Abstract

The aim of the work was to study a steady-state simulation model for a multistage crude oil production plant (AHDAB-field) and effect of optimizing the second stage separator pressure on API Gravity in stock tank. A computer simulator is written to optimize the condition as second stage of oil and gas separators using ASPENONE HYSYS software v.7.1. In the present project the separators of multiphase flow (Oil, GAS and Water) in trunk line which connected with the center process facilities (CPF) for separated associated gas from oil and water by multistage separators to simulated changing the pressures and constant other variables, such as temperature and flowrate .

Stage separation of oil and gas is accomplished with a series of separators operating at sequentially reduced pressures. The liquid discharge from a higher pressure separator is into the lower pressure separator. The set of working separators pressures which yield maximum recovery of liquid hydrocarbon from the well fluid is the optimum set of pressures and the target of this work.

The optimum operation pressures are determined by equation stated as Peng-Robinson using this simulation to the get maximum API gravity, minimum GOR in stock tank and maximum oil recovery.

The problem is constrained, because the pressures of the stage must be in general less than the wellhead pressure and greater than the atmospheric pressure.

ASPENONE v.7.1HYSYS SOFTWARE is used to achieve good separation of gas-liquid mixture exiting crude oil production and maximize hydrocarbon liquid recovery, it is necessary to use several separation stages at decreasing pressures and then adapt the pressure set points to improve separation and recovery at minimum cost. The proposed methodology determines the optimum pressures of separators in different stages of separation and consequently optimizes the operating pressure. In this study optimum separator pressure has taken the basis fluid inlet to separator stream is 100000 bbl/day. The result of the oil recovery was increased by 135 bbl/day and the quality of total produced oil was improved by 0.1° API gravity at optimum pressure of 2^{nd} stage separator choosing 23 psia. This result was found for variable pressure started from 20 psia to 80 psia of 2^{nd} stage separator if compared with the operating pressure at 50 psia which is working now.

If assuming the barrel price of crude oil is 100$/bbl, then the income cash flow is 135 bbl * 100$/bbl = 13500$ each 100000bbl/ day, and in one month is 405000$.

Al AHDAB field today is produces 140000 bbl/day which is could to saving money being ***5670000 $ per one month***.