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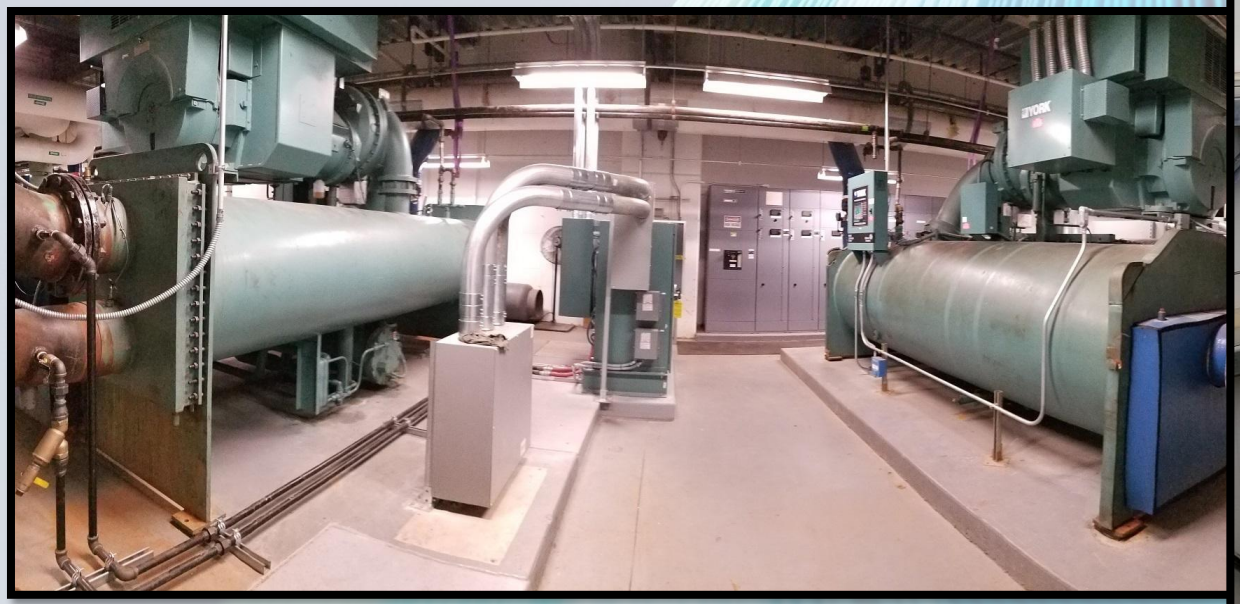
Cooling Tower & Chiller Plant Case Studies

The Benefits of HydroFLOW

- *Increases overall heat transfer efficiency by reducing scale and biofilm deposits.*
- *Reduces the use of anti-scalant, anti-corrosive and biocide chemicals.*
- *Lessens water usage by allowing cooling systems to operate at higher conductivity.*
- *Extends service life of equipment.*



LEED Gold Certified Building

A LEED Gold certified headquarters of a Fortune 100 company in Houston, Texas, replaced their chemical-based cooling system water treatment regimen with *Hydro*FLOW devices.

"*Hydro*FLOW significantly improved the operation of our cooling system, in terms of cost and maintenance. This technology pays for itself with the monthly savings it attains."

- Quote from the Facilities Manager

Results

- **85% blow-down water reduction, which greatly exceeded the 50% goal.**
- **75% chemical reduction.**
- **50% reduction in maintenance frequency.**
- **10% reduction in energy consumption by the cooling towers and chillers.**

Power Station Cooling Tower

A 500 MW combined cycle power plant in the U.S. Midwest was looking to reduce chemical and cooling water usage in their 8-cell cooling tower system. To achieve these goals, a Custom i72" *Hydro*FLOW unit was installed on the recirculating cooling system at the inlet to the condenser.

"According to our cooling tower inspector, the cooling tower fill was one of the cleanest he had ever seen." - Quote from the Project Manager

Results

- **48% blow-down water reduction, which equals roughly 60 million gallons/year.**
- **74% reduction of scale & corrosion inhibitor chemicals.**
- **73% reduction in biocide & dechlorinator chemicals.**
- **No indication of scale or biofilm were identified in condenser or cooling tower fill and basin during inspections.**
- **No degradation to cooling system performance.**

Business Complex Cooling Towers

This business complex in Atlanta, Georgia, includes several high-rise buildings which are maintained by individual Facilities Managers. Due to high water costs, one of the Facilities Managers operated his building's cooling tower at high cycles of concentration to reduce water usage, which resulted in severe scale and biofilm problems. The main challenge was to reduce the cooling system's bio-counts from 100,000 to under 10,000 CFU/ml.

Results

After a few short days with a *Hydro*FLOW custom device, the CFU/ml count dropped to under 1,000. Other added benefits included reduced scale and biofilm accumulation in the cooling tower and chiller tubes.

The custom device helped the business complex achieve a return on investment of roughly six months.

These results motivated Facilities Managers of other buildings to request a capital budget to purchase *Hydro*FLOW equipment.

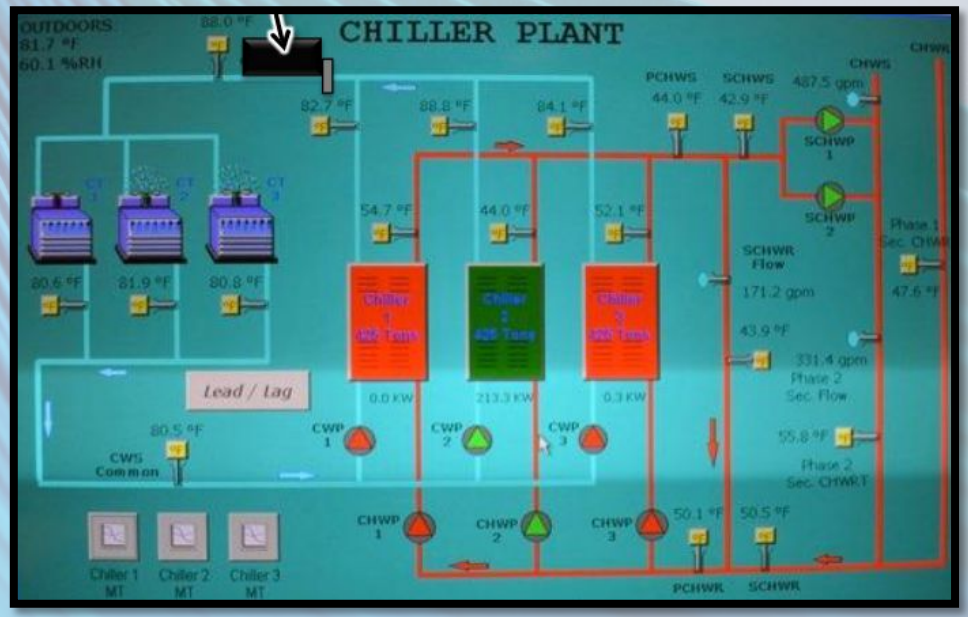
At the end of 2020, multiple custom *Hydro*FLOW devices were installed on cooling towers and potable water systems throughout the complex.

Hotel Cooling Tower

A hotel in Oahu, Hawaii, installed a *Hydro*FLOW custom device to mitigate scale issues in their cooling system, while reducing blow-down water and chemical usage. The incoming makeup water had a total hardness of roughly 200 ppm and Silica hardness of roughly 50 ppm.

Results

- **Scale accumulation stopped as soon as *Hydro*FLOW was installed, while existing scale and biofilm deposits were gradually removed.**
- **Anti-scalant and anti-corrosive chemicals were completely discontinued after 1.5 months.**
- **After reducing the biocide chemical by 75%, the total bacteria counts continued to be minimal.**
- **Bleed/blow-down was reduced by 50%.**
- **The efficiency of chillers was maintained.**



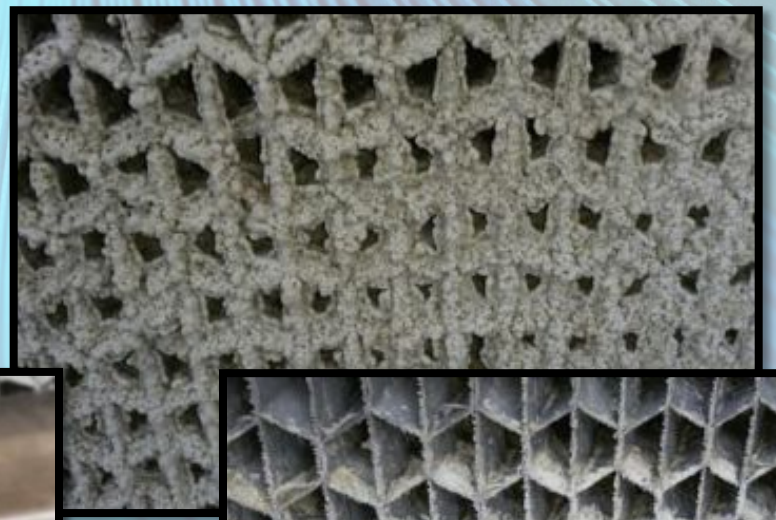
Hospital Cooling Tower

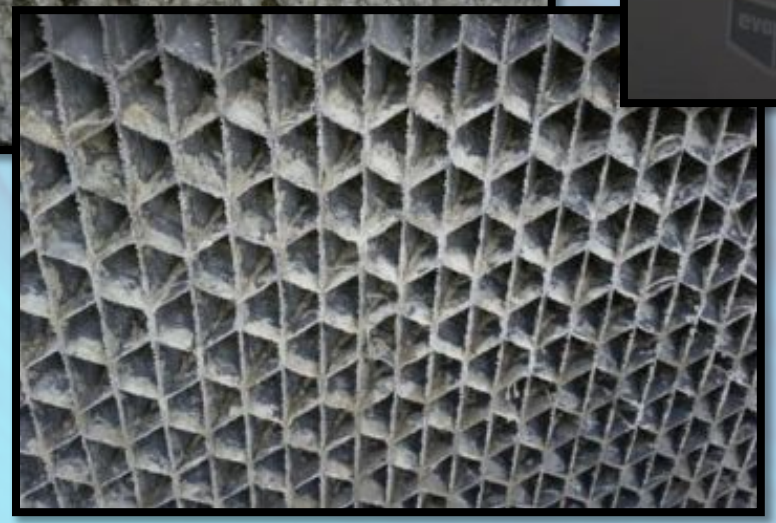
"After five months of the cooling tower being chemical-free, there is no hard scale accumulation, and the Heterotrophic biological count is well under 1,000 CFU/ml. We've also noticed that our chiller is operating more efficiently due to scale and biofilm removal." - Quote from the hospital's Project Manager

Loose mineral deposits collected in the sump, instead of inside pipes and equipment as hard .scale

As minerals precipitates out of solution as fine powder, they can be filtered out, saving bleed/blow-down .water consumption

.Drift eliminator before





.Drift eliminator after

Installed *Hydro*FLOW .device

Casino Chiller Plant

General Details

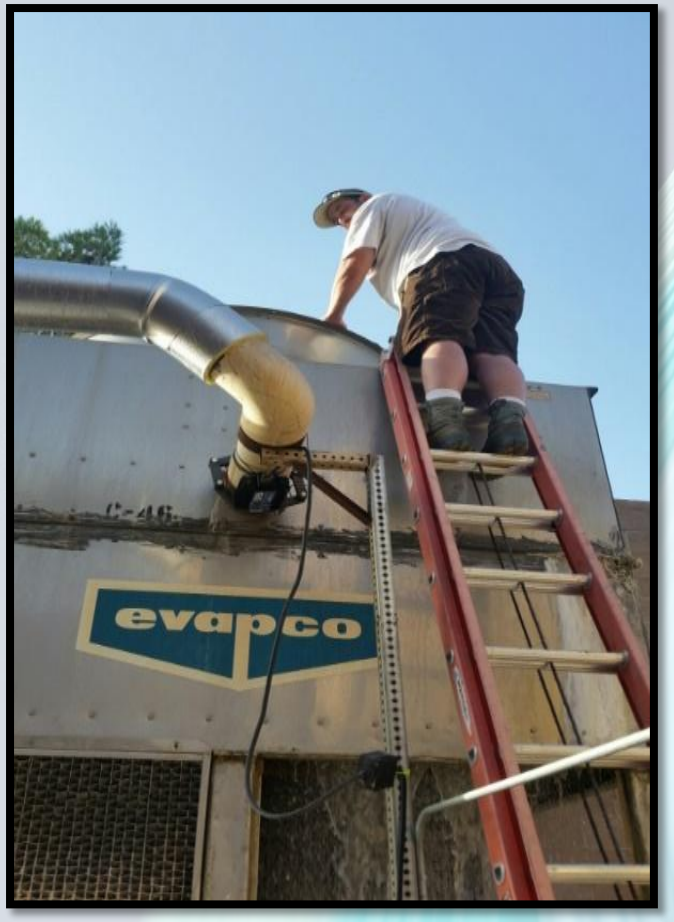
- Four Marley SPX 1,000 ton cooling towers and four TRANE CenTraVac 1,000 Ton Chillers.
- Two chillers are typically in operation and two are on standby.
- The cooling tower water is periodically filtered by a side stream filtration system.
- A 30" *Hydro*FLOW custom device was installed on the pipe that delivers water from the cooling towers to the chillers (condenser water loop).

Results

- The tower's conductivity was increased from 1,750 µS/cm to 3,500 µS/cm, greatly reducing water usage.
- Anti-scalant and anti-corrosive chemicals were completely discontinued after 12 weeks, while biocide was reduced by 75%.
- Existing scale and biofilm deposits were gradually removed.
- Bacteria counts remain under 1,000 CFU/ml.
- Efficiency of the chillers was maintained.
- 15-month payback period due to chemical and water savings.

U.S. Air Force Base Cooling Tower

"We installed a *Hydro*FLOW device on one of our cooling towers about a year ago and have not utilized any industrial water treatment chemicals at all in the last 9-10 months of operation. All scale was removed by the device, there has been no bio-fouling or return of scale matter since the removal of chemicals."
- Quote from the HVAC Manager at the base



Instead of the hard scale that typically accumulates inside the cooling tower, loose brown mud-like material was found. A garden hose was used to easily remove the mud-like substance from the fill material and the drift eliminators.

UNITED STATES AIR FORCE

Medical Center Cooling Tower

Prior to the installation of *Hydro*FLOW devices, conductivity had to be maintained at 1,400 µS/cm due to fouling of the system. After chemicals were reduced, the conductivity was steadily increased to 4,000 µS/cm. The tower and chillers remain in excellent condition after years of running at high conductivity.

Results

- The cooling tower and chillers were maintained within industry standards while reducing chemicals and blowdown water.
- Biocide chemicals were reduced by 75% while keeping CFU/ml counts under 1,000.
- Due to its ability to remove biofilm colonies, *Hydro*FLOW greatly reduced the chance of a legionnaires disease outbreak.
- Antiscalant and anti-corrosive chemicals were discontinued 4 months after installation.
- Blow-down was reduced by over 65%.
- The payback period was under two years.