ABSTRACT

An increase in natural gas demand challenges Gas Producers to explore the possibility for maximizing utilization of existing plant capacity with or without additional capital investment. A plant performance test is the key step and methodology to demonstrate and prove the actual sustainable capacity of the existing plant and to identify potential de-bottlenecking options to further increase the plant capacity.

Prior to conducting the plant performance test at higher capacity, current plant capacity review is undertaken to understand potential safety and individual equipment limitations. The result of this initial review is used as a reference to determine performance test strategy and expectations. Upon completion of the performance test, a comprehensive review of the test results is undertaken to determine the new sustainable capacity of the plant and to provide technical and operational references for final acceptance. The problem arises when not all equipment are equipped with sufficient instrumentation to measure process parameters (e.g. pressure, temperature, flow) required for such performance analysis. Therefore, those unknown parameters need to be predicted before performing equipment performance analysis.

Steady state process simulation is a user friendly tool to theoretically predict the unknown parameters. However, the accuracy and validity of the prediction may be questionable particularly if the plant performance fluctuates throughout the performance test period. Statistical analysis can be a viable solution for this problem since it can be used to screen raw data captured from the performance test. As a result, good quality data can be derived for simulation inputs as well as for validating the predicted parameters from simulation outputs.

This paper will present the methodology of combined statistical analysis and steady state process simulation application to evaluate actual gas plant performance test result. The methodology allows the user friendly advantage offered by steady state process simulation tool while providing better accuracy of the analysis results. A case study from Suban Gas Plant performance test will be presented to show how the combination of statistical analysis and steady state process simulation has been successfully applied for plant performance test result evaluation.

Keyword: plant performance test, steady state process simulation, statistical analysis

INTRODUCTION

Suban Gas Plant is one of ConocoPhillips Indonesia’s (COPI) onshore gas processing plants located in onshore South Sumatera, Indonesia. Suban Gas Plant consists of four gas processing Trains processing 700 MMSCFD sales quality gas and around 9,000 BOEPD condensate per the original nameplate capacity. Simplified process diagram of the plant is shown in the Figure 1.

Until 2009, Suban Gas Plant just produced at its original nameplate capacity. With recent growth in domestic gas market, there was an opportunity to increase the plant’s processing capacity above its original nameplate capacity either by utilizing existing plant spare capacity or by debottlenecking. Plant performance test then became the key step and methodology to demonstrate and prove the maximum sustainable capacity of the existing plant and to identify potential de-bottlenecking options for further capacity increase.