

ABSTRAK

Kebutuhan *Ferrous sulphate heptahydrate* ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$) yang cukup tinggi di Indonesia, sejauh ini belum ada pabrik yang memproduksi *Ferrous sulphate heptahydrate* di Indonesia sehingga masih bergantung dengan impor dari negara lain. Oleh karena itu Pra Perancangan Pabrik *Ferrous sulphate heptahydrate* ini memiliki tujuan untuk memenuhi kebutuhan *Ferrous sulphate heptahydrate* dalam negeri dengan memanfaatkan limbah industri logam. *Ferrous sulphate heptahydrate* digunakan pada proses *water treatment*, pengental tinta di industri tinta, dan campuran pewarna tekstil.

Pabrik *Ferrous sulphate heptahydrate* akan didirikan pada tahun 2024 di kawasan industri daerah kabupaten Gresik, Jawa Timur. Pabrik dirancang dengan kapasitas 10.000 ton/tahun. Pabrik beroperasi 24 jam perhari selama 330 hari pertahun dengan jumlah karyawan 150 orang. *Ferrous sulphate heptahydrate* diproduksi dengan mereaksikan Asam Sulfat dengan *Pickling Liquor* pada suhu 85°C dan pada tekanan 1 atm dalam Reaktor Alir Tangki Berpengaduk (RATB). Kebutuhan utilitas meliputi air sebanyak 254.826 kg/jam, listrik sebesar 326 kWh, bahan bakar berupa solar sebanyak 49,16 kg/jam, *fuel oil* sebanyak 954,2 kg/jam dan kebutuhan udara tekan sebesar $12,2 \text{ m}^3/\text{jam}$

Pada hasil perhitungan, didapatkan modal tetap sebesar Rp. 323.552.529.415, Modal kerja sebesar Rp. 404.215.785.099, biaya produksi sebesar Rp. 391.850.001.676. Keuntungan sebelum pajak sebesar Rp. 81.031.881.841, sedangkan setelah pajak sebesar Rp. 60.773.911.381. *Return Of Investment* (ROI) sebelum pajak sebesar 25,044% dan setelah pajak sebesar 18,783%, *Pay Out Time* (POT) sebelum pajak adalah 3,026 tahun dan setelah pajak adalah 3,734 tahun, *Break Event Point* (BEP) sebesar 43,319%, *Shut Down Point* (SDP) sebesar 20,687%, dan *Discounted Cash Flow Rate* (DCFR) sebesar 8,089%. Berdasarkan hasil analisa ekonomi, dapat disimpulkan bahwa pabrik *Ferrous sulphate heptahydrate* dari *Pickling Liquor* dan Asam Sulfat dengan kapasitas 10.000 ton/tahun ini layak untuk dikaji lebih lanjut.

Kata-kata kunci : *Ferrous sulphate heptahydrate*, Asam Sulfat, *Pickling Liquor*

ABSTRACT

Demand of Ferrous Sulphate Heptahydrate ($FeSO_4 \cdot 7H_2O$) is quiet high in Indonesia and there is no factories that produce Ferrous Sulphate Heptahydrate in Indonesia so it still depends on imports from other countries. Therefore, this pre-design of Ferrous Sulphate Heptahydrate plant has the aim to meet the need of domestic Ferrous Sulphate Heptahydrate by using industrial metal waste. Ferrous Sulphate Heptahydrate is widely used for water treatment process, ink thickener in the ink industry, and for textile dye mixture.

The Ferrous Sulphate Heptahydrate plant is planned to be established at 2024 in the industrial area of Gresik, east java. This factory is designed with the capacity of 10.000 tons / year. The factory works 24 hours per day for 330 days per year with a total of 150 employees. Ferrous Sulphate Heptahydrate is made by react Sulfuric Acid and picling liquor at temperatures $85^{\circ}C$ and at 1 atm pressure in countinuous stirred tank reactor (CSTR). Utility requirements include 254,826 kg/hour of water, 326 kWh of electricity, 49.16 kg/hour of diesel fuel, 954.2 kg/hour of fuel oil and $12.2 m^3$ /hour of compressed air.

In the calculation result, The fixed capital is Rp. 323,552,529,415, the working capital is Rp. 404.215.785.099, the manufacturing costs is Rp.391,850,001,676. Pre-tax profits amounting to Rp.81,031,881,841, while after taxes amounted to Rp. 60,773,911,381. Return of investment (ROI) before tax is 25.044% while after tax is 18.783%, pay of time (POT) before tax is 3.026 years while after tax is 3.734 years. Break Event Point (BEP) of 43.319%, Shut Down Point (SDP) of 20.687% and Discounted Cash Flow Rate (DCFR) of 8.089%. Based on the result of economic analysis, it can be concluded that the plant Ferrous Sulphate Heptahydrate from Pickling Liquor and Sulfuric Acid with capacity of 10,000 ton/year deserves further study

Keywords: Ferrous Sulphate Heptahydrate, Sulfuric Acid, Pickling Liquor