

## ABSTRACT

*The Formaldehyde plant gives very good prospect, considering the requirement of Formaldehyde in Indonesia which progressively increase. Preliminary design of Formaldehyde plant from methanol and air is planned to built in Bontang, the province of East Borneo, in the area of land of 10,979 m<sup>2</sup> with production capacity 15,000 tons/year. This chemical plant will be operated for 330 days or 24 hours a day with total 120 employees. Raw materials needed are methanol 6,269.6542 tons/year and air 54,658.6958 tons/year. The production process will be operated at temperature 350°C and pressure about 1,2 atm using a fixed bed reactor, as a reactor cooler is used Dowterm A. The convert reaction is 96.81%, resulting product formaldehyde, water, Carbon Monoxid, Carbon Dioxid, Dimethyl Ether. This plant are needed 5.841,4232 kg/hour of water from Sangatta river which proceced in utility unit, 20.286,6920 kg/hour of steam, and 180 kWh of electricity power provided by PLN and also need a generator as reserve. A parameter of appropriatness uses an economic analysis with total capital investment 97.846.971.106 consisted of Rp 59.908.867.782,0588 as a Fixed Capital Investment, and Rp 17.696.202.288 as a Working Capital. Total Cost Rp 97.846.971.107 and Annual Sales Rp 115.500.000.000 thus it can get profit Rp 17.653.028.894 before taxes, and Rp 8.826.514.447 after taxes. A count result of parameter after taxes is percentage of Return On Investment (ROI) 32.63 %, Pay Out Time (POT) 4.4 year after taxes, Discounted Cash Flow (DCF) 20.07 %, Break Event Point (BEP) 40.36 %, while Shut Down Point (SDP) 20.12 %. From the analyses above it showed that the result was satisfied so the plant are interesting and appropriate to build.*