CASE STUDY | FOLLOW-UP

Dynamic sulfide scavenger dosing initiated at North Sea platform

Following the excellent results of the initial test-setup, a major offshore gas operator began adjusting his use of scavenger chemicals to reduce processing costs and improve environmental compliance. Using a feed-forward dosing strategy based on real-time sulfide data from a SulfiLogger™ H_2S sensor installed just before the scavenger injection nozzle, the operator manually reduced his scavenger injection rate by 15% while the sulfide concentration of the export gas remained comfortably below the ppm limit.

Background

A major offshore gas operator in the North Sea wanted to optimize his dosing of sulfide scavenger chemicals to reduce operating costs for chemicals and improve environmental compliance. In a lack of available sensor's for real-time monitoring of sulfide in the early stages of the gas processing, the operator installed the novel SulfiLogger™ H_2S sensor between the first-stage separator and the sulfide scavenger injection nozzle.

The previous part of this study confirmed the SulfiLogger™ H_2S sensor's ability to accurately measure sulfide continuously, as the sensor data was heavily correlated with readings from an existing export gas H_2S sensor when compensating for the approximately 15 minutes delay between the two individual measurement points.

Feeling confident in the SulfiLogger™ H_2S sensor's ability to reliably measure sulfide before the scavenger injection, the operator proceded to the next phase of the project.

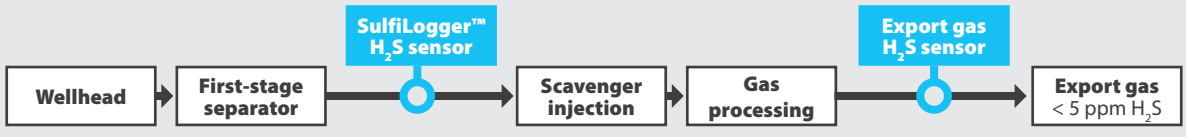
Purpose

The purpose of the second phase of the project was to test the effect of simple manual changes to the sulfide scavenger injection rate based on real-time data from the SulfiLogger™ H_2S sensor.

Initial data identified a significant savings potential as the sulfide concentraion of the export gas was well below the upper sulfide limit.

The operator chose a feed-forward based dosing strategy relying on the input from the SulfiLogger™ H_2S sensor as this would enable him to act immediately to major changes in sulfide levels. The alternative, a feed-back dosing strategy relying solely on the export gas H_2S sensor, would involve a significant delay and a higher risk of costly flaring.

Figure 1: Overview of the sensor's location in the setup.



Results

Initially, with the sulfide scavenger injection rate fixed, a stable H_2S signal was identified during a 4-day period after which the operator decided to manually lower the scavenger injection rate.

On day 5 and 6, the operator reduced the injection rate by a combined 15% in two steps (Figure 2: Bottom graph). The SulfiLogger™ and gas export H_2S sensors remained correlated although the level of magnitude shifted (Figure 2: Top graph) due to the change in injection rate. As a result of the change, the sulfide concentration of the export gas increased from approximately 2 to 3 ppm - still well below the upper limit.

Future potential

For the next step in the sulfide scavenger management project, the operator will expand the setup with the addition of another SulfiLogger™ H_2S sensor installed further downstream after the scavenger injection nozzle to include the reaction time of the chemicals.

The two sensor signals, along with an integrated and automated scavenger injection system, has the potential to optimize sulfide scavenger dosing to match real-time fluctuations in sulfide for significant cost savings far exceeding the results of these simple manual adjustments.

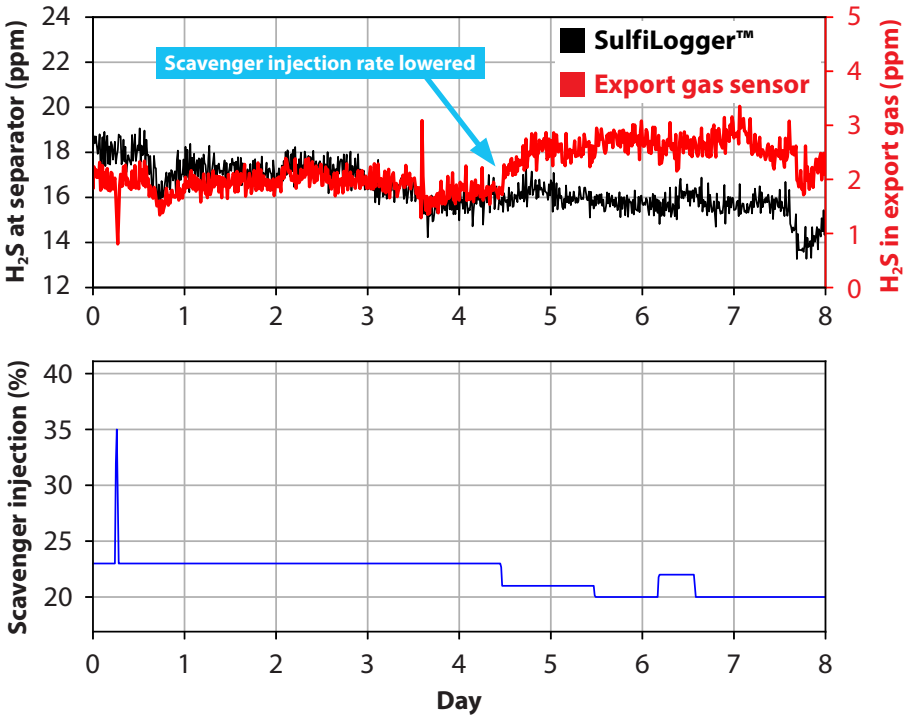


Figure 2:
Top graph: H_2S in ppm measured by the SulfiLogger™ H_2S sensor (black) immediately after the first-stage separator and the existing export gas H_2S sensor (red) during 8 days.
Bottom graph: Scavenger injection rate (blue) during the same 8 days.

The two sensors maintained their correlation while the level of magnitude shifted after the sulfide scavenger injection rate decreased. On day 5 and 6, the operator lowered the scavenger injection rate twice by a combined 3 pct. points for a total reduction in the injection rate of 15%.

About the SulfiLogger™ sensor
The SulfiLogger™ H_2S sensor is well suited for demanding conditions in the oil & gas industry. The sensor measures in super high humidity – it can even measure in water – and it requires no addition of oxygen or any other pre-treatment. Simply in-line continuous measurement giving real time data of the exact sulfide content in the gas.

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