19 37 26 40 31 35 41,044 19,028 3/22/19 37 37 37 39 38 38 31 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 33 33 35 34 47,801 18,390 4/2/19 41 34 36 42 39 51,507 20,206 4/1/19 35 33 33 35 33 43 48,885 17,967 4/2/19 41 34 36 42 39 51,507 20,866 4/3/19 42 35 35 45 39 49,356 20,875 4/4/19 33 33 33 35 33 43 43,885 17,967 4/4/19 36 42 37 38 42 40 41,985 21,314 4/4/19 37 38 39 42 40 41,985 21,314 4/4/19 37 38 39 38 43,270 20,206 4/1/19 36 33 33 35 33 34 47,801 18,390 4/2/19 41 34 36 42 39 51,507 20,266 4/3/19 42 35 35 35 45 39 49,356 20,875 4/4/19 38 39 38 43,270 20,206 4/1/19 36 37 38 42 40 44,264 39 51,507 20,266 4/3/19 42 35 35 35 45 39 49,356 20,875 4/4/19 38 39 38 42 40 44,270 21,433 4/10/19 36 42 37 38 42 40 44,270 21,433 4/10/19 36 42 37 38 42 40 44,270 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 37 40 45 45 45 45 45 45 45 45 45 45 45 45 45	3/13/19	33	31	42	30	35	47,610	18,830
3/16/19	3/14/19	46	36	49	41	45	50,412	23,732
3/17/19	3/15/19	54	44	53	52	52	52,565	27,454
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 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 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 41 38 39 42 40 41,985 21,313 3/30/19 46 45 42 47 45 45,611 23,823 3/30/19 46 45 42 47 45 45,611 23,823 3/31/19 35 33 33 35 34 47,801 18,390 4/2/19 41 34 36 42 39 51,507 20,266 4/1/19 35 33 33 35 33 43 44,885 17,967 4/5/19 28 26 26 27 27 36,663 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 44,256 21,205 4/6/19 26 28 20 20 22 34,161 12,408 4/6/19 26 28 20 20 22 34,161 12,408 4/9/19 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 37 38 42 40 44,720 21,433 4/10/19 38 39 49,356 22 21,34 42 40 44,720 21,431 4/10/19 37 38 42 40 44,720 21,431 4/10/19 38 42 40 44,720 21,431 4/10/19 39 42 37 38 42 40 44,720 21,431 4/10/19 39 36 37 38 42 40 44,720 21,431 4/10/19 39 36 42 40 44,720 21,431 4/10/19 39 36 42 41 42 42 41 43,129 22,016 4/13/19 43 36 42 42 41 43,129 22,016 4/13/19 44 45 43 40 43 47,872 22,872 4/12/19 43 36 42 42 41 43,129 22,016 4/13/19 43 36 42 42 41 43,129 22,016 4/13/19 44 45 43 40 43 47,872 22,872 4/12/19 43 36 42 42 41 43,129 22,016 4/13/19 49 40 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 42 40 44,720 21,433 4/16/19 32 35 34 28 32 43,215 17,311 4/15/19 32 30 30 30 29 30 47,889 16,432 4/16/19 15 15 15 16 15 35,919 8,697 4/17/19 30 42 41 35 32 42 42 44 42,689 16,432 4/18/19 27 27 23 25 25 42,354 13,723 4/19/19 41 27 7 10 21 12 24,998 7,284 4/20/19 12 7 10 21 12 24,998 7,285 4/20/19 12 7 10 21 12 24,998 7,285 4/20/19 19 30 16 17 19 35,746 10,600 4/23/19 19 16 6 9 9 33,784 5,515 4/22/19 19 30 16 6 77 19 35,746 10,600	3/16/19	48	44	54	49	50		26,432
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 35 31 35 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 21,313 3/30/19 46 45 42 47 45 45,611 23,828 3/31/19 40 39 35 39 38 43,870 20,206 4/1/19 35 33 33 35 34 47,801 4/2/19 41 34 36 42 39 51,507 20,686 4/3/19 42 35 35 35 45 39 49,356 20,875 4/4/19 38 26 26 27 27 36,653 17,967 4/5/19 28 22 21 34 26 33,881 12,418 4/8/19 28 22 21 34 26 33,881 12,418 4/8/19 28 22 21 34 26 33,881 12,418 4/8/19 28 22 21 34 26 33,881 12,418 4/8/19 36 42 37 38 42 40 44,256 20,875 4/4/19 37 38 38 38 38 38 38 38 38 38 38 38 38 38	3/17/19	43	39	45	41	43		22,776
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 41 38 39 42 40 44,256 21,205 3/28/19 41 38 39 42 40 41,985 21,313 3/30/19 46 45 42 47 45 45,611 28,288 3/31/19 40 39 35 39 38 43,270 20,206 4/11/19 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 35 45 39 49,356 20,444 4/3/19 33 33 33 35 33 43,885 17,967 4/5/19 28 26 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 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 38 42 40 44,720 21,433 4/10/19 40 40 40 40 40 40 40 40 40 40 40 40 40	3/18/19	38		46		40		
3/21/19 37 26 40 31 35 41,044 19,028 3/22/19 37 37 39 38 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 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 45,661 23,828 3/31/19 40 39 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 35 45 39 49,356 20,875 4/4/19 33 33 35 35 43 43,885 11,695 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 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 42 37 38 42 40 44,720 21,433 4/10/19 42 37 38 42 40 44,720 21,433 4/10/19 42 37 38 42 40 44,720 21,433 4/10/19 43 36 42 40 44,720 21,433 4/10/19 44 45 43 40 43 47,802 19,861 4/11/19 44 45 43 40 43 47,802 19,861 4/11/19 44 45 43 40 44,720 21,433 4/10/19 42 37 38 42 40 44,720 21,433 4/10/19 43 36 42 42 41 43,129 4/8/19 42 37 38 42 40 44,720 21,433 4/10/19 43 36 42 42 41 43,129 4/8/19 42 37 38 42 40 44,720 21,433 4/10/19 43 36 42 42 41 43,129 4/8/19 42 37 38 42 40 44,720 21,433 4/10/19 43 36 42 42 41 43,129 4/8/19 42 37 38 42 40 44,720 21,433 4/10/19 43 36 42 42 41 43,129 4/8/19 42 37 38 42 40 44,720 21,433 4/10/19 43 36 42 42 41 43,129 4/19/19 42 37 38 42 40 44,720 21,433 4/10/19 43 36 42 42 41 43,129 4/19/19 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 4/18/19 42 41 35 37 38 46,542 20,468 4/14/19 32 30 30 30 29 30 47,889 16,432 4/19/19 42 41 35 37 38 46,542 20,468 4/14/19 32 30 30 30 29 30 47,889 16,432 4/19/19 42 41 15 13 12 13 30,960 7,678 4/12/19 41 24 12 20 18 28,925 10,301 4/22/19 19 30 16 17 19 35,746 10,600 4/23/19 19 10 6 6 9 9 33,784 5,515 4/25/19 20 13 20 18 19 35,149 10,406	3/19/19	35	32	38	35	36		19,100
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 41 38 39 42 40 41,256 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 41/1/19 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 33 35 33 33 43,885 17,967 4/5/19 28 26 26 26 27 27 36,653 14,695 4/5/19 28 26 26 27 27 36,653 14,695 4/5/19 28 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 42 37 38 42 40 44,720 21,433 4/10/19 42 37 38 42 40 44,720 21,433 4/10/19 42 37 38 42 40 44,720 21,433 4/10/19 42 37 38 42 40 44,720 21,433 4/10/19 42 37 38 42 40 44,720 21,433 4/10/19 42 37 38 42 40 44,720 21,433 4/10/19 42 37 38 42 40 44,720 21,433 4/10/19 42 37 38 42 40 44,720 21,433 4/10/19 42 37 38 42 40 44,720 21,433 4/10/19 42 37 38 42 40 44,720 21,433 4/10/19 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 35 34 28 32 43,215 17,311 4/18/19 42 41 35 37 38 46,542 20,468 4/14/19 32 35 35 34 28 32 43,215 17,311 4/18/19 42 41 35 37 38 46,542 20,468 4/14/19 32 35 35 34 28 32 43,215 17,311 4/18/19 42 41 35 37 38 46,542 20,468 4/14/19 32 30 30 29 30 47,889 16,432 4/18/19 32 30 30 29 30 47,889 16,432 4/18/19 27 27 23 25 25 42,354 13,723 4/19/19 15 15 15 16 15 35,919 8,697 4/19/19 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 6 7 9 9 33,784 5,515 4/25/19 20 13 00 16 17 19 35,746 10,600 4/23/19 9 16 6 9 9 33,784 5,515 4/25/19 20 13 00 18 19 35,149 10,406	3/20/19	36	33	40		37		19,696
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 30 37 40 42 40 49,893 21,378 3/26/19 35 31 35 34 34 46,156 18,340 3/28/19 28 23 31 24 27 43,218 14,940 3/28/19 42 37 38 42 40 44,256 21,205 3/28/19 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 20.20 4/119 35 33 33 35 34 47,801 18,390 4/2/19 41 34 36 42 39	3/21/19	37		40	31	35	•	
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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 41 38 39 42 40 44,256 21,205 3/29/19 41 38 39 42 40 44,985 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 49,355 20,686 4/3/19 28 26 26 27 27								
3/26/19 35 31 35 34 34 40,156 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 34,885 17,967 4/5/19 28 26 26 27 27<	3/24/19	45	47	44		45		24,143
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 35 45 39 49,356 20,875 4/4/19 33 33 35 33 33 43,885 17,967 4/5/19 26 28 20 20 22 34,161 12,407 4/6/19 26 28 20 20 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>•</td> <td></td>							•	
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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 4/8/19 36 42 37 38 42 40 44,720 21,433 4/10/19 36 42 37 36							•	
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	3/30/19	46	45	42	47	45		23,828
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								
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4/26/19 28 26 18 30 25 31,703 13,513								
	4/26/19	28	26	18	30	25	31,703	13,513

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
5/14/19	6	15	1	12	7	23,507	4,320
5/16/19	21	16	17	19	, 18	26,872	10,279
5/10/19	16	21	17	19	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

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 Corporation 2019-2020 Demand Entitlement MERC-Consolidated November 1, 2019

Attachment 10

MINNESOTA ENERGY RESOURCES - Consolidated

Customer Counts by PGAC Class - July 1, 2018 through June 30, 2019

Tariff	i	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Annual
Rate	Rate	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average
Class		9			Customers								9	0
GS- Residential	MERC000002	30,277	30,357		30,362	30,573	29,253		30,542	30,850	30,713		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
Total		35,717	35,800	35,743	35,800	36,015	34,460	38,149	36,021	36,332	36,207	36,232	36,191	36,055

Attachment 11 Page 1 of 3

MINNESOTA ENERGY RESOURCES - Consolidated

Euturos Contracte WACOG

Futures Co	ntracts WA	COG																																			
Futures	10,000	Dth/contrac	t																																		
Deal Number	Purchase Date	Trade Number	Number Contracts	Physical Volume	Strike Price	Strike Cost	LDS Settle*		Over/(Under) Pi Market F	remium Pren Per Unit Co		Deal Numbe	Purchase Date	Trade Number	Number Contracts	Physical Volume	Strike Price	Dec-19 Strike Cost	LDS Settle*	LDS Settle Cost	Over/(Under) Market	Premium Per Unit		Total Cost	Deal Number	Purchase Date I		Number	Physical Volume	Strike Price	Jan-20 Strike Cost	LDS Settle*	LDS Settle Cost	Over/(Under) Market	Premium Pr Per Unit	Premium Cost	Total Cost
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	05/02/19 06/04/19 07/02/19 08/01/19 09/05/19 09/05/19 10/08/19	78635 79220 79843 80538 80550	6 6 5 2 3 4	60,000 60,000 50,000 20,000 30,000	\$ 2.5400 \$ 2.3730 \$ 2.3860 \$ 2.4790 \$ 2.4770	\$ 142,380 \$ 119,300 \$ 49,580 \$ 74,310 \$ 90,920	\$ 2.2820 \$ 2.2820 \$ 2.2820 \$ 2.2820 \$ 2.2820 \$ 2.2820 \$ 2.2820	\$ 136,920 \$ 136,920 \$ 136,920 \$ 136,920 \$ 114,100 \$ 45,640 \$ 68,460 \$ 91,280 \$	\$ 15,480 \$ 5,460 \$ 5,200 \$ 3,940 \$ 5,850 \$ (360)	\$ \$ \$ \$ \$	- \$ 152,40 - \$ 142,38	0 2 0 3 0 4 0 5 0 6	05/14/19 06/13/19 07/16/19 08/20/19 09/17/19 10/17/19	79411 80182 80698	10 9 9 8 8 8	90,000 90,000 80,000 80,000	\$ 2.6530 \$ 2.6230 \$ 2.4350 \$ 2.8210 \$ 2.5200	\$ 295,900 \$ 238,770 \$ 236,070 \$ 194,800 \$ 225,680 \$ 201,600 \$ -	\$ 2.4270 \$ 2.4270 \$ 2.4270 \$ 2.4270	\$ 194,160 \$ 194,160 \$ 194,160	\$ 20,340 \$ 17,640 \$ 640 \$ 31,520 \$ 7,440		\$. \$. \$.	\$ 295,900 \$ 238,770 \$ 236,070 \$ 194,800 \$ 225,680 \$ 201,600 \$.	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	05/16/19 06/18/19 07/18/19 07/18/19 07/18/19 08/22/19 09/19/19 09/19/19 10/22/19 10/22/19	78910 79531 79532 80275 80749 80750 81492	11 10 4 6 9 1 8 5	100,000 40,000 60,000 90,000 10,000 80,000 50,000	\$2.7720 \$2.7010 \$2.7020 \$2.5340 \$2.8780 \$2.8800 \$2.5840	\$ 277,200 \$ 108,040 \$ 162,120 \$ 228,060 \$ 28,780 \$ 230,400	****** ****** ***** ***** *****	\$ 101,280 \$ 151,920 \$ 227,880 \$ 25,320 \$ 202,560 \$ 126,600	\$ 24,000 \$ 6,760 \$ 10,200 \$ 180 \$ 3,460 \$ 27,840 \$ 2,600	999999999999999999999999999999999999999	· · · · · · · · · · · · · · · · · · ·	333,190 277,200 108,040 162,120 228,060 228,780 230,400 129,200 103,400
Total			32	320,000		\$ 793,710 \$ 2.4803		\$ 730,240 \$ 2,2820	\$ 63,470 \$ 0.1983		- \$ 793,71 - \$ 2.480				52	520,000		\$ 1,392,820 \$ 2.6785			\$ 130,780 \$ 0.2515		s -	******** \$ 2.6785	Total	Total		58	580,000		\$ 1,600,390 \$ 2.7593			\$ 131,830 \$ 0.2273			1,600,390 2.7593
NNG Other-Cons		84.38% 15.63%	27 5								- \$ 669,69 - \$ 124,01			82.69% 17.31%	43 9			\$ 1,151,755 \$ 241,065									84.48% 15.52%	49 9						\$ 111,374 \$ 20,456			
Total	32	100.0%	32	320,000	\$ 2.4803	\$ 793,710	\$ 2.2820	\$ 730,240	\$ 63,470 \$	- s	- \$ 793,71	0 Total	52	100.0%	52	520,000	\$ 2.6785	\$ 1,392,820	\$ 2.4270	*******	\$ 130,780	s -	\$ -	*******	Total	58	100.0%	58	580,000	\$2.7593	\$ 1,600,390	*****	*****	\$ 131,830	s - s	s - s	1,600,390
							Feb-	20										Mar-20													Total						
Deal Number	Purchase Date		Number Contracts	Physical Volume	Strike Price	Strike Cost	LDS Settle*		Over/(Under) Pi Market F		ium Total st Cost		Purchase Date		Number Contracts	Financial Volume	Strike Price	Strike Cost	LDS Settle*	LDS Settle Cost	Over/(Under) Market			Total Cost	Deal Number	Purchase Date	% (Number Contracts	Physical Volume	Strike Price	Strike Cost	LDS Settle	LDS Settle Cost	Over/(Under) Market		Cost	Total Cost
1 2 3 4 4 5 6 6 7 8 9 10 11 12 13 14 15	05/07/19 06/06/19 07/09/19 08/06/19 09/11/19 10/10/19	78694 79270 79910 80607	9 9 8 8 8 8	90,000 80,000 80,000 80,000 80,000	\$ 2.7770 \$ 2.7450 \$ 2.5090 \$ 2.8460 \$ 2.5270	\$ 249,930 \$ 219,600 \$ 200,720 \$ 227,680 \$ 202,160	\$ 2.4990 \$ 2.4990 \$ 2.4990 \$ 2.4990 \$ 2.4990	\$ 224,910 \$ 224,910 \$ 199,920 \$ 199,920 \$ 199,920 \$ 199,920	\$ 25,020 \$ 19,680 \$ 800 \$ 27,760 \$ 2,240	9999	- \$ 249,93 - \$ 219,66 - \$ 200,72 - \$ 227,68 - \$ 202,16	0 2 0 3 0 4 0 5 0 6 7 8 9 10 11 12 13 14 15	05/09/19 06/11/19 06/11/19 08/08/19 09/12/19 10/15/19	78800 79317 79939 80643	8 7 7 6 6 6	70,000 70,000 60,000 60,000 60,000	\$ 2.6620 \$ 2.7230 \$ 2.4480 \$ 2.6620 \$ 2.4750	\$ 226,320 \$ 186,340 \$ 190,610 \$ 146,880 \$ 159,720 \$ 148,500	\$ 2.4050 \$ 2.4050 \$ 2.4050 \$ 2.4050 \$ 2.4050	\$ 168,350 \$ 144,300 \$ 144,300 \$ 144,300	\$ 17,990 \$ 22,280 \$ 2,580 \$ 15,420 \$ 4,200		99999		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15			44 41 34 33 33 26 12 5 4	410,000 340,000 330,000 330,000 260,000 120,000 50,000 40,000	\$2.6942 \$2.6374 \$2.4964 \$2.4969 \$2.6992 \$2.5206 \$2.520	\$ 896,700 \$ 823,820 \$ 890,720 \$ 655,350 \$ 321,320 \$ 129,200 \$ 103,400	****** ****** ****** ***** *****	\$824,900 \$ 824,900 \$ 811,900 \$ 632,160 \$ 293,840 \$ 126,600 \$ 101,280	\$ 206,050 \$ 102,830 \$ 71,800 \$ 19,420 \$ 78,820 \$ 23,190 \$ 27,480 \$ 2,600 \$ 2,120			321,320 129,200 103,400
Total			50	500,000		\$ 1,361,360 \$ 2.7227		\$ 2,4990			- \$1,361,36 - \$ 2.722				40	400,000		\$ 1,058,370 \$ 2.6459			\$ 96,370 \$ 0.2409		\$ -	\$ 2.6459	Total			232	2,320,000		\$ 6,206,650 \$ 2.6753			\$ 534,310 \$ 0.2303			6,206,650 2.6753
NNG Other-Cons	42 8	84.00% 16.00%	42 8								- \$1,143,54 - \$ 217,81		33 7	82.50% 17.50%				\$ 873,155 \$ 185,215							NNG Other-Cons									\$ 446,794 \$ 87,516			
Total	50	100.0%	50	500,000	\$ 2.7227	\$ 1,361,360	\$ 2.4990	******	\$111,860 \$. s	- \$1,361,36	0 Total	40	100.0%	40	400,000	\$ 2.6459	\$ 1,058,370	\$ 2.4050	\$ 962,000	\$ 96,370	ş -	ş -	*******	Total	232	100.0%	232	2,320,000	\$2.6753	\$ 6,206,650	*****	******	\$ 534,310	s - s	s - s	6,206,650

Prices from 10/23/19 NYMEX market

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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)		rojected NNG VACOG		K#118657 NNG Storage Cost		#132024 NNG Storage Cost	ŀ	K#133736 NNG Storage Cost		Total NNG Storage Cost	ANR Storage GLGT/VGT (Dth)	GL	ANR Storage GT/VGT VACOG		ANR Storage _GT/VGT Cost
Nov-19 Dec-19 Jan-20 Feb-20 Mar-20	489,384 1,229,734 1,229,734 1,229,734 489,384	48,750 122,500 122,500 122,500 48,750	97,500 245,000 245,000 245,000 97,500	1,597,234 1,597,234 1,597,234	\$ \$ \$ \$ \$	2.0452 2.0452 2.0452 2.0452 2.0452	\$ \$ \$ \$ \$	1,000,875 2,515,020 2,515,020 2,515,020 1,000,875	\$ \$ \$ \$ \$	99,702 250,534 250,534 250,534 99,702	\$ \$ \$	199,404 501,068 501,068 501,068 199,404	\$ \$ \$	1,299,982 3,266,621 3,266,621 3,266,621 1,299,982	96,000 189,100 189,100 196,000 85,900	\$ \$	2.2000 2.2000 2.2000 2.2000 2.2000	\$ \$	211,200 416,020 416,020 431,200 188,980
Total	4,667,969	465,000	930,000	6,062,969			\$	9,546,809	\$	951,006	\$	1,902,012	\$	12,399,828	756,100			\$ '	1,663,420

	NNG	NNG	NNG		ANR	Emerson	Emerson
Month/	Storage	Index	Index	Month/	Storage	Index	Market
Year	Volume (Dth)	Price	Cost	Year	Volume (Dth)	Price	Cost
Nov-19	635,634	\$ 2.3245	\$ 1,477,531	Nov-19	96,000	\$ 2.3620	\$ 226,752
Dec-19	1,597,234	\$ 2.9720	\$ 4,746,978	Dec-19	189,100	\$ 2.7670	\$ 523,240
Jan-20	1,597,234	\$ 4.0620	\$ 6,487,963	Jan-20	189,100	\$ 3.0820	\$ 582,806
Feb-20	1,597,234	\$ 4.0140	\$ 6,411,296	Feb-20	196,000	\$ 3.0990	\$ 607,404
Mar-20	635,634	\$ 2.9500	\$ 1,875,120	Mar-20	85,900	\$ 2.7225	\$ 233,863
Total	6,062,969		\$ 20,998,888	Total	756,100		\$ 2,174,065
Storage Sa	avings (Cost):		\$ 8,599,060				\$ 510,645

^{*}Indexes and projected WACOG based on 10/23/19 market prices

Attachment 11

MINNESOTA ENERGY RESOURCES - Consolidated Projected Fixed Cost - November 2019 through March 2020

Call/Put Options WACOG

Call/Put Options 10,000 Dth/contract

								Nov-19												Dec-19	9												.la	n-20						
Deal Number	Purcha Date		de Number per Contracts			Strike C Cost	ption Opti Price Cos		Pent Settle Cost	Over/(Under) Market	Premium Per Unit		Total D Cost Nu	Deal Pu umber		de Number ber Contracts		Strike Price	Strike Op Cost P	ption C Price	Option Pe Cost Set	nt Pent tle* Ci	Settle Over/(Under) ost Market		Premium Cost	Total Cost	Deal Number	Purchase Trade Date Numbe	Number contracts	Physical Volume	Strike Price	Strike Cost	Option Price	Option Cost	Pent Settle*	Pent Settle Cost	Over/(Under) Market	Premium Pr Per Unit	Premium Cost	Total Cost
1 2 3 4 5 6 7 8 9 10 11 12 13	06/04/ 07/02/ 08/01/ 09/05/	/19 7921 /19 7984 /19 8053	34 11 19 11 12 11	110,000 110,000 110,000 110,000	\$ 2.8000 \$ 2.6300 \$ 2.6000 \$ 2.6000	289,300 \$ 286,000 \$ 286,000 \$	2.2820 \$ 25° 2.2820 \$ 25° 2.2820 \$ 25° 2.2820 \$ 25°	,020 \$ 2.282 ,020 \$ 2.282 ,020 \$ 2.282 ,020 \$ 2.282	0 \$ 251,020 0 \$ 251,020	\$ - \$ - \$ - \$ -	\$ 0.0930 \$ 0.0950 \$ 0.0960 \$ 0.0990	\$ 10,780 \$ 10,230 \$ 10,450 \$ 10,450 \$ 10,450 \$ 10,450 \$ 10,890 \$ 1	261,800 261,250 261,470 261,580 261,910	1 05 2 06 3 07 4 08 5 09	6/09/19 78/ 1/11/19 78/ 1/11/19 79/ 1/11/19 79/ 1/08/19 80/ 1/15/19 81/	99 18 16 17 38 17	180,000 170,000 170,000 170,000	\$ 3.1500 \$		2.4270 \$ 2.4270 \$ 2.4270 \$ 2.4270 \$	436,860 \$ 2.4 412,590 \$ 2.4 412,590 \$ 2.4 412,590 \$ 2.4		36,860 \$ - 12,590 \$ - 12,590 \$ - 12,590 \$ -	\$ 0.0980 \$ \$ 0.1000 \$ \$ 0.1000 \$ \$ 0.1000 \$	17,820 \$ 17,640 \$ 17,000 \$ 17,000 \$ 17,000 \$ 16,320 \$	454,500 429,590 429,590 429,590	2 3 4 5	05/07/19 77974 05/16/19 78169 06/06/19 78692 07/09/19 79269 08/06/19 79916 09/10/19 80606 10/10/19 81174	10 20 19 19	100,000 S 200,000 S 190,000 S 190,000 S	\$ 3.8000 \$ \$ 3.2500 \$ \$ 4.1000 \$	405,000 5 770,000 5 722,000 5 617,500 5 779,000 5	\$ 2.5320 \$ 2.5320 \$ 2.5320 \$ 2.5320 \$ 2.5320 \$ 2.5320	\$ 253,200 \$ 506,400 \$ 481,080 \$ 481,080 \$ 481,080	\$ 2.5320 \$ 2.5320 \$ 2.5320 \$ 2.5320 \$ 2.5320 \$ 2.5320 \$	\$ 278,520 \$ 253,200 \$ 506,400 \$ 481,080 \$ 481,080 \$ 481,080 \$ 481,080 \$		\$0.1000 \$0.1000 \$0.0950 \$0.1000 \$0.1000 \$0.1000 \$0.1000 \$0.0980 \$0.0980	10,000 \$ 19,000 \$ 19,000 \$ 19,000 \$ 19,000 \$	289,520 263,200 525,400 500,080 500,080 500,080 499,700
14 15 Total	54	92.09	65			\$ 1,726,000 \$ 2.6554	\$ 1,483 \$ 2.	2820	\$ 1,483,300 \$ 2.2820	š -		\$ 61,910 \$1,5 \$ 0.0359 \$	2.3772	14 15 Fotal	00 00		1,040,000	Š	3,240,600 3.1160 2,679,727 \$ 2	Ś	2,524,080 2.4270	\$	24,080 \$ - 2.4270 \$ -	Š	102,780 \$ 0.0317 \$ 84,991 \$	2.5258		Total 98 83.769	117		Š	4,330,500 3.7013		\$ 2,962,440 \$ 2.5320	9	\$ 2,962,440 \$ 2.5320 \$ 2.481,360	\$ -	\$	115,620 \$ 0.0267 \$	2.6308
Other-Cons	11	16.92	2% 11	110,000	\$ 2.6554	\$ 292,092 \$	2.2820 \$ 1,232	\$ 2.282	10 \$ 1,232,280	\$ -	\$ 0.0952	10,477 \$	261,497 Othe	er-Cons	18 17.3	1% 18	180,000	\$ 3.1160 \$	560,873 \$ 2	2.4270 \$ 2.	436,860 \$ 2.4	1270 \$ 2,0	36,860 \$ -	\$ 0.0988 \$	17,789 \$	454,649	Other-Cons	19 16.249	6 19	190,000	\$ 3.7013 \$	703,244	\$ 2.5320	\$ 481,080	\$ 2.5320	\$ 481,080	s	\$0.0988 \$	18,776 \$	499,856
Total	65	100.0	0% 65	650,000	\$ 2.6554	\$ 1,726,000 \$	2.2820 \$ 1,483	3,300 \$ 2.282	1,483,300	S -	\$ 0.0952	61,910 \$1,5	545,210 T	Fotal	104 100	0% 104	1,040,000	\$ 3.1160 \$	3,240,600 \$ 2	2.4270 \$ 2.	2,524,080 \$ 2.4	\$ 2,5	24,080 \$ -	\$ 0.0988 \$	102,780 \$	2,626,860	Total	117 100.09	6 117	1,170,000	\$ 3.7013 \$	4,330,500	\$ 2.5320	\$ 2,962,440	\$ 2.5320	5 2,962,440	s -	\$0.0988 \$	115,620 \$	3,078,060
Deal	Burcho	nee Tree	de Number	Dhunion	Ctriko	Strike C	ption Opti	Feb-20	Pent Settle	Over/(Lleder)	Bromium	Bromium 1	Total C	Dool Bu	roboco Tro	de Number	Einanoial	Ctribo	Strike O	Mar-20	Ontion Ro	nt Bont	Sottle Over//Lleder)	Dromium I	Dromium	Total	Deal	Durchasa	Number	Dhysical	Otriko	Strike	Ontion	otal	Pent	Boot Sottle	Over/(Under)	Dromium C	tromium	Total
Number			per Contracts			Cost	ption Opti Price Cos	t Settle	Cost	Market	Per Unit	Cost	Cost Nu	umber	Date Nun	ber Contracts	Volume	Price	Strike Op Cost P	ption C Price	Option Pe Cost Set	tle* C	Settle Over/(Under) ost Market	Per Unit	Cost	Cost	Number	Date %	Contracts	Physical Volume	Price	Cost	Option Price	Option Cost	Settle*	Cost	Market	Per Unit	Cost	Cost
1 2 3 4 5 6 7 8	06/13/ 07/16/ 08/20/ 09/17/	/19 7810 /19 7884 /19 7940 /19 8018 /19 8069 /19 8137	13 17 09 17 31 17 97 17	170,000 170,000 170,000 170,000	\$ 4.0500 \$ 3.8500 \$ 3.6500 \$ 4.6500	654,500 \$ 620,500 \$ 790,500 \$	2.4990 \$ 424 2.4990 \$ 424 2.4990 \$ 424 2.4990 \$ 424	1,830 \$ 2.499 1,830 \$ 2.499 1,830 \$ 2.499 1,830 \$ 2.499	0 \$ 424,830 0 \$ 424,830 0 \$ 424,830	\$ - \$ - \$ -	\$ 0.1000 \$ 0.1000 \$ 0.1000 \$	\$ 18,000 \$ 4 \$ 17,000 \$ 4 \$ 17,000 \$ 4	467,820 441,830 441,830	2 06	6/16/19 78: 6/18/19 78: 7/18/19 79: 6/22/19 80:	09 14 30 13	140,000	\$ 3.8000 \$	574,000 \$ 2 494,000 \$ 2	2.4050 \$ 2.4050 \$ 2.4050 \$	336,700 \$ 2.4 336,700 \$ 2.4 312,650 \$ 2.4	4050 \$ 33 4050 \$ 3	36,700 \$ - 12,650 \$ -	\$ 0.1000 \$ \$ 0.1000 \$	14,000 \$ 14,000 \$ 13,000 \$ 13,000 \$	350,700	1 2 3 4		72 70 78 77	700,000	\$ 3.6887 \$ \$ 3.5497 \$ \$ 3.3409 \$	2,582,100 2,768,800 2,572,500	\$ 2.4323 \$ 2.4455		\$ 2.4323 \$ 2.4455	\$ 1,702,610 \$ 1,907,490 \$ 1,882,170	\$ - \$ - \$ -	\$0.0984 \$ \$0.0980 \$	71,600 \$ 68,870 \$ 76,450 \$ 76,560 \$	1,771,480 1,983,940 1,958,730
9 10 11 12 13 14 15			10	160,000	\$ 3.7500	- \$		9,840 \$ 2.499 - \$ 2.499 - \$ 2.499	0 \$ 399,840 0 \$ -	\$ - \$ -		5 17,000 \$ 4 16,000 \$ 5 5 - \$ 5			/19/19 807	48 13	130,000	\$ 4.7000 \$	468,000 \$ 2 611,000 \$ 2 487,500 \$ 2	2.4050 \$	312,650 \$ 2.4	4050 \$ 3°	12,650 \$ -	\$ 0.1000 \$	13,000 13,000 \$		5 6 7 8 9 10 11 12 13 14 15		77 75 19 0	750,000 190,000	\$ 3.4187 \$ \$ 3.2000 \$	2,564,000 608,000	\$ 2.4444 \$ 2.4458 \$ 2.5320	\$ 1,882,170 \$ 1,834,360 \$ 481,080	\$ 2.4444 \$ 2.4458 \$ 2.5320	\$ 1,834,360 \$ 481,080	Š -	\$0.0978 \$ \$0.0980 \$	73,320 \$ 18,620 \$	1,907,680
9 10 11 12 13 14 15				1,020,000		- \$	- \$	\$ 2.499 \$ 2.499	0 \$ 399,840 0 \$ -		\$ 0.1000 \$		415,840 - - - - - - - - - - - - - - - - - - -		/19/19 807	48 13 91 13	130,000	\$ 4.7000 \$ \$ 3.7500 \$	611,000 \$ 2	2.4050 \$ 2.4050 \$	312,650 \$ 2.4	\$ 3: \$ 3: \$ 3:	12,650 \$ -	\$ 0.1000 \$ \$ 0.1000	13,000 \$	325,650	7 8 9 10 11 12 13 14 15		0	750,000 190,000	\$ 3.4187 \$ \$ 3.2000 \$ \$ - \$	2,564,000 608,000	\$ 2.4444 \$ 2.4458 \$ 2.5320 \$ -	\$ 1,882,170 \$ 1,834,360 \$ 481,080	\$ 2.4444 \$ 2.4458 \$ 2.5320 #DIV/0!	\$ 1,834,360 \$ 481,080		\$0.0978 \$0.0980 \$ - \$	73,320 \$ 18,620 \$	1,907,680 499,700
15	85 17			1,020,000	\$ 4.0824	\$ 4,164,000 \$ 4,0824 \$ 3,470,000 \$	\$ 2,544 \$ 2.4990 \$ 2,124	- \$ 2.498 - \$ 2.498 8,980 4990 1,150 \$ 2.498	\$ 399,840 0 \$ - 10 \$ - \$ -		\$ 0.1000	16,000 \$ 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	415,840 - - 550,980 2.5990 209,150	6 7 8 9 10 11 12 13 14 15 Fotal	W19/19 807 W22/19 814	48 13 91 13 80	130,000 130,000 800,000	\$ 4.7000 \$ \$ 3.7500 \$ \$	611,000 \$ 2 487,500 \$ 2	\$.4050 \$ \$.4050 \$ \$.4050 \$	312,650 \$ 2.312,650 \$ 2.4150 \$ 2.4150 \$ 2.4150 \$ 1.587,300 \$ 2.415	\$ 1,93 \$ 34050 \$ 31	12,650 \$ - 12,650 \$ - 24,000 \$ - 2,4050 \$ - 87,300 \$ -	\$ 0.1000 \$ 0.1000 \$ \$ 0.1000 \$ \$ \$ \$ \$ \$ \$	13,000 \$ 13,000 \$	2,004,000 2,5050 1,653,300	7 8 9 10 11 12 13 14 15 Total	389 83.12° 79 16.88°	0 468 6 389	750,000 190,000 4,680,000 3,890,000	\$ 3.4187 \$ \$ 3.2000 \$ \$	2,564,000 608,000 16,732,600 3,5753 113,909,879	\$ 2.4444 \$ 2.4458 \$ 2.5320 \$	\$ 1,882,170 \$ 1,834,360 \$ 481,080 \$ 888888888888888888888888888888888	\$ 2.4444 \$ 2.4458 \$ 2.5320 BDIV/O! \$	\$ 1.834,360 \$ 481,080 \$ \$ 2.4450 \$ 9,512,310		\$0.0978 \$0.0980 \$ - \$ \$ \$0.0988 \$ 50.0988 \$ \$	73,320 \$ 18,620 \$ \$ \$	1,907,680 499,700 11,905,110 2,5438 9,896,578 2,008,532

*Prices from 10/23/19 NYMEX market

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 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 nine 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
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

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, 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

Attachment 12

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

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

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

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

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

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

iii. Volume Risk Adjustments

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

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

1. Add back DFC customer selections

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

Exhibit 1 Pipeline and Weather Station Regression Notes

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

<u>GLGT</u> Paper Mills = Blandon mapped to Bemidji, and Sappi and USG mapped to Cloquet

<u>VGT</u> Lamb Weston mapped to Fargo

NNG Taconites / Direct Connects =

6

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

NNG OSEU (End Users) =

- ARKEMA INC. mapped to Rochester
- MAYO Clinic 1 Fairmount mapped to Worthington
- MAYO Clinic 2 (Franklin Htg) mapped to Rochester
- MAYO Clinic 3 (St Mary's) mapped to Rochester
- ARCHER DANIELS MIDLAND, CO. mapped to Minneapolis
- ASSOCIATED MILK PRODUCTS, INC. mapped to Rochester
- · Hawkins Inc. mapped to Minneapolis
- CORRECTIONAL CTR mapped to Minneapolis
- DAIRY FARMERS OF AMERICA mapped to Rochester
- Dick's Sanitation mapped to Minneapolis
- KEMPS LLC mapped to Rochester
- KERRY BIO-SCIENCE mapped to Rochester
- LAKESIDE mapped to Rochester
- MILK SPECIALTIES mapped to Worthington
- LAND OF LAKES mapped to Rochester
- PRO-CORN mapped to Rochester
- SWIFT mapped to 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

<u>NNG</u>

- HENDRICKS HOSPITAL
- BRAND FX BODY INC

4. Autocorrelation Review

The Commission's February 4, 2015, Order in MERC's 2012-2013 demand entitlement dockets³ 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. <u>Design-Day Model</u>

Order Point 5 of the Commission's January 21, 2015, Order in MERC's 2010-2011 demand entitlement dockets⁴ 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

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

⁴ 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. <u>Verification of Regression Analysis Results</u>

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-19-497____

CERTIFICATE OF SERVICE

I, Kristin M. Stastny, hereby certify that on the 1st day of August November, 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. 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, 2019.

/s/ Kristin M. Stastny Kristin M. Stastny

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