

Modeling and Simulation of Steady State Model Approach for Horizontal Three Phase Separator (HTPS)

Bayu Triwibowo^{1,*}, Haniif Prasetiawan¹, Anwaruddin Hisyam², Mohammad Fariz Fauzan¹ and Muhammad Habib Fahd Rizky¹

¹*Chemical Engineering Department, Faculty of Engineering, Universitas Negeri Semarang, Sekaran, Gunungpati, 50299, Semarang, Indonesia*

²*Faculty of Chemical and Natural Resources Engineering, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300, Kuantan, Pahang Darul Makmur, Malaysia*

*Corresponding author: bayu.triwibowo@mail.unnes.ac.id

Abstract. Main function of oil production facility is to separate oil well stream into three phases i.e. oil, gas and water. A vessel called three phase separator is used for this purpose, commonly in horizontal arrangement. In order to optimize the process, an accurate model for horizontal three phase separator (HTPS) is needed. Computational Fluid Dynamics (CFD) is a mathematical tool capable of simulating a wide range of fluid flows. HTPS dimensions used in this simulation were taken from one of oil and gas company in Indonesia. The CFD simulation used in this study is based on volume of fluid and k- ϵ turbulence models. Gas outlet was assumed using porous media zone model with fluid porosity 0.99. Simulation result displayed concentration and velocity distribution for each component inside HTPS. The result of concentration distribution shows that the region of fluid divided into upper region and lower region. The lower region major component were water and upper region mainly consist of gas and oil. The contour of concentration distribution indicated a good separation process with distribution of water flow rate at the outlet of water, oil, and gas respectively are 405,67; 115,65 ; and 172.01 lb/min