



## ABSTRACT

*Textile needs for daily life is increasing along with increasing population, income, and purchasing power of the people. One textile product that is widely used as clothing material is rayon fabric. In the production of rayon cloth, one of the main ingredients for making it is carbon disulfide which can be produced using methane and sulfur.*

*The carbon disulfide plant from methane and sulfur is designed by a capacity of 25,000 tons/year and operates continuously for 330 days/year and 24 hours/day. The raw materials used are pure methane of 752 kg/hour and pure sulfur of 2,919 kg/hour. The process is an endothermic reaction with a silica solid catalyzt. The reaction is carried out on a fixed-bed multitube reactor in a furnace-box with an operating temperature of 575°C and operating pressure of 4.5 bar.*

*The factory will be established in Pelalawan, Riau with an area of 10 hectare and employs 190 employees. Energy requirements to run the plant include electricity needs of 0.33 MW, water needs of 11,560,000 kg/hour, and instrument air requirements of 13,200 m<sup>3</sup>/hour.*

*To run production, this plant requires fixed capital of \$8,825,000 + Rp47,620,000,000 and working capital of \$3,556,000 + Rp4,256,000,000. This carbon disulfide plant is classified as low risk with ROI before tax of 25.65% and ROI after tax of 17.96%, POT before tax of 2.9 years and POT after tax of 3.7 years; BEP 46.55%, SDP 23.63%, and DCFRR 24.26%. Based on the economic evaluation, this plant is considered interesting and worthy of further study.*

**Keywords:** *carbon disulfide, natural gas , methane, sulfur*