Water Technologies & Solutions
case study

GenGard* with STP improves production, saves $42K in water consumption annually for Australian metals producer

challenge

A large metals producer, located on an island state of Australia, was losing production, due to cooling system fouling in their acid plant. A by-product of refining zinc from zinc ore, the acid plant is a secondary process that produces sulfuric acid.

Prevailing winds in the area were introducing debris into the cooling system through the cooling tower. This debris would settle in the system and foul the heat transfer surfaces of the heat exchangers, reducing the capacity of the heat exchangers to reject heat from the process and reducing production levels.

Minimizing production loss was a key component in measuring the success of the trial, as was reducing water consumption in the system.

The cooling tower makeup is derived from city water. Tower data and typical makeup chemistry are shown below:

Recirculation Rate	9680 gpm (2,200 m^3/h)
System Volume	99,000 gallons (375 m^3)
Delta T	12°C
CITY WATER CHEMISTRY	
Magnesium	7.5 ppm
Calcium	26.5 ppm as $CaCO_3$
Phosphate	0 ppm as PO_4
Conductivity	98 µmhos
pH	7.4
TOWER WATER CHEMISTRY	
Cycles of Concentration	8 - 10
Conductivity	750 - 1,500 µmhos
m-Alkalinity	<350 ppm
pH	6.8 - 7.5
Calcium	<350 ppm as $CaCO_3$
Magnesium	<200 ppm

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solution

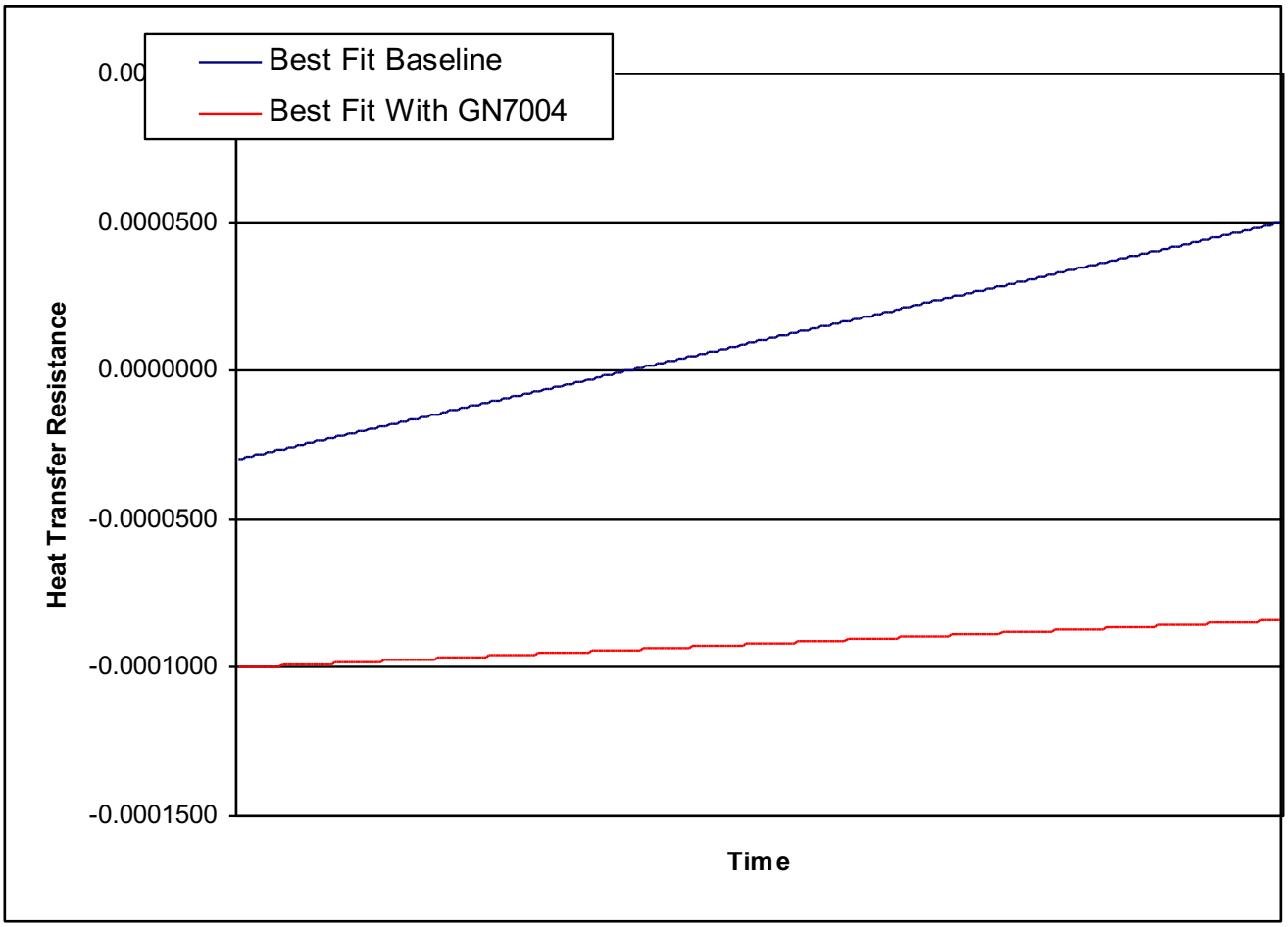
In order to reduce foulant deposition and enable water reduction through higher cycles of concentration in the cooling tower, SUEZ recommended a cooling program change to GenGard GN7004.

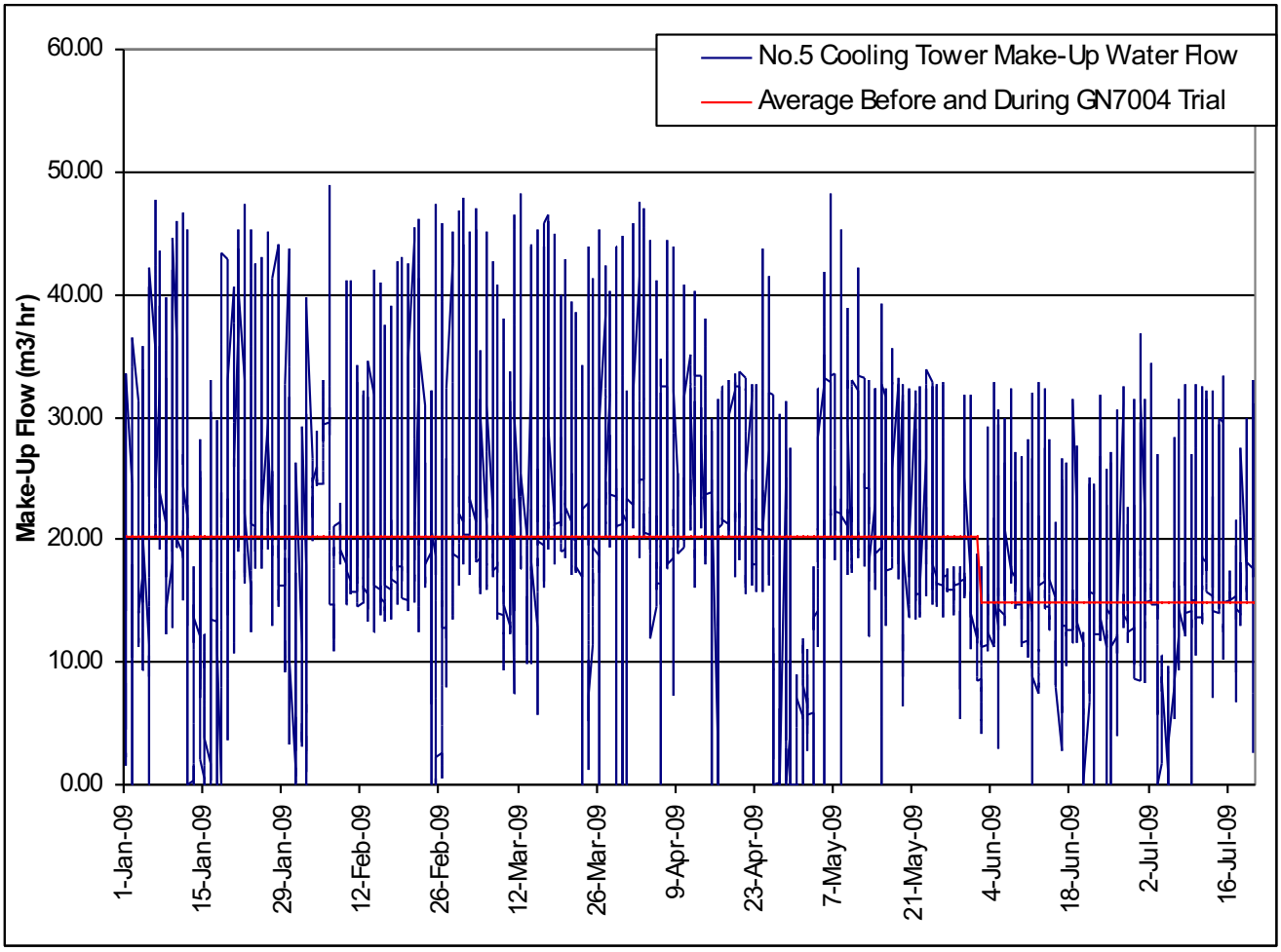
Part of the GenGard platform of cooling products, GenGard GN7004 features SUEZ's newly patented Stress Tolerant Polymer (STP) with the superior ability to keep foulants from depositing. This revolutionary product, effective in both neutral and alkaline pH scenarios, is a forgiving chemistry with excellent inhibition of calcium phosphate, calcium pyrophosphate, zinc phosphate, and aluminum phosphate. It also offers exceptional dispersion of high iron and silt levels and handles high exchanger skin temperatures and high pH excursions.

results

In order to verify program performance, a Deposit Accumulation Testing System (DATS*) Fouling Monitor was used to control, monitor, and record all parameters necessary to perform heat transfer analysis on a simulated plant heat transfer surface. As deposits (scaling, microbial slime, and sediments) accumulated, the tube surface became thermally insulated, and the change in heat transfer resistance (HTR) was recorded electronically.

Figure 1 shows the GenGard performance versus the baseline performance as measured by the DATS™ monitor. As shown in the graph, the slope of the line (i.e. the rate of fouling) was significantly less steep after the GN7004 had been added than during the baseline period, though they began at different points. The fouling rate had been reduced by 80 percent, which also indicates significantly less fouling of the plant's heat exchangers, and a resulting increase in production potential.





Water consumption improved greatly, as well, because GenGard allowed the tower cycles to be raised from 4.5 to 9 cycles. Figure 2 shows the makeup water flow rate taken from the plant control and monitoring system every hour. Using GenGard GN7004 resulted in an average water consumption savings of 5.33m^3/hr, which translates into an annual savings of $42,000.

In summary, GenGard GN7004 gave this metals producer the capability to achieve greater production, while also reducing water consumption.