Analysis Study of Available Alternatives for Mitigation of Aromatic Hydrocarbon Emissions from a Glycol Dehydration Unit	
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Abstract: A natural gas (NG) dehydration unit based on glycol absorption is considered one of the most important gas processing units, aiming to decrease water content and consequently adjust its dew point. However, during this process, not only water is absorbed by the glycol solvent, but also some aromatic compounds, including benzene, toluene, ethylbenzene, and xylene (BTEX), in addition to volatile organic compounds (VOC), are absorbed. These compounds are released during glycol regeneration into the atmosphere, resulting in environmental pollution and consequent catastrophic mental and physical health problems. This study aims to minimize BTEX emissions while ensuring efficient dew point control. Various strategies have been adopted to control BTEX emissions, but the present work focuses on optimizing operating conditions and investigating the influence of operational variables on BTEX emissions, as well as NG water content. LINGO optimization software and HYSYS (version 11) are used to find the plant's optimum conditions for minimizing BTEX emissions and satisfying efficient dew point control. Simulation results show that stripping gas, triethylene glycol (TEG) circulation rate, and inlet feed gas temperature significantly affect BTEX emissions. The proposed optimum operating conditions in this work resulted in a reduction in BTEX emissions by about 81% while satisfying the required NG dew point. Furthermore, two quadratic equations are developed based on regression analysis for efficient calculation of the BTEX emissions and water dew point at any operational variables.