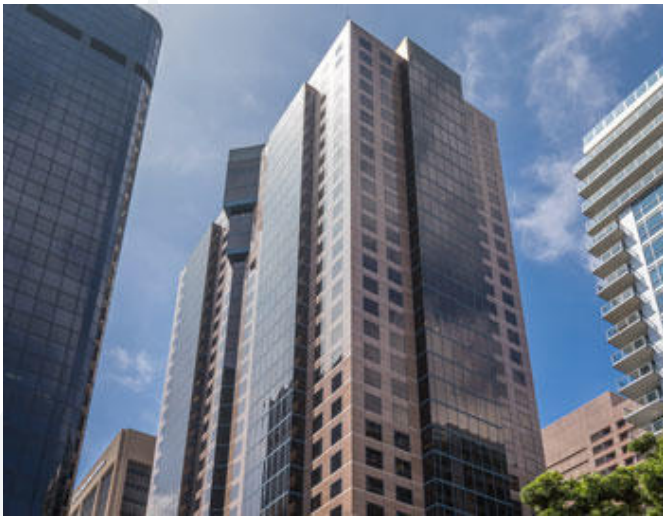


HIGH RISE TOWER

COMMERCIAL OFFICE BUILDING



OVERVIEW

The cooling system at this 34-story office tower in San Diego supplies comfort cooling to 530,535 square feet of Class A office space. If the cooling system were to fail or experience reduced functionality, the negative impact on the tenants in the building would be significant.

The cooling system consists of a two cell 1,000 ton cooling tower providing cooled water to HVAC chillers. Because replacing a tower of this size on the roof of the building would be cost prohibitive, protection and extending the life cycle of this tower is paramount.

IMPLEMENTATION

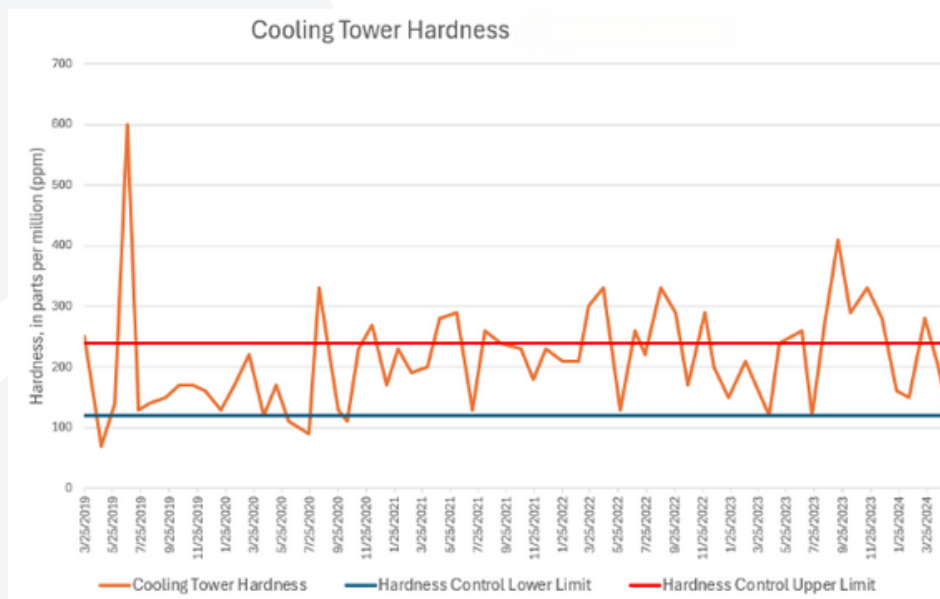
Make up water conductivity (metric for mineral content in water) at the site has been, on average, 891 uS since March 2019. Potable water in San Diego is difficult to treat due to the high concentration of minerals in the water. Due to the extreme hardness and overall mineral content in San Diego's potable water, cooling towers usually operate at two cycles of concentration (CoC) in the region on a traditional liquid chemical program. CoC is how concentrated the cooling tower water is relative to the potable makeup water via evaporation, as well as the ratio of makeup to blow down water. This means 50% of the water being supplied to the cooling tower is being blown down to the drain at two CoC. The owner of the building was not content with this "status quo" of water wastage and brought in Capture H₂O for a better solution.

HIGH RISE TOWER

SCALE CONTROL

The Site opted into the Capture H₂O Blended Program. This program utilizes dual alternating, high efficiency softeners on the cooling tower make up line blended with potable water to control the scaling minerals calcium and magnesium. Due to optimal equipment set up and high-quality service and attention from both the onsite and Capture teams, hardness has been kept within our set parameters (i.e., cooling tower hardness range of 120 - 240 ppm) 87% of the time, leading to tremendous scale control.

What does this mean for building management? **Significant energy savings and corrosion protection.** Every eggshell's width of scale leads to 12% energy loss. With the optimal amount of scaling minerals in the make up and cooling tower water, this system operates efficiently.

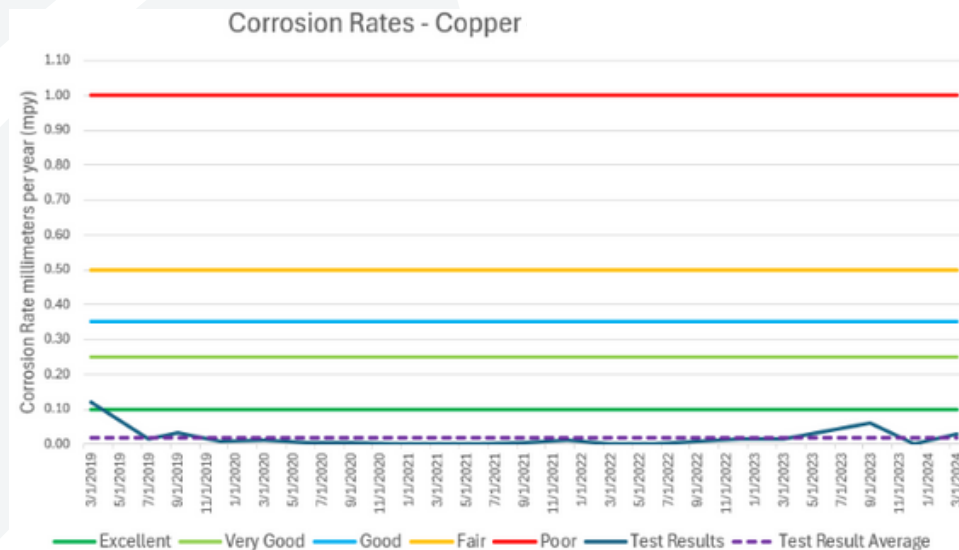
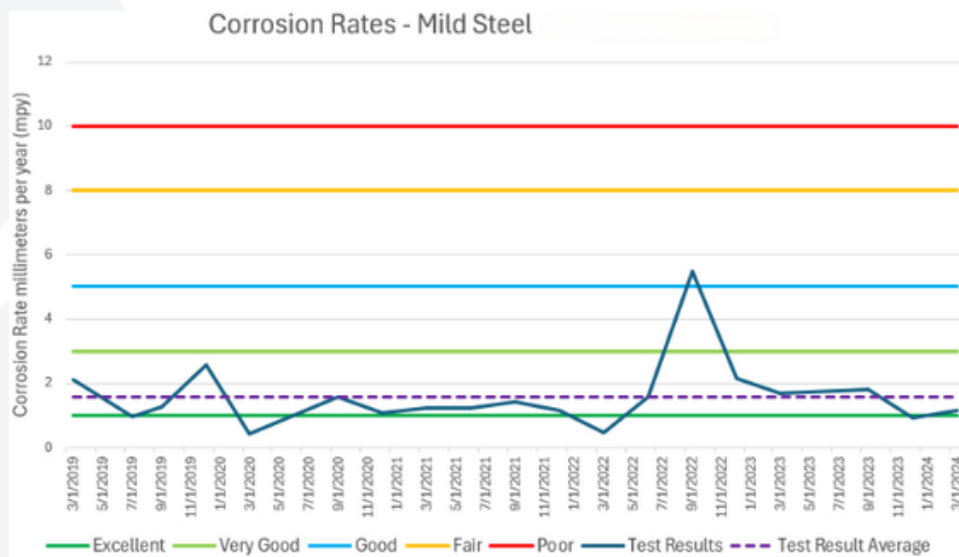


HIGH RISE TOWER

CORROSION CONTROL

This program utilizes the hardness minerals to protect the equipment from corrosion. Due to the highly controlled chemistry, this site realizes world-class mild steel and copper corrosion control. From March 2019 to March 2024, the average mild steel corrosion rate was 1.5617 mils/year (considered Very Good according to ASHRAE Corrosion Standards) and the average copper corrosion rate was 0.0166 mils/year (considered Excellent according to ASHRAE Corrosion Standards).

As you can see from the corrosion coupon data collected over this period, this office tower was able to create an environment that effectively controlled corrosion in the system, while reducing chemical consumption.



HIGH RISE TOWER

BACTERIA CONTROL

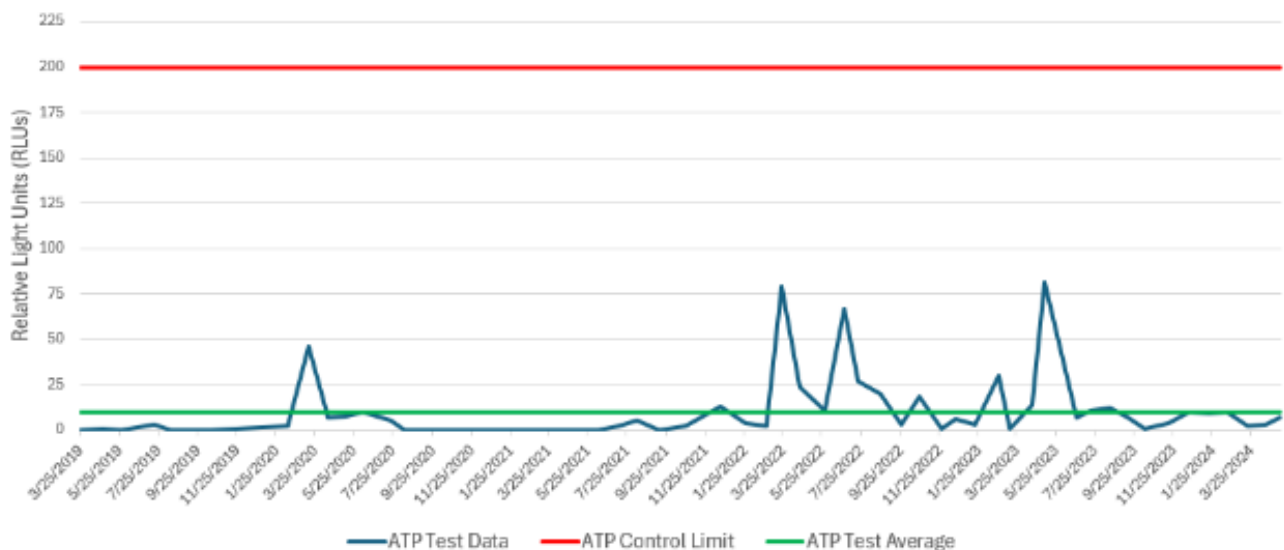
Bacteria control is a serious concern for this building’s owner. A cooling tower is a perfect environment for bacteria growth and reproduction due to the temperature of the water and exposure to the environment. Legionella Pneumophila (Legionnaire’s Disease) is a form of pneumonia contracted through the inhalation of infected aerosolized water droplets, which are prevalent in cooling systems. This, coupled with a high fatality rate of 10%, makes prevention of Legionella in cooling systems critical.

Adenosine triphosphate (ATP) is a molecule that serves as the primary energy source in cells. ATP is industry standard for bacteria testing. Control range is considered 200 Relative Light Units (rlus) or less.

We can see from the data utilizing the ATP test that this site is achieving effective bacteria control with this program. During this period, the high rise building had an average of 10.14 rlus with a maximum of 81 rlus, well within the control range.

Why is this important? Two reasons. Firstly, bacteria, algae, and biofilm can lead to heat transfer inhibition and energy loss. The lower the ATP count, the more efficient this system is operating. Secondly, bacteria can be harmful to humans, especially in the form of Legionella. This office tower has experienced excellent bacteria control over this time period.

Adenosine Triphosphate (ATP) Test Data

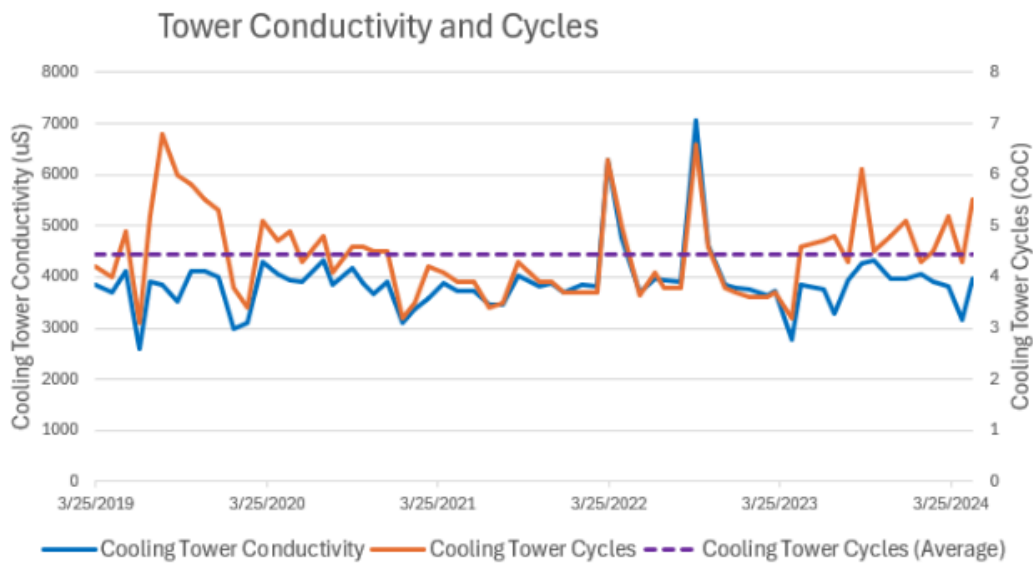


HIGH RISE TOWER

WATER SAVINGS

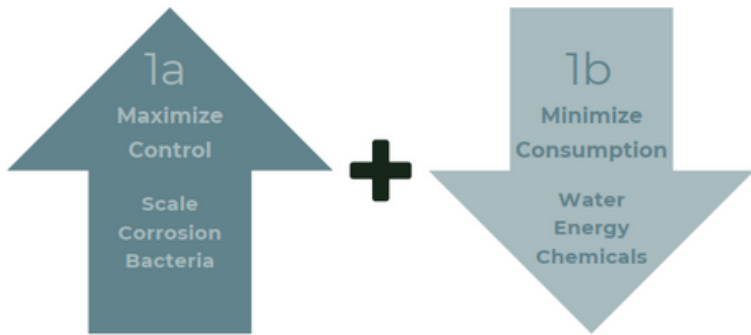
With the primary water treatment functions (scale, corrosion, and bacteria control) achieved, let's look at how the Capture H₂O Blended Program allows this site to limit blowdown, increase cycles of concentration, and save significant amounts of water. From March 2019 to March 2024, the system achieved an average conductivity of 3,893 uS and an average cycles of concentration of 4.43.

Remember that the average cycles of concentration in San Diego is two, or 50% blowdown. At 4.43 CoC, this high rise tower is blowing down only 23% of the makeup water on average. This is a 27% reduction in water consumption and a 54% reduction in blowdown to the drain. **This translated to 733,926 gallons of water savings in 2023 alone.**



SUMMARY...

This high rise commercial tower in San Diego is a model program for cooling water innovation and leadership. The Capture H₂O Blended Program has led to 54% reduction in blowdown, significant lower chemical consumption, and tremendous control.



CAPTURE
H₂O

Find out how Capture H₂O can help your business shift to a more sustainable, cost-effective water treatment program at captureh2o.com

Water Savings

It is difficult to measure the energy savings due to excellent scale and bacteria control and avoided capital expenses from excellent corrosion control. However, cost savings associated with reduced water consumption is quite easy.

In 2023 alone, they saved **733,926 GALLONS OF WATER**, avoiding a water bill of **\$12,391**. The payback on this project with these savings is **39 MONTHS**.