ABSTRACT

Methyl Trichloride Factory is designed with a capacity of 90,000 tons/year, using raw materials of sodium hypochlorite obtained from PT. Asahimas Chemical and dimethyl ketone obtained from KMG Singapore Pte, LTD. The Factory location was established in Krakatau Industrial Estate Cilegon,Cilegon, Banten. The company will be established with the legal entity of a limited Liability company (PT), with the number of employees 176 people. The factory operates for 330 days a year, with a production process for 24 hours/day and the required land area is 10.2 hectares.

The reaction to the manufacture of methyl trichloride begins with reacting sodium hypochlorite and dimethyl ketone in the continuous stirred tank reactor (CSTR) at a temperature of 70 °c and the pressure of 2 ATMs. The reaction occurs in an exothermic liquid phase, to maintain the required reaction temperature of the cooling coil. The product exits the reactor in the form of methyl trichloride, sodium hydroxide, sodium acetate, water, as well as the remaining reactants of sodium hypochlorite and dimethyl ketone. The reactor exit product is then streamed towards the neutralizer to be neutralized by reacting to a diluted sulfuric acid with a mixer at a temperature of 79.56 ° C and a pressure of 2 ATMs. The product exits the top decanter cooled to be delivered to the Advanced processing unit. The results under the Decanter were streamed towards the distillation tower at 79.56 and pressure was lowered with the expansion valve. The result of the distillation tower is the main product of methyl trichloride with a purity of 99% condensed and pumped to be stored on the product tank. While the bottom result of the distillation tower is a majority of water and a small amount of methyl trichloride is pumped and cooled to be shipped towards the Advanced processing unit. The necessary utilities of methyl trichloride plant are water as much as 589,285.9 kg/hour and water make up as much as 24,777.79 kg/hour. 720 kW of electrical power supplied from PLN with a spare 1 generator capacity of 720 kW with a fuel requirement of 747.68 liters/year. Diesel fuel oil needs are obtained from PT Pertamina as much as 2,464.74 kg/year. The need for air press is supplied from the Air Press unit with a capacity of 48 m3/hour and pressure 5 atm. Saturated steam needs as heater supplied from the boiler unit with a capacity 35,682.8 kg/hour and steam saturated temperature of 150°C.

Reviewed in terms of economics, this methyl trichloride plant requires a fixed capital of $ 16,206,258.50 and Rp 127,776,498,280.44,-. Working Capital of $1,800,695.39 and Rp 141,973,886,978.94,-. The economic analysis of the methyl trichloride plant shows the value of prior tax ROI of 25.99% and ROI after tax of 24.69%. POT value before tax is 2.78 years and POT after tax is 2.88 years. BEP of 54.96% production capacity and SDP amounted to 31.7% production capacity. DCF amounted to 21.15%. Based on the technical and economic analysis data, the methyl trichloride plant is feasible to be established.

Key words: Dimethyl ketone, methyl trichloride, sodium hypochlorite