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Product safety and € 60.216 in energy and water savings - ENVIROX™ and 3D TRASAR™ Technology for Cooling Water reduce bio-fouling and increases efficiency in chiller system at a dairy plant in Denmark

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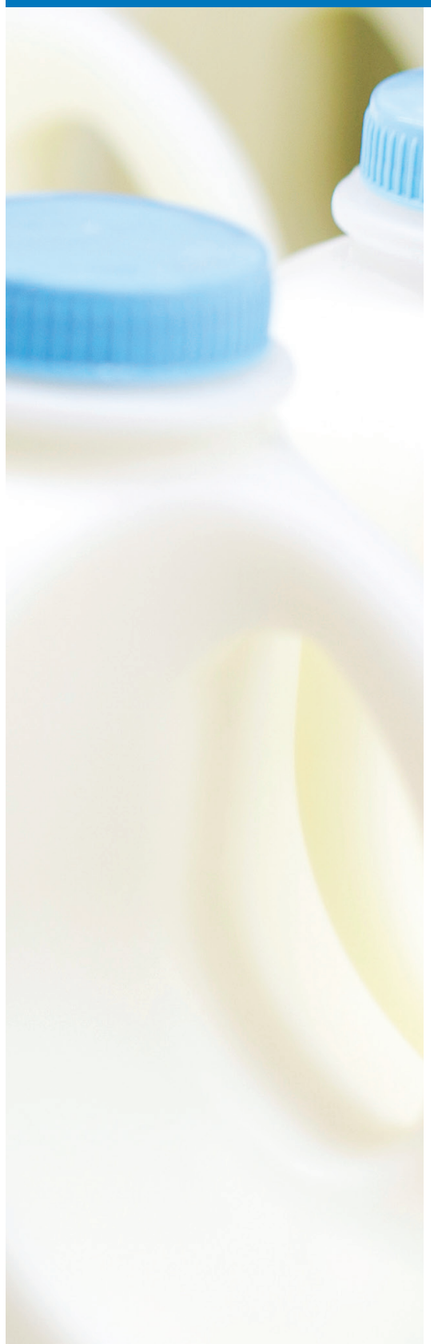
CASE STUDY – FOOD & BEVERAGE

CH-2050E



SITUATION

A dairy plant processing site was experiencing difficulties in obtaining its desired temperature (2°C) at the process side. The plant has a 150 m^3 chilled sweet water system and during the summer the customer has difficulties in decreasing the temperature to less than 4°C.

In addition, to these technical issues, the microbio control in the sweet water system was very poor and bacteria levels were significantly more than the internal requirement.

CUSTOMER'S GOALS

The customer's goals and Key Performance Indicators (KPIs) for this project included:

- Improving the microbiological level in the closed system (sweet water system)
- Implementing a food grade treatment and monitoring improvement
- Cooling system efficiency
- Energy savings
- Water reduction: current is 60m^3/week as make-up and the goal is 0,6m^3/week

Nalco Water's proposed plan of action using ENVIROX Technology and 3D TRASAR Technology delivered the following results:

CUSTOMER IMPACT	eROI℠	ECONOMIC RESULTS
Water savings	WATER	648 m^3/year represented 648 €/year
Biofilm was removed resulting in improved heat transfer in the chilled water evaporator and consequently resulting in energy and cost savings	ENERGY	700.800 kWh/year this represents 59.568 €/year
A reduction in CO_2 emissions and reduced power usage	AIR	Reduction in CO_2 emissions by 216 tons / per year
Total Cost Savings	COSTS	60.216 €/year

eROI is our exponential value: the combined outcomes of improved performance, operational efficiency and sustainable impact delivered through our services and programs.

APPROACH

Nalco Water and the customer's staff worked together to carry out a full Mechanical, Operational, Chemical and Sustainability (MOCS) audit of the system, which included both the water and process side.

The combined team reviewed all aspects of plant operation to identify areas for improvement which would positively impact the customer's operations and identify any new opportunities that would help them achieve their KPIs with Nalco Water's advanced technologies.

The analysis showed that the heat efficiency and biological control was being compromised due to

- Process contamination and microbial induced fouling in the chilled water side of the critical heat exchange surfaces
- Lack of control in the biocide treatment, relating to the water process side

SOLUTION

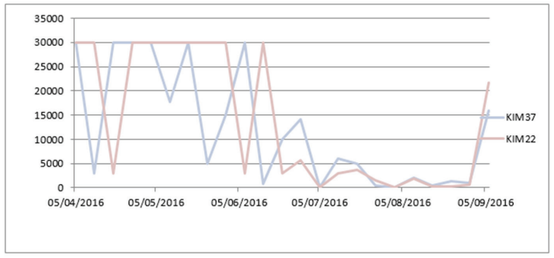
The solution consisted of 3 main actions. First, work with the customer to reduce process contamination. Second, an efficient biocide treatment was implemented. Chlorine dioxide was determined to be the most suitable disinfecting agent due to its:

- Fast-acting capabilities
- Ability to act on a broad spectrum of bacteria
- Non-reactivity with pollutants such as ammonia
- Effectiveness in removing biofilm and inhibiting regrowth
- Approval for potable use
- Low tendency to form harmful THM's
- Limited contribution of chlorides: corrosion under control

Furthermore, ENVIROX Technology was chosen because it generates ClO_2 safely, using a single non-acidic pre-cursor chemical and only small engineering modifications were required. Third, to ensure a fully automated approach to control the key parameters of the system, Nalco Water recommended the implementation of the 3D TRASAR™ Technology along with the treatment program to control the system parameter and more accurately manage the system. The key parameters were: pH, conductivity, Turbidity, ORP, corrosion level. The Nalco Oxidant Controller was selected given that it was able to directly measure ClO_2 level. Moreover, the system was connected to Nalco Water's System Assurance Center to ensure that its Water Experts would continuously monitor the system, responding to any system variances and alarms. Systems are constantly monitored and recommendations are provided for fine-tuning 24 hours a day, 7 days a week, 365 days a year. Immediate alarm response lead to faster problem identification and improved system operations, saving water and energy, while making efficient use of chemistry

RESULTS

Nalco Water's partnership with the plant produced the following results:



- Microbio control: after a cleaning phase (lasting around 3 months), bacteria counts were below the site norms (as shown in the graph)
- Removal of the biofilm resulted in an increase in system efficiency, enabling the plant to run on less compressors and achieve the 2°C temperature in the system during summer
- Efficiency improvement directly corresponds to reductions in energy usage and operating costs for the chiller plan
- Water saving due to water make up reduction: 0,6m^3/week instead of 60 m^3 before: 648 m^3/year water saving
- A reduction in CO_2 emissions of 216 tons per annum, due to reduced power usage
- Improvement of the water turbidity

ENVIROX and 3D TRASAR Technology for Cooling Water

CONCLUSION

The combination of Nalco Water's problem-solving approach, on-site expertise, and the application of innovative technology, delivered significant improvements in sustainability performance. Nalco Water has succeeded in minimizing the water and energy savings, maximizing operational results and optimizing the total cost of operations at this diary plant.