Deploying Technology for Enhancing Black Powder Removal Efficiency

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Abstract

Objectives/Scope: An option for managing the Black Powder (BP) which is encountered in production facilities, pipelines, and processing facilities. The formation of BP in the upstream production and transportation facilities is inevitable due to the corrosive nature of the raw wet gas streams where most of the raw gas streams include high CO2 and/or H2S with wet environment in contact with carbon steel piping and equipment. Conventional inlet filters and slug catchers are not efficient in eliminating 1-micron size BP from escaping to downstream processing facilities such as amine units and heat exchangers resulting in a negative efficiency or reliability impacts for the associated process units. This case study summarizes field experience from deploying a new technology of BP separation.

Methods, Procedures, Process: A comprehensive review of a technology to separate fine solid particles and liquid droplets by using boundary layer currents generated along the walls of a spiral duct positioned inside the separator. The new separators were installed upstream the gas treatment units and equipped with collection drums to allow online cleaning without loss of unit capacity. The separator is the largest of its kind with a capacity of almost 1 BSCFD.

Results, Observations, Conclusions: the new separators resulted in reducing amine foaming incidents by 90% and hence avoiding a production loss equivalent to 1.3 MM$/year. Also, clean amine process has minimized the frequency of replacing amine filters by 75% and minimized the maintenance costs of heat exchangers tubes cleaning. The new filters are equipped with collection drums with a designed capacity to accommodate scraping products when feed gas pipelines are under scraping jobs with out the necessary need of bypassing plant processing facilities. Sustaining the clean amine process has contributed to increasing the amine unit reliability and then maximizing unit capacity.

Novel/Additive Information: The paper will provide field validated evidence that operation of this new technology in eliminating BP and sustaining operation reliability.