Thursday, August 22, 2019

*Operations Engineering – System Planning and Analysis*

# *Eureka Rural Expansion Analysis*

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## *Purpose*

The town of Eureka is seeking to have natural gas service extended to them due to the state rural expansion provision. To facilitate this system expansion, a High Pressure (HP) Feeder Line (FL) is proposed to run from a new interconnect point to the town of Eureka as shown in Figure 1. The two potential interconnect points would be with either Dominion Energy Questar Pipeline (DEQP) or Kern River Gas Transmission (KRGT). The new HP FL length is estimated at approximately 11.5 miles and 8.7 miles for DEQP and KRGT interconnect points, respectively. This analysis considers whether a 4-inch, 6-inch, or 8-inch diameter size should be installed for the given FL routes operating under a 354 psig Maximum Allowable Operating Pressure (MAOP).

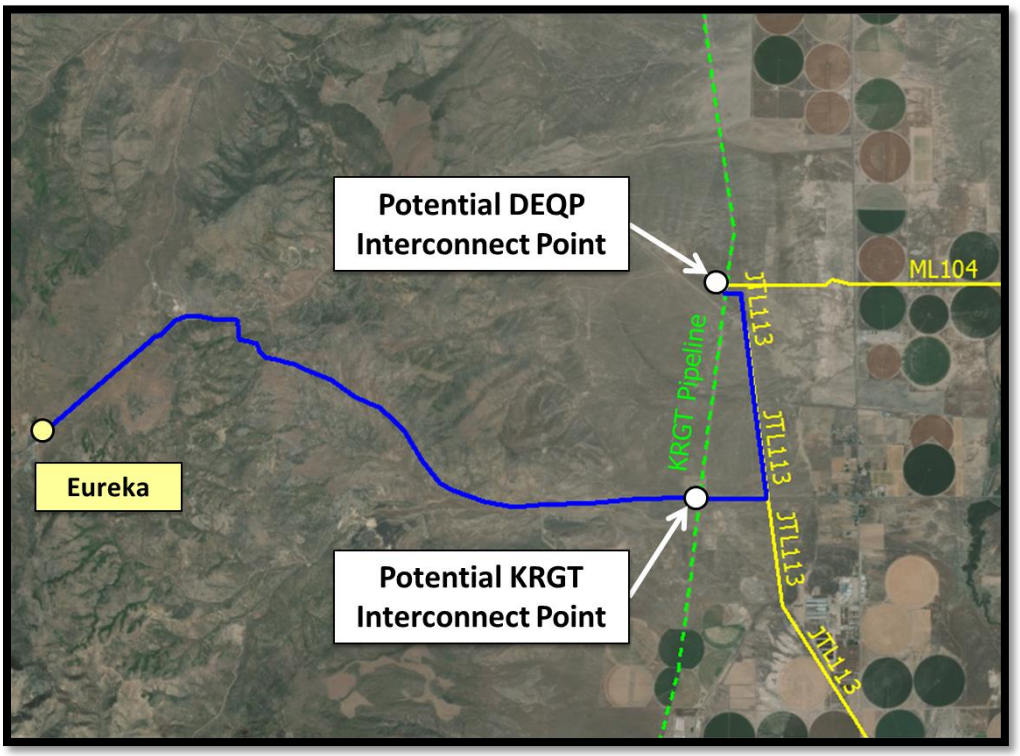


**Figure 1: Overview of the HP FL routes to Eureka**

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## *Analysis*

An unsteady-state model was used to analyze minimum pressures at the end of the HP FL options to Eureka for diameter sizes of 4-inch, 6-inch, and 8-inch under varying daily demands at Eureka and operating at a 354 psig MAOP. It should be noted that demand at Eureka was profiled to match typical residential demand behavior on an hourly basis as well. Results for these scenarios are shown in Figure 2.

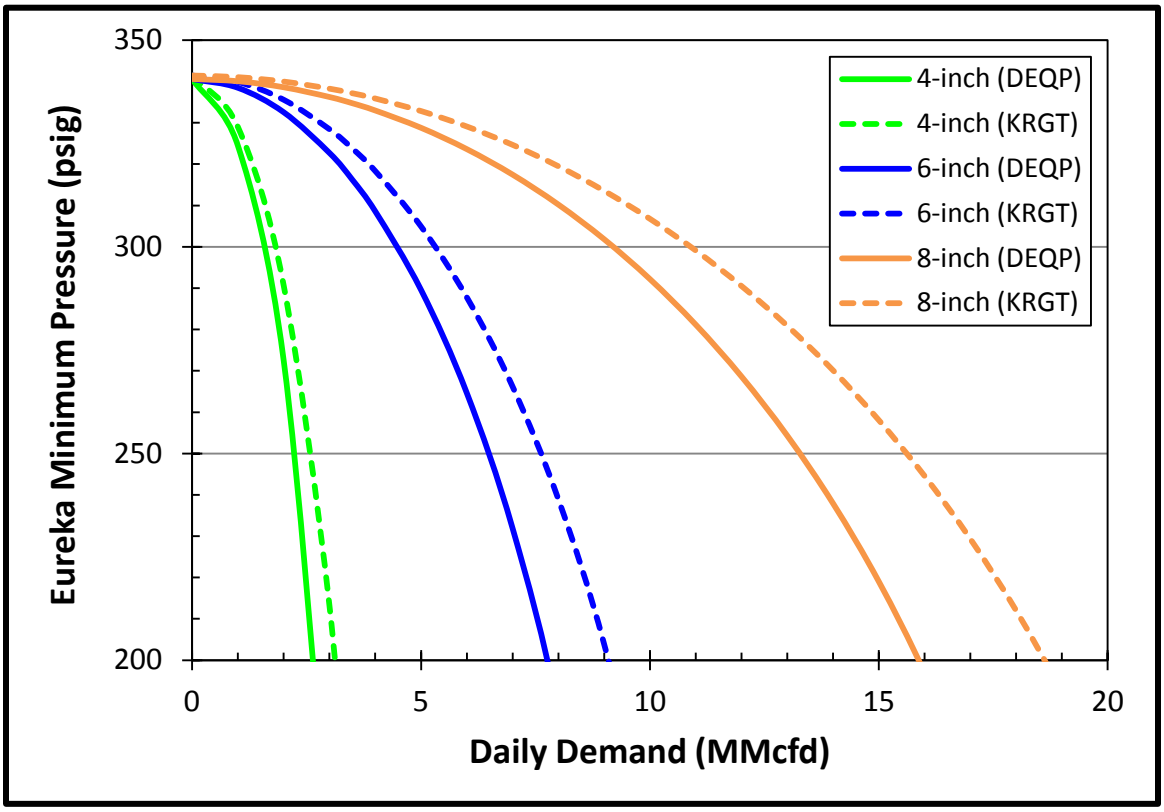


**Figure 2: Minimum pressures at Eureka for different FL diameter sizes**

The maximum daily and corresponding peak hour demands that can be met via the given FL diameter sizes before the minimum pressure at Eureka drops below 200 psig is also shown in **Table 1**.

**Table 1: Demand limits for different FL diameter sizes**

| | DEQP Interconnect Point | | KRGT Interconnect Point | |
|---|---|---|---|---|
| | **Daily Demand (MMcfd)** | **Peak Hour Demand (MMcfd)** | **Daily Demand (MMcfd)** | **Peak Hour Demand (MMcfd)** |
| **4-inch** | 2.6 | 3.5 | 3.1 | 4.2 |
| **6-inch** | 7.7 | 10.4 | 9.1 | 12.3 |
| **8-inch** | 15.9 | 21.4 | 18.6 | 25.1 |

Analysis shows that increasing diameter size from 4-inch to 6-inch, almost triples the daily and hourly capacity of the line to accommodate future growth in the area, regardless of the two interconnect points. While the current residential demand of Eureka doesn't require a 6-inch line, rural expansion to this area will likely encourage firm growth per the original intent of the provision. Having the additional capacity available will be necessary and ensure DEUWI will not need to incur additional costs to upsize from a minimum diameter size of 4-inch in the future.

## *Conclusion*

The appropriate diameter size for extending service to Eureka under the rural expansion provision is 6-inch at either interconnect point identified.