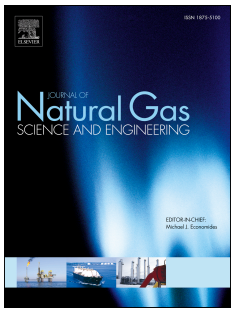
Accepted Manuscript



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PII: S1875-5100(17)30416-X

DOI: 10.1016/j.jngse.2017.11.008

Reference: JNGSE 2340

To appear in: *Journal of Natural Gas Science and Engineering*

Received Date: 30 May 2017

Revised Date: 6 September 2017

Accepted Date: 11 November 2017

Please cite this article as: Shoaib, A.M., Bhran, A.A., Awad, M.E., El-Sayed, N.A., Fathy, T., Optimum operating conditions for improving natural gas dew point and condensate throughput, *Journal of Natural Gas Science & Engineering* (2017), doi: 10.1016/j.jngse.2017.11.008.

Optimum operating conditions for improving natural gas dew point and condensate throughput

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Abstract

Natural gas dew point temperature is a vital quality parameter. The effective control of this specification is important if the natural gas integrity and quality are to be maintained. The present work focuses on improving the dew point and condensation production rate of south Dabaa field dew point control unit (DPCU) located in the Egyptian western desert and owned to the South Dabaa Petroleum Company. Influence of the operational variables on outlet gas dew point and produced condensate were investigated. The simulation results illustrated that feed gas inlet temperature, composition and flow rate, Joule Thomson (JT) valve downstream, and upstream pressure and hot bypass flow rate have a great effect on the sales gas dew point as well as the condensate throughput. A field experiments were conducted to validate the simulation results. It is noticed that there is a good agreement between simulation and experimental results, considering the outlet gas dew point at different operating conditions. Lingo optimization software was used to find the plant optimum conditions. Two quadratic equations were developed based on regression analysis for calculating the dew point and plant condensate rate at any operational variables. The impact of replacing the existing JT valve by a turbo expander was studied. The simulation results indicate that the turbo expander is more effective in comparison with JT valve refrigeration system in decreasing the sales gas dew point and increasing the condensate production rate.

Keywords: Dew point control, sales gas, gas processing, JT valve, turbo expander

1. Introduction

Hydrocarbon dew point has always been a vital operational parameter; it is becoming a critical tariff parameter for the natural gas industry. At the beginning of the natural gas processing chain, it is highly important to control the gas dew point. The dew point controlling process aims to ensure that liquids (either hydrocarbons or water) are not formed in the pipelines and consequently, a safe and reliable transportation can be achieved. The byproduct liquid which is recovered or produced by this process could be used as a valuable fuel or alternatively stabilized and marketed as condensate (Herring, 2011; Foglietta, 2004).