INTISARI

Magnesium Oksida (MgO) diproduksi dari limbah pabrik garam yaitu *bittern* dan batu kapur. *Bittern* diperoleh dari limbah pabrik PT. Unichem Candi Indonesia yang merupakan pabrik garam terbesar di Indonesia. Batu kapur diperoleh dari penambangan batu kapur. Komposisi Magnesium yang masih tersisa dalam *bittern* akan direaksikan dengan Kalsium Hidroksida ($Ca(OH)_2$) untuk membentuk Magnesium Hidroksida ($Mg(OH)_2$). Kalsium Hidroksida diperoleh dari kalsinasi batu kapur hingga menjadi Kalsium Oksida (CaO) dan direaksikan dengan air. Magnesium Hidroksida akan dikalsinasi menjadi Magnesium Oksida dengan *Rotary Kiln*.

Dalam perancangan pabrik Magnesium Oksida dengan kapasitas 40.000 ton/tahun dibutuhkan bahan baku *Bittern* sebanyak 111038,5369 kg/jam dan batu kapur sebanyak 12272,8805 kg/jam.

Pabrik Magnesium Oksida juga didukung oleh unit-unit utilitas seperti unit penyedia dan pengolahan air, unit penyedia udara dan unit pengolahan limbah. Kebutuhan air untuk proses, pembangkit *steam*¸ pendingin dan keperluan lain diperlukan sebanyak 127023,7299 m^3/jam yang diperoleh dari air laut Selat Madura. Kebutuhan listrik pabrik ini sebanyak 29.008,14 kWh.

Pabrik Magnesium Oksida ini termasuk kedalam kategori *low risk chemical industry*. Pabrik ini direncanakan didirikan di Kawasan *Java Integrated Industrial and Port Estate Gresik* (JIIPE Gresik) yang berada di daerah Manyar, Kabupaten Gresik, Jawa Timur. Berdasarkan studi yang telah dilakukan, pabrik ini layak dikaji lebih lanjut berdasarkan nilai ROI sebesar 13,46 %, POT sebesar 4,3 tahun, BEP sebesar 59,10%, SDP sebesar 29,30% dan DCFRR sebesar 25,11 %. Analisis sensitivitas juga menunjukkan bahwa pabrik ini relatif stabil terhadap perubahan *fixed capital investment,* harga bahan baku dan harga produk.

Kata kunci : Magnesium Oksida, *Bittern*, Batu Kapur, Proses Kalsinasi.

ABSTRACT

Magnesium Oxide (MgO) is produced from salt mill waste or commonly called bittern, and limestone. Bittern is obtained from PT. Unichem Candi Indonesia which is the largest salt factory in Indonesia and limestone is obtained from limestone mining. The composition of Magnesium remaining in bittern will be reacted with Calcium Hydroxide ($Ca(OH)_2$) to form Magnesium Hydroxide ($Mg(OH)_2$). Calcium Hydroxide is obtained from the calcination of limestone to become Calcium Oxide (CaO) and then reacts with water. Magnesium Hydroxide will be calcined to Magnesium Oxide with Rotary Kiln.

In this preliminary design of Magnesium Oxide with a capacity of 40,000 tons/year requires 111038,5369 kg / hour of Bittern and limestone as much as 12272,8805 kg / hour.

The plant is also supported by utility system such as water supply and treatment system, air supply system and waste treatment system. Water requirements for the process, steam generator, refrigeration and other requirements are needed as much as 127023.7299 m3 / hour that obtained from the sea water of the Madura Strait. And the electricity needs of this factory are 29,008.14 kWh.

This plant is categorized as a Low Risk Chemical Industry. The plant is planned to be established in the Java Integrated Industrial Area and Gresik Port Estate (JIIPE Gresik), which is located in the Manyar area, Gresik Regency, East Java. Based on the studies that have been conducted, this plant is feasible due to ROI value of 13.46%, POT at 4,3 years, BEP at 59.10%, SDP at 29.30% and DCFRR at 25,11%. Sensitivity analysis also shows that this plant is relatively stable towards changes in fixed capital investment, raw material prices and product prices.

Keywords: *Magnesium Oxide, Bittern, Limestone, Calcination Proces*