

CASE STUDY

Improved water chemistry in district heating plant with ODACON® and ETA treatment



CUSTOMER

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(Germany)

A regional energy provider based in Saxony, Germany, supplying electricity, natural gas, heating, and water to residential, commercial, and industrial customers with a strong focus on sustainability and innovation.

PLANT CHARACTERISTICS

- District heating plant
- Combined cycle power plant with 10 t/h steam capacity
- 3 reserve boilers (shell boiler)
- Back pressure turbine 1 MW
- The boilers are fed with softened make-up water coming from surface water reservoirs
- Several steam storage tanks with a total capacity of 150 t are installed

SITUATION

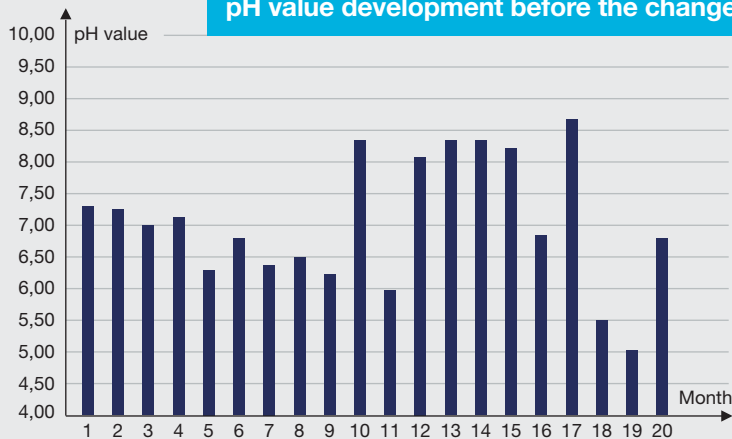
Long term monitoring of pH value in steam shows a fluctuation between 5 and 9. This depends on the quality of the make-up water.

To increase the pH a volatile alkalinizing product was necessary. But the district heating system contains a lot of copper-based materials. This requires an additional corrosion protection as well. Also, the steam storage tanks and reserve boilers have to be protected against standstill corrosion.

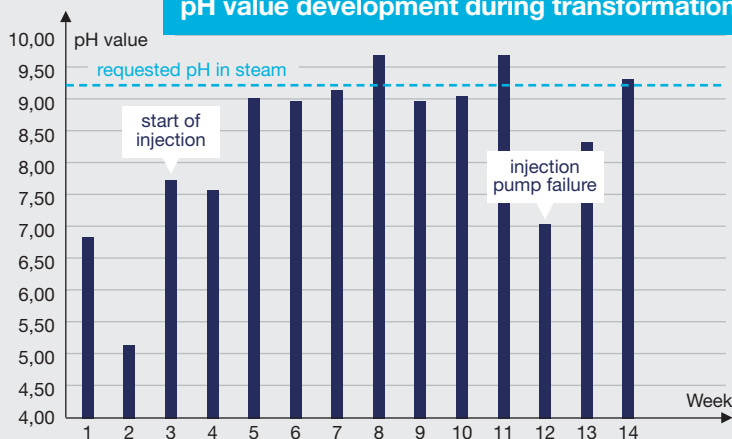
KEY OBJECTIVES

- Increase pH-value > 9.2 permanently
- Keep iron levels low in the system

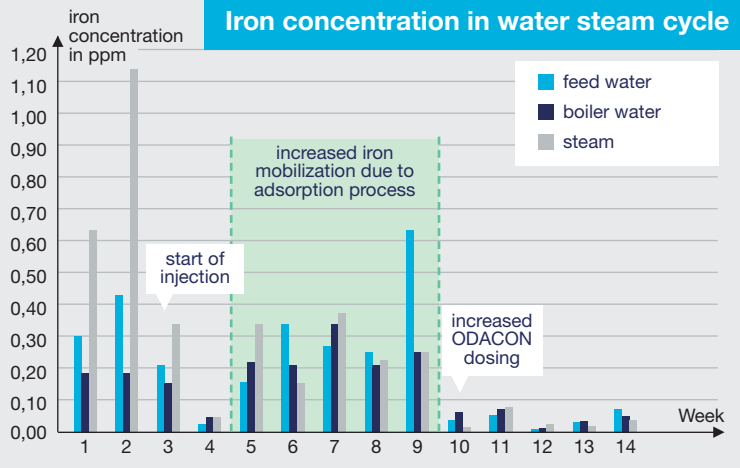
pH value development before the change



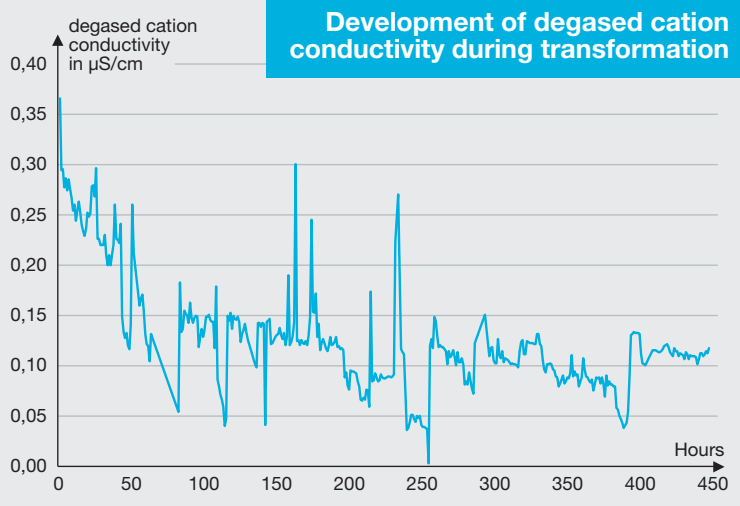
pH value development during transformation



Iron concentration in water steam cycle



Development of degassed cation conductivity during transformation



PRESERVATION PROCEDURE

A combined application of different dosing chemicals was chosen to cover all challenges:

1. Neutralizing amine (ETA):

- Stabilization of pH value in the steam > 9.2
- Neutralisation of carbon dioxide
- Continuous dosing into the feed water

2. Film forming amine (ODACON®):

- Protection of copper materials against high alkalinity
- Protection of the turbine against flow accelerated corrosion (FAC) and deposits
- Preservation of the whole system
- Continuous dosing into the feed water

- During the first month of treatment frequent analyses of pH-value and total iron concentration were performed.
- Additionally, a mobile device for measuring degassed cation conductivity was installed for some weeks.

RESULTS

- The pH-value in steam was increasing.
- In the first months after start of ODAICON® dosing the iron concentration in the cycle increased because of cleaning effects due to the adsorption of ODAICON® at the system surfaces.
- The degassed cation conductivity showed a decreasing trend and stabilized at 0.12 µS/cm.

BENEFITS



80 – 95 %
Reduced Iron
Concentration



Stabilization of
pH-value > 9.2



Protective
Layer Formation

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