SUPPLY RELIABILITY

Supply Reliability Needs

Over the last five years, supply shortfalls have occurred during cold weather events. These shortfalls have occurred when temperatures have been well above Design-Peak-Day conditions. The Company has been impacted by a number of events that have occurred upstream of the Company's system, including production losses (e.g., due to wellhead freeze-offs), processing plant outages, compressor station or gate station failures, transportation pipeline capacity reductions, power outages, plant shut-downs, mechanical failures or force majeure events. Independently, any of these events could result in a supply shortfall that would impact sales customers.

Failure of contracted gas supplies to be delivered to the Company's system during a peak or near-peak design day could result in loss of adequate pressure in the distribution system during extreme cold weather events. If this were to occur, the Company would have no recourse but to initiate emergency service interruptions of both interruptible and firm customers, including industrial, commercial and residential customers. System models show that the types of gas supply shortfalls recently experienced could result in the loss of system pressure in large areas of the Company's system, resulting in a loss of service ranging from 136,000 and 650,000 customers depending on the exact delivery point where the shortfall occurs.

Failure of contracted gas supplies to reach the Company's system on a Design-Peak Day would result in the interruption of gas service to interruptible industrial customers, firm industrial customers, commercial customers and residential customers alike. If a loss of service occurs, industrial customers would be without gas for process use and power generation. Businesses would be without natural gas service for heating, water heating and cooking. Critical facilities such as hospitals, health care facilities, and senior citizen assisted living facilities, day care facilities and schools would be without heat and hot water, and residential customers would also be without natural gas for heating, cooking, and hot water. During cold weather conditions that can reach minus 5° Fahrenheit (°F) or colder, prolonged exposure would pose a significant risk to the safety, health and property of the Company's residential and commercial customers.

Restoring service in such circumstances would likely take a significant period of time. It is important to recognize the differences between restoration of service for electric systems as compared to gas systems. In the restoration of service of electric systems, large blocks of customers can be restored simultaneously with a single flip of a switch. Conversely, once the pressure in a gas system reaches zero pounds per square inch gauge (PSIG), all customers must be individually shut off at the meter and service must be restored to each customer, one by one. Based on the potential for the loss of service to up to 650,000 customers, the Company estimates that it may take weeks to restore service to all affected customers. In the meantime, our customers would be exposed to extreme winter temperatures of minus 5°F or lower which exposes them to serious life safety and health consequences.

It is also important to recognize that the loss of upstream supply during extreme cold weather conditions is not a hypothetical event. During the winter of 2011, there was a major upstream supply shortfall that disrupted natural gas supplies to communities in the States of Arizona and New Mexico with resulting serious impacts on the safety, health, comfort and convenience of a large number of gas customers.[71]

In addition to serious life safety and health implications, the consequences of an event that results in wide-scale supply loss would have dramatic economic consequences for the Company's customers, the communities served by the Company, and the Company.

The estimated cost to restore service to the estimated number of affected customers is up to $100 million. This figure is exclusive of costs for financial and other harm (e.g. property damage) that would be incurred at the state, community, and individual levels, or any financial harm to the Company. The Kem C Gardner policy institute estimates that the impact on Gross State Product could be up to $2.4 billion due to the loss of workforce at Utah businesses.

In order to meet the Company's commitment and statutory obligation to provide safe and reliable service to our customers, the Company's gas supply plan should include sufficient resources to prudently operate and provide uninterrupted service to firm industrial, commercial and residential sales customers in the event of supply shortfalls during a cold weather event. The Company completed an assessment to determine the optimum approach to ensure safe, reliable and cost-effective system supply during periods of supply shortfalls. Based on historical supply shortfalls experienced by the Company, the Company determined that it needed to plan to replace approximately 150,000 Dth/day of gas supply.

Supply Reliability Options

The following options were evaluated to identify the most reliable, safe and lowest reasonable cost alternative to ensure supply reliability and minimize the potential for service interruptions under cold weather conditions: 1) utilize existing resources (reserve Aquifer storage capacity and purchase incremental supplies), 2) demand response (large use customers and Firm Sales customers), 3) Magnum Energy Storage, 4) Ryckman Creek (third party off-system storage and transportation), 5) Clay Basin (third party off-system storage and transportation), 6) Jackson Prairie (third party off-system storage and transportation), 7) expand Aquifer storage capacity (third party off-system storage and transportation), and 8) construct and operate an on-system LNG facility.

[71] Arizona Corporation Commission, Utilities Division, e-Docket No. 11-0081 Reporters Transcript of Proceedings Agenda Item No. U-21 March 2, 2011 and Southwest Gas Corporation Southern Arizona Update (ppt) March 2, 2011 accessed May 8, 2018, http://www.azcc.gov/Divisions/Utilities/gas/SWG%20Storage%202011/SWGstorage.asp.

These options are described below:

1) Utilize Existing Resources (reserve Aquifer storage and purchase incremental supplies)

Under this scenario, the Company would continue to annually evaluate the best method for addressing supply shortfalls utilizing existing resources. This would involve reserving the Aquifers and likely contracting for additional peaking supplies to be delivered at Goshen. This approach relies on upstream (off-system) sources and third parties for additional supply.

This option would require up to 150,000 Dth/day of the existing aquifer storage withdrawal capacity to be removed from the Design-Peak Day supply portfolio. This would require the Company to replace this supply with purchases at other locations. These purchases would be dependent on supply availability.

2) Demand Response (large use customers and firm Sales customers)

Theoretically, this option would systematically reduce load on the distribution system by interrupting service to at least 275 large firm customers. This option assumes all customers with over 100 Dth/day of usage would be included. It also would require the installation of equipment to allow the Company to remotely shut off each customer's gas service with Commission approval. The Company estimates this could result in a reduction in demand of up to 150,000 Dth/day. Power generators are excluded from this analysis.

The demand response option for firm sales customers would attempt to reduce load on the distribution system by relying on firm sales customers to voluntarily decrease demand by lowering the set point of their thermostats. This reduction would be managed through public outreach such as radio and TV announcements, social media and email outreach.

3) Magnum Energy Storage

A number of different options to utilize Magnum Energy Storage were evaluated. These options are Highly Confidential and are described in detail in Docket 18-057-03.

4) Ryckman Creek (third party off-system storage and transportation)

This option would require the purchase of additional storage capacity at the Ryckman Creek facility. This would also require the purchase of additional transportation capacity on either DEQP or Kern River pipeline to deliver the gas to the Company's system.

5) Clay Basin (third party off-system storage and transportation)

This option would require the purchase of additional storage capacity at Clay Basin. This would also require the purchase of additional transportation capacity to deliver the gas to the Company's system.

6) Jackson Prairie (third party off-system storage and transportation)

This option would require the purchase of additional storage capacity at Jackson Prairie. All storage capacity at Jackson Prairie is currently subscribed. This would also require the purchase of additional transportation capacity in order to deliver the gas to the Company's system.

7) Expand Aquifer Storage Capacity (third party off-system storage and transportation)

The Company reviewed two proposals from DEQP for expanded Aquifer storage capacity. These options are Highly Confidential and are described in detail in Docket 18-057-03.

8) Construct and Operate an On-System LNG Facility

The Company researched potential storage options that could be located on the Company's system in close proximity to the demand center that would allow the Company to manage and control its supplies on-system in the event of upstream, off-system supply shortfalls. An on-system facility owned and operated by Dominion Energy would provide supply independence and diversity, and would provide a number of significant operational benefits. For purposes of this analysis the only viable on-system storage option that was identified is a liquefied natural gas (LNG) facility. To our knowledge, no other feasible storage options exist near the demand center of the Wasatch Front. Some utilities are located near salt caverns or depleted natural gas reservoirs and can use these geologic formations for on-system storage. There are no known geologic formations on the Company's system near our demand center.

Under this option, the Company would construct an LNG storage facility on its system near its demand center along the Wasatch Front. This "on-system" storage would be an LNG facility with liquefaction/ vaporization capabilities. This facility would be designed to provide up to 150,000 Dth/day of deliverability.

This on-system facility would be owned and operated by Dominion Energy, allowing the utility complete operational control over the facility and the deliveries into the Company's system. This option would include liquefaction capabilities, including the ability to liquefy gas throughout the summer months for use during the heating season.

The Company has provided technical analysis and supporting workpapers identifying the costs, benefits, and risks used to determine and support the selection of an LNG facility as the best solution to address the supply-reliability need in Docket No. 18-

057-03. The Application and accompanying testimony and exhibits discusses these matters, and the other data required by the Commission's 2009 IRP guidelines and its Report and Order in Docket No. 17-057-12. Because this analysis includes Confidential and Highly Confidential information, the Company incorporates the information by reference.

Supply Reliability Conclusions

The Company has considered and evaluated options to meet the Company's commitment and statutory obligation to provide safe and reliable service to customers. The recommended approach for the Company to ensure safe, reliable, and cost-effective system supplies during periods of supply shortfalls during cold weather events is to construct, own and operate an on-system LNG storage facility with liquefaction and vaporization capabilities.

An on-system LNG storage facility provides the highest reliability and significant advantages compared to the other options. The on-system facility would be owned and operated by the Company, giving it complete control of the facility. Such a facility would provide supply independence in times of supply shortfall. Withdrawing from the LNG facility would not be subject to NAESB nomination cycle constraints or upstream supply risks that are associated with many of the other alternatives the Company considered as solutions to supply disruptions. The LNG supply could be used to directly match demand on the Company's system in the event of an upstream supply disruption. Withdrawals from the facility would feed directly into the Company's feeder line system and ensure supply reliability with the best system pressures.

On-system storage provides flexibility, diversity of supply, and reliability that other supplies cannot match. Reliability is an attribute that cannot be overstated. This alternative provides supply reliability when upstream sources fall short. Gas from on-system storage does not need to be purchased or nominated at the time of need, and may be brought onto the distribution system on short notice. With a 15 million gallon LNG storage tank the Company could vaporize 150,000 Dth/day for eight full days and be able to maintain pressure for firm customers in the event of supply shortfalls or other system emergencies. Proximity to the demand center provides immediate system support and is not dependent on long transmission pipelines that are subject to a variety of risks such as land movement, third party excavation damage, forest fires, floods, washouts, corrosion, regulatory shutdowns, and other force majeure events.

An on-system LNG facility was originally considered to also be used to meet peak-hour demand requirements. The evaluation of alternatives for this purpose resulted in the conclusion that Firm Peaking Services were the best alternative to meet that need because they could reliably meet peak-hour needs at a considerably lower cost. As a result, the design of the facility was changed to reduce the size including storage, liquefaction, and vaporization. The current design still has the capability to provide some peak-hour system support.

An on-system facility can also provide additional benefits beyond supply reliability. It could provide flexibility to offset purchases when supply is limited. It also could be used to provide natural gas service to remote communities that do not currently have natural gas availability and would be more economically served by satellite LNG than a mainline extension. The availability of on-system LNG would prove advantageous in responding to emergencies. In addition, LNG from an on-system facility could be sold to customers that could use it for transportation purposes during off-peak times.

Based on the Company's analysis and evaluations, the construction of a new on-system LNG storage facility is recommended to meet the Company's supply reliability needs.