SUPPLY RELIABILITY EVALUATION

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Introduction

Dominion Energy Utah (DEU or Dominion Energy or the Company) is a Local Distribution Company (LDC) that provides safe and reliable natural gas service to more than one million residential, commercial, and industrial customers in Utah, Wyoming, and Idaho. The Company is obligated and committed to ensure reliable and safe service to its customers.

DEU has adequate natural gas supplies in its gas supply portfolio to meet DEU's customers' needs on a Design Day. However, in order to meet Dominion Energy's system requirements, all supplies must be delivered to the DEU system. In recent years, there have been times where upstream natural gas providers have been unable to deliver natural gas supplies to the DEU system during cold weather events. This failure to provide natural gas during cold weather conditions has challenged the Company's ability to provide reliable natural gas service to its customers. Other unforeseen events, such as equipment failure, human error and force majeure events could also affect gas supplies and impair the Company's ability to maintain reliable service to its customers. To meet its obligation and commitment to provide safe and reliable service to its customers, the Company solicited proposals, through a request for proposal process, for additional resources to provide supply to the DEU system in the event of supply disruptions. The Company conducted an evaluation of the responses to the Company's January 2, 2019 Supply Reliability Solution Request for Proposal (the RFP) to determine the most prudent resource(s) to add to its growing gas supply portfolio to minimize the potential for serious service interruptions during cold weather and other disruptive events and to meet Design Day conditions.

Objective

DEU intends to recommend a safe, reliable and cost-effective additional supply source to maintain system safety, reliability and support during periods of supply shortfalls. Planning for ways to address periods of supply shortfalls is prudent. DEU may be unable to meet its commitment and obligation to provide safe and reliable service for customers without additional reliable resources over and above the existing gas supply portfolio.

In recent years, supply shortfalls have occurred during cold weather events. These shortfalls have occurred when temperatures have been well above Design Day[1] conditions. The Company has been subject to a number of events that have occurred upstream of the DEU 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 and force majeure events. All of these events resulted in supply shortfalls.

Failure of contracted gas supplies to be delivered to the DEU system during a Design Day or near 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 DEU system, resulting in a loss of service up to 650,000 customers depending on the delivery point where the shortfall occurs.

Failure of contracted gas supplies to reach the DEU system on a Design 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, senior citizen/ assisted living facilities, day care facilities and schools would be without heat and hot water. Residential customers would also be without natural gas for heating, cooking, and hot water. During cold weather conditions that can reach minus 5^{o} Fahrenheit (^{o}F) or colder, prolonged exposure would pose a significant risk to the safety, health and property of DEU's residential and commercial customers.

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 an area of a gas system

[1] Design Day is a day with a daily mean temperature of -5 degree Fahrenheit or lower in the Salt Lake Valley.

reaches zero pounds per square inch gauge (PSIG), the Company must physically shut off each impacted customer meter in that area before gas can be reintroduced to the system and service can be restored to each customer, one by one. Based on the potential for the loss of service to up to 650,000 customers, DEU estimates that it may take weeks to restore service to all affected customers. In the meantime, the Company's customers would be exposed to extreme winter temperatures of minus 5^{o} 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.

In December of 1990, Questar Corporation (Questar Gas and Questar Pipeline) experienced a period of prolonged extreme cold weather. Temperatures during this event were near design day temperatures. The prolonged cold weather and high demand resulted in supply shortfalls to what is now the DEU system. These shortfalls were caused by equipment failures at wellheads resulting in reduced pipeline pressures, compressor mechanical problems and plant shut-downs. At the time, these shortfalls were managed through interruption of customers and the flexibility provided by joint operations with the upstream pipelines. Since most DEU transportation customers are not on interruptible contracts, and FERC order 636 requires DEU to be treated equally with all other shippers on upstream pipelines, including Dominion Energy Questar Pipeline (DEQP), these options are no longer available.

In more recent examples, 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.

In October 2018, a rupture of a 36-in Enbridge Pipeline in Canada near the border caused significant supply disruptions for much of the Pacific Northwest. These disruptions resulted in significant price spikes as well as supply shortfalls to downstream distribution companies. FortisBC, the LDC serving Vancouver, BC and surrounding areas was directly impacted.

In January 2019, the Midwest experienced record cold temperatures due to a "polar vortex" event. During this event, there was a fire at a Consumers Energy natural gas compressor station in Michigan. The resulting

supply shortages prompted the Michigan governor and utilities including Xcel Energy in Minnesota to request firm customers to reduce their usage. However, firm residential customers in Minnesota lost service due to this supply-shortfall event.

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 DEU's customers, the communities served by DEU, 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 DEU. The estimated impact on Gross State Product is up to $2.4 billion due to the loss of workforce at Utah businesses.

In order to meet DEU's commitment and statutory obligation to provide safe and reliable service to its customers, the DEU gas supply plan should include sufficient resources to prudently operate and provide uninterrupted service to industrial, commercial and residential sales customers in the event of supply shortfalls during a cold weather event. As a result, the objective of this assessment is 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 DEU, reliably replacing 150,000 Dth/day of gas supply is the goal of this evaluation. In analyzing available options DEU considered the following: safety, reliability, cost, risk, location where the supply source would enter the DEU system, ancillary benefits, and other factors.

Request for Proposal

In order to identify the available options, DEU issued a Request for Proposal (RFP) on January 2, 2019.

On March 4, 2019, the Company received Proposals from three respondents to provide a resource to meet the Company's needs identified in the RFP. These included three options from Magnum Energy Midstream (Magnum Option 1, Magnum Option 2 and Magnum Option 3), two options from Prometheus (Prometheus Option 1 and Prometheus Option 2) and one option from United Energy Partners.

The options identified in responses to the RFP were evaluated along with the option of a DEU owned and operated, on-system LNG facility to identify the most reliable, safe and most cost-effective alternative to ensure supply reliability and minimize the potential for service interruptions.

Magnum Option 1 – [redacted]

In response to the RFP, Magnum Energy Midstream (Magnum) proposed to meet the Company's supply reliability needs with a project that includes the [redacted]

The Magnum Option 1 project would [redacted]

The Magnum Option 1 includes [redacted]

Figure 1: Magnum Option 1 (as shown on page 3 of the Magnum Energy proposal)

i. Safety – Salt cavern storage is a proven safe method of storing natural gas.

ii. Cost – The proposed total annual cost to customers for Magnum Option 1 is

iii. Contract Terms – The proposal represents However, there are additional risks related to this project

iv. Design and Technical Requirements – The Magnum Option 1 proposal meets most of the design and technical requirements set out in the DEU RFP,

v. Delivery Location – The Magnum Option 1 proposal

[redacted]

vi. Operational Requirements – This proposal meets the operational requirements as defined in the DEU RFP.

vii. Financial Viability of the Proposal – [redacted]

viii. Reliability – Salt cavern storage is a proven reliable method of storing natural gas. However, Magnum is not currently serving any natural gas storage customers from this particular formation, so its reliability is unknown. Additionally, the proposed storage facility is geographically remote and is subject to many of the same risks as other remote supply resources, including landslides, flooding, earthquakes, human error, upstream facility design inadequacies and maintenance, cyber-attacks, and third-party damage.

ix. Ancillary Benefits – Magnum indicated this option [redacted]

x. Other Factors [redacted]

[redacted]

The pipeline associated with this option is subject to the same risks as other remote supply resources, including landslides, flooding, earthquakes, human error, upstream facility design inadequacies and maintenance, cyber-attacks, and third-party damage.

Magnum Option 2 – [redacted]

In response to the RFP, Magnum proposed to meet the Company's supply reliability needs [redacted]

The Magnum Option 2 project [redacted]

The Magnum Option 2 [redacted]

Figure 2: Magnum Option 2 (as shown on page 4 of the Magnum Energy proposal)

i. Safety – Salt cavern storage is a proven safe method of storing natural gas.

ii. Cost – The proposed total annual cost to customers for Magnum Option 2 is

iii. Contract Terms – The proposal represents a However, there are additional risks related to this project

iv. Design and Technical Requirements – The Magnum Option 2 proposal meets most of the design and technical requirements set out in the DEU RFP,

v. Delivery Location – The Magnum Option 2 proposal

[redacted]

vi. Operational Requirements – This proposal meets the operational requirements as defined in the DEU RFP.

vii. Financial Viability of the Proposal – [redacted]

viii. Reliability – Salt cavern storage is a proven reliable method of storing natural gas. However, Magnum is not currently serving any natural gas storage customers, so its reliability is unknown. Additionally, the proposed storage facility is geographically remote and is subject to many of the same risks as other remote supply resources including landslides, flooding, earthquakes, human error, upstream facility design inadequacies and maintenance, cyber-attacks, and third-party damage.

ix. Ancillary Benefits – Magnum [redacted]

x. Other Factors – [redacted]

[redacted]

The pipeline associated with this option is subject to the same risks as other remote supply resources, including landslides, flooding, earthquakes, human error, upstream facility design inadequacies and maintenance, cyber-attacks, and third-party damage.

Magnum Option 3 – [redacted]

In response to the RFP, Magnum proposed to meet the Company's supply reliability needs [redacted]

The Magnum Option 3 project [redacted]

The Magnum Option 3 includes [redacted]

i. Safety – Salt cavern storage is a proven safe method of storing natural gas.

ii. Cost – The proposed total annual cost to customers for Magnum Option 3 [redacted] However, there are additional risks related to this project [redacted]

[redacted]

iii. Contract Terms – The proposal represents a [redacted] However, there are additional risks related to this project [redacted]

iv. Design and Technical Requirements – The Magnum Option 3 proposal meets most of the design and technical requirements set out in the DEU RFP, [redacted]

v. Delivery Location – The Magnum Option 3 proposal [redacted]

vi. Operational Requirements – This proposal meets the operational requirements as defined in the DEU RFP.

vii. Financial Viability of the Proposal – [redacted]

viii. Reliability – Salt cavern storage is a proven reliable method of storing natural gas. However, Magnum is not currently serving any natural gas storage customers, so its reliability is unknown. Additionally, the proposed storage facility is geographically remote and is subject to many of the

same risks as other remote supply resources including landslides, flooding, earthquakes, human error, upstream facility design inadequacies and maintenance, cyber-attacks, and third-party damage.

ix. Ancillary Benefits – Magnum indicated this option [redacted]

x. Other Factors – [redacted]

The pipeline associated with this option is subject to the same risks as other remote supply resources, including landslides, flooding, earthquakes, human error, upstream facility design inadequacies and maintenance, cyber-attacks, and third-party damage.

Prometheus Option 1 – [redacted]

In response to the RFP, Prometheus proposed to meet the Company's supply reliability needs with [redacted]

[redacted]

i. Safety – [redacted]

ii. Cost – The proposed total annual cost to customers for Prometheus Option 1 is [redacted]

iii. Contract Terms – The proposal [redacted]

iv. Design and Technical Requirements – The [redacted] proposed by Prometheus meets the design and technical requirements set out in the DEU RFP.

v. Delivery Location – This proposal meets the delivery requirements determined by DEU to meet all of its current supply reliability needs.

vi. Operational Requirements – This proposal meets the operational requirements as defined in the DEU RFP.

vii. Financial Viability of the Proposal – [redacted]

viii. Reliability – [redacted]

ix. Ancillary Benefits – [redacted]

x. Other Factors – [redacted]

Prometheus Option 2 – [redacted]

In response to the RFP, [redacted]

[redacted]

i. Safety – [redacted]

ii. Cost – The proposed total annual cost to customers for Prometheus Option 1 is [redacted]

iii. Contract Terms – [redacted]

iv. Design and Technical Requirements – [redacted]

[redacted]

v. Delivery Location – This proposal meets the delivery requirements determined by DEU to meet all of its current supply reliability needs.

vi. Operational Requirements – [redacted], this proposal would meet the operational requirements as defined in the RFP.

vii. Financial Viability of the Proposal – [redacted]

viii. Reliability – [redacted]

ix. Ancillary Benefits [redacted]

x. Other Factors – [redacted]

United Energy Partners Option – [redacted]

In response to the RFP, United Energy Partners (UEP) proposed to [redacted]

i. Safety – [redacted]

ii. Cost – [redacted]

iii. Contract Terms – The proposal is a [redacted]

iv. Design and Technical Requirements – [redacted] meets the design and technical requirements of the RFP. [redacted]

[redacted]

v. Delivery Location – [redacted] meets most of the design and technical requirements set out in the DEU RFP, [redacted]

vi. Operational Requirements – [redacted]

vii. Financial Viability of the Proposal – [redacted]

viii. Reliability – [redacted]

ix. Ancillary Benefits – None specified.

x. Other Factors – [redacted]

[redacted]

DEU-Owned LNG Facility Option – Liquefied Natural Gas Storage (Company Owned and Operated On-System Facility)

Under this option, the Company would design, construct, own and operate 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 DEU system. This option would include liquefaction capabilities, including the ability to liquefy gas throughout the summer months for use during the heating season.

i. Safety – LNG storage is a proven safe method of storing natural gas. The facility would be sited, designed, constructed, operated and maintained in accordance with the requirements of strict Federal Safety Regulations (United States Department of Transportation (DOT), 49 CFR, Part 193). Dominion Energy can also draw on its affiliate's extensive experience with safely operating LNG facilities. The LNG plant would be subject to inspections by Federal Pipeline and Hazardous Materials Safety Administration (PHMSA) and Utah Commission safety regulators.

ii. Cost – The proposed annual cost to customers for the DEU owned and operated LNG storage project is [redacted]

iii. Contract Terms – This proposal would not need a contract as it would be owned by DEU.

iv. Design and Technical Requirements – The DEU-owned and operated LNG storage project meets the design requirements of the DEU RFP.

v. Delivery Location – This DEU LNG plant option would be well positioned to meet all of the supply reliability requirements.

vi. Operational Requirements – The DEU-owned and operated LNG storage project meets the operational requirements of the RFP.

vii. Financial Viability of the Proposal – Dominion Energy has the experience and available funding to construct this project in the time frame indicated in the RFP.

viii. Reliability – An on-system LNG facility would be very reliable as it would be owned and operated by Dominion Energy, and would be located close to the DEU demand center. The proposed DEU LNG facility could provide 150,000 Dth of supply when needed without any reliance on third-party suppliers or interstate pipelines. It would also eliminate the need to schedule the gas or wait for NAESB cycle deadlines for gas delivery.

The proposed DEU LNG plant's close proximity to the DEU Demand Center also mitigates reliability risks including 1) freeze-offs of upstream production, gathering and processing facilities, 2) force majeure events such as earthquakes, land movement, floods or washouts that may impact pipelines, 3) external factors such as third-party damage, 4) maintenance shut-downs on compressors, processing plants, or other pipeline facilities, and 5) time delays due to the physical transportation of the gas from distant locations.

ix. Ancillary Benefits - Service to Remote Communities – The proposed facility could provide LNG to serve outlying communities that currently do not have natural gas service. Some communities such as Kanab, Green River, and Wendover are distant from the DEU system and could be more economically served by satellite LNG compared with a mainline extension. The DEU-owned LNG Facility on the Wasatch Front could be used to fill trucks to transport LNG to these remote locations.

The DEU-owned LNG Facility could be used to provide operational benefits, such as offsetting approximately 25,000 Dth/day of peak-hour service.

x. Other Factors – Converting and storing natural gas in liquid form is a proven and safe technology with over 100 such facilities in use across the country. Twenty other natural gas utilities have LNG facilities for supply reliability. Locating the DEU-Owned LNG Facility on the DEU system would also eliminate the need to transport the gas over long distances to its system.

This facility would be owned and operated by Dominion Energy. As a result, the facility could be kept ready to operate when supply shortfalls are most likely. This would provide rapid supply availability. Withdrawing from the facility would not be subject to any constraints such as nomination cycles or travel time for supplies and could be used to directly match demand on the DEU system. Withdrawals from the DEU-owned LNG Facility would be directly injected into the Dominion Energy feeder line system. There would be no timing concerns with the transportation of the supply to the DEU system. This is one of the strongest benefits of an on-system storage facility. The natural gas utility has complete control over when and how to use the storage to mitigate shortfalls.

Conclusion

DEU has considered and evaluated all of the proposals provided in response to its RFP for options to meet the Company's commitment and statutory obligation to provide safe and reliable service to its customers. The recommended approach for DEU to ensure safe and reliable service, even during periods of supply shortfalls is to construct, own and operate an on-system LNG storage facility.

The DEU-owned LNG Facility provides the lowest-cost option and the highest reliability. This solution also has significant advantages over other options. For example, such a facility would provide supply independence in times of supply shortfall. Withdrawing from the DEU-owned 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 DEU system in the event of an upstream supply disruption. Withdrawals from the facility would feed directly into the DEU feeder line system and ensure supply reliability with the best system pressures. Additionally, the on-system facility would be owned and operated by the Company, giving it complete control of the facility.

On-system storage provides reliability and flexibility that other supply options 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 at 150,000 Dth/day 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.

The DEU-owned LNG Facility option also has additional benefits beyond supply reliability. It could provide peak-hour system support and 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.

Based on the above analysis and evaluations, the construction of the DEU-owned LNG Facility is recommended.