ABSTRACT

The operational of boiler in PG Watoetoelis has potential resulting accident, that is explosion. PG Watoetoelis operated boiler to support production process in order to generate turbine at electric, milling and boiler station. PG Watoetoelis has 4 boilers, each boiler has capacity 6 ton, 7 ton, 20 ton and 30 ton with temperature 325°C.

The objective of this research is to implement the protection layer in boiler with layer of protection analysis. Firstly this research were identify the danger of boiler by using HAZOP method, then making a scenario by using LOPA method. The magnitude scenarios are determined by considering the consequence influence of workers and society safety around the factory. Explosion that is released from boiler in normal operation is determined as magnitude scenario. Scenario frequency is obtained by using FTA method.

The result of the research obtained scenario frequency 10.5 per year. Passive IPL in boiler is valve with probability failure demand is 1x10^-2 per year. If a valve be able to perform its function as passive IPL obtained frequency initiating event scenario 1x10^-1 per year. The scenario decision making is performed according to the value of frequency initiating event. In which the risk is at “Immediate action” it means that the risk is “very high zone” level, at this level the decreasing of the risk should be done early, because the level of risk is too high. Reducing the value of frequency initiating event is done by adding SIF or system interlock in boiler, so the value of initiating event is 1x10^-3.

Key Word : HAZOP (Hazard and Operability Procedure), LOPA (Layer Of Protection Analysis), IPL (Independent Protection Layer), SIF (Safety Instrumented Fuction).