

Steam and Condensate Quality Water Process Technology

To achieve better steam/condensate cycle ratios, energy savings and reduction of the thermal load on surface water.

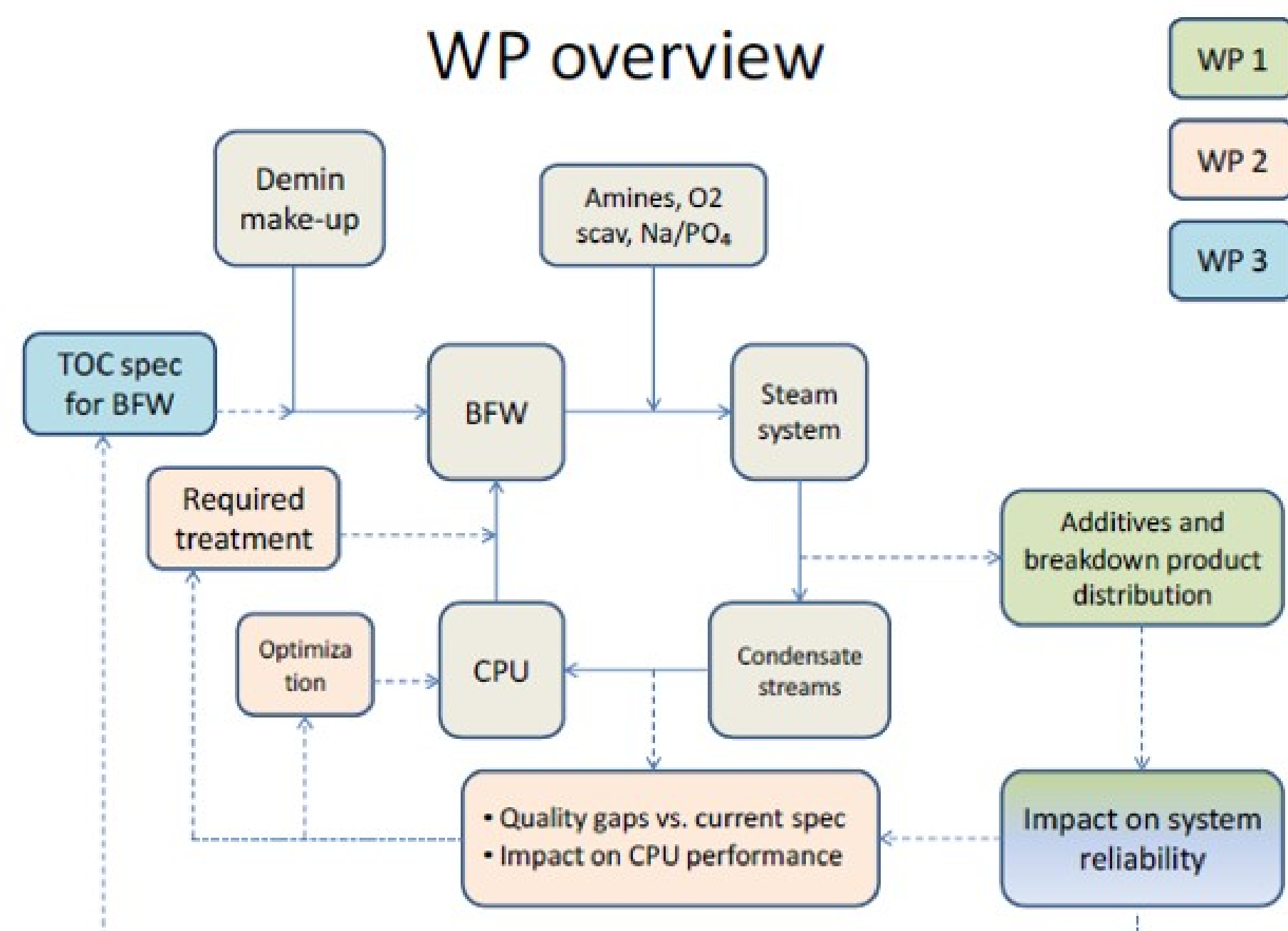


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Budget 1603 k€
Duration 2016-2020

Objective

- Increased insight in the fate of conditioning chemicals (and the resulting protection) in steam-water cycles
- Enhanced condensate polishing and treatment to increase return condensate ratio
- Improved knowledge on harmful effects of different organic carbon (TOC) components, in relation to corrosion



Motivation

- Corrosion costs amount to 3% of the world GDP and it is dangerous in high-duty steam-water cycles
- Prevention of corrosion is critical for cost savings (less downtime) and safety
- Optimized condensate reuse minimizes the intake and dependency on fresh water availability
- Waste heat recovery increases the energy efficiency of the production plant

Project scope

WP1 – Data collection and modeling

- Fate of conditioning chemicals and breakdown products
- Distribution over the system
- Long-term impact on metallurgy

WP2 – Treatment of condensates

- Treatment of “off-spec” and heavily impaired condensates
- Increase energy and water usage efficiency in the plant

WP3 – Boiler feed water (BFW) quality requirements

- Corrosion measurements to generate
 - a) better definition of specific dosing guidelines
 - b) assessment of problematic TOC compounds in relation to corrosion
- Application of filming and neutralizing amines at elevated temperature/pressure

Results

- Effective sampling and characterization protocols executed for film forming amines (FFA) related compounds in condensate/steam cycle (WP1)
- Prolonging experiments with preselected technologies (Membrane distillation and membrane aerated biofilm reactor (MABR)) for treatment of synthetic heavily polluted condensates on lab and pilot scale (WP2)

Next steps

- Complete mass balance of FFA and related compounds in an industrial environment
- Pilot experiments with MABR and subsequent polishing of industrial condensate – initial business case development for full scale implementation
- Corrosion impact measurements using representative compounds determined in WP1
- Economic and energy saving assessment

