INTISARI

Tugas prarancangan pabrik kimia ini mengkaji kelayakan berdirinya pabrik magnesium sulfat dari asam sulfat dan dolomit. Pabrik magnesium sulfat ini direncanakan beroperasi secara kontinyu selama 330 hari/tahun dengan kapasitas 100.000 ton/tahun, dengan kebutuhan bahan baku berupa asam sulfat 98% sebanyak 84.037,53 ton/tahun dan dolomit sebanyak 79.972,43 ton/tahun dan menghasilkan produk utama berupa magnesium sulfat heptahidrat sebanyak 100.000 ton/tahun serta produk samping berupa gypsum sebanyak 76.325,81 ton/tahun.

Proses pembuatan magnesium sulfat dilakukan dengan mereaksikan dolomit dengan asam sulfat pada reaktor tangki berpengaduk. Produk hasil reaksi kemudian dipisahkan antara produk utama dan produk samping. Produk utama selanjutnya dipekatkan dengan evaporator dan kemudian dikristalkan dengan crystallizer. Produk berupa kristal kemudian dikeringkan dengan rotary dryer untuk selanjutnya siap dijual.

Pabrik ini direncanakan akan didirikan di kawasan industri Kabupaten Tuban dengan luas area 9,7560 ha dan menyerap sebanyak 250 pekerja. Proses produksi magnesium sulfat ini membutuhkan air sungai sebanyak 5.976,25 kg/jam, udara sebanyak 82.592,58 kg/jam, dan listrik sebesar 744,95 kW per jam.

Pabrik ini didirikan dengan *fixed capital* sebesar $36.568.761,41 + Rp206.963.445.927,10 dan *working capital* sebesar $9.851.190,46 + Rp15.201.915.896,38. Pabrik magnesium sulfat ini dikategorikan sebagai pabrik *low risk*, dan berdasarkan hasil evaluasi ekonomi dihasilkan nilai ROI sebelum pajak sebesar 23,23%, dan setelah pajak sebesar 17,42%, nilai POT sebelum pajak sebesar 3,01 tahun dan setelah pajak sebesar 3,65 tahun. Nilai BEP sebesar 47,97%, SDP sebesar 22,23%, dan nilai DCFRR sebesar 22,57% per tahun. Berdasarkan hasil evaluasi ekonomi ini dapat disimpulkan bahwa pabrik magnesium sulfat ini menarik dan layak untuk dikaji lebih lanjut.

Kata kunci: Asam Sulfat, Dolomit, Magnesium Sulfat.

ABSTRACT

The preliminary plant design task examines the feasibility of establishing a magnesium sulfate plant from sulfuric acid and dolomite. The magnesium sulfate plant is designed to operate continuously for 330 days/year with a capacity of 100,000 tons/year, with raw material needs in the form of 98% sulfuric acid as much as 84,037.53 tons/year and dolomite as much as 79,972.43 tons/year and produce main products in the form of magnesium sulfate heptahydrate as much as 100,000 tons/year and by-products in the form of gypsum as much as 76,325.81 tons/year.

The process of magnesium sulfate productions is carried out by reacting dolomite with sulfuric acid in a stirred tank reactor. The product of the reaction is then separated between the main product and by product. The main product is further concentrated by the evaporator and then crystallized by the crystallizer. The product in the form of crystals, is then dried with a rotary dryer and then ready for sale.

The plant is planned to be established in the Tuban industrial area, which has an area of 9.7560 ha and can absorb as many as 250 workers. The magnesium sulfate production process requires river water as much as 5,976.25 kg/hour, air as much as 82,592.58 kg/hour, and electricity at 744.95 kW per hour.

The factory was established with a fixed capital of $36,568,761.41 + Rp206,963,445,927.10 and a working capital of $9,851,190.46 + Rp15,201,915,896.38. This magnesium sulfate plant is categorized as a low risk plant, and based on the results of the economic evaluation, the value of ROI before tax is 23.23% and after tax is 17.42%. The value of POT before tax is 3.01 years and after tax is 3.65 years. BEP value of 47.97%, SDP value of 22.23%, and DCFRR value of 22.57% per year. Based on the results of this economic evaluation, it can be concluded that this magnesium sulfate plant is interesting and worthy of further study.

Keywords: *Sulfuric Acid, Dolomite, Magnesium Sulfate*