ABSTRACT

Pumping unit is the primary lifting equipment used to pump out heavy oil from underground reservoir by PT. CVX in Indonesia. Production rate depends on the level of availability and reliability of the pumping unit. Based on data from 2011-2012, it has been found 3805 failure cases of 5405 populations brought in nonoperation of the pumping unit. Costs incurred for those matters were approximately $1.4 million for unplanned shutdown, USD 7.8 million for planned shutdown and USD 2.4 million for routine maintenance.

This research has objectives to identify failure root causes, analyze failure probabilities, identify the most influencing failure and determine preventive action to reduce pumping unit failure using Fault Tree Analysis method. The Fault Tree Analysis method or logic tree uses Focus Group Discussion (FGD) and determination of basic event probability value is conducted using secondary data and field observations.

This research results in 32 basic event failures. Top event probability of logic tree is 0.6342. The main causes of failure occurred on the gearbox, bearing structure and control panel. Preventive action that required to reduce pumping unit failure is by improving the quality of the all three components: gearbox, bearing structure and control panel. Repairs test was carried out on those three components. The repairs test result for 5 months shows decrease value of top event probability is 0.5141.