

Mitigating Liquid Carry-Over and Foaming in a Gas Processing Plant through the Installation of Vertical Scrubbers

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لینکی تووژینهوه:

<https://doi.org/10.1134/S0965544124020178>

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Abstract

Gas-liquid separators often encounter the challenge of liquid carry-over, where small liquid droplets become entrained in the produced gas stream. This phenomenon can lead to foaming and reduced capacity in downstream absorption processes, as observed in Iraq's Khor Mor gas-condensate processing plant. To assess whether liquid carry-over contributes to the foaming issue in the sweetening tower, this study analyzed the liquid droplet size distribution in the gas phase and the gas/liquid separation efficiency of the upstream Alpha, Bravo #1, Bravo #2, and Charlee separators feeding the tower. The analysis was conducted by using the industry-standard process software, Horizontal Vessel and ProSeparator correlations within Aspen HYSYS v.14. The study revealed that Alpha, Bravo #1, and Bravo #2 separators were unable to eliminate all liquid droplets within the specified size, failing to achieve the required efficiency. In response, the study proposes a vertical scrubber design with a standard mesh mist extractor, applying the Arnold-Stewart semi-empirical procedure. The design demonstrated a gas/liquid separation efficiency of 99% under current and future conditions. These findings suggest that the proposed design can serve as an optimal solution to control liquid carry-over, maintain high gas/liquid separation efficiency, and prevent foaming, even with an increase in the vessel inlet flow rate over time.



Ms. Fenk A. Sulaiman is serving as an Assistant Engineer and Lab Assistant at the [Petroleum and Mining Engineering department](#). She obtained B.Sc. degree in Petroleum Engineering in 2017 at Soran University. Following that, she worked as a Lab Assistant for two years at the Petroleum Engineering department. She earned her M.Sc. degree in Petroleum Engineering in 2023 at Soran University. During her academic journey, she got internships with several notable natural gas and oil companies, including Dana Gas, Crescent Petroleum, Hunt Oil, and Gulf Keystone. Fenk's research interests include Production Engineering and Process Engineering.

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