



Conditioning System

A case study for cooling tower application

A food processing plant in Arizona had a chemical reduction goal and maintenance problems with the facility's cooling tower and heat exchangers. The towers are located ground level, and in a position where seasonal dust storms blow dirt and particles into the towers and the cooling tower media became heavily scaled over time, thus greatly affecting efficiency. The facility also utilized a large amount of biocide to keep the bacterial growth and algae under control. As a result, periodic cleaning (with the associated downtime) and most important, differential pressure readings in the facility's plate heat exchangers, necessitated an increase in maintenance work.

Industrial Water Innovations **Cooling Tower Conditioning System**, installed in early 2017 and shortly after, the facility was able to stop all use of biocides and the cooling towers and heat exchangers are now operating at optimum efficiency.

This particular cooling tower only operates Monday to Friday. Every Monday, the cooling tower starts up again with a larger micro count and, depending on the weather, more debris in the basin than the previous week.

A micro count analysis performed in the spring of 2017 just before start of operations on Monday, rendered the below results:

- Coliform: 320 (CFU/ml), Aerobic: >10,000 (CFU/ml), ORP: 217mV, Temperature: 63F

The results of the micro count analysis after only 1 day of the system running (Tuesday)

- Coliform: 7 (CFU/ml), Aerobic: 2,100 (CFU/ml), ORP: 217mV, Temperature: 63F

Note: The only chemical still used in the cooling tower is corrosion inhibitor due to the extensive network of steel pipes in the facility.

The basin blowdown set point for the tower is set at 2600uS. The cooling tower basin is maintained by the conditioning system at values around 800 to 900 uS, with peaks of up to 2300uS when weather conditions are not favorable. The blowdown set point is seldom if ever reached.



Picture of the cooling tower basin and filter media, conditioned by the system. Scale has dropped off and the water is completely translucent and free of cloudiness. No odors are perceived and no algae growth has been observed anywhere in the tower.



Return piping with directional jets, adjusted to prevent stagnant areas and particle build up in basin.

The facility's cooling tower was originally installed in 2002. Industrial Water Innovations system went online in early 2017, and the facility has noted the following:

- The cooling tower has not reached a blowdown set point in many months. This has resulted in a 90% reduction in water waste and saved chemical corrosion inhibitor.
- Eliminated all bacterial and algae growth without the use of biocide chemical. A savings of \$25,000 per trimester.
- Eliminated the required maintenance for the tower basin. A full day for a crew of 3 cleaning the tower basin once a year.
- Observed differential pressure readings in the plate heat exchangers have been stable for months and have not had to do any maintenance. A savings of 48 hours on maintenance activities and associated production downtime to maintain the heat exchanger. This was every 3 months and now it is a once a year activity.
- There is a noticeable break down of previously formed hard scale deposits, which are now falling into the tower's basin where the system catches them and filters them out.
- Progressively, the cooling tower fill is becoming cleaner over time. It is expected that the yearly cleanup of the media would not be necessary.

Maintenance on the cooling tower and heat exchangers has been practically eliminated or significantly reduced.



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The heat exchanger was opened for inspection of the plates 10 months after installation of the conditioning system. These pictures, taken as soon as it was opened and had not been maintained or washed yet, show the condition of both sides of the plate. Our client noted they are extremely clean and the small amount of hard water deposits on them flake off easily when touched. High pressure wash and acid bath was not required to clean them.

Industrial Water Innovations technology, is doing its part on the plant's goal for sustainability efforts to reduce chemical use and waste.

Check the website for more detailed information or contact:
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