BAMAG
German Engineering since 1872

Biological Wastewater Treatment

Shell Pulau Bukom Refinery / Singapore

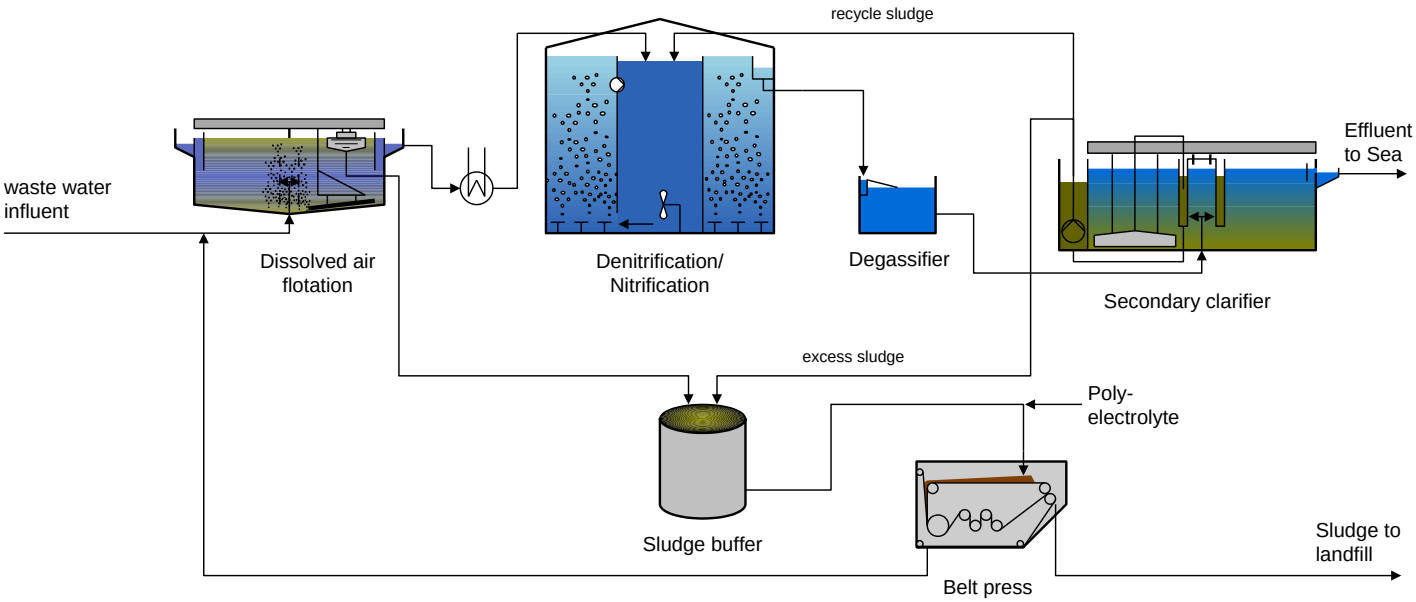
The treatment process was specially developed for typical refinery waste water and is successfully applied in more than 20 plants around the world.

The plant is designed for extended treatment of 7,200 m³ of waste water per day, making an essential contribution to curbing the pollution of the coastal waters of Singapore, into which the treated water is discharged.

Bamag is an international EPC contractor for water and wastewater treatment plants as well as thermal processes.
We design, supply and operate your plant.
We are...

... the experts

Bamag
6. El Terra St. Hadayek El Ahram - Giza, Egypt
Tel . +2 (02) 3377 2082 Fax. +2 (02) 3376 2465
www.bamagllc.com



1. Objective

Treatment of the process and non-process effluents from the refinery

- Design data

Capacity:	7,200 m³/d
COD	800 ppm
BOD_5	400 ppm
NH_3	150 ppm
Sulphides	10 ppm
Phenols	60 ppm
Oil	20 ppm

- Treatment criteria

COD	< 100 ppm
BOD_5	< 20 ppm
NH_3	< 2 ppm
Sulphides	< 0.05 ppm
Phenols	< 0.05 ppm
Oil	< 3 ppm

2. Plant concept

- Process steps:

  Dissolved Air Flotation, Lurgi Bamag Deep tank bio-reactor with Nitrification / Denitrification, Clarification, Sludge buffering, Dewatering

- Brief description

  The process effluent is collected from the DAF and pumped into the Deep tank bio-reactor after passing a heat exchanger.

  Chemicals are dosed in the right quantity and composition in order to allow for an optimized biological treatment.

  The tank is designed with an inner reaction zone for Denitrification and an annular outside reaction zone, aerated by Jet-Aerators, for Nitrification. The organic compounds and the Ammonium in the waste water are oxidised in the Bio-reactor and the nitrate that forms is removed in the denitrification stage.
  After passing a degassifier and a clarifier Basin the treated water is discharged to the sea.
  The sludge produced in the effluent treatment plant, which is extracted by a suction scraper from the bottom of the clarifier, is pumped into an aerated sludge stabilisation tank and finally dewatered with a Belt Filter Press.
  The quality of the effluents is monitored online for detection of overloads.

3. Characteristic plant data

1 Deep tank bio-reactor

working volume	5,500 m³
diameter	22 m
total height	15.5 m
	aeration
	3,200 Nm³/h

1 Clarifier

diameter	28 m
depth	3 m
surface loading	0.50 m³/m² h

Sludge treatment

Sludge storage	350 m³
Sludge aeration	0,3 kg/s
dewatering capacity	
	max. 12 m³/h