NALCO Water
An Ecolab Company

Inlet Integrity Program helps a natural gas plant reduce compressor maintenance by 56% and save $630K annually

CASE STUDY

BACKGROUND

In North America, a natural gas plant located in West Texas was processing 220 MMscf/d. The plant brought in low-pressure and intermediate-pressure gas from the Permian Basin to remove CO_2 and H_2S with an Acid Gas Removal Unit (AGRU). As the gas entered the plant, it first traveled through an inlet separator, a vessel designed to separate the gas from the water, condensate and solids that came in from the field. After the inlet separator, the gas traveled through a set of compressors before going to the AGRU.

The plant had a set of four compressors for the low-pressure gas that compressed 75 MMscf/d. A competitive antifoulant was being fed to the inlet separator to help reduce fouling on the compressors. However, they were still experiencing fouling on their low-pressure compressor valves. The suction valves on their compressors were getting fouled with a combination of salt, iron sulfide and other foulants that led to overheating of the valves, also known as "hot valves". In one month, the plant had 180 hot valves across their four compressors. This was causing high maintenance costs, requiring the company to rebalance the network to send gas to other plants while their team worked on replacing the valves.

Opening the compressors to work on the valves was not only costly and time consuming, but it also posed a safety risk. Every time a compressor was opened, the maintenance workers were potentially exposed to hydrogen sulfide gas (H_2S).

SOLUTION

Nalco Water was asked to investigate the situation to provide a recommendation. The Nalco Water personnel worked with the local team to audit the system and get deposit samples for analysis. After confirming what was depositing on the compressor valves, it was recommended to implement a three-product approach.

The first two products are part of the Nalco Water Inlet Integrity Program. An iron sulfide inhibitor was fed to help remove that portion of the foulant. This product was fed upstream of the plant.

The second product was a general antifoulant designed to help pull materials into the aqueous phase of the inlet separator, so they are blown down with the water. This was fed to help remove salt in the inlet separator and was fed directly before the vessel.

The second part of the program was a compressor antifoulant to minimize solids that make it past the inlet separator from depositing on the compressor, which was fed directly before the compressor.

In addition to the three products, Nalco Water recommended adding a water wash injection directly before the inlet separator to help with the separation of solids from the gas. This program was selected because it had success with a similar issue at their other plant.

*Value is annualized based on the first five months of program implementation

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ANNUAL SAVINGS

ASSET PROTECTION

56% reduction
in maintenance costs

TOTAL VALUE DELIVERED

$630,000
ANNUALLY*

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RESULTS

The plant saw immediate results with the recommended program. The hot valves on the compressors started to slow down. During the first two months, the program helped reduce the number of hot valves that occurred by 57. During this time, the local team continued to meet with the customer and optimize the feed rates. Months three and four reduced the number of hot valves by 121 and 102, respectively, compared to before the program started.

The reduction in hot valves is projected to reduce maintenance costs annually by 56% and save the plant $630,000 in parts and labor after the cost of the chemicals.

Figure 1: Compressor valve at program start.

Figure 2: Compressor valve after Inlet Integrity Program implementation.

CONCLUSION

The partnership between Nalco Water and the customer to understand what was causing the hot valves and what could be done to minimize it, helped the gas processing plant to reduce their largest, most constant issue. The Nalco Water Inlet Integrity Program, along with the compressor antifoulant, is projected to save the plant $630,000 per year while freeing up thousands of personnel hours that were being used on compressor maintenance, so that they can focus on other projects to improve their plant. The team is also continuing to work together to further optimize the program and drive hot valve occurrence down even more.

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