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Quest CCS Project

Quest CO2 Dehydration Performance

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Summary

This document summarizes the CO₂ dehydration performance in the TEG unit for the reporting period.

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1. DEHYDRATION PERFORMANCE SINCE COMISSIONING

The triethylene glycol (TEG) unit performance has exceeded design expectations. The system requirement was to meet the winter water content specification for the pipeline of 84 ppmv (4 lb/MMscf) to mitigate hydrate formation potential during normal operation. Corrosion of the pipeline is not expected at this level of dryness since it is well within the solubility limit of the CO₂ stream. Actual water content was on average 46 ppmv for 2015, 55 ppmv for 2016 and 46 ppmv for 2017. The figure below depicts the actual water content in the CO₂ stream to the pipeline from August 23rd, 2015 up to and including December 31st, 2017. The only days above the 84 ppmv winter spec was while the compressor/TEG was offline. Flow to the pipeline did not occur during these periods.

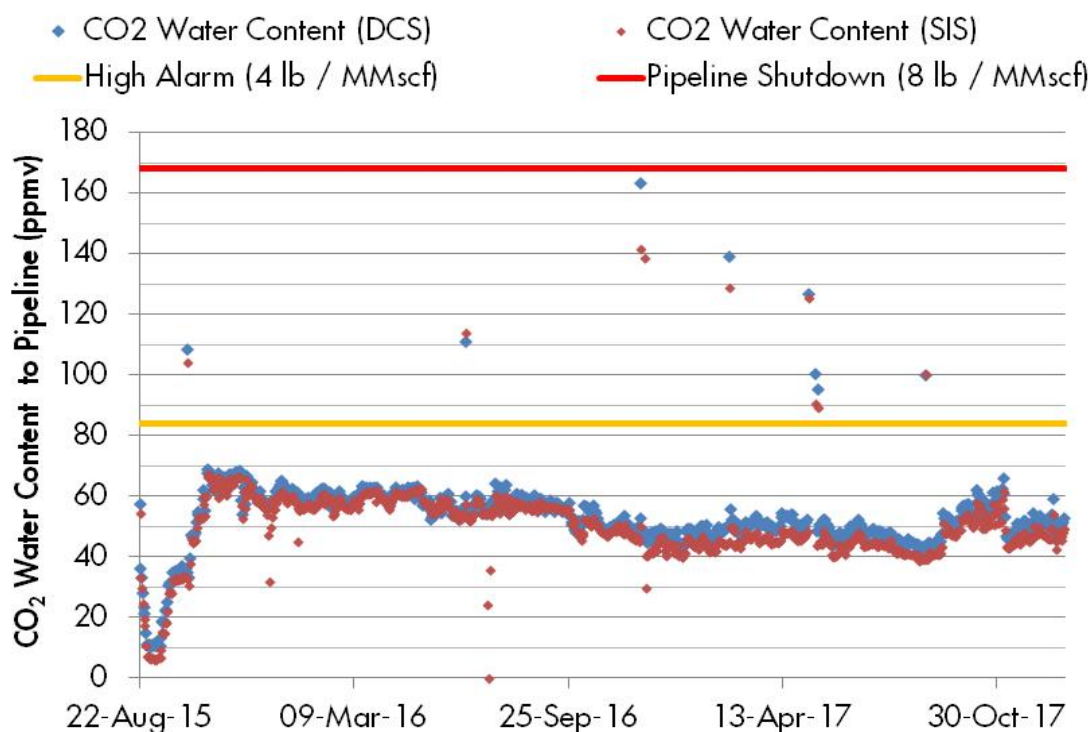


Figure 1: Water content in CO₂ to pipeline (ppmv)

2. LESSONS LEARNED SINCE COMISSIONING

The following points summarize the lessons learned from the TEG startup:

- Carryover of TEG into the CO₂ stream to the pipeline was very low when compared with design. The estimated losses for 2016 and 2017 were roughly 6,900 kg and 5,800 kg annually vs the design makeup rate of 46,000 kg annually. The losses are < 6 ppmw of the total CO₂ injection stream for 2017, compared to the 27 ppmw expected in design.

- When running at design process conditions for temperature, stripping gas and TEG flows, the CO₂ moisture content was below 20ppm. This allowed an optimization on stripping gas to reduce N₂ usage for the unit from design of 37.7 sm³/m³ TEG to ~3 sm³/m³ TEG. After making this adjustment, the average for moisture content of the outlet remains below spec.
- One of the CO₂ moisture content analyzers on the outlet of the TEG unit experienced some reliability issues in December 2015 (seen in Figure 1, red line deviating from blue). The issues were associated with scale buildup on the highly polished stainless steel reflective mirror. Scale buildup was found to be related to low temperatures on the mirror and the issues were rectified via improving heat containment in the enclosure. Operation of the device has been stable ever since.

REFERENCES

Refer to the BDEP (basic design and engineering package) for more info regarding the dehydration unit. No physical design modifications were made to the dehydration unit post startup.

CO ₂ Capture Ratio Report		2017 GoA Knowledge Share Report
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