

Start Date: December 15th, 2016
Address: 9146 Telstar Ave,
 El Monte, CA 91731
Cooling Tower System: Evapco PMC-645 457-tons
UET Reactor Sizing: 4x4 UET Reactor



The Client:

Thrifty Ice Cream has been known and well-loved in the West coast for their cylinder-shaped scoops and unique flavors. They have made the traditional California dessert a sure hit to people from all ages with their one-of-a-kind flavors like Chocolate Malted Krunch. They are sold in all Rite Aid stores in California, and are also available to residents and guests around the west coast.

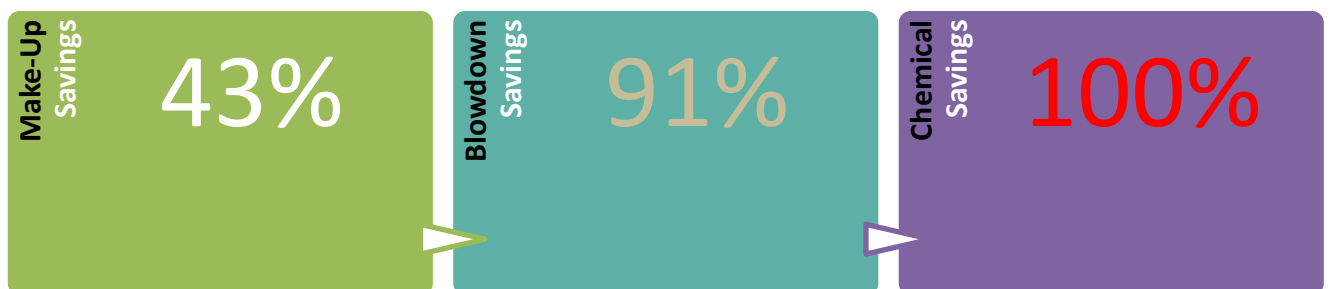


Summary:

Dynamic Water Technologies (DWT) installed a 4x4 UET reactor system at Thrifty Rite Aid to eliminate chemicals, remove scale, save water, and deal with the high silica coming in from the makeup water (>20 ppm). While onsite, DWT has identified multiple improvements to the client system including a new controller to regulate blowdown and a real-time monitoring system. The UET system has been able to eliminate chemicals completely, using only the electrochemical reactors for water treatment.

Savings:

	Before UET	After UET
Cycles	1-2	6-15
Conductivity Set-point (µS/cm)	1,000 µS	3,000 – 8,500 µS
Projected Annual Water Usage (gallons)	3,000,000	1,700,000
Projected Blowdown (gallons)	1,600,000	150,000
Projected total Savings (USD)	N/A	\$36,000



Accomplishments:

It is Dynamic Water's intention to elevate the level of care towards the critical cooling systems in order to bolster production

- Bio-contamination control - complete control of bio-contamination with no chemical additives
 - There have been no algae blooms and adequate chlorine levels to keep bio-contamination well under accepted standards.
 - There is an indication on the scale color that sulfate-reducing bacteria was present in the tower before the UET was installed. The scale (usually a fluffy white color) was black within the reactors. This is indication of dead bacteria bodies being gathered on the precipitating scale. See attached UET handout for more information.
- Scale control - Prevention of further scaling while removing historical scale
 - Total hardness and carbonate hardness values of makeup water relative to basin water reflect historical scale being removed from client's system.
- Corrosion control - No signs of corrosion
 - Consistently showing 0.00 ppm iron in the water testing verified twice per month.
- Silica removal - Furthermore, the chemistry shows that historical silica is being removed from the scale present within the client system – a challenge unanswered using traditional water chemistry. Especially at a facility like this where the incoming silica is greater than 20 ppm, we are proud to be able to increase cycles while handling such high silica levels.
 - Silica numbers in makeup and basin show removal of historical silica from client system
- Water savings – Blowdown is hovering around 3,000 uS, up from 1,000 uS in December.
 - We hope to raise the conductivity of the basin to 6,500 uS, (increasing the cycles to over 12 with makeup conductivity hovering around 420 uS) by mid-April 2017, and then to 8,500 uS by summer.
- System repair – DWT was able to identify several components of the client system that was not working properly.
 - The controller that was installed on the system was not connected, and wasn't reading or regulating properly. That controller has since been replaced with DWT's real time monitoring system.
 - Several leaks within the basin were identified.
 - The blowdown valve was stuck open, causing a lot of unnecessary water waste.



Technical Information:

City of El Monte Water Compositions: (12/15/16 to 3/31/17)

PARAMETER	MINIMUM	MAXIMUM
Conductivity (μ S)	390	510
pH	7.7	8.1
Total Hardness (ppm)	150	195
Free Chlorine (ppm)	0	0
Iron (ppm)	0	1
Silica (ppm)	23	27
Chlorides (ppm)	334	430

26.4.17

Service report	
Customer: Thrifty Ice Cream	Contact: DWT technical members
Service type: Examining the performance of UET's water treatment	

Background

UET treats the water in one of the cooling towers in the factory. The treatment replaced all chemical additives. The cooling tower that UET is treating cannot elevate the conductivity; therefore, all of the tower's drain options were closed. The water in the UET reactors was examined and found as in the picture below:



The picture presents solids in the UET unit with a dark appearance.

Technical Discussion

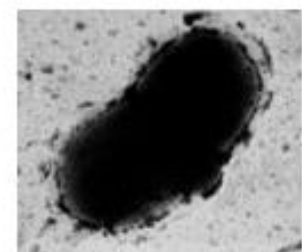
Due to the color of the solids generated in the UET reactor, it is very clear that the factory **suffered** from biological growth in their pipeline, which is considered to be a very serious source for developing a disease. The source of this contamination of water is normally in the food processing business, and is associated with sulphate bacteria.

Sulfate bacteria - those bacteria that can obtain energy by oxidizing organic compounds or molecular hydrogen (H_2) while reducing sulfate (SO_4^{2-}) to hydrogen sulfide (H_2S).

Most sulfate-reducing bacteria can also reduce other oxidized inorganic sulfur compounds, such as sulfite, thiosulfate, or elemental sulfur (which is reduced to hydrogen sulfide).

The source of it is from using H_2SO_4 in order to reduce the pH, avoiding scale.

However, fumes and solids from food sources are sucked (hoovered) into the cooling tower, and come into contact with the cooling water. The presence of organic materials and the sulphate develops bacteria, which rapidly accelerates into colonies. The UET constantly produces biocide



The sulfate bacteria under a microscope

which kills these bacteria. Once the bacteria are eliminated, the bodies settle together with the scale on the generated scale in the reactor.

This is a unique advantage for the food industry in which the cooling water treatment included H_2SO_4 as a side effect, which generated sulphate bacteria, while the UET technology eliminates it and removes the bacterial bodies from the water.

Service plan to be made

1. To perform a reactor cleaning – using gloves and face masks for protection
2. To discharge the solids without handling them with bare hands – most recommended to use plastic bags to collect them

Recommendation for the future

It is most advised that the client will order UET's water treatment for the rest of the cooling towers, in order to avoid diseases onsite.

Signed by David Sherzer