# Supply Reliability Technical Conference Docket 18-057-03

June 19, 2018



### **LNG Basics**

What is LNG?

- LNG is natural gas in liquid form
- It is made by cooling natural gas to approximately -260 Degrees (f)
- The volume of the gas is reduced to 1/600 of its original size

How is LNG Made?

- Gas is transported via pipeline to a liquefaction facility
- Impurities are removed from the gas
- Gas is run through a cooling process and stored cryogenically



#### **LNG Basics**

How is LNG vaporized?

- LNG is stored until it is needed
- LNG is removed from the tank and reheated
- The reheated LNG vaporizes back into gaseous form
- The natural gas is then re-odorized and put into pipelines for distribution

LNG Uses:

- Peak Shaving
- Transportation
- Supply Reliability
- Base Load



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#### **Operating Parameters: (Questions 22g, 24, & 25)**

- Liquefaction of gas would occur approximately 180\* days each year April-September (would not utilize peak capacity of feeder line)
- Approximate 30 day transition window (October)
- Vaporization of gas available approximately 150 days each year (November-March)

\*Typo in M.Gill testimony incorrectly indicated 100 days



#### Sizing Criteria: (Questions 22a, 22d, 22e, & 22f)

Liquefaction Rate: 8.2 MMcfd (Common Capacity Size) Vaporization Rate: 150 MMcfd Storage Tank Size: 15 million gallons (See Table Below)

Typical PHMSA Tap	k Sizes (Peak Shaver Fa	acilities	5)		
Size	Number	Jenneres	Percentage		
12 M Gallon	25		36%		
15 M Gallon	11		16%		
Greater than 5M Less Than 12M Gallon	34		48%		
*Does not include marine terminals, truckin	g and satellite				
facilities. See <a href="https://www.phmsa.dot.gov/">https://www.phmsa.dot.gov/</a>	pipeline/liquified-				
natural-gas/Ing-data-and-maps for more info	ormation				



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# **Ancillary Uses: (Questions 13 & 21)**

- In addition to providing supply reliability, the plant could be used to serve remote communities in Utah.
  - Satellite vaporization facilities could use trucked LNG to provide base load for their communities
  - After initial filling, the full liquefaction window would likely not be needed solely to fill the tank. Portions of the liquefaction window could be used to fill remote tanks.
  - The current design of the plant does not include trucking terminals
    - Additional liquefaction trains and trucking terminals could be added in the future



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# Ancillary Uses: (Questions 5, 13d, 22d, & 22f)

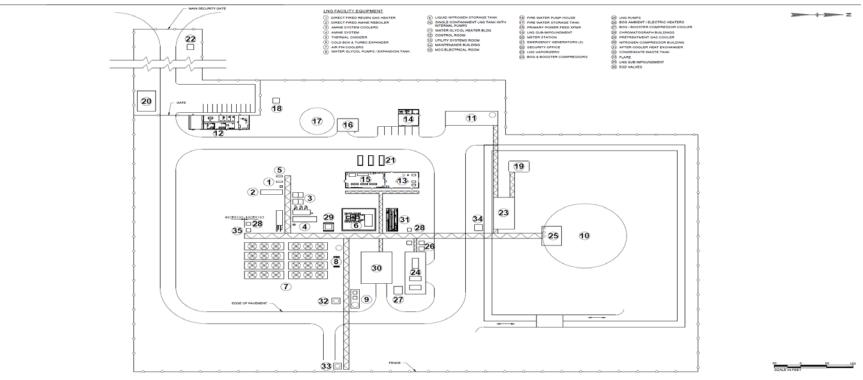
#### Serving Remote Communities:

City	Footage	Pipeline Extension	Cost	Peak Daily Load MMcfd	Max Annual Load MMcf
Green River	232,000	4"	\$ 42,246,000	0.7	52
Bear Lake	61,175	6"	\$ 15,120,000	8.2	1125
Kanab	332,640	6"	\$ 94,864,898	2.3	160
Wendover	397,000	6"	\$ 119,122,127	1.7	144

\*Satellite Facility with 270,000 gallon storage and 10 MMcfd vaporization: \$25M-\$30M (Pipeline Extension Costs do not include IHP distribution system costs)



## **Site Layout**





# **Project Rendering**



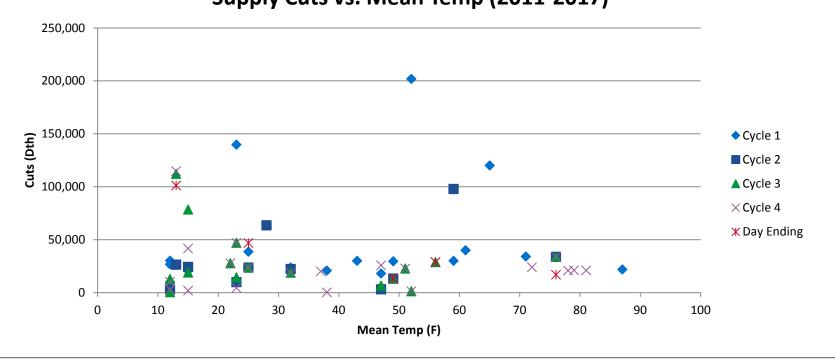


# LNG Facility for Peak-Hour Needs vs. LNG Facility for Supply Reliability (Question 1)

- DEU explores all alternatives when evaluating solutions to business needs
  - 1990's an LNG facility was considered to meet customer growth as opposed to pipeline expansion and new gate station construction
  - 2014 an LNG facility was considered as an alternative to off-system Aquifer storage contracts
  - 2016-2017 an LNG facility was considered to meet peak-hour demands DEU determined Firm Peaking Services were a more cost-effective solution
  - 2017-2018 an LNG facility was considered for supply reliability Current facility design is smaller than what was considered to meet both the peakhour demand and supply reliability

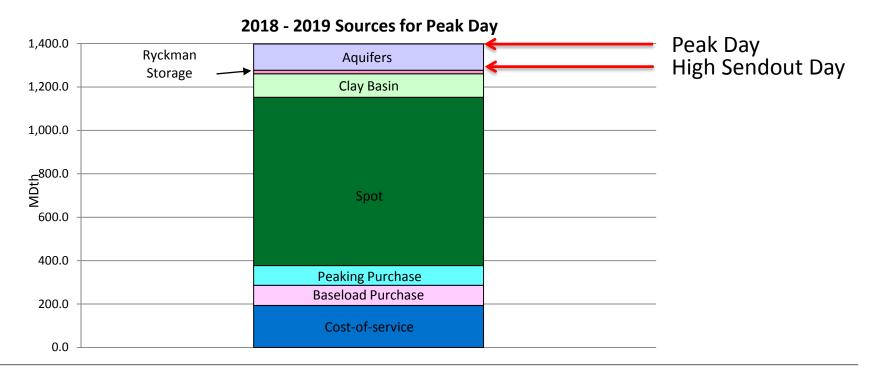


# Probability of Supply Shortfalls on Cold Days (Questions 7, 16, & 22c) Supply Cuts vs. Mean Temp (2011-2017)





# Why Can't DEU Continue to Rely on Purchases and/or Storage to Make Up for Supply Shortfalls as it has for Past Events? (Question 8)





#### Comparisons of the LNG facility to other Alternatives (Question 11)

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# Is the LNG the "Least Expensive Option"? (Question 12)

- A few of the options that were considered were at a lower cost than an LNG facility
- These "lower cost" options did not meet all of the needs to ensure supply reliability and presented unacceptably high risk
- In addition to cost, the statute also requires consideration of:
  - Long-term and short-term impacts
  - Risk
  - Reliability
  - Financial impacts on the utility
  - Other factors determined by the Commission



# **Planned In-Service Date for the LNG Facility? (Question 14)**

- The planned in-service date is 2022
- Paragraph 28 of the Application contains a typographical error



# Force Majeure Clauses in Supply Contracts and Transportation Contracts (Question 18)

- DEU has not agreed to add supply freeze-offs as a force majeure event in its gas supply contracts
- DEU has penalties in its contracts for liquidated damages
- From a commercial standpoint the Company cannot insist on increased penalties without limiting the counterparties that would be willing to sell gas to DEU
- Limiting the number of counterparties transacting will result in reduced availability and/or increased costs
- Counterparties will not agree to remove force majeure clauses from contracts or tariffs



#### Storage Cavern Potential on DEU System (Question 17)

- No known gas fields or salt caverns at, near or adjacent to the DEU system
- Confirmed with a Geologist and Petroleum Engineer



## **Other Uses (Questions 3 & 26)**

- 30% needs to be used yearly
  - Serving rural communities
  - Potential flexibility/reduction in gas supply purchases
- Wexpro gas used for injections
  - Reduction in amount of summer shut-ins



#### **Economic Impact (Question 9)**

# Table 1: Economic Impacts of a Natural Gas System Outage(Millions of 2017 Dollars)

	Low So	enario	High Scenario		
Category	Absolute	Relative*	Absolute	<b>Relative</b> *	
Total Employment	-7,103	-0.36%	-11,586	-0.58%	
Personal Income	-\$341.5	-0.26%	-\$556.9	-0.42%	
Gross State Product	-\$1,445.9	-0.85%	-\$2,375.6	-1.39%	

\* Relative to 2017 baseline.

Source: Kem C. Gardner Policy Institute analysis of Dominion Energy data using the REMI PI+ v2.1.2 model.



#### **Restoration Cost**

- Restoration Timeline 51 Days
- Cost to the Company Estimated Minimum \$10,450,000
   Estimated Maximum \$104,600,000
  - (Coalville extrapolation)



#### **Cost of a Major System Outage**

	Major System Outage
Supply Disruption Probability	> 7%
State Economic Impact	\$2.4B
Company Costs	\$105M
Property Damage	> \$0
Resulting Loss of Life	Unknown



# Other System Risks that Increase the Probability

- Landslides
- Flooding
- Earthquakes
- Human Error
- Upstream Facility Design Inadequacies and Maintenance
- Cyber Attacks
- Third-Party Damage
- Risk Factors Associated with NAESB Cycles

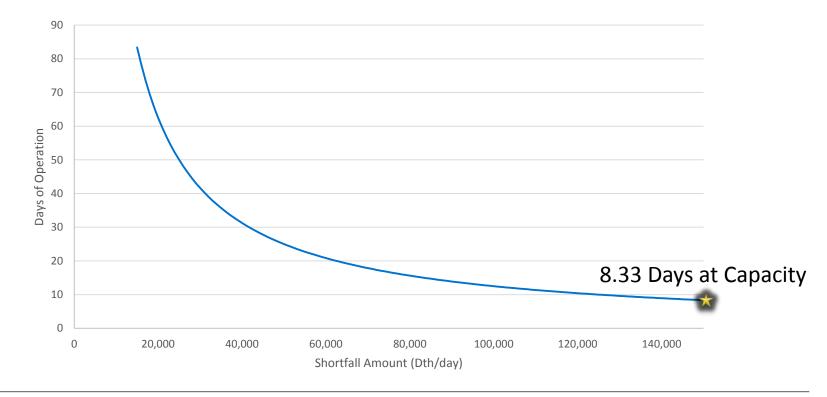


#### **Cost / Benefit – Other Companies**

- We do not have access to other companies' Cost /Benefit analyses
- Other companies have commission-approved on-system storage
   LNG on LDC systems in the US
   Reported on-system storage
   77%
- Dominion Energy Utah currently has no on-system storage of any kind



#### Length of Coverage (Questions 15, 19, & 20)



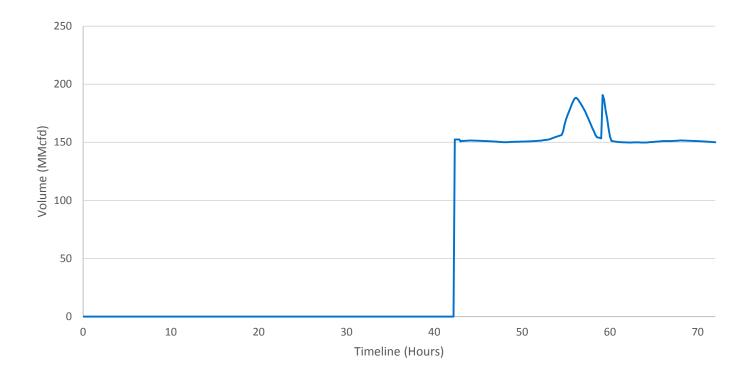
June 19, 2018

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No reduction in vaporization capacity due to tank volume



#### Sizing Scenarios (Question 22a & b)





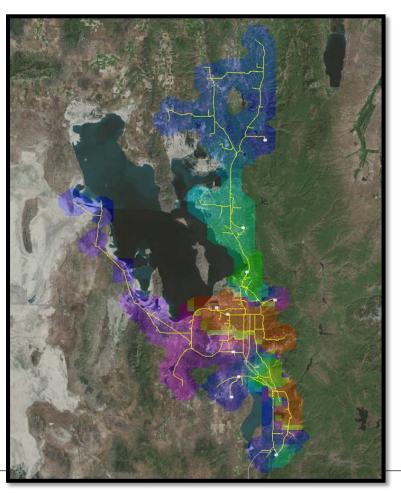
# **Specific Sites**

In addition to the selected site, the Company considered the following locations:

- Point of the Mountain
- Lark
- North Salt Lake

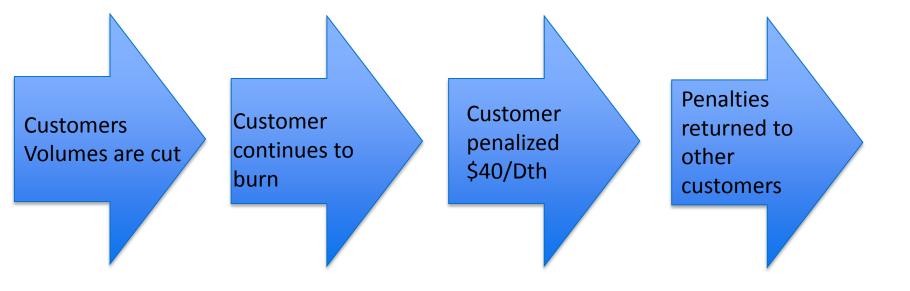


# Flow Direction (Question 23)





#### Interruptible Transportation customers who don't interrupt





#### **Rate Issues**

Interruptible Customers who do not interrupt (Question 2)

Transportation Customers in Green River, Kanab (Question 4)

Remote locations Cost Sharing (Question 6 and 13e)

What's included in 30 Year Levelized Cost (Question 10)



# **30 Year Levelized Costs**

- Operating Expenses
- Maintenance Expenses
- Overheads
- Depreciation Expense
- Income Taxes
- Other Taxes
- Return on Rate Base

