About GlaxoSmithKline

GlaxoSmithKline ("GSK") manufactures active pharmaceutical ingredients (APIs) used in a variety of GSK prescription medicines. The site currently makes 12 APIs for a range of medicines prescribed for the treatment of respiratory, HIV, gastro-intestinal, allergy, anti-viral and neurological conditions.

Cooling Tower Water Treatment Process Redesign

Prior to the project, chemicals – biocide and scale inhibitor – were added periodically to cooling water treatment system to control cooling water parameters. However, GSK could not achieve the optimum cooling tower water control parameters as the treatment system had no feedback control to vary the amount of chemicals, which caused the problem of biocide and scale inhibitor overdose.

An overdose of biocide could lead to potential corrosion issues in the cooling tower structure and condenser tubes, while an overdose of scale inhibitor could lead to potential system fouling in cooling tower infill and condenser tubes. These could result in bacteria growth and poor system performance.

GSK replaced the existing system with an automatic chemical dosing system. The key improvement of this system was the introduction of tracer molecules in the chemicals. The tracer molecules enabled accurate real-time measurement of the chemical concentration in the cooling water, thereby allowing the system to determine the precise amount of chemicals needed to achieve the optimum chemical concentration.

Achievements

This project led to an improvement in the cooling tower performance – optimum pH, fouling, scaling and corrosion levels – as well as a low fouling factor for the chiller condenser tubes. A very low condenser approach temperature was achieved and maintained, resulting in an increase in chiller efficiency.

Overall, an annual savings of 409 MWh or $53,238 was achieved. This translates to about 5% improvement at the system level.