



3D TRASAR™ Water Saver Technology helps a global automobile manufacturer exceed water saving goals and ensure optimum cooling system performance

NALCO
An Ecolab Company

CASE STUDY - MANUFACTURING

CH-1534



SITUATION

A large Midwest-based automotive assembly company had a corporate sustainability target of 30% water reduction for the period from 2012 to 2015. The company had already achieved a 62% reduction over the past 10 years (2000 - 2010) and was struggling to find additional ways to meet the goal. The cooling tower system was identified as one of the largest users of water in the plant and it had already been optimized using 3D TRASAR® technology. The goal was to find a new technology that could assist in further reducing water use.

BACKGROUND AND CHALLENGES

The targeted cooling system consisted of two cooling towers used for comfort and engine test (Dynamometer) cooling. The system volume was 16,000 gal that was dedicated to 6 chillers, 2 Tube and Shell, and 1 Plate and Frame heat exchanger. Skin temperatures reach over 200°F.

As with most cooling water systems, there are three main concerns that the treatment strategy needs to address. Those concerns are prevention of corrosion, scaling, and microbial fouling. If not managed correctly, each of these concerns will reduce asset life and increase operating costs via increased energy and water consumption.

The system was optimized for each of these concerns with the following parameters:

- Cycles of concentration = 5
- Blowdown water = 10,965 gpd
- Corrosion of mild steel = 1.3 mpy
- Corrosion of copper = 0.2 mpy
- Microbial activity = 10⁴ cfu/ml
- No scale build-up in critical heat exchange equipment or on the cooling towers

CUSTOMER IMPACT

87% reduction in blowdown saving 3.5M gallons of water annually

46% reduction in makeup water saving 3.5M gallons of water annually



ECONOMIC RESULTS



Annual savings of \$17,290

Annual savings of \$7,000

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

The challenge was to increase cycles of concentration, thereby reducing blowdown and saving water without increasing corrosion, scale or microbial activity.

SOLUTION

To address this sustainability goal, 3D TRASAR Water Saver technology was recommended as part of a fully integrated solution that included 3D TRASAR technology, 24/7 engineering service, and Nalco chemistries. This technology was operating for 6 months, from May through October, during one of the most intense cooling seasons on record in this geography.

3D TRASAR Water Saver technology is an electrochemical precipitation technology that preferentially removes hardness minerals from cooling water. By removing these minerals from the water, blowdown is reduced and cycles of concentration are increased resulting in significant water savings.



Figure 1

RESULTS

During the 6 month operating period, cycles of concentration were gradually increased and blowdown was reduced. All key performance indicators were monitored. Here are the results that were achieved:

- Cycles of concentration = 40+
- Blowdown water = 1371 gpd (87% reduction)
- Corrosion of MS = 1.5 mpy
- Corrosion of Cu = 0.05 mpy
- Microbial activity = 10^4 cfu/ml

- No evidence of scale build-up in critical heat exchange equipment or on the cooling towers as confirmed by approach temperatures and inspection.

CONDUCTIVITY/CYCLES OF CONCENTRATION

Conductivity went from approximately 1050 umhos to 7350 umhos which equated to 40+ cycles of concentration. Blowdown was reduced by 87% resulting in significant water savings. See Figure 2.

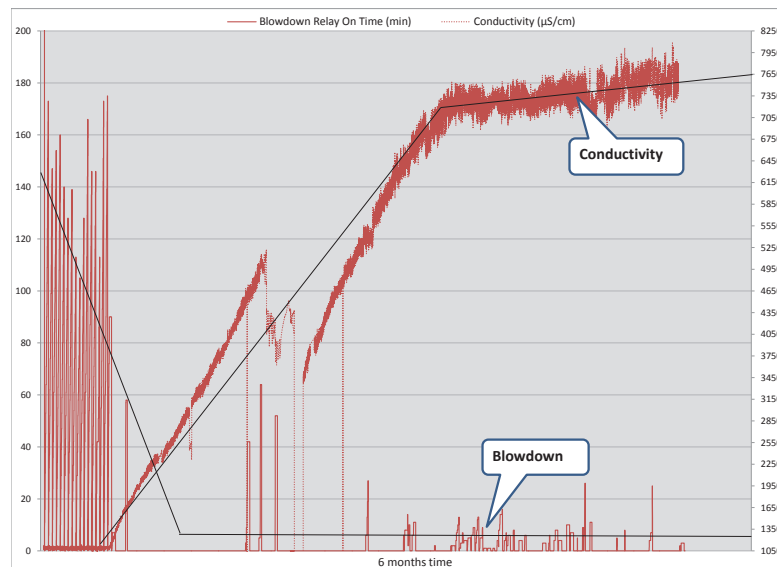


Figure 2 - Cooling System Blowdown and Conductivity

Corrosion Rates were maintained at 1.5 mpy for mild steel and < 0.05 mpy for copper through the hottest part of the summer. These are well below the recognized industry standards for corrosion in cooling water systems of <3.0 mpy for mild steel and <0.3 mpy for copper. See Figure 3.

Microbial Activity in the cooling system was maintained under excellent control even during the highest temperatures of the cooling season as evidenced by microbial analysis reports. See Figure 4.

The net achievement was that blowdown was reduced by 87% or 3.5M gals/yr saving \$17,290/yr. Makeup was reduced by 46% or 3.5M gals/yr saving \$7000/yr. Corrosion, microbio, and scaling were all controlled below published industry standard guidelines.

CONCLUSION

By implementing a fully integrated solution including 3D TRASAR technology, 24/7 Engineering Service, and Nalco chemistries, the automotive customer was able to exceed their sustainability target for water savings on this cooling system while providing peace of mind that their cooling assets were being operated in a safe and effective manner.

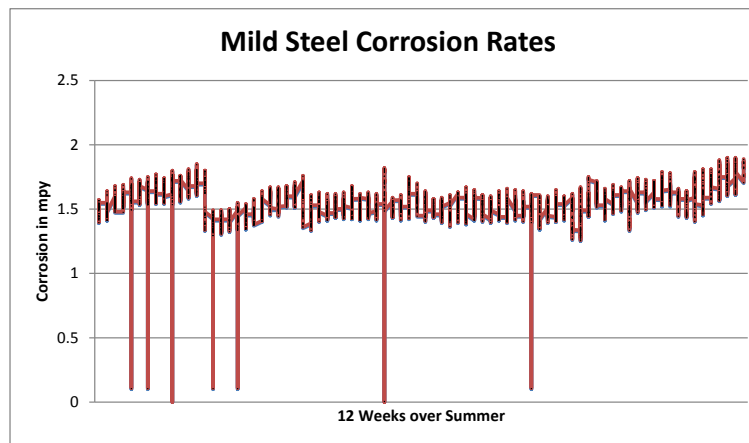
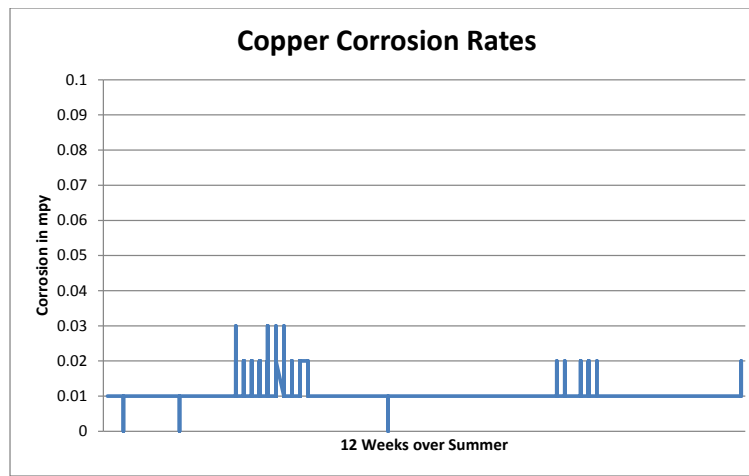


Figure 3 - Cooling System Corrosion Rates

Final – Report Number: 690180

Nalco CO
 1601 W DIEHL RD
 NAPERVILLE – IL – 60563-1198 – USA
 Sold To: 0001075096 Ship To: 0002179181
 Representative: Kaveh Sotoudeh
 Sample taken from: AEC Tower

Batch number: NAO4291
 Sample number: NB032527
 Date Sampled: 22-Aug-2012
 Date received: 22-Aug-2012
 Date completed: 27-Aug-2012
 Date authorized: 27-Aug-2012

Analytical Report

PHYSICAL APPEARANCE

Physical State: Liquid	Color of Sample: Colorless	Solids: Flocs	Quantity of Solids: Slight
Analysis		Result	Test Method
AEROBIC BACTERIA			
Total Viable Count @ 35°C		1 000est. CFU/mL	CB22010
Pigmented Bacteria		1 Type	CB22011
Mucoid Bacteria		Not Detected	CB22011
Total Coliforms		<1 000 CFU/mL	CB22031
E Coli		<1 000 CFU/mL	CB22031
Pseudomonas spp @ 35°C		<1 000 CFU/mL	CB22012
ANAEROBIC BACTERIA			
Sulfate Reducing Bacteria		<1 CFU/mL	CB22018

Figure 4

Nalco, an Ecolab Company

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