Montana Public Service Commission
Docket No. 2022.07.078
Electric and Natural Gas General Rate Review

PRE-FILED DIRECT TESTIMONY

OF JASON M. MCCLAFFERTY

ON BEHALF OF NORTHWESTERN ENERGY

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Witness Information

Q. Please provide your name, employer, and title.

A. My name is Jason M. McClafferty. I am NorthWestern Energy's ("NorthWestern") Manager of Gas Transmission Operations.

Q. Please provide a description of your relevant employment experience and other professional qualifications.

A. I have a Bachelor of Science degree in General Engineering with Mechanical emphasis from Montana Tech of the University of Montana. I joined NorthWestern in October 2006 and have worked in the Gas Transmission and Storage ("GTS") department for the last 15 years. I am a registered Professional Engineer in the State of Montana.

I have held staff and supervisor positions within the GTS Department during my employment at NorthWestern, including positions within the Gas Engineering Department, the Gas System Planning Group, and the Gas System Operation Group. In 2020, I was promoted to the Manager of Gas Transmission Operations. In my prior positions, I performed initial design, construction oversite, and operation startup of regulation and measurement stations, compressor stations, new pipeline sections, and purchase stations. I have held both Chair and Vice Chair positions in the Southern Gas Association (SGA) Forecasters Forum Committee where daily, monthly, yearly, and long-range gas transmission forecasting for gas

load and system growth are discussed amongst utilities. In my current role as Manager of Gas Transmission Operations, I oversee daily Gas Transmission and Storage operation and coordinate workflow throughout the Montana service territory. I develop seasonal storage planning, long-term system development, and ensure safe, reliable, compliant operation of the gas transmission system.

I was also an expert witness regarding natural gas transmission planning in NorthWestern's last natural gas general rate review in 2016, Docket No. D2016.9.68, filed with the Montana Public Service Commission ("Commission").

Purpose and Summary of Testimony

Q. What is the purpose of your testimony in this docket?

A. The purpose of my testimony is to provide details to support NorthWestern's GTS initiatives, other than in pipeline compliance, which is discussed in the Pre-filed Direct Testimony of Keith W. Meagor. My testimony also describes investments that NorthWestern has made in natural gas transmission and what is anticipated in the near future. I also present and explain proposed changes to tariffs and rules related to natural gas transmission services (Tariff Schedule Nos. GTC-1 and AGTC-1, and Natural Gas Rule 1).

Q. Please summarize your testimony.

A. Regarding NorthWestern's Montana natural gas transmission system, my testimony describes the major challenges and initiatives facing the system, operation and maintenance ("O&M"), and costs incurred since NorthWestern's last natural gas general rate review in 2016. The test year for the last general rate review was 2015. As a result, I focus on activities and costs during the period 2016 through 2021, the test year for this rate review. More specifically, my testimony discusses:

- the physical characteristics and operation of the system including gas transmission and storage facilities, major interconnections with other gas pipelines, and system deliverability;
- O&M of the system;
- major plant additions;
- gas transmission system planning; and
- a discussion of challenges to come, including meeting 1) peak day capacity needs and system growth, and 2) the potential future need to provide gas transmission service for natural gas-fired generation within NorthWestern's service territory.

Natural Gas Transmission and Storage Systems

Q. What are the sources of natural gas on NorthWestern's transmission system?

A. There are three major sources of natural gas on NorthWestern's transmission system. First, there are 27 purchase stations, i.e., natural gas production inputs, connected to NorthWestern's system that provide supply to the system from third-party producers. Secondly, there are six interconnecting pipelines on NorthWestern, namely Carway with TransCanada Energy, Elk Basin with Colorado Interstate Gas, WBI with Williston Basin Interstate, Aden Border with Pine Cliff Energy, Many Islands with TransGas, and Havre Pipeline Company at Blaine County #3. Lastly, we own and operate three underground natural gas storage fields, namely Cobb, Box Elder, and Dry Creek.

Q. How much natural gas is NorthWestern's transmission system designed to deliver?

A. For the 2021/2022 heating season, the NorthWestern gas transmission system was designed to deliver 358,515 dekatherm per day (Dkt/d), and this deliverability was achieved through the resources shown in Table 1 below. A comparison to the 2015 percent resource allocation shows increased interconnection capability.

Table 1: Gas Transmission Resources

Gas Transmission Natural Gas Resource Allocation			
	Dkt/d	2021 % Resource	2015 % Resource Comparison
2021 Design Day	**358,515**		
Transmission System Resources			
Flowing Gas	**26,000**	7%	12%
Total Storage	**169,000**	47%	49%
Total Interconnects	**163,515**	46%	39%
Total Transmission system Reso	**358,515**		
Note: System design day is total firm deliveries with 2.46% fuel adder.			

Q. What volume of natural gas did NorthWestern's transmission system deliver to Montana customers in 2021?

A. NorthWestern delivered 43,722,529 million cubic feet ("MCF") of natural gas to its Montana customers in 2021. About 51% or 22.3 billion cubic feet ("BCF") of the gas was delivered to the Core Customers for which NorthWestern also has the responsibility to provide natural gas supply and 39% or 17.2 BCF was delivered to the on-system, Non-Core Customers – those customers to whom NorthWestern provides transmission service, but is not responsible for providing natural gas supply. For more details on natural gas supply to Core Customers, see the Pre-filed Direct Testimony of Bleau J. LaFave. Additionally, 10% or 4.2 BCF was delivered to on-system interruptible customers – those customers to whom NorthWestern provides non-firm transmission service.

Q. Does NorthWestern expect that its current natural gas transmission and storage systems are sufficient to serve customer needs in the future?

A. No. The gas transmission and storage systems is currently fully "subscribed" meaning that during certain times of the year there is no additional capacity available on parts of the transmission system. Our 2021 analysis shows a one-year compound annual growth rate of 1.38% for NorthWestern's Core Customers. We expect this trend to continue as shown below in the historical annual growth rate table. The table includes totals for both Core and Non-Core Customers. However, annual growth rate is based on organic Core Customer growth only with Non-Core Customer counts added after the growth rate is calculated.

Table 2: Gas Transmission

Yearly Annual Growth Rate		Total Customers
2016	1.31%	191,696
2017	1.40%	194,388
2018	1.26%	196,838
2019	1.27%	199,343
2020	1.19%	201,722
2021	1.38%	204,507

Additionally, the on-system flowing gas from all producers on the transmission system, referred to above as the purchase stations, is declining at approximately 8% per year, and NorthWestern expects this trend to continue as well. The 8% decline in on-system flowing natural gas is a natural phenomenon of declining pressure in production

reservoirs, which decreases the ability of the reservoir to sustain the current flow rate. The offset to declining production is to drill additional wells.

The combination of the system growth and flowing gas decline results in a supply/delivery gap to meet customer needs of approximately 5,000 MCF per day, annually, looking forward. This additional volume is needed during design day weather events and indicates the need for additional system capacity during times of greatest need for our customers – cold weather events experienced during the heating season. Design day weather on the NorthWestern system is defined as the weather encountered on the NorthWestern system during February 2, 1989. This weather event was a coincidental peaking event that covered the entire NorthWestern service territory in Montana. A significant amount of data analysis has been done with the National Weather Service and the Montana Climate Office at the University of Montana to determine if this event is likely to occur again. The analysis shows an event similar to the 1989 event is likely to occur again, and recent cold weather events have shown that specific areas of the system have been colder than the 1989 event. This, in turn, further indicates the need for NorthWestern to continue designing its system to these temperatures.

Q. Is it realistic to expect that all natural gas facilities operate at peak capability at all times?

A. No. NorthWestern personnel take steps each year to properly inspect and maintain the equipment we own and operate. However, under certain conditions, storage field flows can decline below expectations. For example, storage wells and pipelines can and do freeze off. Natural gas produced from storage fields or production fields enter the gathering system saturated with water from the reservoir. Once at the surface, the water vapor can drop out of the natural gas stream as temperatures cool or the pressure changes when the natural gas flows from the reservoir to the pipeline. We attempt to mitigate this problem, but cannot predict all circumstances where freeze-offs can occur.

Also, compressor station equipment can fail when operating under extreme conditions for extended periods. We mitigate the potential for this problem by designing compressor stations with spare units. The failure of a compressor thus results in lowered reliability from that particular compressor station. Any additional failures or compressor shut-downs will result in lower supply on the transmission system.

Further, extreme cold weather, power outages, loss of flow from outside parties, either interconnect gas or third-party producers, can all result in a loss of natural gas supply on the transmission system.

Q. What happens when there is inadequate deliverability to meet demand?

A. While NorthWestern plans carefully and has built a certain amount of redundancy into the natural gas transmission system, we do recognize that events outside of our control can occur. These include much colder weather than designed for or expected (or for a longer period of time) or unexpected equipment outages either on our system or on adjacent systems delivering to our interconnections. NorthWestern maintains a Gas Curtailment Plan that allows us to interrupt natural gas use through careful curtailment of NorthWestern's electric distribution customers that also are served by NorthWestern's natural gas transmission system. A curtailment plan for natural gas operations allows us to avoid more prolonged, difficult outages. Curtailment of firm natural gas transmission customers is done only after all other options are exhausted including curtailment of interruptible natural gas loads.

Before curtailment is considered, we look for other solutions to contingencies. For example, the loss of natural gas supply from a third-party producer, storage field, or interconnecting pipeline can be fixed by supplying natural gas from another source in many circumstances. The loss of a compressor is fixed by starting the spare compressor. The freeze-off in one pipeline can be offset by rerouting supply to another pipeline until the affected pipeline can be "thawed". Generally, these

solutions require field personnel to perform these duties and are not considered long-term fixes.

It is important to note that, to date, NorthWestern has not had to implement the Gas Curtailment Plan. However, it is a prudent practice to have the plan ready to use.

Q. Please provide an overview of O&M activities on NorthWestern's Montana natural gas transmission system and storage facilities.

A. NorthWestern has approximately 121 full-time positions in GTS located in Butte, Augusta, Dry Creek, Cut Bank, Havre, and Deer Lodge, who operate and maintain the natural gas transmission system and storage facilities. The staff provide engineering; maintenance of the Geographic Information System; design drafting; construction and maintenance; system integrity and cathodic protection; gas measurement; billing and supervisory control and data acquisition; gas system control; gas production, gathering, and processing; and storage and transmission services. The staff's responsibility includes the safe, reliable operation of the system including inspections.

Q. Please further describe NorthWestern's inspection and maintenance activities.

A. One hundred percent of the natural gas transmission system is inspected annually through visual, laser detection, or flame ionization testing. Laser technology and flame ionization are both techniques that can be used to detect the level of flammable gas in an environment.

Depending on location and population, some portions of the system are inspected more often. Known High Consequence Areas (Mr. Meagor discusses these areas in more detail) are patrolled monthly for any changes. Other activities include routine maintenance, compressor overhauls, well maintenance, cathodic protection maintenance, and city gate station maintenance. NorthWestern also uses contractors in some cases to complete various tasks on our system, including pipeline right-of-way clearance and compressor overhauls.

Q. What operation, inspection, and maintenance activities does NorthWestern conduct on its natural gas storage facilities?

A. NorthWestern personnel inspect and maintain compressors, dehydrators, control valves, electronic monitoring equipment, liquids removal plants, storage wells, and pipelines to name a few. The purpose of the inspection and maintenance of this equipment is to ensure safe, reliable service throughout the year. We consult manufacturers' recommendations, industry best practices, and regulations to establish procedures for these activities. Mr. Meagor discusses NorthWestern's storage facilities and

compliance with Pipeline Hazardous Materials and Safety Administration (PHMSA) regulations in greater detail.

Natural Gas Transmission and Storage Systems Planning

Q. How does NorthWestern determine the needs of the natural gas transmission system?

A. We conduct annual planning in order to determine the need for capacity on our natural gas transmission system.

Q. Please describe NorthWestern's transmission and storage systems planning methodology.

A. NorthWestern plans for modifications and upgrades to the natural gas transmission and storage systems to meet growing customer peak day deliverability needs using hydraulic engineering modeling software. The software is capable of determining pipeline pressure and size requirements for the entire system. The model helps us to predict overall system needs and peaking requirements, which then allows us to determine how to maintain or increase overall deliverability through on-system gas, storage capability, and interconnections to other pipelines. The modeling software also allows us to study and engineer for local area deliverability under normal operation and peaking events.

Each year, NorthWestern uses a multi-variable, linear regression program to develop the expected system peak day requirements based on expected adverse weather conditions and use per customer. The variables include average daily temperature, previous day temperature, next day temperature, wind speed, relative humidity, cloud cover, weekday/weekend occurrence, and percent of residential customers. Of all of the variables, the model is the most sensitive to the temperature of the peak day event. The peak day design delivery capability for the system drives the capacity-related capital expenditures on the natural gas transmission and storage systems. As a result, this planning effort is an important annual exercise and helps NorthWestern predict capacity requirements and needed capital investment over a 10-year planning horizon. Again, as noted earlier, NorthWestern worked with the National Weather Service and the Montana Climate Office at the University of Montana regarding its peak day forecasting techniques. We also benchmarked against other similar natural gas delivery companies. This process validated the methodology that we use for our forecasts and highlighted the fact that the weather (temperature) that is assumed for the peak day is the largest driver of all of the variables. NorthWestern documents and summarizes the results of the planning methodology yearly.

Q. Please describe NorthWestern's transmission and storage systems upcoming challenges.

A. Data analysis continues to show that the gas transmission and storage systems is at full capacity as outlined above in Table 1. Planning on the systems has been accomplished in a near "just in time" fashion. This results in capacity increases being utilized in a very short period of time and does not allow for any significant increase of capacity on the systems. As further proof of systems capacity constraints, a number of potential customers over the past few years have declined to take service from the NorthWestern transmission system because additions to the system are extremely expensive from the potential customer's point of view.

Our future challenge is to build out the natural gas transmission and storage systems to allow for delivery from storage fields to the load centers on the transmission system. We currently have sufficient "annual capacity", but continue to see a growing design day capacity need. We believe the answer to this challenge is to develop more storage on the system and rebuild NorthWestern pipelines to increase the capacity to our growing customer base. To meet this challenge, we are studying multiple transmission system enhancements of existing and/or addition of storage facilities.

Natural Gas Transmission and Storage Costs

Q. Please describe the types of capital investment projects NorthWestern GTS undertakes.

A. There are four different types of natural gas capital investment projects: Natural Gas Capacity, Compliance, Reliability, and Asset Life.

- **Gas Capacity** related projects are needed to meet growing firm customer peak day deliverability needs. Capacity projects are identified through the natural gas transmission and storage planning process discussed earlier in my testimony. Capacity projects include, but are not limited to, compressor station additions, pipeline looping, regulator capacity increase, and storage field enhancements.
- **Compliance** related projects are required by the Code of Federal Regulations, 49 CFR 192. (Mr. Meagor provides more information on these projects.)
- **Reliability** related projects are planned and executed to ensure that our customers are able to receive delivered natural gas when it is needed, even under difficult situations. We plan for contingencies on the system as part of our reliability efforts. Reliability projects include, but are not limited to, dresser coupled pipeline replacement, transmission facility single failure points, and obsolete system components.
- **Asset Life** projects are planned and executed to ensure we are keeping up with aging infrastructure. Asset Life projects include, but

are not limited to, pipelines, pipeline components, storage wells, and other transmission facilities that have reached their useful life documented through leaks, repairs, and integrity issues.

Q. How does NorthWestern determine what natural gas transmission projects to pursue?

A. Our evaluation process begins with identifying the needs as described earlier in my testimony. Once the needs are identified, preliminary solutions are produced and evaluated based on costs and effectiveness. Each solution has differing merits and different costs. We look for a solution that provides the most benefit to customers from an O&M and reliability standpoint. NorthWestern then compares the costs, often on a net present value basis, which includes initial investment and O&M as well as asset life and depreciation, as appropriate.

This analysis results in a list of capital investment needs that fall into the different categories mentioned above, namely capacity, reliability, asset life, and compliance. The natural gas transmission and storage systems planning process described in my testimony is dealing with growth projects. However, we also look at reliability, asset life, and regulatory compliance in our annual review. The process for discovering and establishing these types of projects varies from the growth projects in that

they are discovered through operations issues, maintenance activities, and review of code requirements each year.

Q. How does NorthWestern rank potential projects identified in that process?

A. NorthWestern has a formal ranking process used throughout the Company to rank and prioritize projects. The specifics of the ranking process vary slightly from department to department. GTS uses criteria based upon asset life, capacity, reliability and risk (probability times severity of consequence), and compliance.

Q. Please discuss significant capital investments made since NorthWestern's last natural gas general rate review in 2016.

A. In 2016, NorthWestern added significant compression horsepower, approximately $7.7 million, to allow for increased storage flows and increased pressure to the Kalispell area. The additional flow from these supplies was needed to meet system demand.

In 2017, NorthWestern added an additional compressor, approximately $5.9 million, to increase flow from TC Energy for delivery to the majority of the natural gas transmission system.

In 2018, we added compression at Absarokee, approximately $7.4 million, to allow for increased flows from the CIG interconnect and Dry Creek storage to serve increasing load in the Bozeman area. Significant changes to the Carway pipeline, approximately $2 million, were also completed in 2018 to allow for inline inspection tools to meet various regulatory requirements in Canada and the United States.

In 2019, NorthWestern added more compression, approximately $3.5 million, to Absarokee to further increase capacity into the Bozeman area. Additionally, the Belfry compressor station build-out, approximately $2 million, began to allow for increased capacity from the CIG interconnect and increased reliability into the GTS transmission system. The Billings area also benefitted from the addition of the Warren – Billings pipeline rebuild/reroute, approximately $13.6 million, which was done to meet regulatory requirements.

In 2020, NorthWestern added compression, approximately $8.8 million, at Belfry to further enhance capacity into the GTS transmission system. There were also a number of regulatory compliance-related projects, approximately $3.5 million, in the Helena and Choteau areas.

In 2021, NorthWestern started work to replace the Morel-Butte pipeline, spending approximately $15.7 million. This project increases reliability as well as capacity to flow additional gas into the Butte and Bozeman areas.

Proposed Changes to Natural Gas Transmission Tariffs

Q. What proposed tariff changes are you sponsoring in this docket?

A. I sponsor proposed changes to Tariff Schedule Nos. GTC-1 and AGTC-1, and Natural Gas Rule 1.

Q. Please identify the proposed changes to Schedule No. GTC-1, including the reason(s) for the proposed changes.

A. Exhibit JMM-1 reflects the proposed redlined changes to Schedule No. GTC-1. The proposed changes to Schedule No. GTC-1 include the following:

1. Addition of a new Section 19 reflecting NorthWestern's offered open seasons to allocate available storage capacity or unused pipeline capacity that benefits Core Customers through offsets to rates;
2. Modifications to the standards of conduct to provide clarity;
3. Modifications to the allocation of capacity in Sections 17 and 18 to address growth on our system and related planning for customers other than Core Customers; and

4. Modifications to Section 11 regarding the responsibility for the natural gas to provide clarity.

Q. Please identify the proposed changes to Schedule No. AGTC-1, including the reason(s) for the proposed changes.

A. Exhibit JMM-2 reflects the proposed redlined changes to Schedule No. AGTC-1. The proposed changes to Schedule No. AGTC-1 include the following:

1. Removal of the term “merchant function” throughout and replaced with “Default Supply”. NorthWestern no longer uses the term “merchant function” so this proposal is necessary to align with the current nomenclature;
2. Same modifications to Section 17 as those made to Schedule No. GTC-1; and
3. Added language to clarify process for moving from Non-Core to Core service.

Q. Are there any other tariff rules impacted by the changes described above?

A. Yes. Given the language added to Schedule No. AGTC-1 concerning the clarification of the process of moving from Non-Core to Core Service, NorthWestern is also revising the definitions of Core Service and Non-Core Service in Natural Gas Tariff Rule 1 to provide clarity regarding each

of these services. Exhibits JMM-3 provides the redlined version of Natural Gas Tariff Rule 1.

Q. Regarding the changes to Section 17 of Schedule Nos. GTC-1 and AGTC-1, please provide more details as to how NorthWestern arrived at the proposed language.

A. NorthWestern had discussion with customers who use the natural gas transmission system regarding the proposed changes to the allocation of capacity found in Section 17 of Schedule Nos. GTC-1 and AGTC-1. After having those conversations, NorthWestern presented draft redlines to the customers for consideration and comment. NorthWestern responded to these comments by incorporating or revising its proposed language in Section 17. The proposed changes presented here are a result of that process.

Q. Does this conclude your testimony?

A. Yes, it does.

VERIFICATION

This Pre-filed Direct Testimony of Jason M. McClafferty is true and accurate to the best of my knowledge, information, and belief.

/s/ Jason M. McClafferty
Jason M. McClafferty