

Retention Loop Helps Producer Meet Gas Sales Specs and Reduce H₂S Scavenger Use

CHALLENGE

Meeting sales specifications for gas sweetening was difficult even with higher volumes of H₂S scavenger.

- » The H₂S scavenger did not have sufficient contact time to effectively sweeten the gas before the custody transfer point.
- » While a mechanical solution was required, factors such as production volumes, pressure and temperature needed to be considered to ensure effective treatment.
- » The cost for the project had to be controlled to ensure a timely return on the capital investment.

SOLUTION

Multi-Chem met with the customer's production team to identify the most cost-effective mechanical solution.

- » It was agreed that an in-line application would produce the desired result given sufficient length and optimum conditions.
- » Multi-Chem considered gas production volumes, pressures and temperatures to design a retention loop that would provide sufficient contact time.
- » The retention loop — a 6-inch diameter pipeline measuring about 500 feet — included two atomized injection points for scavenger.

RESULTS

The project was a success for the operator on all fronts. With the newly installed retention loop:

- » Contact time was increased from 6 to 26 seconds.
- » H₂S scavenger volumes were reduced by almost 70 percent.
- » Gas met sales specifications consistently.
- » The cost of the project was recovered in just four months due to the reduced spend on H₂S scavenger.

MULTI-CHEM DESIGNS AND IMPLEMENTS MECHANICAL SOLUTION FOR GAS SWEETENING CHALLENGE

NORTH AMERICA LAND

OVERVIEW

A major producer in the Piceance Basin was having trouble consistently meeting sales specifications for gas sweetening. Large volumes of H₂S scavenger were being used to address the issue. Upon system review, it became clear the custody transfer points were too close to most of the gas systems on the well pad, which didn't allow enough contact time for proper scavenger efficiency. Multi-Chem, a Halliburton Service, worked with the operator to engineer and design a retention loop to improve the effectiveness of the scavenger program. Upon installation, sales specifications for gas sweetening were easily met with a lower dose of scavenger. The cost savings from the reduced chemical spend meant the operator was able to recover the capital cost of the project within four months.

CHALLENGE

A large natural gas producer in Colorado was struggling to effectively and consistently scavenge enough H₂S from its produced gas to meet the sales specifications of 4 ppm or less. With the existing infrastructure and operations, dose rates for the scavenger were averaging 47.5 gallons per day to compensate for the lack of contact time. The challenge was to develop a solution to meet sales spec and reduce scavenger chemical spend with minimal capital investment.

SOLUTION

After conducting a full review of the customer's operations, which included several pads, gas gathering systems and transfer points, Multi-Chem offered several mechanical solutions to remedy the problem. A retention loop was identified as the most cost-effective solution.

Multi-Chem took all aspects of the operation into account – pad layout, gas production volumes, pressures and temperatures, among other data points — to design a retention loop that provides sufficient conditions for the H₂S scavenger to sweeten the gas. A key factor to consider was the velocity of the gas, which needs to be high enough to move the chemical through the system but also low enough to give the scavenger time to work.



The atomized injection point for H₂S Scavenger on the new retention loop.



The loop was built above ground to limit construction costs and make it easier to inject chemicals and monitor gas flow.

After calculating various scenarios, the team decided on a 6-inch, 500-foot long pipeline to run along the pad’s heater treaters before reaching the custody transfer point. Two atomized injection points that split the application to improve efficiency were included in the design.

The retention loop was built above ground, which helped control construction costs. This also made it easier to access for treatment and monitoring.

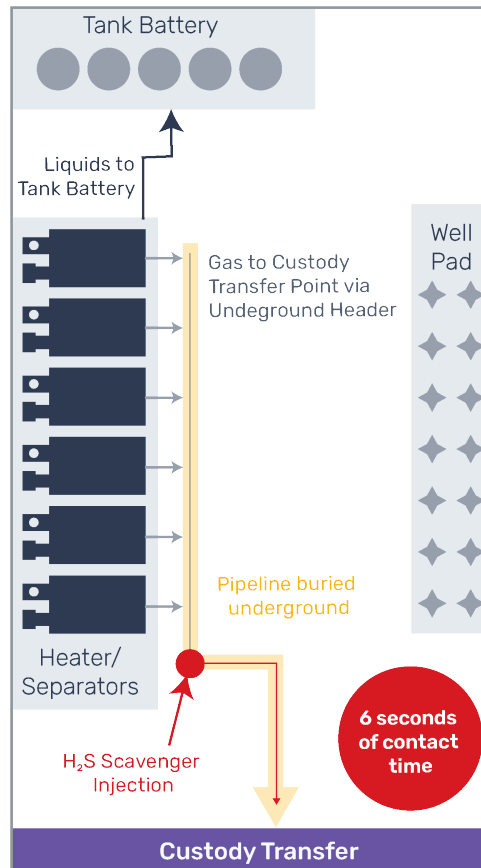
RESULT

Upon completion of the project, Multi-Chem monitored the operations, which delivered the expected contact time and achieved sales gas specifications. The operator was able to reduce the scavenger volumes enough that only one injection point was needed.

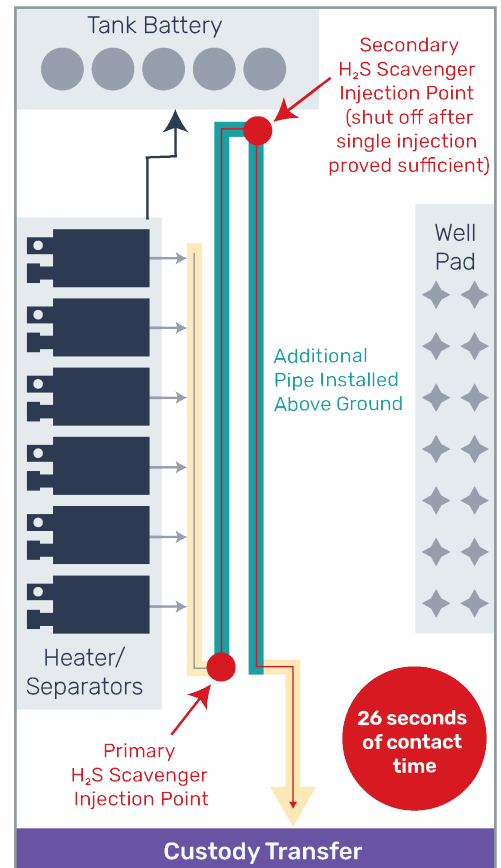
The scavenger feed rate optimization brought the average down to 13.75 gallons per day, a reduction of almost 70 percent compared to before implementation. The cost savings meant the project paid for itself in four months.

Since the installation of the retention loop, the operator has requested Multi-Chem review several other pads in the field and recommend similar designs. Construction on the second loop has begun and design recommendations have been submitted for three other pads.

Original Pad Layout



Layout with New Retention Loop



The retention loop added 500 feet of pipe for the chemical treatment to sweeten the gas. The design of the system allowed Multi-Chem to reduce H₂S scavenger volumes by almost 70 percent.