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PetroBrazi Refinery ETP, Romania
From old to new: overhauling and optimization

The Refinery ETP of OMV Petrom SA in Brazi, which has a capacity of 30,000 m^3/d, has undergone a comprehensive refurbishment and technological optimisation and upgrading programme. This ambitious project was carried out by WABAG Water Services SRL, Romania. The modernisation process commenced in 2010 and was realised in two phases during continuous plant operation. In addition, a self-washing filtration system was installed for enhanced water reuse. The projects were completed in 2014 to the full satisfaction of the client.

WWS has operated the ETP for a period of eleven years from 2008 to 2019.

Features

- Update of an existing plant to state-of-the-art ETP
- Attainment of stringent environmental standards of the Austria-based OMV group regarding the direct discharge of treated wastewater into a nearby river
- Professional O&M including optimisation according to HSEQ regulations and standards.

Client
OMV PETROM SA

Type
General Contractor

Award of contracts
O&M: 2008
Modernisation Stage 1: 2010
Modernisation Stage 2: 2012

Commissioning
Stage 1: 2012
Stage 2: 2014
Reuse - filtration system: 2014

Maximum hydraulic load
30,000 m^3/d

Raw water
Effluents from petrochemical production facilities

Water reuse
Partly reuse as utility water

Oil recycling
70 tons per day

O&M
04/2008 – 06/2019

Current refinery's effluent treatment facilities:

- Currently 1 (initally 3 treatment lines), 30,000 m^3/d
- Pre-treatment plant for sour water - stripper effluent
- Sludge dewatering plant
- Slop oil treatment plant
- Laboratory
- Maintenance facilities

Main components/process steps

- Slop Oil Recovery - API
- Dissolved Air Flotation - DAF
- Activated Sludge Process
- Slop and Sludge Tri-canters
- VOC Odour Treatment

Since 2010 more than 13 million € were invested for an efficient operation of the plant as well as environmentally sound discharge of treated wastewater.

Achieving high effluent standards

Parameter	Units	Effluent Limits
COD	mg/l	≤ 100
TSS	mg/l	≤ 35
Ammonium	mg/l	≤ 2.0
Phenol	mg/l	≤ 0.1
Cyanide	mg/l	≤ 0.1
Oil product	mg/l	≤ 3.0
Phosphorus	mg/l	≤ 1.0
Detergents	mg/l	≤ 0.5

Scope of Refurbishment

Stage 1

- Pumping stations
- Chemical Dosing System:
  Revamping and extension – installation of new dosing systems for: ferric chloride, sulphuric acid, lime milk, trisodium phosphate, polyelectrolyte.
- Biological treatment:
  - Upgrade of the biological treatment for nitrogen removal:
  - Internal flow re-circulation
  - Re-compartmentalisation in the denitrification zone
  - Installation of new return and excess sludge pumps
  - Implementation of methanol dosing station
  - Plant automation
- Dephenolisation plant:
  Renewal of biological pre-treatment plant of sour water:
  - New aeration system
  - New methanol dosing unit
  - Pipework for wastewater stream reorganisation
  - Measurement equipment
  - Electrical and instrumentation equipment
- Rehabilitation of 4 API oil product separators:
  - Demolition of old equipment
  - Rehabilitation of civil works
  - Installation of new scraper
  - Covering of all API-tanks
  - Adaption of fire fighting system
  - Adaption of electro-technics
  - Waste air treatment

Stage 2

- Dissolved Air Flotation (DAF)
  Modernisation of the physical-chemical stage DAF (liquid-gas mixtures centrifugal pumps) including refurbishment of flotation tanks.
- Tank Farm Pumping station
  Construction of new oil and sludge pumping system including collection and distribution lines.
- Construction of a new raw water pumping station and main connection from line 3 to line 2.
- Analysis
  Installation of online analysis equipment and its integration into the new SCADA system.
- Equalisation
  Refurbishment of existing equalisation tank and its integration as buffer tank in case of peak loads.

Enhanced reuse – installation of a self-washing filtration system.

Some 60 per cent of the daily treated wastewater (15,000 m^3/d) is recirculated and reused again at the refinery for various processing purposes. Therefore, in order to improve the quality of this reused water, the effluent of the plant outlet is post-treated by three self-washing filter units with a maximum capacity of 1,000 m^3/h.

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Client
OMV PETROM SA

Type
Industrial Outsourcing

Start of O&M
April 2008

Maximum Hydraulic Load
30,000 m^3/d

Average Operation Load
25,000 m^3/d

Work force
60

Work shifts
in total 5 shifts; 2 shifts per day;
each 12 hours

Operation & Maintenance

The O&M Services include:

- Complete technical and commercial management of the plant
- Quality management according:
  ISO 9001, ISO 14001, OHSAS 18001
- Provision of O&M personnel
- Training and integration of personnel
- Continuous maintenance & repairs
- Reporting to client and public authorities
- Expert consulting for plant upgrading
- Design and completion of reinvestments

R&D - Innovation

NOTOPUR™ is an innovative early warning system developed as part of the WABAG Group's R&D programme. This newly designed monitoring process ensures the constantly smooth operation of the crucial activated sludge process.

Efficient day-to-day operation:

- Procurement of chemicals and spare parts
- Sludge and slop treatment (dewatering/purification)
- Sludge disposal (transport to incineration plant)
- Laboratory services and reporting

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