Management of boilers and condensate lines corrosion by dosing JurbySoft products into the main feedwater line

Industry	Oil refinery
Type	Steam boilers water and condensate lines treatment
Task	Selection of the optimum dosage of JurbySoft 36 for steam pH correction and corrosion protection of steam and condensate lines.
Water source	River water

About the project

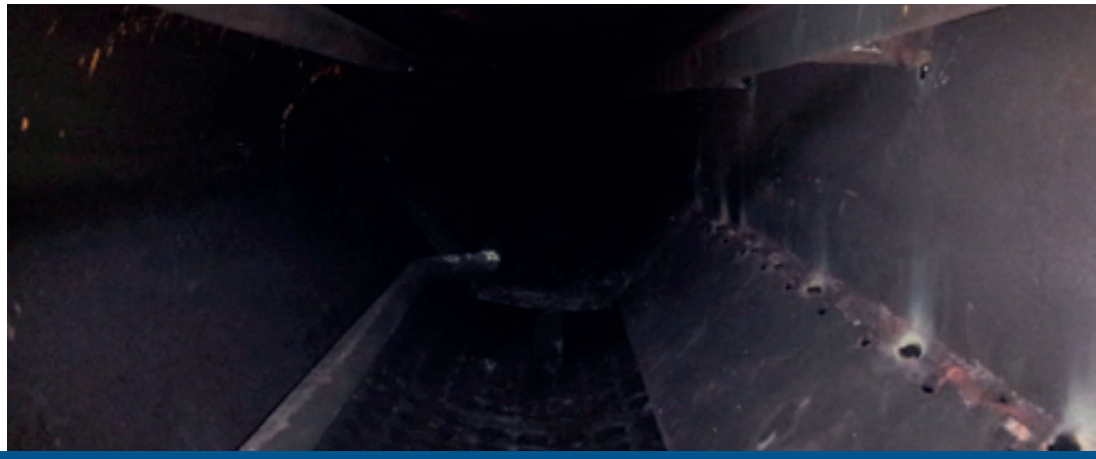
The boiler house is located in a unit of the oil refinery. In boilers, the steam is produced for the whole plant needs and delivered to the required equipment by pipelines. The trial need arose because the designed scheme of the deaerator does not provide the removal of bound CO2, which is formed during the decomposition of bicarbonates. The presence of CO2 causes the formation of carbonic acid with lowers pH in steam and condensate, causing corrosion in pipelines.

Water treatment programme

Before the trial customer did not use any treatment. Only, due to constant Jurby WaterTech international specialists visiting of the plant to perform service works in cooling towers, the client managed to show the problems he is encountering in the boiler house. After that, the specialist prepared a water treatment program, installed the dosing equipment, and ran a trial.

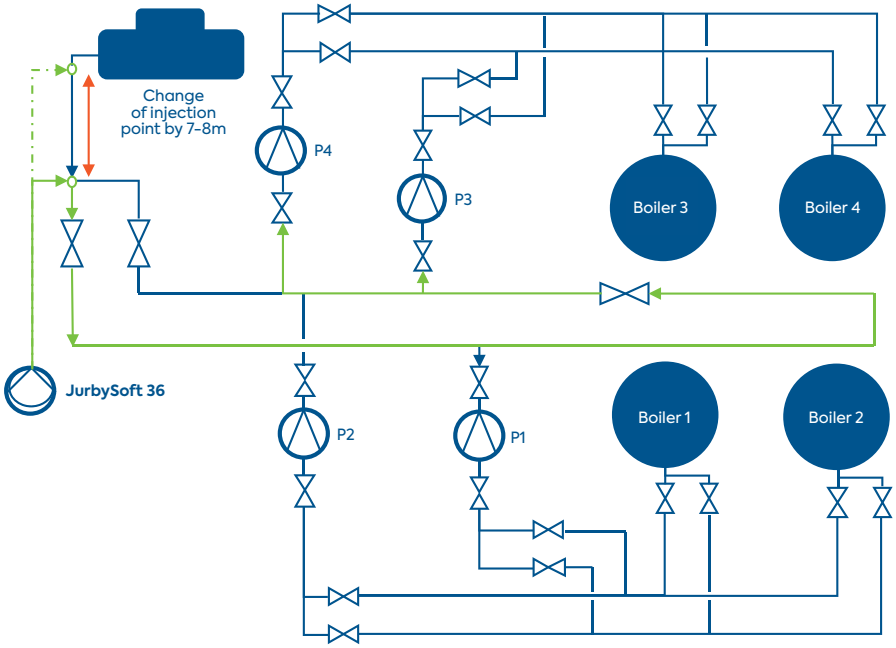
Main technical parameters of boiler house

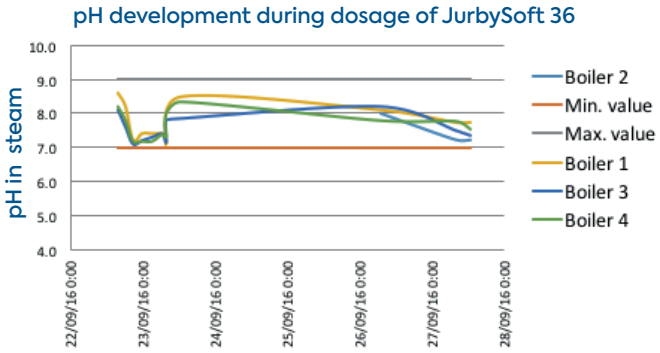
In this part of the plant, four steam boilers are installed. Three boilers are constantly running, while the remaining is for reserve. The steam production capacity of the operational boilers is 49–53 t/h. The output of all four boilers is in the range of 62-66 t/h.



Results of the trial in the plant

The JurbySoft was injected by a metering pump into a common feedwater pipeline right after the deaerator and fed to the three boilers. The dose of JurbySoft 36 was in the range of 30–80 g/m3. From time to time, the staff adjusted dosing to keep pH of the condensate between 8,0 – 9,0. After the start of JurbySoft dosing, the pH increase in saturated steam of boilers three and four were immediately observed in boilers and remained in the pH range of 7,0–8,5 during the trial. However, in boiler 2, the dosage initially failed to increase pH to 7,0. The failure to increase pH was caused by the fact that the JurbySoft 36 inhibitor was dosed at a point on the feedwater pipeline just before the make-up water stream divides into separate pipelines for boilers 1, 2 and 3,4. As the distance from the inlet point to the point of separation is minimal, the inhibitor did not have time to mix evenly with the water flow, and most of it went to boilers 3 and 4. The plant specialists changed the JurbySoft injection point by moving it 7-8 meters away from the manifold, after which the pH in boiler no. 2 also began to increase to pH=7 (see illustration below).





Finally, boilers 1 and 2 went for repairs. During the repairs in boilers 1 and 2, the baffle plates of the separation system and the partitions between the salt and clean compartment in the upper drums were repaired. These efforts resulted in positive outcomes. No difference in pH readings was observed in all boilers with the dosage of product 30-35 g/m3 of steam (see graph below).

Summarize

When using JurbySoft 36, the saturated steam pH value has normalised (increased to pH=8,0–9.0), consequently stopping steam acidification and improving steam quality. Visual inspection of the opened boilers, working at the trial, revealed that the inside surfaces of the boilers were almost clean, covered with passivation film of dark grey colour thickness to 1 mm (see picture below). There is practically no red deposit - it is gone because of treatment with JurbySoft 36.