Thursday, June 5, 2025

Engineering – System Planning & Analysis

System Analysis

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Purpose

The Company proposes to extend natural gas service to the community of South Rim, just outside of Stockton, in Tooele County. The High Pressure (HP) Feeder Line (FL) route would tap off the 8-inch FL048 in Stockton, near SR-36 and head west across an at-grade rail crossing and along the highway around the north and west sides of Rush Lake as shown in Figure 1. This analysis considers whether a 4-inch, 6-inch, or 8-inch diameter size FL should be installed for the given route operating under a 354 psig Maximum Allowable Operating Pressure (MAOP), similar to FL048.

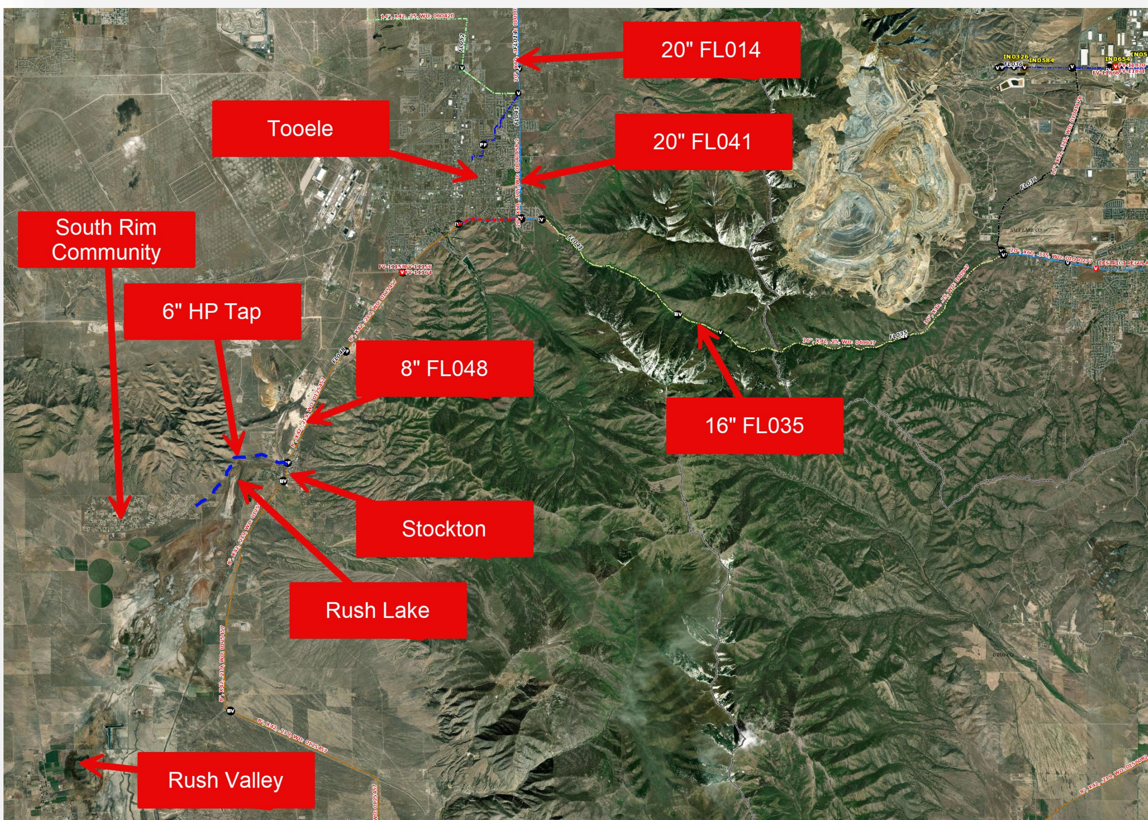

Figure 1: Overview of the HP FL Route to South Rim

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Assumptions & Inclusions

Population projections from the Kem C. Gardner Policy Institute indicate the population of Tooele County will be 88,340 in the year 2026; 98,423 in the year 2031 (5 years); and 107,711 in the year 2036 (10 years). That corresponds to a 2.19% compounded annual growth rate for 5 years and 2.00% for 10 years.

There is little elevation change from one side of Rush Lake to the other. The proposed FL was analyzed with the same elevation on each end.

Analysis

An unsteady-state model was used to analyze minimum pressures at the end of the HP FL options to the South Rim community for diameter sizes of 4-inch, 6-inch, and 8-inch under varying daily demands and operating at a 354 psig MAOP. The pressures at the tap location were resultant from the rest of the connected system, with the baseline condition showing the pressures at the tap location around 221 psig. The tap line was analyzed at a length of approximately 14,000 ft. The demand at South Rim was also profiled to match typical residential demand behavior on an hourly basis as well. Results for these scenarios are shown in Figure 2.

The following demand cases were considered

1. 340 existing homes = 0.471 MMcfd (from a residential load calculator)
2. Capacity of a medium-capacity post-type reg station (cathouse) = 0.8 MMcfd
3. 1,000 future homes = 1.413 MMcfd (from a residential load calculator)
4. Capacity of a 1x1 Fisher EZR full-size regulator station = 2.24 MMcfd

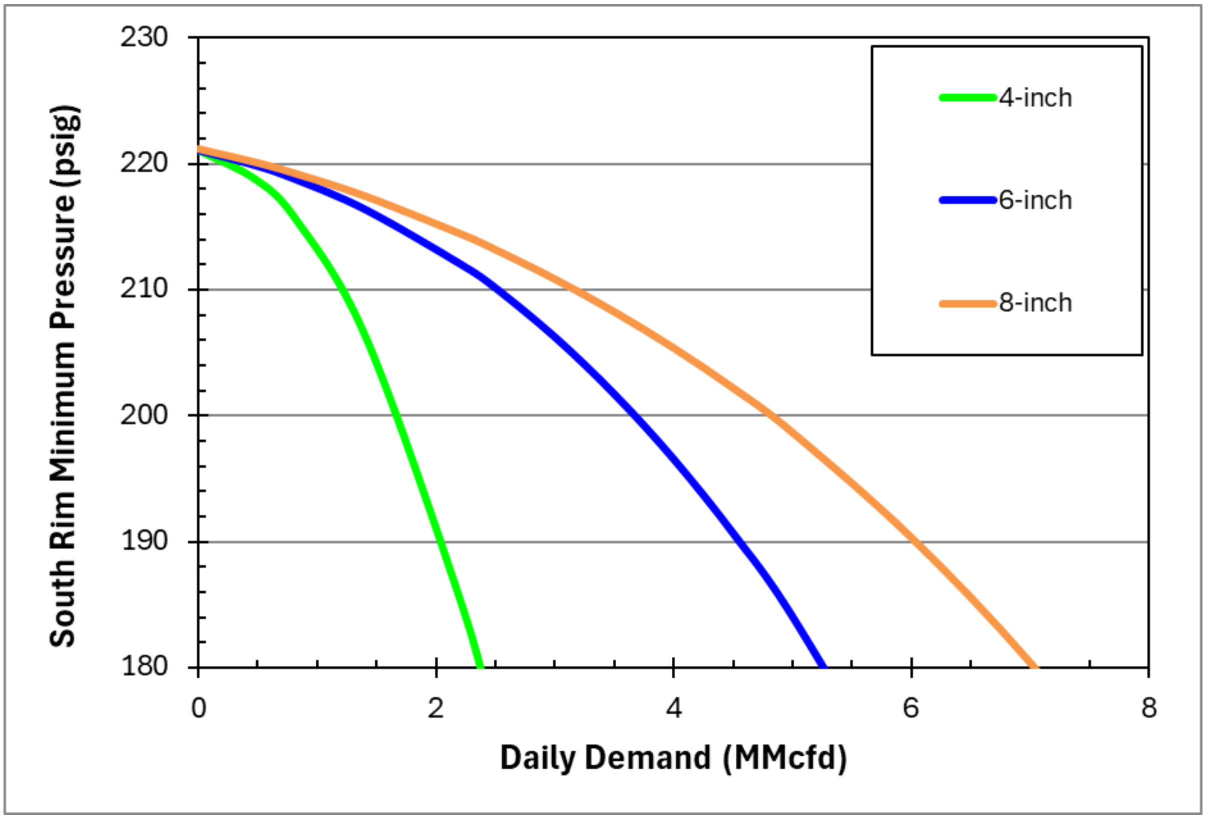

Figure 2: Minimum Pressures at South Rim for Different FL Diameter Sizes

The maximum daily and corresponding peak hour demands that can be provided via the proposed FL diameter sizes before the minimum pressure at South Rim drops below 180 psig is also shown in Table 1. The 180 psig value was selected as a pressure at which further future reinforcement might start to be considered if pressures fell below that value.

Table 1: Demand Limits for Different FL Diameter Sizes

	Daily Demand (MMcfd)	Peak Hour Demand (MMcfd)
4-inch	2.4	3.2
6-inch	5.3	7.1
8-inch	7.0	9.5

Analysis shows that increasing diameter size from 4-inch to 6-inch, more than doubles the daily and hourly capacity of the line to accommodate future growth in the area. Increasing the design size further from 6-inch to 8-inch diameter provides diminishing returns in capacity. The potential peak hour residential demands of South Rim were analyzed in several scenarios. Refer to Table 2. The following demand flows were analyzed as follows:

Table 2: Analysis Cases and Results

Case	Demand (MMcfd)	Tap Size (in)	Minimum Pressures (psig)		Pressure Drop (psig)	Max Velocity (ft/s)
			FL048 Tap	South Rim		
Baseline	0	N/A	221	N/A	N/A	N/A
1	0.471	4	220	219	1.2	4.9
		6		220	0.2	2.1
		8		220	0.0	1.2
2	0.8	4	219	216	3.4	8.4
		6		219	0.4	3.6
		8		219	0.1	2.1
3	1.413	4	218	206	11.5	15.6
		6		216	1.3	6.5
		8		217	0.3	3.7
4	2.24	4	215	184	30.6	27.7
		6		212	3.2	10.5
		8		214	0.8	6.0

The analysis also showed no significant pressure losses in the existing HP system with any of the above cases. The end of FL048 at Tooele Army Depot was the most significant drop and it only dropped from around 220 psig to 214 psig.

While the present demand wouldn'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 EGU will not need to incur additional costs to upsize from a minimum diameter size of 4-inch in the future.

Model Adjustments & Concerns

All projected flows for South Rim were assumed to be nominated from RT0001 Riverton gate station.

Conclusion

The appropriate diameter size for extending service to South Rim under the rural expansion provision is 6-inch.