Extending the Life of Sweet Crude Processing Vessels

INTEGRATED GLOBAL SERVICES

Amine gas treating, also known as gas sweetening and acid gas removal, refers to a group of processes that use aqueous solutions of various alkylamines (commonly referred to simply as amines) to remove hydrogen sulfide (H_2S) and carbon dioxide (CO_2) from gases. It is a common process used in refineries, petrochemical plants, natural gas processing plants, and other industries. Sweetening processes remove hydrogen sulfide and/or mercaptans, and reduce the sour, foul odors of these elements.

Internal vessel wall corrosion is a major issue within many amine vessels in refineries. Upgrading the vessel's substrate material, modifying amine processes, and/or developing an enhanced monitoring plan are all ways that operators deal with metal wastage from corrosion. Unfortunately, however, many refineries continue to experience significant impact from corrosion, leading to lost production time, premature vessel failure, exorbitant replacement costs, even safety incidents. Proactive, preventative maintenance should be done to resolve corrosion issues before the potential impact becomes devastating.

Integrated Global Services (IGS) has been working with refineries worldwide for over 15 years to solve corrosion issues within amine vessels, and has developed a proprietary cladding material to extend the life of these vessels, thereby saving some customers hundreds of millions of dollars in foregone and/or extended equipment replacement cycles.

Often, the cost of vessel replacement includes not only the construction cost of the new vessel, but also the related planning, installation, and lost production from the additional time required to complete the replacement. Among the equipment most commonly serviced by IGS are amine absorbers/contactors and amine regenerators/strippers.

Amine Absorber/Contactor Corrosion Issues

Since acid gas absorption releases heat, and the majority of amine absorbers/contactors are not insulated, water vapor condensation on wall surfaces not wetted by the amine solution can occur. If CO_2 is the only acid gas present, or when a very low level of H_2S is also present with the CO_2, carbonic acid will form and may be very aggressive when interacting with carbon steel.

Amine Regenerator/Stripper Corrosion Issues

A common problem with many rich amine inlet liquid distributors to the regenerator is they are not designed for flashing or a two-phase feed. Mechanical forces

present, when there is flashing or a two-phase feed, are sufficient to cause severe distributor vibration and/or failure.

IGS has worked with many refineries owned by Fortune 50 energy companies, including several in the Republic of Kazakhstan, to help them address corrosion and extend the life of many amine vessels.

IGS's specially designed materials began with a full metallurgical root cause analysis and continued with the development of specifically formulated cladding materials designed to virtually freeze the condition of the substrate and protect the vessels from future metal wastage. The turnaround manager at the Tengiz refinery in Kazakhstan has stated that "using IGS, rather than resin, ceramic or and/or epoxy coatings, which are less reliable and often require extensive cure times, to extend the life of our amine vessels has not only saved us significant money but also helped us manage our turnarounds where corrosion was an ongoing issue."

For more information, please visit www.integratedglobal.com/case1.html *[1].*

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