BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

IN THE MATTER OF THE REQUEST OF DOMINION ENERGY UTAH FOR APPROVAL OF A VOLUNTARY RESOURCE DECISION TO CONSTRUCT AN LNG FACILITY	Docket No. 19-057-13

DIRECT TESTIMONY OF MICHAEL L. PLATT

FOR DOMINION ENERGY UTAH

April 30, 2019

DEU Exhibit 4.0

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Michael L. Platt. My business address 1140 West 200 South, Salt Lake City, UT 84104.

Q. By whom are you employed and what is your position?

A. I am employed by Dominion Energy Utah (Dominion Energy, DEU or Company) as the Manager of Engineering Systems. I am responsible for the System Planning and Analysis Group, Records Management, Research and Development, and both High Pressure (HP) and Intermediate High Pressure (IHP) geographic information system (GIS) teams. My qualifications are included in DEU Exhibit 4.01.

Q. Have you testified before this Commission before?

A. Yes. I provided testimony in Utah Docket Nos. 17-057-09, 17-057-20 and 18-057-03. I have also made presentations at technical conferences and Integrated Resource Plan workshops.

Q. Attached to your written testimony are DEU Exhibits 4.01 through 4.04. Were these prepared by you or under your direction?

A. Except as otherwise stated, they were prepared by me or under my direction. Those not prepared by me or under my direction are true and correct copies of the documents they purport to be.

Q. What is the purpose of your direct testimony?

A. The purpose of my direct testimony is to explain how the specifications in the Company's supply reliability request for proposal (RFP) and optimal location described in the RFP (Optimal Delivery Location) were determined, to review a system analysis of the supply reliability proposals, and explain the multitude of scenarios that may lead to an increased risk of potential supply disruptions that would impact the Company's ability to maintain safe and reliable service to the Company's firm sales customers. I also discuss the consequences of failing to properly plan for a supply reliability disruption.

II. SUPPLY DISRUPTION SCENARIOS AND RELIABILITY SOLUTION REQUIREMENTS

Q. What kind of event would cause a supply disruption sufficiently significant to require the Company to turn to additional solutions to maintain safe and reliable service?

A. There are a number of events that could pose a sufficiently serious disruption to require the Company to have a supply reliability solution. The most likely event would be a weather related supply disruption either on a very cold day, or for a prolonged time period. Ms. Faust indicates the Company has experienced several supply disruptions caused by cold weather. As Ms. Faust testifies, while these colder temperatures were not nearly as cold as would be experienced on a Design Day[1], natural gas production was disrupted because natural gas wells and/or processing plants did not operate due to freezing temperatures. When the wells stop producing, or the processing plants stop operating, the natural gas cannot travel through the interstate pipeline system to DEU's load center. Fortunately, none of these events occurred at or near Design Day temperatures. Had the temperatures been closer to Design Day temperatures, these incidents would likely have affected service to DEU's residential customers. If the production had stopped, impacting deliveries to the Company's city gate stations, for a longer period of time, it would have been more difficult, if not impossible, for the Company to continue to make up for the supply shortfalls.

Also, like other businesses and government entities with operations along the Wasatch Front, the Company has been preparing to meet customer demands during and after a natural disaster, such as an earthquake. The Company typically designs pipelines installed across fault lines to withstand the impact of earthquakes. Notwithstanding the design, a major earthquake at any of the fault lines surrounding the DEU load center could damage a pipeline, which could significantly reduce the amount of gas supply being delivered to the DEU system.

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

There are many other events that could, and regularly do, disrupt natural gas supplies to local distribution companies like DEU. These scenarios are discussed in greater detail in DEU Exhibit 2.04 – Supply Reliability Risk. Upstream supply disruptions may be caused from events such as third-party damage (tear-outs), landslides, fires, flooding, cyber-attacks, internal and external corrosion, and stress corrosion cracking. Several of these events have occurred in recent history and have either disrupted, or threatened to disrupt natural gas service to DEU's customers. As a result, the Company believes that, as a prudent operator, it has an obligation to plan for and be prepared to respond to these kinds of risks.

Q. If these situations have occurred in the past and the Company has been able to maintain service, why does DEU need an additional supply reliability resource now?

A. DEU and its customers have been fortunate that the temperatures have not been colder when shortfall events have occurred, and that the supply disruptions have not been prolonged. In addition, as explained in Tina Faust's direct testimony, certain remedies to supply disruptions that were used in the past are no longer available to the Company. Other utilities, such as Southwest Gas, and pipeline companies have not been so lucky. Given the amount of the supply shortfalls in relation to the total system demand and the limited duration of the shortfalls, the Company has been able to withstand the shortfalls with tools currently available to the Company. Had any of these supply disruptions occurred at colder temperatures or for a prolonged period of time, the Company's customers would have likely lost natural gas service. As Ms. Faust discusses in her testimony, we are aware that other utilities have had this very experience, and many of their customers went without natural gas service for days, during cold weather. DEU seeks to ensure that its customers have safe and reliable service, even in the worst conditions, on dangerously cold days. Accordingly, DEU is assessing the system for potential risks and planning to provide reliable service even in the most difficult circumstances.

Q. At what temperatures is the system susceptible to wellhead freeze-offs and other weather related shortfalls?

A. In recent history, when the temperatures drop to about 10°F mean in Salt Lake City, there have been upstream freeze-offs (both at wellheads and at processing plants) due to extremely cold temperatures in the Wyoming gas production area,[2] where corresponding minimum temperatures reach approximately -15°F mean. The Company currently uses withdrawals from the Chalk Creek, Coalville and Leroy storage facilities (Aquifers) to replace disrupted supplies during moderate weather, but when temperatures drop below that approximate 10-degree threshold, the Company needs supply from the Aquifers just to meet customer demand with extra resources to replace disrupted supplies.

DEU Exhibit 4.02 shows the Company's gas supply portfolio. The chart shows the components of the Company's gas supply portfolio, including spot purchases, peaking purchases, baseload purchases, cost-of-service production, withdrawals from Clay Basin, withdrawals from the Spire Storage West storage facility (Spire Storage), and, lastly, withdrawals from the Aquifers. When temperatures drop further, the Aquifers are no longer available to replace disrupted supplies. When temperatures drop below a 3°F mean, the Company is required to call upon all of its resources described in DEU Exhibit 4.02, and has no more resources to utilize. This assumes that each of these supply sources is not disrupted and is capable of providing the anticipated natural gas.

Q. If a supply disruption happens during cold temperature periods when all contracted supply is needed, what is the consequence?

A. At or below 3°F, the Company cannot use any of its existing resources to replace supplies disrupted by upstream events. Put another way, at extremely cold temperatures, the Company's supply portfolio is fully-utilized, and a supply disruption would result in a supply shortfall, reduced deliveries to the Company's city gate stations, and loss of service to customers. I have conducted a temperature probability analysis and determined that the chances of experiencing these temperatures or colder temperatures in

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2 Green River, Wyoming

Salt Lake City is approximately once every 16 years. See pages 2 and 3 of DEU Exhibit 2.04 in the Probability of High Demand section.

Q. How do temperatures in the gas producing areas where most of the natural gas supplies for the DEU system are being produced and processed correlate with temperatures in Salt Lake City?

A. When the temperatures in Green River, Wyoming are compared to temperatures in Salt Lake City, the data show that Green River is significantly colder than Salt Lake City. On average, the temperatures in Green River are about10°F colder than Salt Lake City. The largest difference in temperature since 1948 is 36°F colder in Wyoming.

Q. Do the Design Peak Day unsteady-state and steady-state models account for supply shortfalls?

A. No. My models assume that all of the supply in the portfolio will show up on an extremely cold winter day. Historically, including over the last few years, when mean temperatures have reached single digits, this has not been the case because there have been supply disruptions upstream. Based on this experience, it is extremely likely that if the Wasatch Front were to experience a -5°F average day, the temperatures in Wyoming would be considerably colder, and there would be well freeze-offs or equipment failures throughout the production, processing and gathering systems that DEU relies on to serve its firm sales customers.

Q. Would company-owned on-system storage be immediately available in a shortfall event?

A. Yes. On-system storage would not involve interstate transportation, and would therefore not be constrained by the NAESB-mandated nomination schedule, as discussed in DEU Exhibit 3.03. For this reason, if the proposed on-system, Company-owned and operated LNG facility (DEU-owned LNG Facility) were available, the Company could call upon that facility when it was needed. In fact, gas would be physically flowing into the Company's system within five minutes. This is not necessarily true for most of the options offered in response to the Company's supply-reliability RFP. An on-system solution is the most reliable way to ensure gas supplies are available when upstream events prevent gas supplies from reaching the DEU system for distribution to the Company's firm customers.

Q. What are the circumstances that lead you to believe that supply shortfalls will occur?

A. There are physical phenomena that result in hydrates forming at the wellhead that are both temperature and moisture dependent. The gas in the wells that the Company's customers rely on contains liquids that freeze. By extension, the wellheads the Company depends on experience freeze-offs, despite the mitigation measures. As a system planning engineer responsible for managing system planning, it is crucial that my team and I understand that wellhead freeze-offs are temperature dependent and predictably occur under certain circumstances.

Q. How do less predictable causes of supply shortfalls factor in?

A. Other risks including landslides, flooding, earthquakes, human error, upstream facility design inadequacies and maintenance, cyber-attacks, and third-party damage as identified in DEU Exhibit 2.04 are mostly independent of temperature and therefore more difficult to predict when they might occur. Additionally, pipelines are subject to internal and external corrosion as well as stress corrosion cracking. However, these risks are present whether the Company can or cannot predict the timing or frequency of occurrence. These additional factors increase the probability of a supply shortfall by a non-zero amount that is impossible to accurately predict without all the related data.

III. CONSEQUENCES OF FAILING TO MITIGATE SUPPLY RELIABILITY RISK

Q. What consequences could be experienced if the Company experienced a supply shortfall on a Design Day?

A. Using a 2017-2018 Design-Day model I calculated that the Company would lose service up to 650,000 customers if a supply shortfall of 150,000 Dth/day occurred. Even if one were to assume the least extreme outcomes from such a shortfall, it is unlikely that this scenario would result in a loss of service to fewer than 130,000 customers as that is approximately the number of residential customers that consume this amount of gas on a Design Day. DEU Exhibit 4.03 shows the HP system pressures that would occur, at times throughout the day, if DEU experienced a supply shortfall of 150,000 Dth/day on a Design Day.

Q. How is it possible to lose service to 650,000 customers when only losing about 10% of the Design-Day supply?

A. The progressive loss of pressure and continued lack of supply reduces system capability by far more than 10 percent. As the lack of supply persists, the system pressures continue to drop and the amount of line pack also drops.

The low system pressures result in a capacity reduction at the regulator stations feeding the IHP system of 1.2 Bcf/day. My analysis shows that this amount of reduced capacity ultimately results in 650,000 customers losing service.

Q. How did you calculate and determine that the Company would lose service to 650,000 customers?

A. Calculating the amount of customers impacted in this scenario was a complicated and long process. First, I ran a Design-Day unsteady-state gas network analysis model. At two hours prior to the peak hour, I removed 150,000 Dth/day of supply at the Riverton gate station. Then, I stepped the model through until pressures at a regulator station dropped below 0.00 psig. When unsteady-state model pressures reach zero the simulation stops. Each time a regulator station dropped to 0 psig, I stopped the analysis and re-profiled the demands at these zero pressure locations so that the demand drops to zero before the model crashes. I repeated this process until the model produced complete results.

At that point, I exported the model resultant pressures throughout the simulation. I used the pressures to recalculate the capacity at each regulator station. The capacity used in the models is based on a 125 psig inlet. When pressures drop below 125 psig, the resulting regulator capacity also drops. The total capacity that is lost due to lower pressure is 1.2 BCF. After recalculating the capacities, I imported them into the corresponding IHP model. Once each IHP model was solved, all locations that were less than 5 psig were considered lost service customers. This analysis demonstrated a loss of service to 650,000 customers.

Q. Why do you think that there could be impacts to the health and safety of DEU customers if a loss of service occurred?

A. When homes lose natural gas service they also lose their internal heat quickly. On a Design Day, an average sized home, with good insulation and no working heat sources contained within, would reach freezing temperatures within hours of losing natural gas service. The estimated time needed to restore service to 650,000 customers is approximately 51 days. This means that without some other heat source, many homes will reach freezing temperatures quickly and could be without heat for a significant number of days. Because many customers would not have an alternative heat source, their health and safety would be at significant risk.

IV. FINANCIAL CONSEQUENCES OF A SUPPLY DISRUPTION

Q. If the Company were to lose service to 650,000 customers, what would be the cost to restore service to those customers?

A. Restoring service to 650,000 customers over a period of approximately 51 days would cost between $10,450,000 and $104,600,000. This range was calculated using two different estimation methodologies for determining the restoration costs. The lower limit was calculated by determining the number of internal employees and mutual aid workers necessary to restore service to each customer, and by multiplying that figure by the wages paid to each individual necessary for the relighting process. This calculation assumes 150 Company workers per shift for the first three days, and then an additional 225 workers assisting with re-lighting after the first three days. The higher estimate is an extrapolation of the Company’s experience with an outage in Coalville, Utah in 2016. The Coalville event required the Company to reinstate service to approximately 600 customers, and it cost approximately $100,000. Extrapolating this scenario to 650,000 customers results in the higher cost estimate.

Q. How long will it take the Company to restore service to 650,000 customers?

A. The Company estimates that it could restore service to all 650,000 customers within 51 days. This figure was determined by assuming a three-minute shut-off time and 25 minutes to relight each customer.

Q. Why would the Company have to shut off meters before restoring service?

A. When a system loses pressure, pilot lights on appliances will go out. The Company must then shut off meters before reintroducing gas to the system to ensure that it does not inadvertently introduce gas into a home where appliances do not have their pilot lights lit. Then, when the system pressures reach operational levels, service technicians will open the valve to the meter and relight each applicable gas appliance within the home or business and ensure they are functioning properly.

Q. Won't some customers relight their own furnace and appliances before day 51? Have you accounted for this in your estimate?

A. Presumably, some customers will choose to relight their own furnace and appliances during an extended outage. The same is probably true for commercial customers. Regardless, DEU would nevertheless be required to visit each customer location to ensure that service had been safely restored.

Q. What other potential costs could result from a significant supply shortfall?

A. An outage of the magnitude identified above would likely result in safety risks, product damage, and property damage. A supply disruption is most likely to occur in winter months when temperatures are very cold. Leaving customers without service in such conditions for any period of time creates a health and safety risk. There is also a likelihood that pipes would freeze and that some customers would experience significant property damage. As Ms. Faust explains, this type of damage was widespread when Southwest Gas experienced a supply shortfall in 2011. The Company is also aware that, when industrial customers on the DEU system have experienced supply curtailments or interruptions, they have expressed concern about the significant costs associated with lost product and property damage.

To obtain an estimate of the total resulting cost to the State of Utah from such a service disruption, the Company retained the Kem C. Gardner Policy Institute at the University of Utah (”Institute”) to analyze the economic impact of such an outage. The Institute determined that the impact from a significant shortfall on the Gross State Product (GSP) would likely fall between $1.4 and $2.4 billion dollars. The full Institute study report is attached as DEU Exhibit 4.04.

V. REQUEST FOR PROPOSAL SYSTEM REQUIREMENTS

Q. How were the volumetric rate and pressure requirements determined for the RFP?

A. In order to maximize system reliability, deliverability and flexibility of the supply reliability option, the pressure upstream of the DEU system must be equal to or greater than the system Maximum Allowable Operating Pressure (MAOP). Without delivery pressures greater than operating pressures, the gas will not flow into the DEU system. The current connected system MAOPs are 720 psig (FL26), 471 psig (Northern), and 354 psig (Central). Additionally, the Company’s long-term plan includes a 720 psig MAOP pipeline corridor from Payson to Hyrum.

The volumetric rate specified in the RFP is a result of the Gas Supply department’s experiences with shortfall events and their corresponding quantities over the past 10 years, as discussed in Mr. Schwarzenbach’s testimony.

Q. Why did the Company identify the specified delivery location in the RFP?

A. The Optimal Delivery Location is where the system pressures are separated with an MAOP break as shown in Figure 2. On the north side the MAOP is 471 psig and on the south side the MAOP is 354 psig. The farther from this location a supply reliability option is located, the less capability that option will have to deliver gas to the other side of this barrier, especially from the south where the pressures are lower. Volumes at a lower pressure cannot flow into a higher pressure area. A positive pressure difference must exist in order for gas to flow.

The reason that a site to the north of the specified location is not ideal for locating a supply reliability resource is that there will be a pressure drop through the pipe system from that location to the MAOP break. South of this location, on the other hand, system pressures are too low to send volumes north unless the pressure at the MAOP break has equalized (i.e. the pressure on the north is the same or lower than the pressure on the south).

A supply reliability resource located in the Optimal Delivery Location, operating at or above the MAOP of the system, is capable of maintaining system pressures if shortfalls of equal volumes occur at any gate station in either the 354 psig or 471 psig systems. There is no other location in the system that provides the same amount of reliability, versatility, and capability in the current system or to the system as it is expected to evolve in the future.

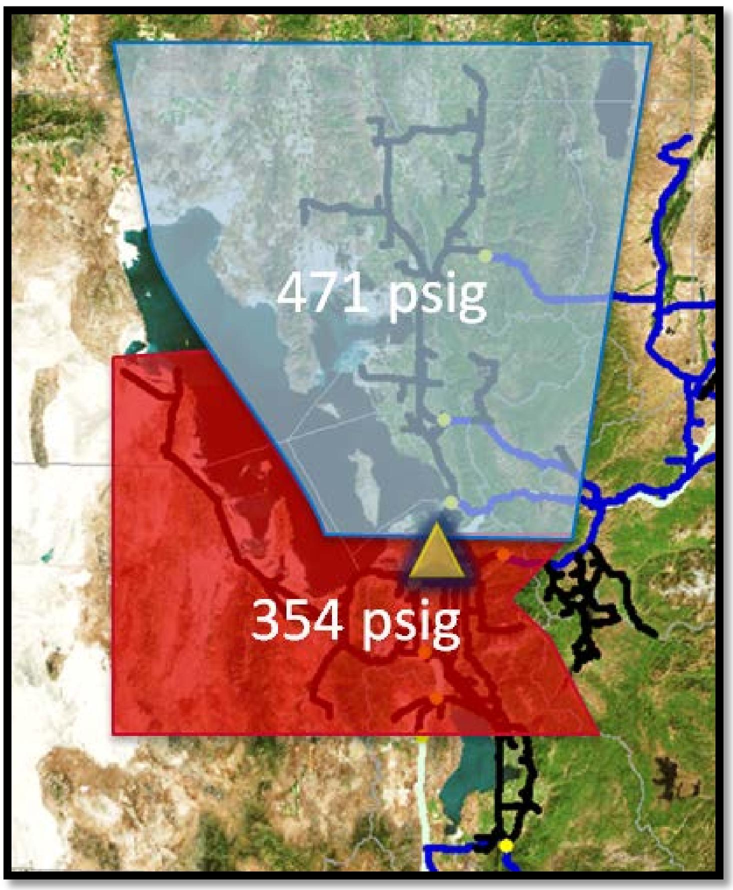

Figure 2: Optimal Delivery Location

Q. Why is it important that the chosen supply reliability resource be in the Optimal Delivery Location and deliver the pressures (650 – 720 psig) described in the RFP?

A. In order to provide reliability for the most likely scenarios to occur, the selected resource must be capable of providing operational pressures for shortfalls at all the gate stations feeding the Wasatch Front. Delivery at the Optimal Delivery Location allows the gas to be delivered to the northern or southern extents of the connected system. In order to "push" the gas in either direction, pressures, at this location, must remain above operating pressures. A delivery pressure of 650 – 720 psig will also allow for the resource to provide supply to the system when the buildout of the planned 720 psig MAOP corridor is completed.

Q. Are there other reasons the Optimal Delivery Location was chosen as ideal for delivery of a supply reliability resource?

Risks to a pipeline can be measured in probability per mile. The more miles of pipeline that exist between the supply reliability solution and the demand center, the higher the probability of an incident on that pipeline. Reliable supply that is located adjacent to major demand centers is inherently superior to any less proximal solution. Thus, a resource that is centrally located is ideal. The lower the miles between the resource and the delivery location, the lower the risks associated with that resource.

Q. Does locating the supply reliability resource in the Optimal Delivery Location provide sufficient pressures in the case of a shortfall scenario at any gate station?

A. Yes. The only caveat to this is in the case of a Payson gate shortfall. In that case, the pressures in Feeder Line 26 are likely to drop below 525 psig, which would result in losing the ability to feed one of the customers from FL26. However, this customer is one of few who could potentially shift to an alternate delivery location without interruption.

VI. SYSTEM ANALYSIS OF PROPOSALS

Q. Have you compared the model results for each variant of the proposals submitted?

A. Yes. I modeled each proposal with a shortfall of 150,000 Dth/day[3] at each gate station in a projected 2023 Design-Day Model. The notable result from the modeling is that supply

3 At Sunset the average Design-Day flow through the station is significantly less than 150,000. The shortfall amount

reliability options that deliver into the Optimal Delivery Location are capable of meeting shortfall scenarios at every gate station. Conversely, [redacted] cannot support the system in the case of a shortfall at the Hyrum gate station without additional reinforcements.

Q. Were there scenarios that did not maintain system pressures?

A. Scenarios that deliver into the Optimal Delivery Location, either by design or with reinforcements, maintained system pressures in all shortfall scenarios. In order to ensure this, I modeled each proposed delivery location with shortfalls at every connected gate station, 40 models in total. The options that delivered outside the Optimal Delivery Location did not maintain system pressures in all scenarios without reinforcements. Those [redacted]

Q. Why is [redacted], without reinforcements, inadequate for meeting customers' needs?

A. Due to the MAOP break at Flyer Way (North Temple) and overall distance from [redacted], this location cannot support a shortfall at [redacted] and results in sub-operational pressures [redacted] These conditions on the HP system result in a loss of service to thousands of customers. As discussed in more detail below, the severity of the outage will only increase as demand on the system grows.

Q. How did you determine the number of customers that would be lost if the Supply Reliability option were located in [redacted], without reinforcements?

A. Using the resultant pressures from this scenario, I recalculated the capacity of each affected regulator station feeding the IHP system. I estimated the number of customers lost by solving the corresponding IHP models with the reduced capacities. Any customers where pressures dropped below 5 psig would not have flowing gas and were added to the

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for Sunset is approximately 72,000 Dth/day.

total. It is notable that, unlike the HP model, I used the 2018 IHP models. Additional demand growth in 2019 and going forward will cause a greater number of customers to experience a loss of service, if this option were chosen.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Q. From a system analysis standpoint does the DEU-owned LNG Facility provide additional benefits?

A. Yes. The DEU-owned LNG Facility has the ability to potentially provide approximately 25,000 Dth/day (on a volumetric rate basis) of the peak-hour demand requirement while maintaining all 150,000 Dth/day of supply reliability.

Q. What other conditions make the Optimal Delivery Location preferred?

A. Projects have been identified and executed that will allow for delivery from this area into either the north or central HP system. FL12 has already been replaced with a design MAOP of 720 psig. The Flyer Way regulator station, that is scheduled to replace North Temple, is designed to flow and regulate gas from either direction. FL13 is scheduled for replacement in the coming years and will have a design MAOP of 720 psig. These actions have all been taken independent of any supply reliability resource due to system needs and flexibility.

VII. OTHER CONSIDERATIONS

Q. Are there meaningful additional risks to utilizing remote supply reliability options?

A. Yes. Utah and surrounding areas are laden with seismic fault lines. The farther a supply source is from the demand center, the higher the probability of other factors affecting the reliability of that supply, including landslides, flooding, earthquakes, human error, upstream facility design inadequacies and maintenance, cyber-attacks, and third-party damage as identified in DEU Exhibit 2.04.

A single pipeline between two points will be exposed to more risks if the same alignment is extended farther. The resource that provides the greatest reduction in incident probability is inherently the most valuable.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Q. Could you please summarize your testimony?

A. Yes. Under my system model for a Design Day, a supply shortfall could result in loss of service to as many as 650,000 customers which would take up to 51 days to restore service. Temperatures are likely to result in supply shortfalls at least once every 16 years. These shortfalls are unlikely to be remediated with current Company resources. A supply reliability resource that is located in the Optimal Delivery Location prevents a loss of service to customers on a Design Day, and warmer, should there be a shortfall at any of the gate stations feeding the Wasatch Front. Additional risks exist for supply reliability solutions that are located farther from the system's demand center due to earthquakes and other events that could adversely affect a pipeline. As the manager of engineering systems for DEU, I am confident that the solution that provides the maximum amount of reliability at the lowest reasonable cost is an on-system, DEU-owned LNG Facility operated by the Company.

Q. Does this conclude your testimony?

A. Yes.

State of Utah)
) ss.
County of Salt Lake)

I, Michael Platt, being first duly sworn on oath, state that the answers in the foregoing written testimony are true and correct to the best of my knowledge, information and belief. Except as stated in the testimony, the exhibits attached to the testimony were prepared by me or under my direction and supervision, and they are true and correct to the best of my knowledge, information and belief. Any exhibits not prepared by me or under my direction and supervision are true and correct copies of the documents they purport to be.

Michael Platt

SUBSCRIBED AND SWORN TO this 30th day of April, 2019.

GINGER JOHNSON
Notary Public State of Utah
My Commission Expires on:
August 4, 2019
Comm. Number: 684539

Notary Public