Optimization of TEG Dehydration Unit in Domestic Gas Processing Plant

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Abstract

The content of hydrocarbons and water vapor in natural gas will lead to the formation of hydrate that are corrosive and can cause blockage of pipes and other equipment. One way to prevent the occurrence of hydrates is to reduce or even eliminate the water content in natural gas. The presence of H₂O in the gas can also reduce heating value of the gas. Therefore, the necessary process of water absorption by the absorbent is considered quite effective. Most manufacturers use the natural gas triethylene glycol (TEG) to remove water from natural gas streams. In this study, the optimization process will be conducted at TEG Dehydration Unit in order to TEG loss can be minimized and improve the efficiency of the TEG Dehydration Unit. The method used is absorption by triethylene glycol and simulations performed using software Hysys and ProMax. Optimization is conducted by changing some of the base case operating conditions that have been created using existing condition that aims to obtain the optimum conditions with TEG loss small on the existing circumstances. Validation simulation results of the steady state of the TEG Dehydration Unit using Hysys and ProMax produces %error relatively small so it can be used to create a base case using the existing data. The purity of lean TEG after optimization using Hysys and ProMax are 98.92 and 99 wt%, respectively. TEG Loss after optimization using Hysys and ProMax successively decreased to 0.032 and 0.013 gal TEG/ MMscf of the earlier of 0541 and 0492 gal TEG/ MMscf. In this case, ProMax is better than Hysys because it has a smaller %error compared with the design data during steady state simulations and further purify the lean TEG to 99 wt% with TEG Loss smaller is 0.013 gal TEG/ MMscf.

Key Words: TEG Dehydration Unit, Optimization, TEG loss, Hysys, ProMax