Question 50: In the absence of individual dipleg sample points, how do you manage corrosion in the vacuum overhead system?

SAM LORDO (Nalco Champion)

Although it is not fully a Best Practice, the monitoring of the combined stream coming off of the overhead accumulator has historically been used successfully. To help monitoring in the absence of the segregated samples, we suggest the use of active corrosion monitoring devices (intrusive and nonintrusive).

PHIILLIP THORNTHWAITE (Nalco Champion)

Controlling corrosion in each stage of a VDU (vacuum distillation unit) overhead provides a significant challenge, and successfully managing this depends on the system configuration and management of the corrosion control program.

Most of the HCl, as well as most of the light organic acids and SOx (sulfur oxide) acids, absorb in the water that condenses in the first stage. As the pressure increases with subsequent stages, the acidic environment features more H2S and CO2 (carbon dioxide).That is not to say that the downstream stages are subjected to a less corrosive environment, and it is quite common to see significant damage in these areas.

The problem that arises in many cases is that the neutralizer is injected into the main overhead line; and while good protection of the first stage of the overheads can be achieved, due to process conditions, downstream stages can still be exposed to low pH conditions and high rates of corrosion. To overcome this issue, correct application of the neutralizer is critical.

The neutralizer should be injected via established Best Practices, ideally with a steam carrier and a spray nozzle. The neutralizing amine has a boiling point well in excess of the system’s temperature. Therefore, maximizing the vaporization of the amine is almost impossible and the neutralizer remains a relatively large droplet, which will hinder effective distribution, especially to downstream stages. By utilizing a spray nozzle and steam carrier, vaporization of the amine is maximized, and droplet size is minimized to allow more effective distribution.

However, distribution to the downstream stages is can still be poor; and in order to overcome this flow imbalance, injection of some of the neutralizer requirement directly into the motive steam can help to significantly improve corrosion control in the downstream stages.

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