

Analisis kegagalan peralatan dan optimasi proses sweetening di lapangan x = Equipment failure analysis and sweetening process optimization at field x / Rio Kurniawan

Rio Kurniawan, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20433726&lokasi=lokal>

Abstrak

ABSTRAK

Lapangan X memiliki gas dengan kandungan CO₂ > 20% dan harus dikurangi menjadi 5% dikarenakan CO₂ mempengaruhi heating value gas, toxicity dan sangat korosif. Proses pemurnian gas yang dilakukan adalah absorpsi CO₂ dari gas alam menggunakan larutan activated methyldiethanolamine. Sejak beroperasinya unit CO₂ removal di Lapangan X tahun 2003, telah mengalami kegagalan, yaitu 3 kali kerusakan pada peralatan CO₂ removal, dimana terjadi penipisan pada dinding absorber dan kerusakan pada tray di low pressure flash, serta gas yang akan dijual masih di atas 5% sehingga dilakukan identifikasi terhadap kegagalan pada unit peralatan CO₂ dengan melakukan survey lapangan dan pengujian di laboratorium, serta analisis proses CO₂. menggunakan simulasi HYSYS. Hasil analisis data laboratorium menunjukkan kegagalan pada peralatan dapat disebabkan karena korosi CO₂, Cl⁻ dan beban mekanik, sedangkan pada simulasi, kegagalan disebabkan oleh tidak efektifnya proses absorpsi CO₂, dimana sulitnya mengatur temperatur regenerasi amine yang berdampak pada temperatur lean amine sehingga regenerasi CO₂ tidak sempurna yang menyebabkan tingginya CO₂ pada outlet gas absorber, acid loading, dan loses amine & H₂O. Oleh karena itu perlu dilakukan optimasi proses absorpsi CO₂ di Lapangan X, dengan penambahan cooler setelah LP flash sehingga temperatur regenerasi dapat mencapai 90 oC dengan tetap menjaga temperatur lean amine pada 50-60 oC. Konsentrasi amine yang dapat digunakan sekitar 40 ? 50 wt% dan flowrate amine sekitar 700 ? 1083 m³/h.

<hr>

ABSTRACT

Field X produces nature gas which content CO₂ more than 20% and should be reduced to be less than 5%. CO₂ very affects to the gas heating value, toxicity, and its corrosive level. Field X does absorption process to purify natural gas from CO₂ using activated methyldiethanolamine. Since the establishment of CO₂ removal unit at Field X, the equipment for CO₂ absorption process has been damaged three times, in example depletion of the absorber wall and damage to the tray at low pressure flash. Besides, the gas has not met the specification yet, which is CO₂ level above 5%. According to the situation described, we need to identify the cause of CO₂ equipment unit failure trough some field research, lab testing, and analysis CO₂ process using HYSYS simulation. Lab test result shows equipment failure can be caused by CO₂ corrosion, Cl⁻ and mechanical load, while simulation result shows this failure can be caused by CO₂ absorption process. The difficulty to set amine regeneration temperature will impact to lean amine temperature so that CO₂ regeneration process not complete and cause the high value of CO₂ in absorber outlet gas, acid loading, and loses amine and H₂O. Therefore we need to do optimization for CO₂ absorption process in Field X, such as adding a cooler after LP Flash so regeneration temperature reach 90˚C but still keep the lean amine temperature in 50 ? 60˚C. Amine concentration that can be used around 40-50 wt% and amine flowrate around 700 ? 1083 m³/h.;