



## INTISARI

Cresol merupakan senyawa kimia yang memiliki isomer berupa gugus orto, meta dan para yang dapat diperoleh dari *cracked naphtha*. Pada prarancangan cresol dari *cracked naphtha* ini, *cracked naphtha* diekstraksikan dengan larutan NaOH 40% di dalam ekstraktor. Hasil dari ekstraksi akan diperoleh *cresylic acid* berupa *sodium cresolate* sebagai produk utama dan *sodium phenolate*, *sodium xylenolate*, dan *sodium propanethiolate* sebagai produk samping. Selanjutnya, ion  $\text{Na}^+$  dihilangkan dari hasil ekstraksi dengan mereaksikan dengan larutan  $\text{H}_2\text{SO}_4$  98% didalam reaktor alir tangki berpengaduk (RATB). Hasil dari reaksi berupa cresol sebagai produk utama, fenol, xylenol dan propenitiol sebagai produk samping. Setelah diperoleh produk, dilakukan separasi secara bertahap dengan dekanter, dan menara distilasi 2 tingkat. Hasil separasi ini akan diperoleh o-cresol sebanyak 1189,96 kg/jam, m,p-cresol sebanyak 3882,10 kg/jam dan produk samping xylenol sebanyak 2917,15 kg/jam. Pabrik dijalankan selama 330 hari/tahun dan 24 jam/hari.

Pabrik ini akan didirikan di Kawasan Industri Cilegon, Cilegon, Banten. Kebutuhan listrik untuk menjalankan pabrik ini diperkirakan sebanyak 1,42 MW dengan kebutuhan air dan udara masing-masing 36665,73 kg/jam dan 13790,64 kg/jam, serta dijalankan pada lahan seluas 8 hektar dengan jumlah karyawan sebanyak 245 orang.

Untuk menjalankan produksi, dibutuhkan modal tetap sebesar \$ 542.954.487,81 dan modal kerja sebesar \$ 1.132.717.489,81. Berdasarkan prosesnya, pabrik cresol dari *cracked naphtha* berkapasitas 40.000 ton/tahun ini tergolong *low risk* dengan nilai ROI *before tax* 47,81%, ROI *after tax* 23,90%, POT *before tax* 1,73 tahun, POT *after tax* 2,95 tahun, BEP 47,27%, SDP 32,94%, dan DCFRR 18,69%. Berdasarkan hasil evaluasi ekonomi, dapat disimpulkan bahwa pabrik ini menarik secara ekonomi dan layak untuk dikaji lebih lanjut.

Kata kunci: cresol, *cracked naphtha*



## **ABSTRACT**

*Cresol is a chemical compound that has 3 types of isomers; ortho, meta, and para, which can be obtained from cracked naphtha. On the plant design of cresol from cracked naphtha, cracked naphtha is extracted with NaOH 40% solution in extraction tower. The extracts are called as cresylic acids, which contain sodium cresolate as the main product and sodium phenolate, sodium xylenolate, and sodium propanethiolate as the side products. Furthermore, Na<sup>+</sup> ions are removed from the extract by reacting it with H<sub>2</sub>SO<sub>4</sub> 98% solution in a continuous flow stirred-tank reactor (CSTR). As a result, cresol is obtained as the main product, and phenol, xylenol, propanethiol as the side products. After the products are achieved, the products are separated gradually with decanter and two distillation towers. From this separation, 1189,96 kg/hour of o-cresol, 3882,10 kg/hour of m,p-cresol as the main product and 2917,15 kg/jam of xylenol as the side product are collected. The plant operates for 330 days/year and 24 hours/day.*

*This plant will be established in Cilegon Industrial District, Cilegon, Banten. The electricity needed to operate this plant are estimated as much as 1,42 MW with water and air required respectively as much as 36665,73 kg/hour and 13790,64 kg/hour, and it will be operated on 8 hectares area with 245 employees.*

*To start the production, this plant requires \$ 542.954.487,81 of fixed capital, and \$ 1.132.717.489,81 of working capital. Based on its process, plant design of cresol from cracked naphtha with capacity of 40.000 tons/year is classified as low risk plant, with ROI after tax 23,90%, POT after tax 2,95 years, BEP 47,27%, SDP 32,94%, and DCFRR 18.69%. Thus, the results of the economic evaluation conclude that this plant is feasible and attractive to establish.*

*Keywords: cresol, cracked naphtha*