Innovative Online Cleaning Procedure for Condensate Stabilizer Reboilers Fouling at Zero Cost of a Gas Plant

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Abstract

The purpose of this paper is to share an innovative zero-cost procedure that was deployed at a gas plant condensate stabilization facility to remove salt accumulation around a reboiler tube bundle. The procedure is deployed while the unit is running without the need to cut production or impact the product specs, subsequently enhancing the equipment reliability while maintaining stable operation.

This innovative procedure is based on two main principles. First is stopping the snowball effect of salt accumulation by dropping the temperature of the stabilizer, hence preventing water evaporation in the reboiler and consequently stopping further salt accumulation. The second principle is the gentle oscillation of the condensate feed to the stabilizer, which creates turbulence inside the reboiler and as a result eradicate any deposited salt through the condensate thrust forced.

After following the above procedure and continuing for few days, the reboiler overhead temperature suddenly droops significantly without any increment, which indicates that salt fouling started reducing. Subsequently, the reboiler HO flow increases and the reboiler overhead temperature also increases gradually. As a result, the Stabilizer column temperature also return to the desired level and the reboiler hot oil (HO) flow, overhead temperature and the column temperature become stable and normal operation. This indicated that the reboiler salt fouling is disappeared and the reboiler became clean.

During this cleaning mode of operation, major quantity of condensate is coming from the other reboiler which is not affected by salt fouling is operating at higher temperature consequently having higher quality condensate. In addition, operating the other stabilizer unit at comparatively higher temperature provides high quality condensate. Upon blending small quantity of relatively lower quality condensate with large quantity with higher quality condensate resulted no impacts on the condensate product specification. Therefore, the condensate all product specifications are maintained within the limit during the entire cleaning period.

The noble idea of reboiler salt fouling online cleaning was implemented multiple times when noticed any fouling without any concerns. The online cleaning duration depends on the intensity of salt fouling caused by high free water carryover with condensate feeding to stabilizer column due to feed quality changes.
Implementing this method enables the reboiler to restore its design heat duty by removing the salt blocking the heat exchanger surface area. This result in significant cost avoidance through the following:

- Eliminating the cost of conventional hydrojetting cleaning for the reboilers.
- Avoiding feed reduction during the unit down time for hydrojetting cleaning.
- Debottlenecking the stabilizer capacity by enabling the reboiler to process the condensate feed.

The main advantage of this procedure lies in its zero-implementation cost, as it only involves process parameters variation without requiring injecting a chemical or conducting mechanical cleaning. At the same time, it can be implemented while the unit is running without impacting the plant production. The procedure can be implemented in all conventional condensate stabilizer units facing water carryover and salt fouling issues.