



Commercial cooling Tower Case Study - 90 Day Evaluation

Case study updated on April 26, 2013

Installer: Nano Tek-On - *HydroFLOW* Master Distributor in Hawaii.
Customer: Central Pacific Plaza
Location: Honolulu, Hawai - USA
Application: Two 300 ton cells and one 75 ton cell - One 300 ton cell operates during the day, one 300 ton cell is on standby and the 75 ton cells operates during the night
Unit: *HydroFLOW* 14" Custom on a 12.78" Outer Diameter Cast Iron Pipe
Goal: Keep biological growth, scale accumulation and corrosion rate under control while using minimal amounts of chemicals
Timeframe: Trial began on January 22, 2013 and ended on April 22, 2013

Evaluation Protocol:

- Weeks 1-2: No chemical reduction. Biological water tests to be compared to baseline data after 15 days. Scale and bio accumulation to be compared to baseline pictures.
- Weeks 3-5: Scale/corrosion inhibitors and biocide to be reduced to 75% (25% reduction). Biological water tests to be compared to baseline results after 5 weeks. Scale and bio accumulation to be compared to baseline pictures.
- Weeks 6-9: Scale/corrosion inhibitors and biocide to be reduced to 50%. Biological water tests to be compared to baseline results after 9 weeks. Scale and bio accumulation to be compared to baseline pictures.
- Weeks 10-12: Customer to decide if scale/corrosion inhibitor and biocide can be reduced to 25% (75% reduction). Biological water tests to be compared to baseline results after 12 weeks. Scale and bio accumulation to be compared to baseline pictures.

Cooling Tower Cells





Installation Location - After Sump Pumps (Before the Chillers)





Results after 90 days

- Lime scale and corrosion buildup inside the cooling tower and chillers remained under control even though anti-scalant and anti-corrosive chemicals were discontinued
- Biocide chemical was reduced by 85% and bacteria levels reduced from 100,000 CFU to 1,000 CFU
- Blow-down reduced by 50%
- Conductivity remained stable at 1245 ~ 1295 Micro Siemens

Before and After Pictures

Before



After



Lime scale and corrosion buildup remained under control even though anti-scalant and anti-corrosive chemicals were discontinued



[Dip slides were used to monitor biological count]

Before

After



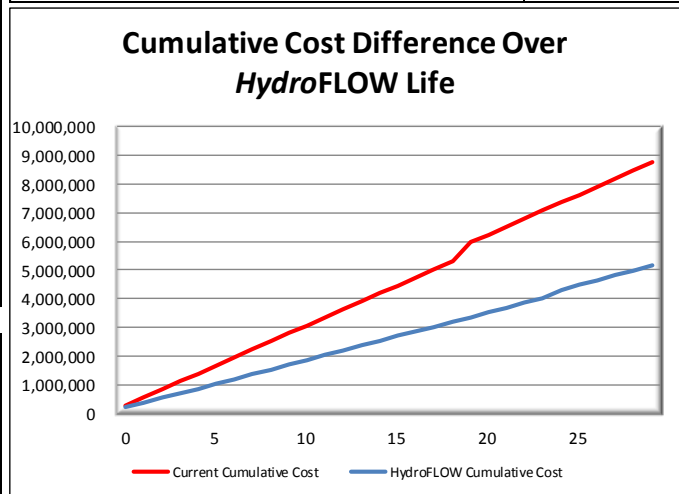
Biocide chemical was reduced by 85% and bacteria levels reduced from 100,000 CFU to 1,000 CFU



Return On Investment - Under 4 months

Cooling Tower Description			
Tower Type	Open	Remaining Life, yrs	20
Unscheduled Downtime to Replace Tower, hrs			48
Est Tower Replacement Cost (incl. installation), \$			\$200,000
Tower Tonnage		300	
Equipment Replacement Due to Wear and Tear			
Piping, yrs	20.0	Tubes or Fills, yrs	20.0
Cost Incl Labor, \$	\$15,000	Cost Incl Labor, \$	\$15,000
Offline, hrs	48	Offline, hrs	48
System Parameters			
Annual Hours of Operation, hrs (1 yr = 8,760)			8,760
Revenue Lost When Tower is Offline, \$/hr			\$1,000
Operating Costs			
No. of Fan Motors	3	Fan Motor HP	20
No. of Sump Pumps	1	Pump HP	20
		Electricity Cost (\$/kWh)	\$0.34
Cycles	2	Bleed (Gal./Min.)	9.00
		Potable Water Cost (\$/ccf)	\$2.81
		Sewage Cost (\$/ccf)	\$10.77
		10% Side Stream Filtration (50 Micron)	No
Chemical Costs			
		Annual Chemical Cost, \$	\$8,000
Maintenance Costs			
		Annual Tower System Maintenance Cost, \$	\$5,000
Company Name:	CPP	Phone:	
Address:		email:	
Application:	Tower		

Hydro FLOW Solution			
Hydro FLOW Model	P14"	Installed Price	\$35,691
Payback Period		Months	
Cash Flow Breakeven	3.8	Simple Payback	3.5
Financial Return (ROI)		%	
Internal Rate of Return	317%	Simple Return	340%
Total Ownership Cost Savings			
	Financial Life Cycle Period for Analysis, yrs		30
	Current	Hydro FLOW	Savings
Capital Equipment	\$ 230,000	\$ 65,691	\$ 164,309
Electricity	\$ 5,409,378	\$ 3,516,096	\$ 1,893,282
Water	\$ 2,576,424	\$ 1,288,212	\$ 1,288,212
Chemicals	\$ 240,000	\$ 84,000	\$ 156,000
Maintenance	\$ 150,000	\$ 97,500	\$ 52,500
Downtime	\$ 144,000	\$ 96,000	\$ 48,000
Total	\$ 8,749,802	\$ 5,147,499	\$ 3,602,303
Cost of Capital	10%	NPV of Savings, \$	\$ 1,073,512
		Average Annual Savings, \$	\$ 121,266



Referral Information

Please contact Harald Von Sydow, Owner of Nano Tek-On, in order to receive the customer's contact information.

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