ABSTRAK

Pabrik Alumina dirancang untuk memenuhi kebutuhan Alumina di dalam maupun di luar negeri. Kapasitas yang direncanakan sebesar 250.000 ton/tahun. Pabrik ini beroperasi secara kontinyu selama 330 hari dalam setahun. Pabrik ini direncanakan berdiri di Serang, Provinsi Banten diatas tanah seluas 43.365 m^2. Alumina mempunyai rumus molekul Al_2O_3. Alumina berfungsi sebagai bahan metalurgi, industri kimia, industri otomotif, dan industri kosmetik. Proses pembuatan Alumina dilakukan dalam Reaktor Alir Pipa (RAP). Pada reaktor ini reaksi berlangsung pada fase padat-gas, *irreversible*, eksotermis, *isothermal* pada suhu 500 ^oC dan tekanan 24,67 atm, sehingga untuk menjaga suhu reaksi digunakan jaket. Pabrik ini digolongkan pabrik beresiko tinggi (*high risk*) karena kondisi operasi relatif tinggi. Untuk memproduksi Alumina sebesar 250.000 ton/tahun diperlukan bahan baku Aluminium Klorida sebesar 92.709,3916 kg/jam, Nitrogen sebesar 62752,6909 kg/jam, dan Oksigen sebesar 16.681,0859 kg/jam. Utilitas pendukung proses meliputi penyediaan air pendingin sebesar 135.745,4770 kg/jam, penyediaan udara tekan sebesar 51 m^3/jam, penyediaan listrik sebesar 2.442 kW diperoleh dari PLN dan 1 buah generator sebesar 3.000 kW, bahan bakar generator sebanyak 197 kg/jam dan bahan bakar *furnace* sebanyak 3906 kg/jam. Pabrik Alumina ini direncanakan beoperasi pada tahun 2024 dengan menggunakan modal tetap sebesar Rp 917.862.565.469 dan modal kerja sebesar Rp 8.132.896.195.882. Dari analisis ekonomi terhadap pabrik ini menunjukkan keuntungan sebelum pajak Rp 472.112.782.944 / tahun setelah dipotong pajak 25% keuntungan mencapai Rp 354.084.587.208 / tahun. *Percent Return On Investment* (*ROI*) sebelum pajak 51,44% dan setelah pajak 38,58%. *Pay Out Time* (*POT*) sebelum pajak selama 1,7 tahun dan setelah pajak 2,1 tahun. *Break Even Point* (*BEP*) sebesar 46,02%, dan *Shut Down Point* (*SDP*) sebesar 33,95%. *Discounted Cash Flow Rate* (*DCFR*) terhitung sebesar 7,16%. Dari data analisa kelayakan di atas disimpulkan, bahwa pabrik ini menguntungkan dan layak dipertimbangkan untuk pendirian di Indonesia.

Kata- kata kunci: Alumina , RAP, Aluminium Klorida, Oksigen

ABSTRACT

Alumina factory is designed to meet the needs of Alumina among national and international. The planned capacity is 250.000 tons / year. This plant operates continuously for 330 days a year. The plant is planned to be located in Serangp, Banten on an area of 43.365 m^2. Alumina has the molecular formula Al_2O_3. Alumina serves as a metallurgi, chemical industry, automotif industry, cosmetics industry, and others. The process of making Alumina is carried out in a Plug-Flow Reactor (PFR). In this reactor the reaction takes place in the solid-gas phase, irreversible, exothermic, isothermal at a temperature of 500 °C and a pressure of 24,67 atm so that to maintain the reaction temperature the jacket is used. This plant is classified as a high risk factory due to relatively high operating conditions. To produce Alumina of
250.000 tons / year, Aluminium Chloride is needed as much as 92.709,3916 kg / hour, Nitrogen as much as 62.752,6909 kg / hour, and Oxygen is 16.681,0859 kg / hour. The process supporting capacity includes the provision of cooling water of 22.624 kg / hour, the supply of compressed air is 51 m^3/ hour, the supply of electricity is 2.442 kW obtained from PLN and 1 generator is 3.000 kW and fuel is 197 kg/hour, and fuel gas for furnace is needed as much as 3906 kg / hour. The Alumina Plant is planned to operate in 2024 by using the fixed capital of Rp 917.862.565.469 *and working capital of Rp* 8.132.896.195.882. *From the economic analysis of this factory, it shows a pre-tax profit of Rp* 472.112.782.944 */ year after tax deduction of 25% profit reaches Rp* 354.084.587.208 */ year. Percent Return On Investment (ROI) before tax 51,44 % and after-tax 38,58 %. Pay Out Time (POT) before tax for 1,7 years and after-tax 2,1 years. Break Even Point (BEP) is 46,02 % and Shut Down Point (SDP) is 33,95 %. Discounted Cash Flow Rate (DCFR) is calculated as 7,16%. From the feasibility analysis data above, it was concluded that this factory was profitable and worth considering for the establishment in Indonesia.*

Keywords: Alumina, PFR, Aluminium Chloride, Oxygen