

Belchatow 858 MW WTP

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ALSTOM

Block Diagram

- Raw water pumping station/Rotating band screens
- 2 sludge bed upflow clarifiers @ 2x1000 m³/hr
- Filtration plant: 2 x 5 double chamber sand filters with capacity 2x1000 m³/hr/line
- SBS dechlorination dosing station
- Demin plant: 2 x (MMF – CIX – Degas – AIX- MBX) capacity each line 80 m³/hr. DOWEX UPCORE process
- ClO₂ dosing station (Biggest in Poland)
- 3 neutralization pits
- Allan-Bradley PLC

Chemical Tanks

- HCl tank and NaClO₂ tank for production of ClO₂
- HCl and NaOH tanks for Demin plant regeneration
- FeCl₃ tank for coagulant
- Flocculant dosing station (PROMINENT)

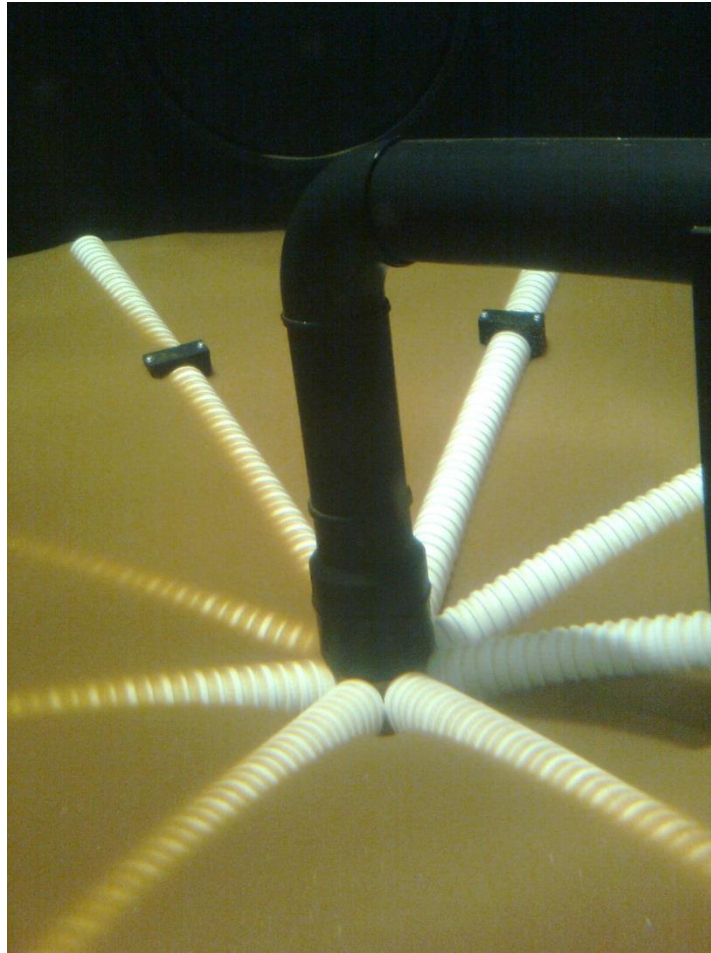
Chemical Unloading HCl



ClO₂ Dosing Station



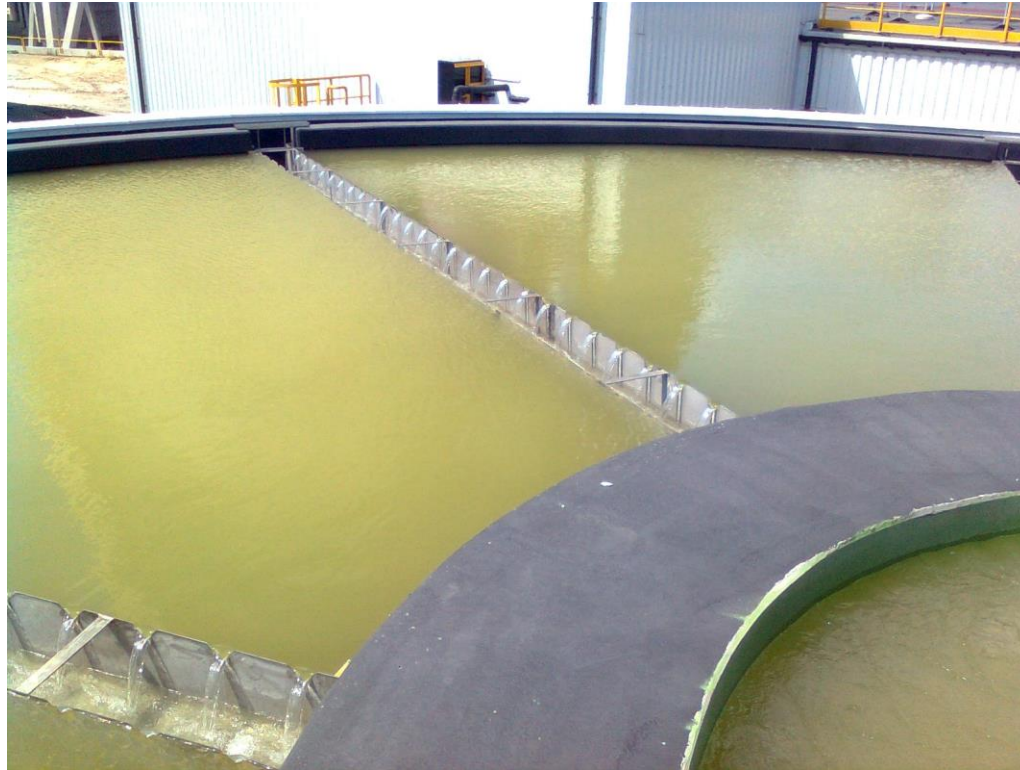
Resin Loading



Clarifier



Clarifier Bad



Clarifier Good



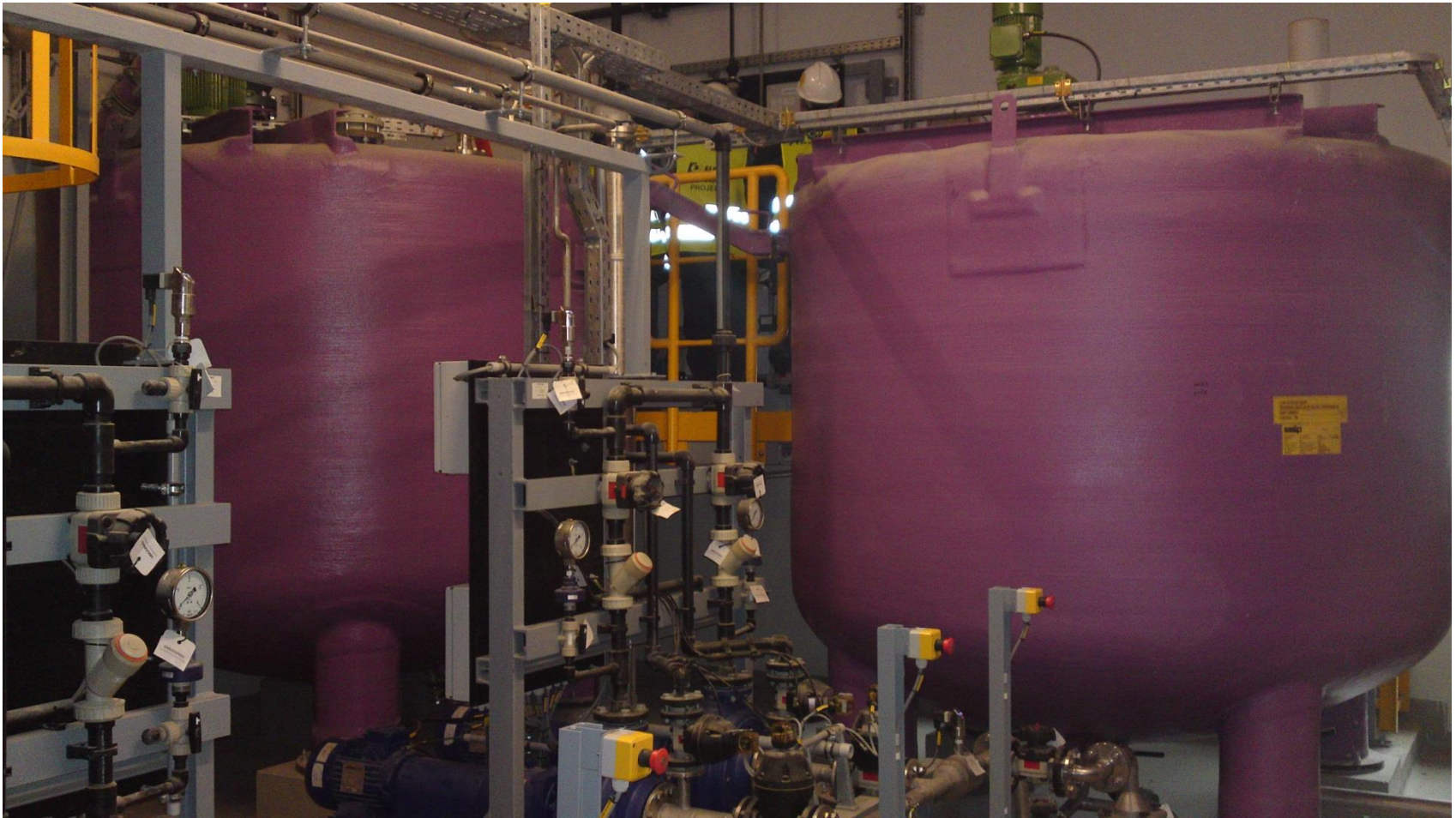
Filling The Cooling Tower



Sand Filtration Plant



Lime Preparation and Dosing



Mixed Bed



Contractor Working Hard



Resin Backwashing



Resin Loading



Anion Exchanger Feed Pump



Water Quality

- Clarifier reduced SS and hardness down to 10 ppm
- SFP reduced SS down to 1 ppm
- Demin plant produced demin water with near 0.055 uS/cm conductivity

Technical Problems - I

- 1. raw water control valves not working properly due to high delta P
- 2. original resin backwash vessels scrapped for nothing
- 3. decarbo water pumps cavitating
- 4. demin pump impellers after CIX made from CS corroded
- 5. bolts in neutralization basin made from inox

Problems - II

- 6. Difficult to commission the clarifiers no good instructions
- 7. ClO₂ attacking the flocculant
- 8. no bypass line for ClO₂ for the clarifiers
- 9. chemical unloading area no containment
- 10. regeneration with closed drain valves not foreseen safety logic

Problems - III

- 11. Sludge pumps oversized for recirculation for clarifiers
- 12. Big decarbo pumps were noisier than 85 dB
- 13. degasifiers were carrying over and the acidic water was destroying the outside of bldg
- 14. there was no flushing line for the acid/base unloading lines

Problems - IV

- 15. bad HCl acid leak from flange on one of the unloading cabinets lead to destruction of aluminum housing
- 16. Lime mixing impellers were eroded after one year: make sure material is suitable.
- 17. Some pumps were vibrating and we needed to reinforce the supports
- 18. Issues with CO₂ contamination of demin water tank. Prefer filling line to come to bottom of tank to avoid splashing. Issues with overflow line air lock

Problems - V

- Leaking pipe wall penetration for neutralization basins (Civil)
- *Prominent* recommended changing gaskets/membranes for ClO₂ plant every 6 months (too early)
- Client was acting difficult (political)

Delays in Commissioning

- Permanent power supply delayed
- Raw water supply delay
- Clarifier commissioning delay
- No hoses ordered by engineering for resin loading