Meeting Peak-Hour Demand Option Evaluation Summary:

Objective:

Develop a safe, reliable and cost-effective supply portfolio that provides gas supply to the Dominion Energy Utah, Dominion Energy Idaho, and Dominion Energy Wyoming ("DEUWI" or "Dominion Energy") system at locations and pressures adequate to meet near-term system demand requirements of a Design Peak Day including the Peak-Hour demand of that day (current Peak-Hour estimate is 340,000 Dth/day) on a firm basis.

Options:

1. No advanced action.
2. Demand response.
3. Additional firm upstream transportation capacity and supply purchases.
4. Excess firm upstream transportation capacity and additional off-system storage.
5. Backhaul on interruptible upstream transportation capacity and supply purchases.
6. Upstream hourly Firm Peaking Services.
7. On-system storage.
8. Magnum Energy Storage.

Options Evaluation:

1. No advanced action:

This option would not involve putting anything additional in place to meet Peak-Hour demand requirements. This option could result in the loss of adequate pressures in the system to maintain service to all firm customers. System Planning estimates that, without any action taken in advance to ensure that Peak-Hour demand can be met, system integrity may be compromised resulting in the loss of service to up to 390,000 customers.

i. Safety – This option would create safety concerns for customers throughout the DEUWI system. The loss of adequate system pressures could result in loss of system pressure in the distribution system. If this were to occur, emergency service interruption would be initiated. Depending on the severity of the event, this option could result in the loss of service to customers in areas of the distribution system.

Once the event passed and adequate supply secured, the shut off areas would have to be relit. This would entail shutting off each individual meter, re-pressurizing the system, and then turning each meter back on and re-lighting appliances. This is a time consuming process and some customers could be without service for an extended period of time. While customers are without service, they would also likely be without heat. This would pose a safety risk to customer's health and create other risks to homes and businesses.

ii. Reliability – Peak-Hour demand is an everyday occurrence. Not planning in advance to meet Peak-Hour demand on the highest demand days would be imprudent and would reduce Dominion Energy's ability to ensure reliable service for customers.

iii. Cost – An event that results in wide scale customer loss would have dramatic economic consequences for Dominion Energy and the state of Utah. Without a solution to meet Peak-Hour demand, models indicate that up to 390,000 customers would lose service. For reference, the cost to restore service to approximately 600 customers in Coalville in January of 2017 was about $100,000.

iv. Risk – The upstream pipelines have warned that they may not be able to provide flows over the hourly average daily nomination during Peak Hours on high demand days. Models show that not meeting Peak-Hour demands on these high demand days will result in the loss of pressure throughout the DEUWI distribution system with potentially catastrophic consequences.

v. Affiliate Concerns – There are no affiliate relation concerns for this option.

2. Demand response:

The option of using demand response to reduce the Peak-Hour demand requirements relies on reducing a sufficient amount of customer usage during the Peak Hours of the day to avoid a supply shortage. One concern is that the gas supply of these customers is not reliable on a Peak Hour.

a. *Large Industrial Customers:*

This option would systematically reduce load on the distribution system during Peak Hours by interrupting service to 275 large firm transportation customers during those hours. This approach would require the installation of equipment to allow Dominion Energy to remotely shut off customers' gas service. The Company estimates this could result in a reduction of demand of approximately 150,000 Dth/day. While this would provide a large reduction in demand, without impacting the health and safety of residential customers, it could have a significant impact on industrial customers, including hospitals, schools, hotels, and other similar customers.[1]

i. Safety – This option would safely reduce demand on the system.

ii. Reliability – If Dominion Energy were to install remote control valves, the Company could have complete control over the reduction of demand. However, the Company would not have control over the availability of supply. There is no guarantee that the customers being curtailed actually have gas being delivered to the system on the day the Company would need excess supplies. The Company's Natural Gas tariff No. 500 ("Tariff") would also have to be changed to require customers to continue to deliver the gas once they had been curtailed for an emergency scenario. This scenario may also require recontracting with transportation customers with high penalties for non-compliance.

iii. Cost – The cost of the equipment required to install remote control on approximately 275 of the largest customers is about $27.5 million based on an estimated average cost of about $100,000 for the equipment for each customer. There are also potential losses to customers due to their processes being shut down with little or no warning.

iv. Risk – The reduction of demand would occur directly on the DEUWI system. The primary risk of this option is supply related. Specifically, if the customers did not have any supply scheduled for delivery to the system, their reduction in usage would not help offset any supply shortfalls on the Company's system.

[1] *Power generators should be excluded from this analysis due to the direct impact this could have on residential electric customers. Therefore, this analysis assumes that power generation customers are not among those impacted by a demand response option.*

v. Other Factor – Timing – With remote control equipment, Dominion Energy would have direct control over the reduction and the timing of the reduction. The demand reduction would not be subject to any constraints such as nomination cycles or travel time for supplies.

vi. Other Factor – Obligation to Firm Customers – Dominion Energy is committed to serving firm customers reliably and opposes planning to curtail firm customers during conditions that are reasonably anticipated. Moreover, firm customers expect and pay for firm, reliable service. Employing this option would essentially cause firm customers to become interruptible customers in some circumstances.

vii. Affiliate Concerns –There are no affiliate relation concerns for this option.

b. *Residential Customers (voluntary reduction):*

This option would systematically reduce load on the distribution system by relying on firm sales customers to voluntarily reduce 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.

i. Safety – This option would safely reduce demand on the system. The fact that the reduction would be completely voluntary should ensure that customers do not reduce the temperature in their homes below safe levels.

ii. Reliability – This option is unreliable because it is strictly voluntary and a significant number of customers would need to take action immediately. The Company could not estimate, with any accuracy, the expected demand reduction that would result from a public outreach program. *Also, based on previous periods of interruption, many of these customers have continued to burn gas, even when called upon to restrict usage.*

We are aware of a utility that has used three advisory campaigns for the purpose of reducing natural gas demand:

1- A core notification campaign – Mass media campaign promoting reduction in residential and commercial customer usage on “advisory days.”
2- 2 - A noncore notification campaign - Mass media campaign promoting reduction in large noncore customer usage on “advisory days.”
3- A pilot rebate program – An offer that included an incentive for reducing gas usage on “advisory days” – this involved an ecobee thermostat and an hourly meter.

4- None of the above campaigns produced statistically significant reductions in gas usage.
5- In addition, any reduction in usage would not be reliable enough to count on in a peak-hour event.

iii. Cost – Costs are dependent on how we implement the program.

iv. Risk – The reduction of demand would occur directly on the DEUWI system. The primary risk associated with this option is the uncertainty about how many customers would voluntarily restrict their own usage immediately. If the volume were not enough to offset any supply shortfalls being experienced, the system could still experience pressure losses.

v. Other Factor – Timing – This option would not provide a quick response time. Supply shortfalls generally occur overnight, or in the early morning. Residential firm sales customers are likely to be asleep at such times and are unlikely to respond quickly, if at all, to the request to lower their thermostats. It is also important to note that many thermostats are programmed to increase the temperature prior to when people wake up. In addition, Many business and commercial firm sales customers are closed during those times and are also unlikely to respond quickly, if at all.

vi. Other Factor – Obligation to Firm Customers – Dominion Energy is committed to serving firm customers reliably and opposes planning to curtail firm customers during conditions that are reasonably anticipated. Moreover, firm customers expect and pay for firm, reliable service. Employing this option would essentially cause firm customers to become interruptible customers in some circumstances.

vii. Affiliate Concerns – There are no affiliate relation concerns for this option.

3. Additional firm upstream transportation capacity and supply purchases:

This option assumes the purchase of additional upstream capacity based on the demand requirements of a Peak-Hour instead of the average daily requirements. It would require Dominion Energy to purchase and nominate gas to meet the Peak Hour demand, and would also require Dominion Energy to make later cycle nomination adjustments (or purchase additional no-notice transportation capacity) to adjust the nominations down after the Peak Hours. This approach would likely result in net injections on any day this methodology is used.

i. Safety – There are no safety concerns with this option.

ii. Reliability –For this method to be pursued, additional purchases and nominations would have to be made on all cold days since purchases and nominations are done the day prior to the gas flowing. It would be impossible to determine when the pipelines would restrict flows to match the RDC.

iii. Cost – Dominion Energy Questar Pipeline ("DEQP") has presented options to provide up to [redacted] Dth/day of additional capacity to the Wasatch Front. [redacted] Dth/day of this capacity could be provided on their northern system at a rate of [redacted] /Dth/day. The remaining [redacted] Dth/day could be on the DEQP southern system at a cost of [redacted] /Dth/day. The total cost of the additional [redacted] Dth/day DEQP capacity would be [redacted] per year.

Kern River Gas Transmission ("Kern River") currently has over 340,000 Dth/day of capacity available after May 2018. Capacity on Kern River may be available at a negotiated rate. To meet the 340,000 Dth/day peak-hour requirement from Nov 15 through Feb 14, the costs are shown in the Table 1 below based on different potential rates for transportation capacity.

Table 1.

Rate	$ 0.1000	$ 0.1500	$ 0.2000	$ 0.2500	$ 0.4000	$ 0.4500	$ 0.5000
Cost	**$ 3,094,000**	**$ 4,641,000**	**$ 6,188,000**	**$ 7,735,000**	**$ 9,282,000**	**$ 10,829,000**	**$ 12,376,000**

In addition to the capacity cost, Dominion Energy would also incur costs associated with supply during the relevant period. The cost of 340,000 Dth of supply on a Design Peak Day will be dependent on available prices. Since the excess gas that is being purchased on the day will be sent to storage, and it is safe to assume that prices on a Design Peak Day will be higher than other days, the additional cost would be equal to the gas cost spread multiplied by the volume. For every $1 of gas cost spread, the additional purchases will cost $340,000 on a Design Peak Day. Also, because gas purchases will have to be made

the day prior to gas flowing, Dominion Energy would have to make assumptions as to when it would need to utilize this option. This could result in the purchase of unnecessary additional supplies on a number of days each year.

iv. Risk – Firm transportation capacity on upstream pipelines is reliable. However, in order to utilize additional capacity, Dominion Energy would need to purchase additional supplies (up to 340,000 Dth/day). Without additional, peaking/baseload contracts for this supply, Dominion Energy has concerns regarding the availability of this much supply on a Design Peak Day. This would be a substantial increase in supply, and Dominion Energy may need to consider additional baseload or peaking contracts to ensure the supply will be available. These contracts would likely also include a demand charge.

v. Other Factors – The DEUWI system has constraints in takeaway capacity from Kern River. This could limit the amount of capacity that could be used from Kern River.

vi. Affiliate Evaluation – Dominion Energy would evaluate between capacity on DEQP and Kern River for this option.

a. Recognize Affiliate Conflict – DEQP is an affiliate.
b. Minimize the Conflict – The Company would conduct a detailed evaluation of capacity options available from DEQP and Kern River in order to determine the best capacity option.
c. Prioritize Customers First – Dominion Energy would contract for capacity that is in the best interest of customers, considering cost and reliability.
d. No undue influence – Dominion Energy would contract for capacity without allowing any undue influence.

4. Excess firm upstream transportation capacity and additional off-system storage:

This alternative would require the purchase of additional storage capacity and upstream capacity based on the need requirements of a Peak-Hour instead of the average daily requirements. This would require Dominion Energy to nominate gas to meet the Peak-Hour demand. It would also require Dominion Energy to make later cycle nomination adjustments (or purchase additional no-notice transportation capacity) to adjust the nominations down after the Peak Hours. This option would likely result in net injections on any day this methodology is used.

i. Safety – There are no safety concerns with this option.

ii. Reliability – The purchase of firm storage withdrawal capacity to provide supply for this option would make this a reliable option from most storage facilities. However, Dominion Energy has concerns regarding the operational availability of the Ryckman Creek storage facility. This is the only storage facility currently connected to Kern River.

iii. Cost – DEQP has presented options to provide up to 180,000 Dth/day of additional capacity to the Wasatch Front. 100,000 Dth/day of this capacity could be provided on their northern system at a rate of $0.31502/Dth/day. The remaining 80,000 Dth/day would be on the DEQP southern system at a cost of $0.17652/Dth/day. The total cost of the additional 180,000 Dth/day DEQP capacity would be $16,652,614 per year.

Kern River currently has over 340,000 Dth/day of capacity available after May 2018. Capacity on Kern River may be available at a negotiated rate. To meet the 340,000 Dth/day peak-hour requirement from Nov 15 through Feb 14, the costs are shown in the Table 1 below based on different potential rates for transportation capacity.

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In addition to the capacity cost, Dominion Energy would also incur costs associated with storage capacity. There is currently no storage capacity available at Clay Basin. However, some capacity may become available over the next year. Also, this option would not be able to cover the full withdrawal capacity required. For reference, the total 1-cycle cost for the existing contracts for 111,825 Dth/day of withdrawal is $8,574,714.

Magnum Energy provided a response to the Request for Proposals ("RFP") Dominion Energy offered in 2016. This response provided for [redacted] Dth/day of withdrawal and [redacted] Dth of capacity with a "discussion only" cost estimate of [redacted] on an annual basis.

iv. Risk – The use of firm withdrawal capacity and firm transportation would reduce the risk of supply unavailability, although it would not eliminate it.

v. Other Factors – This option would be limited by the availability of storage withdrawal capacity. Currently, there is very limited available firm withdrawal capacity from the Clay Basin or Jackson Prairie facilities. Dominion Energy has concerns regarding the operational availability of the Ryckman Creek storage facility. The Magnum storage facility is not yet constructed, but may provide available capacity at some point in the future.

vi. Affiliate Evaluation – Dominion Energy would evaluate between capacity on DEQP and Kern River for this option. Dominion Energy would also consider storage options provided by DEQP.

a. Recognize Affiliate Conflict – DEQP is an affiliate.

b. Minimize the Conflict – The Company would conduct a detailed evaluation of capacity options available from DEQP and Kern River in order to determine the best capacity option. The Company would also conduct a detailed evaluation of storage capacity options available.

c. Prioritize Customers First – Dominion Energy would contract for capacity that is in the best interest of customers, considering cost and reliability.

d. No undue influence – Dominion Energy would contract for capacity without allowing any undue influence.

5. Backhaul on interruptible upstream transportation capacity and supply purchases:

This option would require the purchase of additional supplies at Goshen. These supplies could be delivered from Goshen to the Payson Gate Station on the DEUWI system by backhauling on interruptible transportation capacity on DEQP. The use of this option would be limited by the availability of supplies at Goshen, and the meter and takeaway capacity at the Payson Gate Station.

i. Safety – There are no safety concerns with this option.

ii. Reliability – This option has reliability concerns due to the uncertainty regarding the availability of supply at Goshen. During periods of high demand, the supplies on Kern River will likely be limited due to demand on the southern section of their system (SoCal Gas and Southwest Gas). These supplies can be contracted for through peaking supply contracts to increase the likelihood of availability. The use of interruptible capacity on DEQP is also of concern.

iii. Cost – The cost for this option is variable and, thus, uncertain. The cost of the interruptible transportation would be a volumetric charge of $0.17652 per Dth for any volumes transported. The demand cost of peaking supply contracts to increase the likelihood of availability could range between $600,000 and $1,000,000. The largest expense would be the cost of the additional purchases. These purchases would be at a location with high demand on days when prices would be at their highest.

iv. Risk – The risk associated with this option is the risk of supply unavailability and the transportation on interruptible capacity. While the use of peaking supply contracts could decrease this risk, the high demand would still create a "bidding war," which could drive pricing high enough to exceed the penalties associated with the deals.

v. Other Factors – The use of this option would be limited to the deliverability capacity through the Payson Gate Station.

vi. Affiliate Evaluation – This option would require the use of capacity on ML 104 which is owned by DEQP.

   a. *Recognize Affiliate Conflict – DEQP is an affiliate.*
   b. *Minimize the Conflict – DEQP would be the only option for capacity under this alternative.*
   c. *Prioritize Customers First – Dominion Energy would contract for capacity that is in the best interest of customers, considering cost and reliability.*
   d. *No undue influence – Dominion Energy would contract for capacity without allowing any undue influence.*

6. Upstream hourly Firm Peaking Services:

DEQP and Kern River both responded to a Request for Proposal ("RFP") that was issued in February of 2016. Both respondents provided option for the Company to procure services to meet the Peak-Hour demand.

The Kern River Firm Peaking Service would allow the Company to nominate gas to a point on Kern River's pipeline, then deliver gas from that point to the DEUWI system on a firm basis during specified periods during the day when additional supply is needed. This service has been approved by the FERC.

This service has already been used by Dominion Energy and was found to be reliable. Dominion Energy contracted for 30,000 Dth of Firm Peaking Service from Kern River for the 2016-2017 heating season and the service was used regularly during cold weather events. The 30,000 Dth is the total maximum daily quantity ("TMDQ") which is the total amount that can be provided on the day. At least 70% of this amount must be delivered to the specified delivery point on Kern River pipeline. Once the gas is delivered to that point, it could be scheduled to the DEUWI system in no less than 6 hours at a rate no higher than 5,000 Dth/hr, which is the equivalent rate of 120,000 Dth/day.

Dominion Energy has also contracted for 25,000 Dth of Firm Peaking Service from Kern River for the 2017-2018 and 2018-2019 heating season and 28,750 Dth of Firm Peaking Service from Kern River for the 2018-2019 heating season.

DEQP also proposed a Firm Peaking Service in response to the RFP. This service is also now approved by the FERC. This service works differently from the Kern River service. The DEQP firm peaking service does not require the purchase of any additional supplies. DEQP uses withdrawal and injection capabilities at the Coalville, LeRoy, and Chalk Creek aquifers along with additional pipeline capacity on Overthrust Pipeline to manage linepack on the DEQP system throughout the day. Dominion Energy *has contracted for 250,000 Dth/day of Firm Peaking Service from DEQP for the 2017-2018 heating season only.*

i. Safety – There are no safety concerns with this option.

ii. Reliability – Services from Kern River and DEQP both provide increased supply deliveries during Peak Hours on a firm basis. The pipelines have designed the deliveries into their system and are committed to providing them on firm basis for a Design Peak Day.

iii. Cost – The cost for the Kern River service is [redacted] per Dth/day for the total amount that can be provided for the day. The total cost for the equivalent Firm Peaking Service of

a 100,008 Dth/day rate on Kern River would be [redacted]. The total cost for the equivalent Firm Peaking Service of a 115,008 Dth/day rate on Kern River will be [redacted] for the 2019-2020 heating season.

The cost for the DEQP Firm Peaking Service for 250,000 Dth/day rate is $1,488,000 for a one year deal and $1,872,000 for a multi-year deal. The difference is due to the fact that the multi-year deal would require DEQP to reserve capacity on Overthrust Pipeline for the entire year to ensure it would be available to use for the service is subsequent years.

iv. Risk – The Kern River and DEQP Firm Peaking Services are both provided on a firm basis. The only risk with the Kern River service would be the supply risk associated with delivering the supply to the Kern River point. This risk is greatly minimized by buying the gas a day ahead.

The only risk with DEQP service would be the availability of service in subsequent years if only secured for a single year.

v. Other Factors – Firm Peaking Services provide for the delivery of additional supplies during the Peak Hours of the day. These deliveries are made outside of the normal NAESB cycles and match the hours of increased customer demand.

The DEUWI system has constraints in takeaway capacity from Kern River. This could limit the amount of capacity that can be used from Kern River.

vi. Affiliate Evaluation – Dominion Energy would evaluate between capacity on DEQP and Kern River for this option.

a. *Recognize Affiliate Conflict – DEQP is an affiliate.*
b. *Minimize the Conflict – The Company conducted a detailed evaluation of capacity options available from DEQP and Kern River in order to determine the best capacity option. The Company had limited take-away capacity from the Kern River gate stations and contracted for as much Firm Peaking Service from Kern River as possible based upon those constraints. It purchased the remaining required Firm Peaking Services from DEQP.*
c. *Prioritize Customers First – Dominion Energy contracted for capacity that is in the best interest of customers, considering availability, cost and reliability.*
d. *No undue influence – Dominion Energy contracted for capacity without allowing any undue influence.*

7. On-system storage:

An on-system storage facility could provide many benefits, including the ability to utilize the facility when necessary to meet Peak-Hour demand. An on-system storage facility can provide supply directly into the distribution system when needed. Dominion Energy has researched on-system storage as an option and hired a consultant to provide a design and estimate the costs associated with constructing and operating that designed liquefied natural gas (LNG) storage facility on the DEUWI distribution system.

Dominion Energy has completed the preliminary Front End Engineering Design (pre-FEED) for a facility with a storage capacity of [redacted] *of liquefaction (injection) and* [redacted] *or vaporization (withdrawal).*

i. Safety – LNG facilities are used throughout the country. Design standards for tank design and existing site permitting requirements ensure the safe design and operation of LNG storage facilities.

ii. Reliability – An on-system LNG facility would be the most reliable of the options as it be owned and operated by Dominion Energy. An LNG facility could provide 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.

iii. Cost – The Company only has preliminary cost estimates, which have a +/- 25% contingency. Currently the estimated capital cost is [redacted]. The projected resulting revenue requirement would be about [redacted] annually.

iv. Risk – Locating a storage facility on-system eliminates the risk that the gas will not be available when needed. Dominion Energy would have control over all operations at the facility to make sure the storage is full and ready for withdrawal.

v. Other Factors – An on-system storage facility would provide numerous benefits in addition to addressing Peak-Hour demand requirements. For example, it could be used to provide supply during periods of shortfalls or curtailments on upstream pipelines.

vi. Other Factors – This facility would not be available for at least 3-4 years due to design and construction timelines.

vii. Affiliate Evaluation – This option does not have any affiliate implications.

8. Magnum Energy storage

This option would involve the purchase of storage capacity at the Magnum Energy facility and the construction of a pipeline from the delivery point of the storage facility to the DEUWI system. Magnum Energy developed a proposal for this option in response to the 2016 RFP.

[redacted]

i. Safety – Salt cavern storage is a proven safe method of storing natural gas. There are no notable safety concerns with this option.

ii. Reliability – Salt cavern storage is a reliable method of storing natural gas. However, based on its March 31, 2016 proposal the delivery point for the withdrawal would be at Goshen which is an interconnect with upstream pipelines. This would require the use of transportation capacity on the pipelines which would limit the ability to deliver the gas to the DEUWI system on a non-ratable basis to meet the peak-hour demand.

iii. Cost – Magnum provided estimated storage costs of [redacted].

iv. Risk – The pipeline associated with this option could be subject to the same types of force majeure events that concern the company regarding other off-system storage options including line breaks, earthquakes.

v. Affiliate Concerns – There are no affiliate relation concerns for this option.