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Biological Pretreatment Stage

Kalle – Albert Chemical Park
Wiesbaden / Germany

Infraserv Wiesbaden commissioned BAMAG with a capacity extension to its Petersaue wastewater treatment plant.

The existing wastewater treatment plant and the new biological pretreatment stage are designed to treat the wastewater streams generated at the Kalle-Albert Chemical Park in Wiesbaden including the process effluent from a methyl cellulose production plant.

The purpose of the capacity extension is to provide cost-effective reduction of the high COD load of currently about 82,000 kg/d to the discharge limits prescribed for direct discharge into the receiving water.
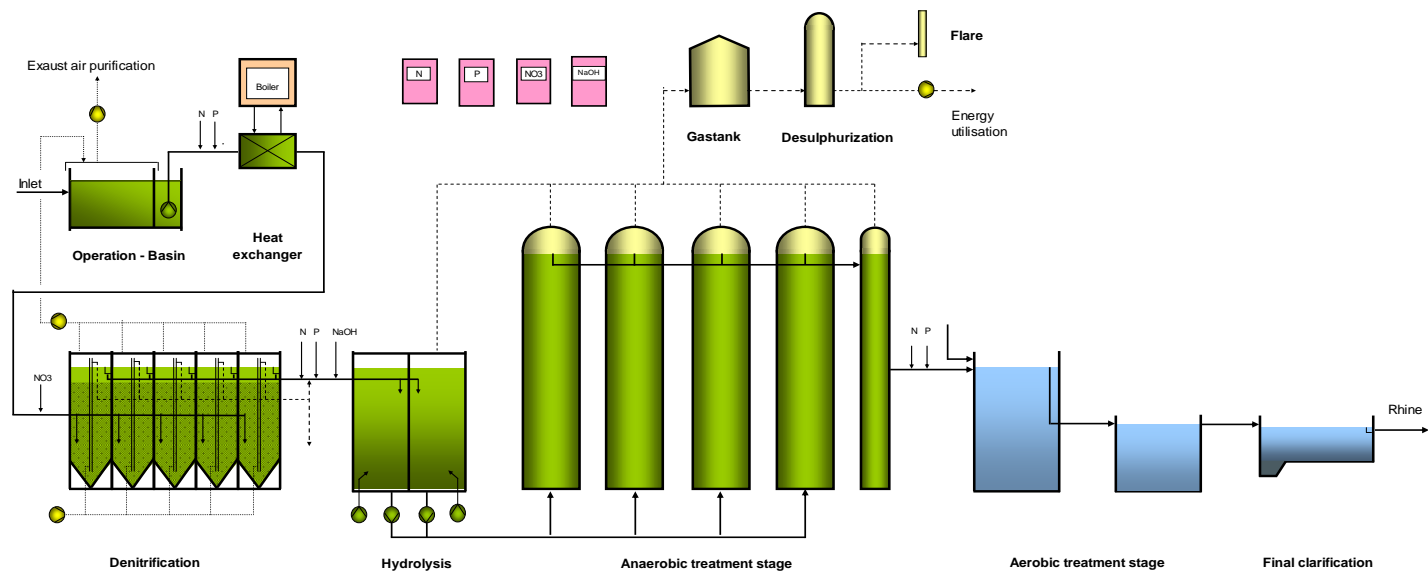
The contract comprised the turnkey construction of the new plant on a fast-track schedule of only 12 months during ongoing operation of the existing plant.

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

Labels on diagram: Exaust air purification | Boiler | N P | Flare | Energy utilisation | Inlet | Heat exchanger | Operation - Basin | N | P | NO3 | NaOH | Gastank | Desulphurization | N P NaOH | N P | Rhine | NO3 | Denitrification | Hydrolysis | Anaerobic treatment stage | Aerobic treatment stage | Final clarification

1. Objective

Capacity extension to the existing wastewater treatment plant by the integration of a new biological pretreatment stage for the treatment of the Chemical Park production effluents**.**

Design data

Industrial Park + Methyl cellulose production plant

Wastewater rate	18.600 m3/d
COD load	82.000 kg/d

Industrial Park (directly to aerobic treatment)

Wastewater rate	12.000 m3/d

Treatment objective
direct discharge quality

Mechanical primary treatment stage (existing)

- Neutralization tank
- Primary clarifier
- Buffer tank
- Fine bar screen
- Pumping station

2. Plant concept

Capacity extension
No. 1 Biological treatment stage

- Denitrification unit
- Anaerobic treatment unit
- Chemicals dosing station

Biogas treatment

- Gas holder
- Desulphurization reactor
- Boiler house
- Wastewater preheating

No. 2 Biological treatment stage (existing)

- Deep-tank bioreactor (converted trickling filters)
- Aeration tank
- Secondary clarifier

Sludge treatment (existing)

- Thickener
Operating building / Chemicals storage area

After primary treatment in the existing mechanical treatment stages comprising neutralization, primary clarification, a fine bar screen and a buffer tank, the Chemical Park production effluent stream is pumped to the new biological pretreatment stage via the pumping station. Here it is conditioned by nutrient addition and preheating (if required) before being routed to denitrification in a continuously operating denitrification filter unit (5 lines).

The objective of the downstream anaerobic treatment stage is the cost-effective COD reduction with simultaneous biogas production. Anaerobic treatment is carried out in 4 reactors using granulated media for attached biomass growth (pellets). Separation of the gas / water / pellet mixture is accomplished by an integrated separator system.

Following desulphurization, the biogas generated is sent via a compressor station to the on-site power plant for energy utilization.

Final treatment of the biologically pretreated production effluent and the sulfate-laden wastewater stream to direct discharge quality is accomplished in the existing aerobic treatment stage consisting of the deep-tank bioreactor (2 lines) evolved from the conversion of the former trickling filters, the downstream aeration tanks (2 lines) and the secondary clarifiers (6 lines).

3. Features of the new biological pretreatment stage

- High operating reliability through multi-train concept and redundant major units
- Greatly reduced sludge volume through anaerobic pretreatment
- Improved economics through biogas utilization in the on-site power plant
- Small footprint through compact design
- Realization on a fast-track schedule through prefabrication of major components
- Construction and connection of new biological pretreatment stage during ongoing operation of the existing plant
- Turnkey construction, to-schedule completion and commissioning of the new biological pretreatment stage with all its unit operations.

InfraServ
Wiesbaden

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