



:: Quantified Business Results ::

Ammonia production facility reduces product losses for big returns

Challenge

An Ammonia production facility in Oklahoma produces NH₃, Methanol, and Urea Ammonia Nitrate. The process operates 24/7 for up to 3 years before shutdown maintenance is performed. Following their last scheduled outage in 2007, the facility noticed a significant increase in product losses to flare. The ability to isolate certain valves to pinpoint the source(s) of the increase was impossible without upsetting normal operations with the risk of an unwanted shutdown.

Solution

Syn Gas escaping to the flare system is a direct loss of the partially refined natural gas feedstock. The customer contacted Experitec for assistance with a CCI valve that appeared to not operate properly. The CCI valve was specified for a Class VI leakage rate in a 2000 psid shutoff condition. They experienced an unplanned shutdown with a very short time window for startup. Experitec contacted Emerson Instrument and Valve Services (I&VS) to go onsite and perform valve diagnostics on this CCI valve and others scheduled for maintenance in the upcoming turnaround. I&VS had the diagnostic equipment and repair tools needed and was able to dispatch immediately. The utilization of valve diagnostics helped identify the operational effectiveness of the valve. This valve, and additional CCI valves, had been recently retrofitted by CCI with a DVC6000 series Smart positioner with PD level diagnostics, which is the company standard.

Results & Estimated Savings

The results of the scan revealed the seat loading was inadequate for Class VI shutoff. The highest shut-off capacity the actuator could provide was Class II in the current condition. In addition to low seat load, the scan showed an adequate seat profile, high friction, significant air supply droop, and very sluggish step response. Further investigation revealed rust and moisture contamination in the supply air that led to residue buildup in the positioner and actuator. Valve technicians performed corrective actions by blowing the supply air piping clean, installing a supply air line filter, cleaning and rebuilding the actuator, replacing the DVC, and installing pneumatic boosters to provide faster stroking time and increased thrust with less air passing through the DVC.

Conservative estimates for the difference in flow rate from Class II to Class VI are 8100 scfh. At an estimated cost of Syn Gas at \$10 per Mscf, the estimated reduction in lost production is \$1944 per day or \$709,560 per year. Cost savings may be much higher if actual flow rates could be determined or if the cost of Syn Gas increases. The associated cost savings with this valve and the identification of other valves in the plant by utilizing I&VS diagnostics allowed for better decisions. Valves scheduled for maintenance were either fixed during the pre-turnaround or provided reduced repair requirements during the scheduled outage thereby avoiding additional and significant repair and maintenance costs. This customer believes in the power of valve diagnostics.