NATURAL GAS INJECTION SYSTEM DESIGN FOR “AIR DRIVE PUMP WELLHEAD CONTROL PANEL” JOB PERTAMINA TALISMAN JAMBI MERANG

Name of Student : M. Fajri Jufri
NRP : 2408 100 104
Departement : Engineering Physics FTI-ITS
Supervisor I : Dr. Ir. Totok Soehartanto, DEA
Supervisor II : Hendra Cordova, ST. MT.

Abstract
Shutdown system in WHCP needs gas pressure as energy to pump and increase hydraulic pressure in shutdown valve at the wellhead, but its usage, nitrogen tube is not efficient and pressure of nitrogen always decrease. This final project research will design injection system with natural gas that complete with pressure control system in order to stabilize the pressure supply in WHCP.

Sizing process result that have been done shows pipe specification diameter is 2 inch, pressure regulator with delta pressure is 900 psig, pressure control valve with coefficient valve (Cv) is 0.045 and scrubber volume is 0.18193.

Simulation result shows injection system that has been designed can supply gas for air drive pump with maximum volume flow 0.045 m³/s, gas mass flow 2.885 kg/s with output pressure 100 psig, completed with control system that uses control mode Proportional Integral (PI) with parameter Kp=1, \(\frac{K_p}{K_i} = 0.817\). Performance for control system is resulting Maximum overshoot (Mp) 30.82%, Settling time (ts) 3.5 s, Peak time (tp) 1.2 s, Error steady state (ess) 0.005 %.

Probability of Failure on Demand (PFD) value result before design is 93.878 annual fail and after re-design is 0.9528 878 annual fail.
Keywords: Injection System, Pressure Control, Sizing, Scrubber, Wellhead Control Panel.