

## Side stream cooling water filter package for Ethylene cracker complex SHELL Singapore.

*Cooling water side stream filter package consisting of DynaSand filter internals. The washwater coming from the DynaSand filters is treated by Johnson lamella plate packs and Zickert bottom scrapers. The complete installation is built in concrete basins.*

### The challenge

The Ethylene Cracker Complex (ECC) is a petrochemical complex located next to and connected with the Bukom Refinery of SHELL Eastern Petroleum Ltd. The complex will be partly built on reclaimed land. Land reclamation is to connect Pulau Bukom Kechil with Pulau Ular and Pulau Busing. Due to the limited space on this complex a compact installation was required for the cooling water filtration package.



### The solution



ABB Lummus Global (now CB&I) appointed Nordic Water Benelux BV to prepare the basic design of the side stream filter cooling water package.

Based on the design of Nordic Water order was given for the manufacture and supply of the DynaSand filter internals, Johnson lamella plate packs and the Zickert bottom scraper.

## The result

The cooling water system for SHELL ECC Singapore is an open recirculation system with a cooling tower. Sweet water is circulated in an open circuit and cooled using evaporative type cooling towers. Make-up water is supplied by pipeline from Singapore mainland and blow down is routed to sea.

To avoid excessive fouling of the cooling water system, 2-3% of the pumped circulating cooling water is routed over the Side Stream filter package to remove TSS (e.g dirt, corrosion products). The filter effluent is routed back to the cooling water basin. The wash water is treated by the lamella package and the clean effluent is routed to the cooling water basin. The sludge is removed by the Zickert scraper and routed to a centrifuge.

Soon after the start-up it became apparent that the installation works even better than intended. See below for some information.



## Some facts

### DynaSand filters:

- average flow 1.687 m<sup>3</sup>/h, maximum flow 1.800 m<sup>3</sup>/h
- TSS in capacity < 50 mg/l
- TSS out < 15 mg/l, normally values between 5 - 10 mg/l are reached.

### Johnson lamella plate packs and Zickert bottom scraper:

- Flow 120 m<sup>3</sup>/h,
- TSS in capacity < 500 mg/l
- TSS out < 25 mg/l, normally values are reached < 20 mg/l.

### Installation:

- 30 pcs DynaSand internals DS6000AE-B, 5 basins with each 6 internals
- 2 pcs Johnson lamella plate packs - type LP140/140-05
- 1 pc Zickert bottom scraper – type Z2011, 8x3,5m.