Wilson, Stuart

From: Wilson, Stuart
Sent: Wednesday, February 14, 2024 8:45 AM
To: Hagan, Michael
Subject: RE: Texas Gas - LG&E/KU Analysis

Thank you, Michael! We will digest and follow up.

Stuart

From: Hagan, Michael <[redacted]>
Sent: Tuesday, February 13, 2024 5:34 PM
To: Wilson, Stuart <[redacted]>; Sullivan, Gordon <[redacted]>
Cc: Ball, Adam <[redacted]>; Martin, Stephen <[redacted]>; Schultz, Joseph <[redacted]>; Sebourn, Michael <[redacted]>; Loucks, Julianna <[redacted]>; Backstrom, Charles Buzz <[redacted]>
Subject: RE: Texas Gas - LG&E/KU Analysis

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Stuart, we've completed the follow up analysis for various scenarios during the winter storm Elliot event. We picked an operational point to model which was on Dec 23rd when Trimble was at low pressure, 430psig and flowing ~134,000/d rate. Cane Run was at 465 psig flowing 131,000/d. At this point during the storm, Trimble pressure was essentially stable, but Texas Gas was still operating at a deficit, in other words our deliveries exceeded our receipts into that part of our system and we were actively trying to move linepack (pressure) there.

Since we were still operating at a deficit, taking units off at Trimble helped the system but we only see about a 5 psig pressure improvement at Trimble per 43,200 reduction of flow. Cane Run (and Mill Creek had it been on the system) would have shown around a 10-15psig increase similar to the North Flow results communicated earlier.

Once the system is no longer operating at a deficit, our model results show very similar changes in pressure as the north flow results shown earlier. Even though pressure at Trimble was low, taking 1 unit off resulted in ~10 psig pressure improvement at Trimble, and 10-15psig improvement at Mill Creek/Cane Run.

To recap our assumptions, our analysis held everything else on the Texas Gas system constant other than varying flows to the KU power plants to show the relative magnitude of those changes. In reality, and as we experienced during Elliot, once we were able to get horsepower on at key compressor stations, we're able to raise discharge pressure at those compressor stations and more quickly move line pack into the KU operating area, thus improving pressure at a much faster rate.

Let me know if this makes sense or I'd be happy to schedule a call to go over it in more detail.

Thanks,
Michael

Business Use

From: Hagan, Michael
Sent: Wednesday, January 31, 2024 3:54 PM
To: Wilson, Stuart <[redacted]>; Sullivan, Gordon <[redacted]>
Cc: Ball, Adam <[redacted]>; Martin, Stephen <[redacted]>; Schultz, Joseph <[redacted]>; Sebourn, Michael <[redacted]>; Loucks, Julianna <[redacted]>; Backstrom, Charles Buzz <[redacted]>
Subject: RE: Texas Gas - LG&E/KU Analysis

Stuart thanks, here are the results we shared today. I'll let you know once we have something to share on the winter storm Elliot scenario.

Michael

From: Wilson, Stuart <[redacted]>
Sent: Wednesday, January 31, 2024 11:24 AM
To: Hagan, Michael <[redacted]>; Sullivan, Gordon <[redacted]>
Cc: Ball, Adam <[redacted]>; Martin, Stephen <[redacted]>; Schultz, Joseph <[redacted]>; Sebourn, Michael <[redacted]>
Subject: EXT: RE: Texas Gas - LG&E/KU Analysis

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Hey guys,

Thank you again for the work you're doing! Here's the updated table of minimum pressures.

Gas Pressure on TGT System at TGT Takeoff Needed to Operate LKE Units

	CR7[1]	PR13	MC5[2]	TC CTs[3]
During Startup	463 psig	420 psig	390 psig	439 psig
Min Load	463 psig	375 psig	390 psig	256 psig
Max Load	510 psig	441 psig	390 psig	423 psig

Stuart

Business Use

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[1] Assumes gas compression is "on." The minimum operating pressure listed by the manufacturer for the CR7 compressor is 460 psig. However, CR7 was capable of full-load operation during Winter Storm Elliott at 426 psig.
[2] Assumes base and incremental gas compression is "on." Unit requires 390 psig minimum to operate, so starting unit at that pressure may be infeasible depending on the resulting pressure drop on pipeline.
[3] Reflects addition of new software. Assumes gas compression is "on." Startup assumes the other five TC CTs are operating at max load with -20 F ambient temperatures. Min / Max assumes all six TC CTs at the same load point (min or max) with -20 F ambient temperatures. Pressures at min and max load are based on manufacturer's estimates and may be conservative.