LAKOS

Application Bulletin

Energy Savings Alone Can Justify LAKOS

Application: Baltimore Aircoil Series 1500 Cooling Towers
System: LAKOS TowerClean Units with AutoPurge

One of two compact LAKOS TCX Systems.

Two 770-ton cooling towers, serving the air conditioning needs of plastics manufacturing facility in Evansville, Indiana suffered significant solids build-up and maintenance routines for years. Nearby agriculture and manufacturing processes were the primary sources of airborne particle matter. Despite tower basin cleaning at least 2-3 times per year on each system, particle matter accumulation to depths of as much as six inches were not uncommon. Carryover to the heat exchangers was inevitable, too, resulting in tube cleanings three times each summer. And, the fouling limited chiller efficiency to no greater than 80%, requiring supplemental chiller support in the way of a 400-ton rental chiller at $40,000 annually just to handle the normal load. Strainer cleanings, condenser storage tank cleanings and excessive water blowdown/make-up made the situation even more intolerable, costing them over $50,000 annually in supplemental service costs.

Additionally, this facility had already once suffered under deposit corrosion to its cooling tower basins, costing them approximately $250,000 for repairs.

LAKOS HydroBooster sweeps unwanted solids across basin to pump intake.

Conservative estimates suggested that fouling was well above normal levels, reaching 15-20% efficiency loss in the condenser tubes. Comparing the energy draw both before and after cleaning service, it was determined that a combined annual energy savings of $16,464 to $21,954 was possible if the heat exchangers could be continually protected from unwanted solids fouling (see chart on reverse for specific details). Note that this energy cost savings was achieved with an electrical cost burden rate of only $0.0335/kwh.

The solution was determined to be two LAKOS TCX TowerClean Systems with HydroBooster Packages to prevent unwanted accumulation in the tower basins. One year after the LAKOS installations, the customer experienced no plant shutdowns for basin cleaning, no heat exchanger cleaning costs, no storage tank cleaning requirements, no rental chiller needs and significant water/chemical treatment savings. Moreover, condenser tube efficiency remained at optimum levels, realizing every bit of the calculated energy savings.

continued on reverse

Payback for the LAKOS Systems occurred in less than two years, based on energy savings alone. With the other savings factored in, payback was achieved in less than one year.

It's important to note that the effective use of a LAKOS TowerClean System reduces the risk of legionella by preventing unwanted solids accumulation in the cooling tower basin or remote sump. This eliminates the breeding ground where this bacteria can thrive, and allows the biocide to reach and kill the bacteria.

Keeping the basin or sump free of solids also controls under-deposit corrosion. Known as sulfate-reducing bacteria (SRB), this bacteria relies on the absence of oxygen by hiding beneath solids build-up to form the highly corrosive hydrogen sulfide and attack the tower basin, heat exchangers and more. Proper filtration and water treatment combine to effectively control this problem.

CONDENSER FOULING FACTORS

Fouling Factor	*Approx. Scale Thickness*	*Power Increase*
Clean System	0.000 inch	0.0 %
0.0001	0.001 inch	1.1 %
0.0005	0.006 inch	5.5 %
0.0010*	0.012 inch	11.0 %
0.0020*	0.024 inch	22.0 %
0.0030*	0.036 inch	33.0 %
0.0040*	0.048 inch	44.0 %

** Typical fouling occurs in this range*

ANNUAL SAVINGS CALCULATIONS

Energy savings . . . . . **$ 31,279**
15% reduction of energy costs; two 770-ton units, 0.62 kw/ton, 80% load factor, 6000 annual operating hours, 0.03 cents per kwh

Tower basin cleaning . . . . . **$ 6,720**
LAKOS eliminated 12 annual cleanings, involving 2 men, 8 hours each

Condenser tube brushing . . . . . **$ 7,570**
LAKOS eliminated 2 annual brushings, involving 2 men, 12 hours each

Chemical costs . . . . . **$ 912**
7.9% reduction of chemical usage, budgeted at $10/ton/year

Rental chiller . . . . . **$ 40,000**
LAKOS improved system efficiency to eliminate the need for this equipment

TOTAL ANNUAL SAVINGS: $ 86,481

Future Savings Projections: *After 3 years: $259,443; After 5 years: $432,405; After 10 years: $864,810*

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