

Conditioning System:

A case study for evaporative condenser application

A food processing plant in Arizona installed an evaporative condenser in 1990 for cooling air compressors and other equipment. This evaporative condenser operates 24x7x365 to provide chilled water for air compressors for the plant. Thermal efficiency on the towers coil pack greatly affects how cool the compressors run and it is vital for the plant's production.

The condenser was installed on an elevated platform adjacent to a flour mill causing maintenance problems in the condenser and low thermal exchange efficiency on the coil pack. In addition to the flour particulates, it is also in a position where seasonal dust storms blow dirt and particles into the basin and other internal surfaces, greatly affecting efficiency.



Over the years, regular inspections of the tower continually showed debris collecting in the basin at a much higher frequency than expected and required applications of chlorine time-release tablet chemicals to keep bacterial growth and algae under control. As a result, continual cleaning (with the associated downtime) necessitated an increase in maintenance work.

Industrial Water Innovations' **Cooling Tower Conditioning System** was installed the last week of February 2019 and positive results started to be apparent soon after installation. The maintenance personnel noted completely clear water and improved chemistry. The facility was able to stop all use of residual chlorine tablets and defoamer and the evaporative condenser is now operating at optimum efficiency.

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



The conditioning system installed at the condenser continuously cleans and treats the basin water to maintain best performance.



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

CASE STUDY: Industrial Water Innovations' system went online in early 2019 and the facility has noted the following:

- The evaporative condenser showed immediate water quality improvements
- Just a small amount of filter backwash has replaced the larger amount of blowdown This has resulted in a substantial reduction in water waste, thus lowering the use of chemical corrosion inhibitor, which is still in use due to the network of steel pipes.
- All bacterial and algae growth is prevented without the use of biocide chemical. A savings of \$10,000 per trimester.
- Eliminated maintenance for the evaporative condenser, which is typically a full day for an external contractor with a vacuum septic tank pump truck for the sludge and a crew of 3 cleaning the basin and coils.



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- Observed the coil pack of the tower improvement in cleanliness. A savings of maintenance activities and associated production downtime to maintain the heat exchange tubing.
- A noticeable break down of previously formed hard scale deposits, which are now falling into the condenser's basin, where the system catches them and filters them out.
- The evaporative condenser continuously becomes cleaner over time and the use of pressure washers will no longer be necessary.
- The basin blowdown trigger set point for the tower is set at 2800uS. The condenser's basin is now maintained by the system at around 2400 uS, therefore the blowdown set point is seldom reached.

Maintenance on the evaporative condenser has been practically eliminated or significantly reduced and its only replaced by quarterly maintenance on the conditioning skid to clean the operating components due to the extreme operating environment. The maintenance on the conditioning system can be performed in a few hours without any downtime for the evaporating condenser and compressors.

Industrial Water Innovations is doing its part to assist the plant in its goal for sustainability efforts to reduce chemical use, waste and improve operational efficiency.



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