

OCEAN POINTE

COMMERCIAL OFFICE BUILDING



OVERVIEW

Ocean Pointe is a 30,500 square foot, three story office building in San Diego, CA. The cooling system consists of a 125-ton fluid cooler and a closed loop that provides comfort cooling to the office tenants in the building.

Before Capture H₂O took over the water treatment program at this building, the fluid cooler's copper tube bundles were caked with scale which lead to increased energy consumption due to the inhibited heat transfer. Note that every eggshell's width of scale leads to 12% energy loss.

IMPLEMENTATION

Make up water conductivity (metric for mineral content in water) at the Ocean Pointe site has been, on average, 919 uS since December 2022. 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, cooling towers usually operate at two cycles of concentration (CoC) in the region on a traditional liquid chemical program. This was the case at Ocean Pointe. 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 that half (one divided by two CoC) of the water consumed by the tower was sent to the sewer as wastewater. Ownership was not content with this outcome and looked to Capture H₂O for more sustainable options.

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SCALE CONTROL

Ownership opted into the Capture H₂O Hybrid Program. This program utilizes an **energized** physical water conditioner paired with limited solid chemicals. The physical water conditioner acts like a transformer, introducing an electromagnetic field into the condenser water. This field interrupts the scale formation process and removes existing scale by charging the scaling minerals. This results in them attracting to each other instead of the system equipment.

As shown in the photos, the Hybrid program dissolved the existing scale that was caked on the tube bundle over a **5-month period**. This improved heat transfer and significantly decreased the building's energy costs.



December 2022



March 2023



May 2023



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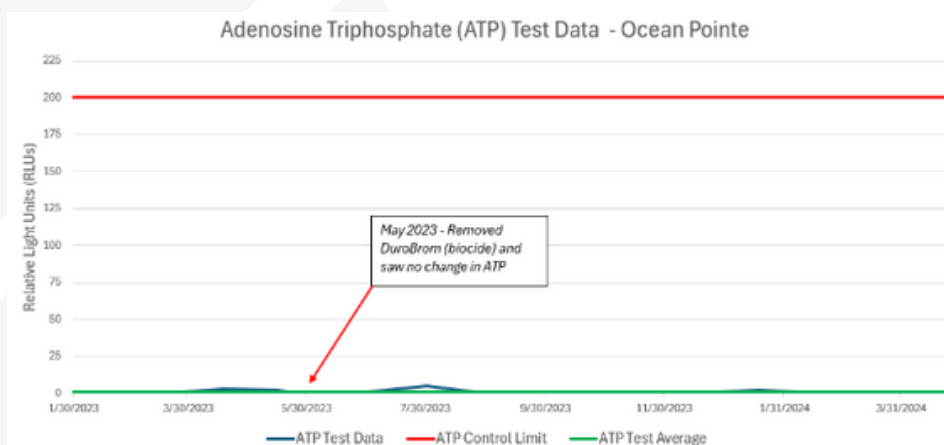
BACTERIA CONTROL

Not only does the electromagnetic field charge the scaling minerals, it also charges bacteria and microorganisms in the water. This process, known as electroporation, increases the permeability of the cell membrane and disrupts the cell's ability to regulate the flow of proteins, ultimately causing it to burst and die.

As shown in the below trend graph, bacteria control is measured and verified utilizing Adenosine triphosphate (ATP) tests. ATP is the molecule that serves as the primary source of energy in cells and is industry standard for bacteria testing. Control range is considered 200 Relative Light Units (rlus) or less.

Why is it important to control bacteria? Three reasons:

- Bacteria, algae, and biofilm lead to heat transfer inhibition and energy inefficiencies. The lower the ATP count, the more efficient a system is operating.
- Second, aerosolized bacteria can be harmful to humans, especially in the form of Legionella Pneumophila (Legionnaire's Disease).
- Third, chemicals are expensive! Reducing the need for bacteria-focused chemicals is a significant cost saver and creates a safer environment for the people who work in the building.



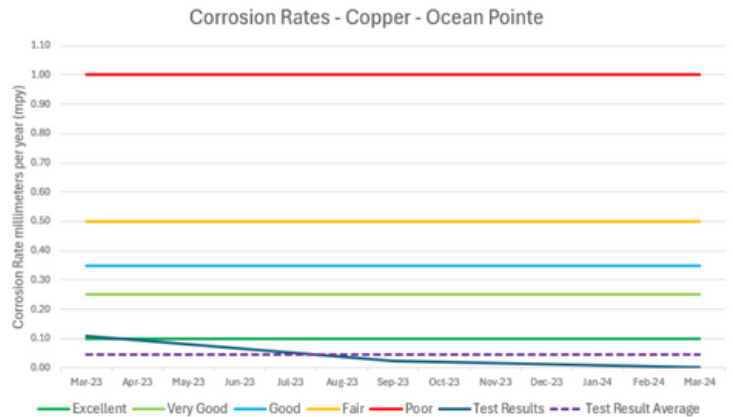
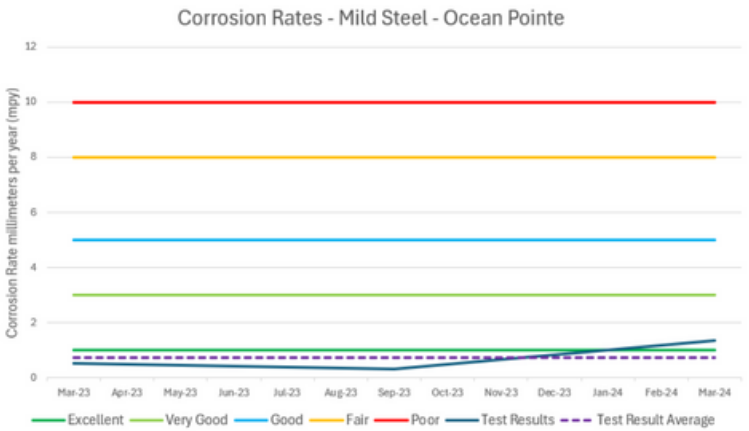
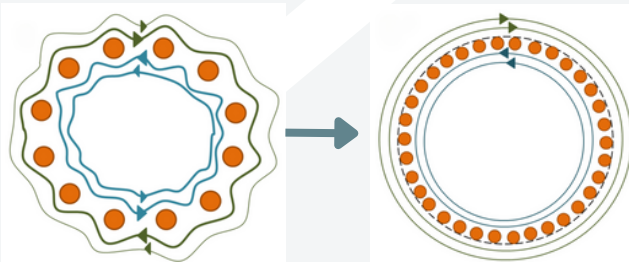
Since December 2022, Ocean Pointe has had an average of 0.94 rlus with a maximum of 5 rlus, well within the control range.

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CORROSION CONTROL

The same electromagnetic field that stops scale and bacteria from forming also prevents corrosion. The device uses an electrical phenomenon known as “skin effect” which drops the electromagnetic field to 0 near the surface - under half a millimeter - of the pipe. Corrosion is simply an exchange of ions between two materials, and the lack of an electromagnetic field and presence of current flow on the inner surface of the pipe stops ion transfer between the pipe and the water, preventing corrosion. This removes the need for corrosion inhibiting chemicals.

The diagrams below are a representation of how magnetic and electromagnetic fields will oppose each other when in the shape of a pipe. These fields cancel out at 0 near the inner surface of the pipe.



As seen from the corrosion coupon data collected over the evaluation period, Ocean Pointe was able to create an environment that provided excellent corrosion control for the mild steel and copper metals in the system while feeding **no corrosion inhibiting chemicals.**

SUMMARY...

The Capture H₂O Hybrid Program is a great option for smaller towers and sites that have footprint limitations. It is also a great alternative to the High Cycle Program for customers who are in areas with stringent limits on softener waste generation. At Ocean Pointe, the program has led to a 66% reduction in blowdown, a significant reduction in chemical consumption, and excellent control.

“The Capture H₂O Hybrid Program has been a great option for the cooling system at Ocean Pointe. Thank you to Capture for their implementation and service.”

- **Julio Spano, Essential Heating and Air, Mechanical Contractor for Ocean Pointe**



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

With the scale, corrosion and bacteria limiting factors addressed by the Hybrid Program and not chemicals that lose effectiveness at higher CoC, the Capture H₂O Hybrid Program allowed Ocean Pointe to increase cycles and reduce blowdown, resulting in significant water savings. Since December 2022, the system has risen from two to six CoC, and we anticipate Ocean Pointe ultimately attaining

10 cycles by the end of 2024.

Remember that the average CoC in San Diego is two, meaning 50% of the water consumed by the tower is sent to the sewer as wastewater. At six cycles of concentration, Ocean Pointe is sending only 17% (1 divided by 6 CoC) of the makeup water to the sewer. This is a

33% reduction in water consumption, and a 66% reduction in wastewater sent to the drain.