

Optimizing the steam consumption in gas sweetening unit of South Pars Gas Complex

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Abstract:

Inlet sour gas to the Phase 1 of South Pars Gas Refinery is sweetened by EAP selective MDEA process in two identical sweetening units (Unit 100 & 200) of two gas trains. Sour gas is brought into countercurrent contact with 50% wt amine solution flowing down the absorber column. The sweet gas leaves top of the absorber and is introduced into the downstream unit. The rich amine is withdrawn from the bottom of the Amine Absorber and flows to the regeneration section which includes some equipment such as flash drum, exchangers and amine regenerator column. The rich amine flows to the top of the Amine Regenerator, where the H₂S and CO₂ in the rich amine solution are stripped by counter-current contact with steam generated in the Regenerator Reboiler. The overhead product from the regenerator is a mixture of steam, H₂S and CO₂. The water vapor in the stream is condensed and returned to the column as reflux, while the H₂S /CO₂ rich acid stream is fed to the Sulphur Recovery Unit. The Amine Regenerator Column is a trayed type and the reboilers are of kettle design, heated by desuperheated LP steam. Inlet steam flow rate is cascade with top temperature of regenerator and is adjusted by it.

In this study, steam consumption in regeneration section has been optimized. To attain this goal, a test run was done and all key parameters of sweetening unit were monitored.

By considering 30 days per month and 11 months per year, one month for maintenance job and overhaul, the steam consumption was decreased for value of 7500 kg/hr (50,688,000 kg/year) in both sweetening units which include two reboilers per each unit. Averagely 1,824,768,000 Rials/year is saving by minimizing the steam consumption in both units.

Keywords: MDEA, sour gas, sweet gas, regenerator, steam consumption