

Cooling System Applications



ATMOSPHERIC COOLING TOWER

GENERAL DESCRIPTION OF EQUIPMENT

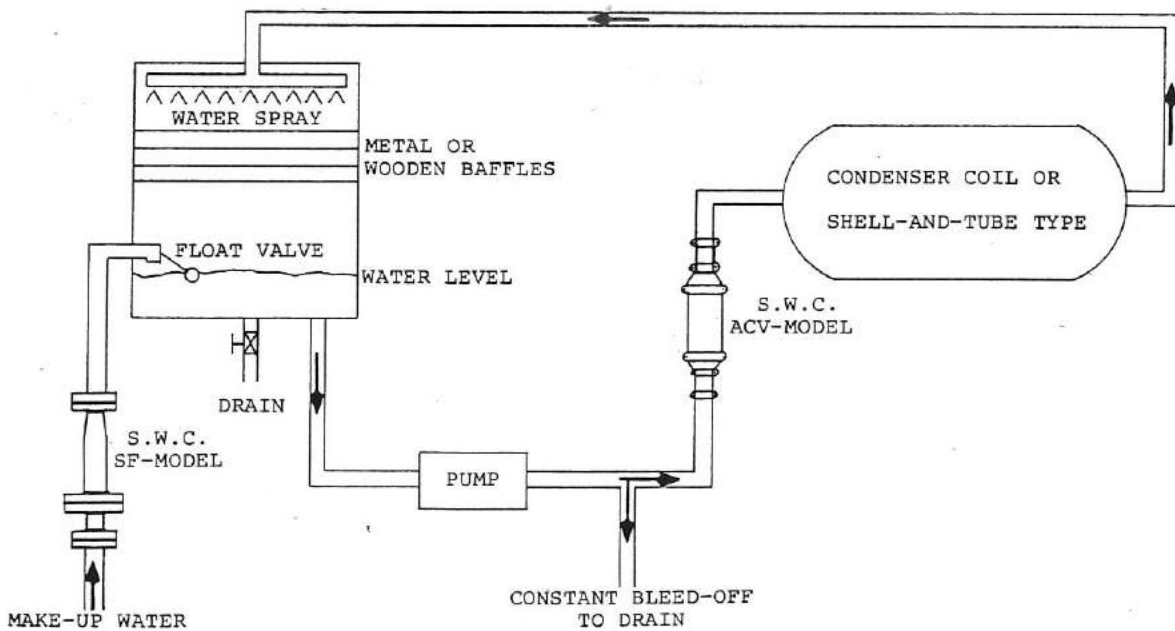
Operation is similar to an evaporative condenser except the heat is removed from the condenser water by means of evaporation. The tower has metal or wooden baffles instead of tubes, and the water is cooled by the atmospheric air while trickling down the baffles. This system contains a much larger volume of circulating water than the evaporative condenser system.

SIZING AND LOCATION

Install a properly sized Superior Water Conditioner® (ACV-Model) in the circulating condenser water line on the discharge side of the pump in a vertical position, and in accordance to the flow capacity of the pump. In circulating cooling systems, it is not necessary to treat 100% of the flow because the water is circulated very rapidly and there is very little temperature difference (delta T). The ACV-Model automatically treats the proper amount, allowing the remainder of the water to bypass the treatment chamber within the unit.

Another Superior Water Conditioner® (RT or SF model) should be installed in the make-up water line, sized to treat 100% of the make-up water (includes evaporation loss, drift, and bleed-off). To determine flow rate, hold the float valve wide open and take an actual measurement.

Suspended solids in the water, as well as pollen, soot and other foreign matter in the air will collect in the cooling tower. This sludge gradually settles in the basin (sump). For this reason, the bleed-off should be placed at the lowest point in the system or the sludge will collect and clog up the line and spray nozzles, creating a higher head pressure. This build-up could cause the customer to believe Superior® is not working. Use of a bag filter, or centrifugal separator might also be recommended to install ahead of the Superior® unit.



EVAPORATIVE CONDENSER

GENERAL DESCRIPTION OF EQUIPMENT

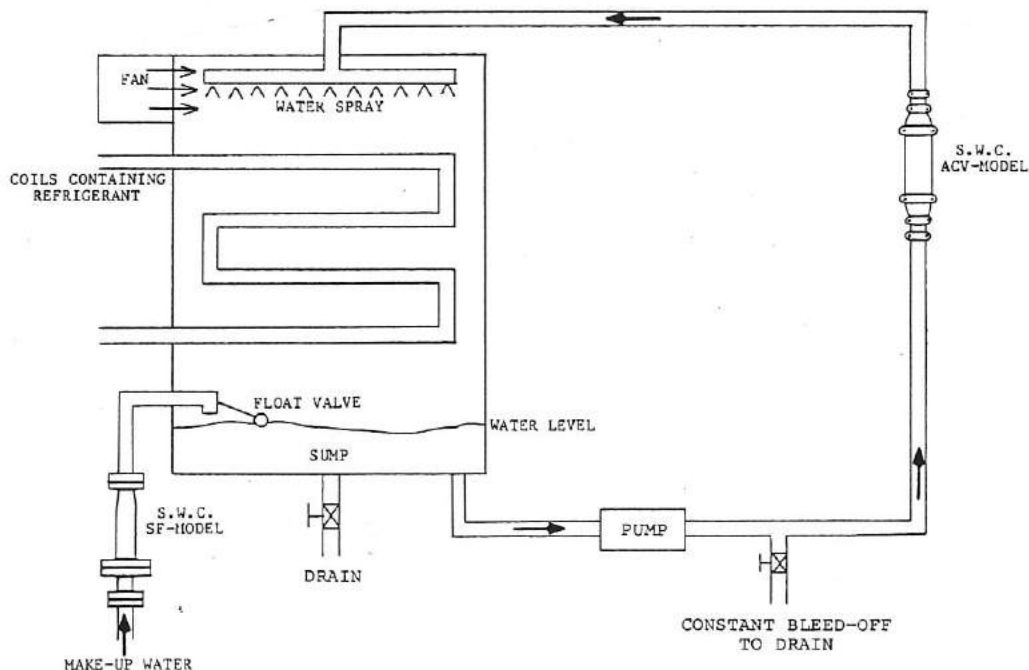
In the evaporative condenser, heat is removed from refrigerant gases traveling through tubes by water. The warm water drops to the bottom of the sump and is carried back to the top of the evaporative condenser with a pump. The water is then sprayed over the tubes after traveling through air flow created by a fan, which cools it first by evaporation, taking heat out of the refrigerant gases traveling through the tubes.

SIZING AND LOCATION

Install a properly sized Superior Water Conditioner[®] (ACV-Model) in the circulating condenser water line on the discharge side of the pump in a vertical position, and in accordance to the flow capacity of the pump. In circulating cooling systems, it is not necessary to treat 100% of the flow because the water is circulated very rapidly and there is very little temperature difference (delta T). The ACV-Model automatically treats the proper amount, allowing the remainder of the water to bypass the treatment chamber within the unit.

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APPLICATION PROFILE



H. J. Heinz Company, Bagel Bites Facility, Fort Myers, Florida

Product / System: Superior Water Conditioner, Manufactured by Superior Manufacturing Division of Magnatech Corporation, Ft. Wayne, Indiana

Application: Chemical-Free Water Treatment of (3) Roof-Top Evaporative Condensers and (1) Process Steam Boiler

Manufacturer's Objective: To Control Lime/Scale and Corrosion with minimal use of chemicals

Ft. Myers Historical Treatment Method: Chemicals (various types, such as Sodium Bisulfite, Tetrapotassium Pyrophosphate, Potassium Hydroxide, Neutralized Blends of Scale and Corrosion Inhibitors, Blends of Isothiazolins, etc.)

Annual Chemical Cost for condensers and boiler: \$42,000

Date of System Purchase: July 6, 2011

Cost of System: \$38,350

Projected Simple Payback: Less Than 11 Months

Project Owner: Victor Herbert

CASE HISTORY

For the past 20+ years, Bagel Bites Division of H. J. Heinz Company in Fort Myers, Florida had been using chemicals to treat their three evaporative condensers for the control of lime/scale, corrosion, and microbiological fouling. Additionally, they were chemically treating their process steam boiler with scale and corrosion inhibitors, and pre-softening all the fresh-water makeup to the boiler with sodium based ion-exchange water softeners as well.

Although chemicals had provided satisfactory results throughout the years, the systems had to continually be monitored, and occasionally the chemical formulas had to be modified due to inconsistencies in the quality of the water supply and varying atmospheric conditions. Additionally, typical with most chemical treatment programs, as a system stabilizes over time, certain organic impurities in the water may eventually become immune to a particular chemical type, therefore rendering the treatment to be less effective, which also makes it necessary to adjust the chemical formulas.

The Ft. Myers factory elected to purchase a permanent magnet water treatment system that would control lime/scale and corrosion without the use of chemicals. The first applications were installed on evaporative condensers #1 and #2 (**Photo's 1 & 2**). After six weeks of being installed, there was clear evidence of the existing scale build-up starting to be removed from the condenser tubes, interior walls and sump basins (**Photo's 3, 4, & 5**). This is as a direct result of the treatment effect of the Superior Water Conditioner, as it also reduces surface tension of water, which causes it to be wetter and more soluble, allowing it to slowly break down existing build-up and creating a suspended solid, which can be easily removed through blow-down and bleed-off procedures.

Photo 3 displays a very distinct difference in scale thickness is evident on a couple of the tubes on the right side of the picture. Notice that the top half of the tubes have less build-up of old scale which is slowly being removed as a result of the magnetically treated water being directly sprayed onto them from overhead. It can be expected that the bottom half of the tubes will also eventually get cleaner as the treated water continues to be sprayed onto them and runs off around the outer diameter, carrying the loose scale and mud into the basin below.

Photo's 6 & 7 demonstrate larger pieces of scale and mud that had broken loose from the tubes and interior walls, as a result of the effects of the treated water. This debris had to be physically removed from the basins.

Evaporative condenser # 3 is the smallest and oldest one on site. The damaging effects of harsh chemical treatment over the years can be observed in **Photo's 8 & 9**.

Photo 10 shows the installation of the Superior Water Conditioner on the process steam boiler feed water line.



(photo 1)



(photo 2)



(photo 3)



(photo 4)



(photo 5)



(photo 6)



(photo 7)



(photo 8)



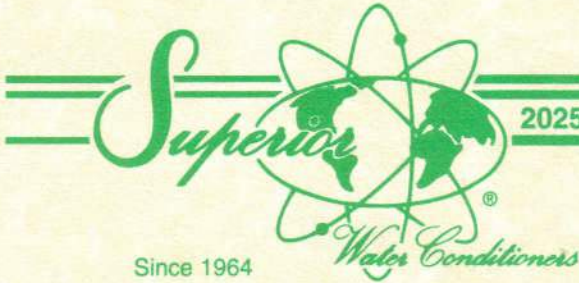
(photo 9)



(photo 10)

Superior Manufacturing Division

MAGNATECH CORPORATION



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Website: <http://www.superiorwatercond.com>

U.S. and Foreign Patents

December 1994

Dear Friend,

Enclosed please find a letter from Eli Lilly and Company (Lilly) dated August 30, 1994. The letter describes results from a one year trial which was conducted to compare the overall effectiveness and performance of *magnetic vs. chemical* treatment on cooling towers. The letter concludes that:

"the magnetic water conditioning system proved to be effective compared to conventional chemical tower water treatment."

Lilly has authorized Superior to disclose to potential customers this letter which details the results of Lilly's tests on magnetic water conditioning applications. The only version of this letter which you may disclose is the version which we have provided to you. **DO NOT** change or alter this letter in any way.

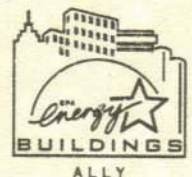
Because Superior has signed a very stringent agreement with Lilly, we must use this letter discriminately. **SHOW IT ONLY** to customers who are interested in buying Superior Water Conditioners, not to competitors or skeptics who are only interested in harassing us or Lilly in an attempt to discredit magnetics. In addition, **WE MUST NOT ALLOW COPIES TO BE MADE AND CIRCULATED.** If you need more copies for your sales representatives, please advise us and we will provide them to you.

LILLY, IN ITS ABSOLUTE DISCRETION, MAY TERMINATE OUR RIGHT TO USE THIS LETTER AND LILLY'S NAME WITH ONE DAY'S WRITTEN NOTICE.

Lilly is very valuable to us, and we must not jeopardize in any way our good relationship with them.

We are very pleased and excited about these results. Best wishes for increased sales! Thank you for your cooperation in preserving the good will of someone that is willing to help, even though great pressure from the outside (and some from the inside) has been applied to prevent the Lilly letter from ever being typed, documenting the results.

Charles H. Sanderson
Magnatech, Inc.
Superior Manufacturing Division







Eli Lilly and Company

Lilly Corporate Center
Indianapolis, Indiana 46285
(317) 276-2000

August 30, 1994

Charles H. Sanderson, Sr.
Superior Manufacturing Company
2015 S. Calhoun
P.O. Box 13343
Fort Wayne, IN 46868-3343

Dear Mr. Sanderson:

The Environmentalist 2000 magnetic water conditioning unit (conditioner model numbers CT8000APD and SF5000AK) was introduced to Eli Lilly and Company corporate headquarters (LCC) during 1992, to a wooden, counter-flow, forced draft, 8000 ton cooling tower on administration building M22A. The system was to replace all chemicals used to treat the tower water utilized for two centrifugal chiller condensers of 2000 and 4000 ton capacity.

The M22A magnetic system was compared to a chemically treated tower water system cooling seven centrifugal chillers with 19,000 tons of capacity in utility building M78 at LCC. M78 cooling towers are concrete, counter-flow, forced draft units with 29,000 tons capacity. A one year trial was conducted from January, 1993, to December, 1993, to compare the overall effectiveness and performance of magnetic to chemical treatment.

Two test heat exchangers were utilized to compare M22A to M78's tower water by modeling the chiller condensers in each building. Conductivity meters, pH probes, temperature transmitters, corrosion coupons, blowdown meters, and make-up meters were used to measure the two water streams. In addition, weekly grab samples were taken from each system to measure the cycles of concentration,

Mr. Charles H. Sanderson, Sr.
Page 2
August 30, 1994

Ryzner index, bacterial count, average total hardness, calcium hardness (CaCO₃), alkalinity, and chloride levels.

The magnetic system used 70% less blowdown and removed 51% more calcium (CaCO₃) from the tower water than chemical treatment. The Ryzner index for the magnetic system was fairly neutral while the chemical system indicated a scaling condition. The chillers in M22A ran 11% more efficiently than the previous year when they were chemically treated.

Sulfuric acid, sodium hydroxide, phosphonic acid and defoaming agents were eliminated from M22A's tower water. However, chlorine and bromine were utilized to prevent high bacteria levels, slime, and algae growth. Nevertheless, the magnetic water conditioning system proved to be effective compared to conventional chemical tower water treatment.

The data from this trial should not: 1) be considered an endorsement by Eli Lilly and Company of the use of magnetic water conditioning for all cooling tower applications; 2) be extrapolated or interpreted in an effort to attempt to support any other cooling tower application or any other application. The results set forth in this letter and detailed in the attached spreadsheets are specific to this trial and are the exclusive property of Eli Lilly and Company.

Sincerely,

ELI LILLY AND COMPANY



Eric E. Sussman, Plant Engineer
Environmental Control and Utilities

MAGNETIC (M22A) VS CHEMICAL TREATMENT (M78) SYSTEMS

	DATE	CORR RATE (mpy)	ACTUAL RUNNING TON-HR/MONTH	BLOWDOWN GAL/MONTH	DRAIN VS TONS (GAL/TON-HR)	MAKE-UP GAL/MONTH	DRAIN VS MAKE-UP
M22A	Jan-93		<i>717,573</i>	<i>78,933</i>	11%	<i>464,312</i>	17%
	Feb-93		<i>730,884</i>	<i>88,750</i>	12%	<i>522,059</i>	17%
	Mar-93		<i>884,407</i>	<i>85,479</i>	10%	<i>502,818</i>	17%
	Apr-93		<i>582,357</i>	<i>64,059</i>	11%	<i>384,350</i>	17%
	May-93		<i>953,024</i>	<i>36,320</i>	4%	<i>966,600</i>	4%
	Jun-93	3.65	<i>191,021</i>	<i>57,306</i>	30%	<i>318,367</i>	18%
	Jul-93		<i>604,039</i>	<i>118,212</i>	30%	<i>656,733</i>	18%
	Aug-93		<i>1,399,940</i>	<i>287,015</i>	21%	<i>1,603,180</i>	18%
	Sep-93		<i>882,150</i>	<i>298,480</i>	34%	<i>1,058,440</i>	28%
	Oct-93		<i>741,266</i>	<i>354,247</i>	48%	<i>800,020</i>	44%
	Nov-93		<i>827,001</i>	<i>443,610</i>	54%	<i>826,840</i>	54%
	Dec-93		<i>28,465</i>	<i>15,371</i>	54%	<i>31,369</i>	49%
	Feb-94	5.09					
AVE/TOTALS			8,542,127	1,927,782	26%	8,135,087	25%
M78	Jan-93		<i>1,057,793</i>	<i>1,163,572</i>	110%	<i>3,117,825</i>	37%
	Feb-93		<i>1,231,773</i>	<i>1,354,950</i>	110%	<i>2,865,155</i>	47%
	Mar-93		<i>1,409,598</i>	<i>1,550,558</i>	110%	<i>3,554,522</i>	44%
	Apr-93		<i>1,750,633</i>	<i>959,000</i>	55%	<i>4,057,313</i>	24%
	May-93		<i>2,267,234</i>	<i>630,560</i>	28%	<i>4,943,368</i>	13%
	Jun-93	3.00	<i>4,945,915</i>	<i>909,498</i>	18%	<i>22,494,379</i>	4%
	Jul-93		<i>6,227,617</i>	<i>5,300,589</i>	85%	<i>23,300,595</i>	23%
	Aug-93		<i>5,408,028</i>	<i>3,028,100</i>	56%	<i>16,214,054</i>	19%
	Sep-93		<i>2,812,268</i>	<i>1,908,990</i>	68%	<i>8,165,447</i>	23%
	Oct-93		<i>1,853,421</i>	<i>2,125,120</i>	115%	<i>6,255,820</i>	34%
	Nov-93		<i>1,190,655</i>	<i>1,769,500</i>	149%	<i>2,838,006</i>	62%
	Dec-93		<i>1,360,164</i>	<i>1,936,941</i>	142%	<i>4,035,294</i>	48%
	Feb-94	3.67					
AVE/TOTALS			31,515,099	22,637,378	87%	101,841,778	31%
RESULT AND CONCLUSION			CAPACITIES: M22A - 6,000 TONS M78 - 19,000 TONS		MAG 70% LESS BLOW-DOWN		CHEMICALS BLOWDOWN MORE

Superior Treatment

Chemical Treatment

Comparison

	DATE	CORR RATE (mpy)	ACTUAL RUNNING TON-HR/MONTH	BLOWDOWN GAL/MONTH	DRAIN VS TONS (GAL/TON-HR)		
CITY WATER MAKE-UP	Jan-93						
	Feb-93						
	Mar-93						
	Apr-93						
	May-93						
	Jun-93						
	Jul-93						
	Aug-93						
	Sep-93						
	Oct-93						
	Nov-93						
	Dec-93						

NOTES

- 1) Italicized (TON-HR/MONTH) data, BLOWDOWN (GAL/MONTH) data, and DRAIN VS TONS (GAL/TON-HR) ratios are estimated from similar running conditions in previous months.
- 2) Corrosion coupons placed in the M22A and M78 tower systems from Feb-93 through May-93 and from Jun-93 through Feb-94 were used to determine yearly corrosion rates in Jun-93 and Feb-94, respectively.
- 3) The higher Feb-94 corrosion data for M22A may not be a result of problems with the magnetic water treatment program. The M22A chillers ran a very small percentage of the time between Dec-93 and Feb-94. This condition of no water circulation across the corrosion coupons often causes the corrosion rate to accelerate.
- 4) Corrosion rates shown are for mild steel coupons. M22A Corrosion rates from three copper coupons were negligible at .06mpy & .037mpy (M22A north pump) and .055mpy (M22A south pump) from Feb-93 to May-93.

MAGNETIC (M22A) VS CHEMICAL TREATMENT (M78) SYSTEMS

DATE	RYZNER INDEX	AVE CYCLES	BACTERIAL COUNT	AVE TOT HARD ppm	Ca HARDNESS (as CaCO3) ppm
Jan-93,M22A	6.41	4.7	1.00E+01	470	265
Feb-93	3.6	4.6	1.00E+02	...	780
Mar-93	4.1	5.5	1.00E+02	...	857
Apr-93	4.23	7.25	1.00E+03	1100	433
May-93	4.4	13	1.00E+05	1570	503
Jun-93	...	...	...	1340	980
Jul-93	...	...	...	920	730
Aug-93	5.1	5.6	1.00E+01	1007	321
Sep-93	5.4	4.7	1.00E+05	769	308
Oct-93	6.06	3.6	1.00E+04	633	193
Nov-93	6	4.3	1.00E+05	570	219
Dec-93	...	...	...	...	...
AVE/TOTALS	5.03	5.92	1.00E+04	874	431

Superior Treatment

Jan-93,M78	4.65	8.6	1.00E+02	1360	810
Feb-93	5.3	5.75	1.00E+02	...	1373
Mar-93	5.6	3	1.00E+01	...	480
Apr-93	5.3	3.75	1.00E+02	1250	895
May-93	4.9	5	1.00E+04	1427	1003
Jun-93	4.86	4.75	1.00E+04	1230	990
Jul-93	5.05	4.3	1.00E+04	1133	888
Aug-93	6.3	5.3	1.00E+05	1737	1100
Sep-93	4.8	4.7	1.00E+04	1186	904
Oct-93	4.7	4.1	1.00E+04	1081	837
Nov-93	4.3	2.6	1.00E+04	662	465
Dec-93	4.4	2.8	...	730	510
AVE/TOTALS	5.01	4.55	1.00E+04	1180	886

Chemical Treatment

	LAST 4 MONTHS OF MAGNET INDICATE NEUTRAL, M78 SCALE	LAST FOUR MONTHS SIMILAR	FAIRLY SIMILAR	MAGNET LOWER	MAG REMOVES 51% MORE Ca THAN CHEMICALS
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Comparison

DATE	RYZNER INDEX	AVE CYCLES	BACTERIAL COUNT	AVE TOT HARD ppm	Ca HARDNESS (as CaCO3) ppm
Jan-93,C.W.			
Feb-93				322	230/207
Mar-93				342	230/217
Apr-93				280/313	200/204
May-93				300	193
Jun-93				232	155
Jul-93			
Aug-93				353	246
Sep-93				278	202
Oct-93				278	202
Nov-93				320	260
Dec-93				315	206

NOTES

- 1) For LCC city water, numbers to the right of a slash "/" and italicized data were measured by an independent laboratory.
- 2) Bacterial count data for M22A in Aug-93 is from 8/18 thru 8/31. From 8/1 thru 8/17, the bacterial count varied from 1.00E+04 to 1.00E+07.
- 3) M22A Jun-93 and Jul-93 data which is in bold letters and italicized was not used in this analysis due to the tower water system being taken down for scaling and operational problems.
- 4) C.W. stands for Indianapolis city water

MAGNETIC (M22A) VS CHEMICAL TREATMENT (M78) SYSTEMS

DATE	%Ca HARDNESS	ALKALINITY (as CaCO3) ppm	CHLORIDES (as Cl) ppm	AVE pH	CONDUCTIVITY umhos/cm	35K GALLONS
Jan-93,M22A	56%	295	106	8.30	1730	0
Feb-93	...	593	187	8.43	2293	0
Mar-93	...	423	220	9.10	2500	0
Apr-93	39%	460	290	8.98	2325	0
May-93	32%	521	530	8.87	2083	0
Jun-93	73%	600	440	8.90	1450	0
Jul-93	79%	500	280	8.65	1090	0
Aug-93	32%	320	316	8.70	2606	0
Sep-93	40%	314	259	8.36	1925	0
Oct-93	30%	269	205	8.24	1875	0
Nov-93	38%	272	192	8.20	1582	0
Dec-93	...	...	...	...	...	...
AVE/TOTALS	38%	385	256	8.58	2102	0

Superior Treatment

Jan-93,M78	60%	156	259	8.04	3800	70
Feb-93	...	167	230	8.30	3273	25
Mar-93	...	160	110	8.27	1500	81
Apr-93	72%	183	150	8.25	2255	54
May-93	70%	296	202	8.20	2620	138
Jun-93	80%	273	190	8.17	2513	329
Jul-93	78%	227	173	8.25	2383	679
Aug-93	63%	144	298	8.23	3200	230
Sep-93	76%	252	262	8.17	2803	118
Oct-93	77%	248	228	8.25	2575	242
Nov-93	70%	424	113	8.18	2760	240
Dec-93	70%	445	128	8.19	1950	270
AVE/TOTALS	72%	248	195	8.21	2636	1496

Chemical Treatment

	MAG REMOVES MORE Ca THAN CHEMICALS	MAG HIGHER, pH SHOULD BE HIGHER	MAG SLIGHTLY HIGHER	SIMILAR LAST FOUR MONTHS	MAG LOWER, CONTROLLED BY BLOWDOWN	MAGNET ELIMINATES NEED
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Comparison

DATE	%Ca HARDNESS	ALKALINITY (as CaCO3) ppm	CHLORIDES (as Cl) ppm	AVE pH	CONDUCTIVITY umhos/cm	Magnesium ppm Hardness
Jan-93,C.W.	...	171	34	7.65	...	...
Feb-93	64%	170/219	40/68	7.6/8.1	580/783	116
Mar-93	63%	170/221	40/62	7.6/7.8	580/812	125
Apr-93	71%/65%	240/199	40/40	7.6/7.8	580/657	110
May-93	64%	206	44	8.40	680	107
Jun-93	67%	135	36	7.40	518	77
Jul-93	...	...	...	...	...	...
Aug-93	70%	240	31	8.60	650	106
Sep-93	73%	212	55	7.60	727	...
Oct-93	73%	212	55	7.60	727	...
Nov-93	81%	300	45	7.60	740	...
Dec-93	65%	197	41	7.10	530	109

NOTES

- 1) For LCC city water, numbers to the right of a slash "/" and italicized data were measured by an independent laboratory.
- 2) Bacterial count data for M22A in Aug-93 is from 8/18 thru 8/31. From 8/1 thru 8/17, the bacterial count varied from 1.00E+04 to 1.00E+07.
- 3) M22A Jun-93 and Jul-93 data which is in bold letters and italicized was not used in this analysis due to the tower water system being taken down for scaling and operational problems.
- 4) Monthly 35K data in gallons are not accurate due to estimating tank level through site glass. However, yearly total is accurate and is based upon actual delivery data.

MAGNETIC (M22A) VS CHEMICAL TREATMENT (M78) SYSTEMS

DATE	SULF. ACID GALLONS	C77P BROMINE LBS
Jan-93,M22A	0	0
Feb-93	0	0
Mar-93	0	0
Apr-93	0	0
May-93	0	0
Jun-93	0	0
Jul-93	0	0
Aug-93	0	50
Sep-93	0	300
Oct-93	0	150
Nov-93	0	250
Dec-93	...	...
AVE/TOTALS	0	975
Jan-93,M78	150	0
Feb-93	502	0
Mar-93	327	0
Apr-93	325	0
May-93	761	350
Jun-93	996	250
Jul-93	1090	875
Aug-93	1136	695
Sep-93	985	650
Oct-93	475	300
Nov-93	558	150
Dec-93	0	0
AVE/TOTALS	7305	3700
	MAGNET ELIMINATES NEED	CHEMICALS NEEDED TO KILL BACTERIA

Superior Treatment

Chemical Treatment

Comparison

DATE	COPPER (as Cu) ppm	IRON (as Fe) ppm	SODIUM (as Na) ppm	SILICA TOTAL (as SiO2) ppm
Jan-93,C.W.	...	...	...	...
Feb-93	<i>L .05</i>	<i>0.11</i>	<i>41</i>	<i>5.60</i>
Mar-93	<i>L .05</i>	<i>L .05</i>	<i>46</i>	<i>L 5.0</i>
Apr-93	<i>L .05</i>	<i>0.08</i>	<i>23</i>	<i>8.60</i>
May-93	<i>L .05</i>	<i>0.05</i>	<i>29</i>	<i>6.30</i>
Jun-93	<i>L .05</i>	<i>0.13</i>	<i>18</i>	<i>8.40</i>
Jul-93
Aug-93	<i>L .05</i>	<i>0.1</i>	<i>24</i>	<i>9.20</i>
Sep-93
Oct-93
Nov-93
Dec-93	<i>L .05</i>	<i>L .05</i>	<i>49</i>	<i>L 5.0</i>

NOTES

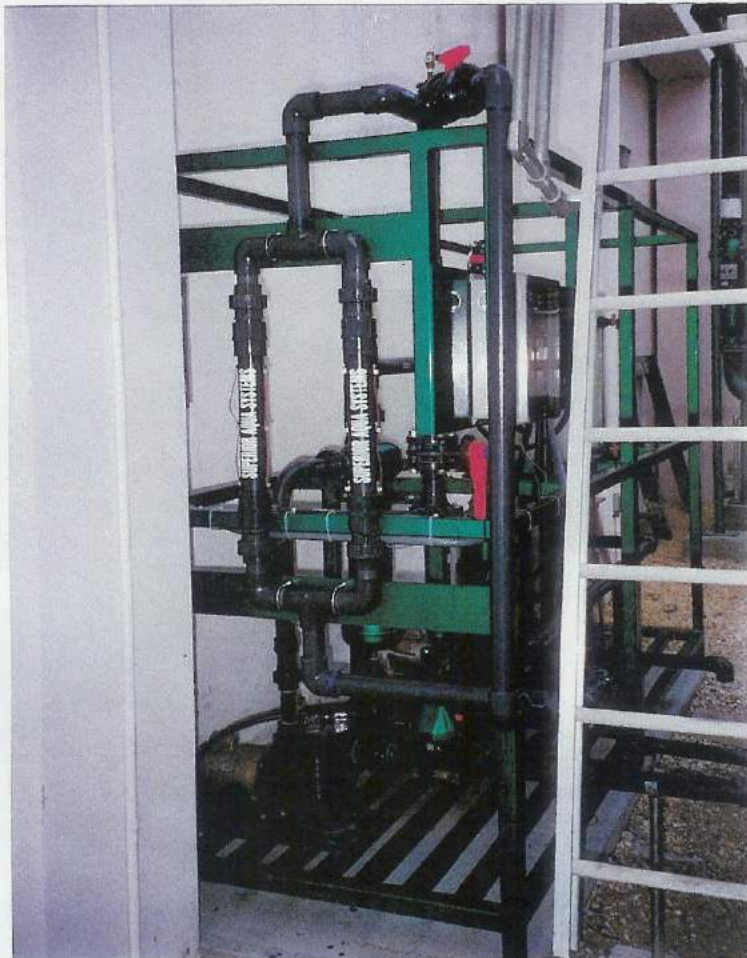
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- 3) M22A Jun-93 and Jul-93 data which is in bold letters and italicized was not used in this analysis due to the tower water system being taken down for scaling and operational problems.
- 4) Monthly sulfuric acid (in gallons) and C77P (in lbs.) bromine data are not accurate due to estimating tank level through site glass. However, yearly total is accurate and is based upon actual delivery data.



**FT. MYERS, FLORIDA POST OFFICE
INSTALLATION AUGUST 27, 1999**



FT. MYERS, FLORIDA POST OFFICE
700 TONS/COMFORT AIR COOLING TOWERS
MODEL CT-400-ZB ENVIRONMENTALIST/ZERO-BLEED-2000
INSTALLED AUGUST 27, 1999





FT. MYERS, FLORIDA POST OFFICE

700 TONS/COMFORT AIR COOLING TOWERS

- (3) MODEL RT-1000-K SUPERIOR WATER CONDITIONERS (FWMU)**
 - (3) MODEL ACV-6-K SUPERIOR WATER CONDITIONERS (RECIRC)**
 - MODEL CT-400-ZB ENVIRONMENTALIST/ZERO-BLEED-2000**
- INSTALLED AUGUST 27, 1999**





J-B SUPPLY CO.

P.O. Box 897
BRANDON, FL 33509
(813) 689-5965
(800) 330 5965
FAX (813) 689-9598

"FOR SERVICE
OTHERS ONLY PROMISE"

Feb. 18, 2000

Charlie Sanderson
Superior Mfg. Div.
2015 S. Calhoun St.
Ft. Wayne, IN. 46802

Dear Charlie;

In August, 1999, a "Superior Water Conditioner, Zero Bleed®" system was installed on the 700 ton cooling tower at the Postal Service Distribution Center in Ft. Myers, FL.

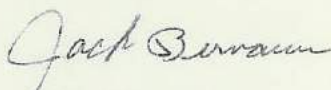
On Feb. 14, 2000, I drove to Ft. Myers. About 8 AM, the chillers were opened for inspection by the maintenance personnel. The head mechanic that opened the chillers said that the chillers were cleaner than he had ever seen them.

John Wilson, Supervisor over the HVAC, agreed.

Ed Morgan, Supervisor of Maintenance Operations, was there and agreed that everything looked very good.

See photos of the chiller tubes and SWC on the towers inclosed.

Sincerely,


Jack Bernauer



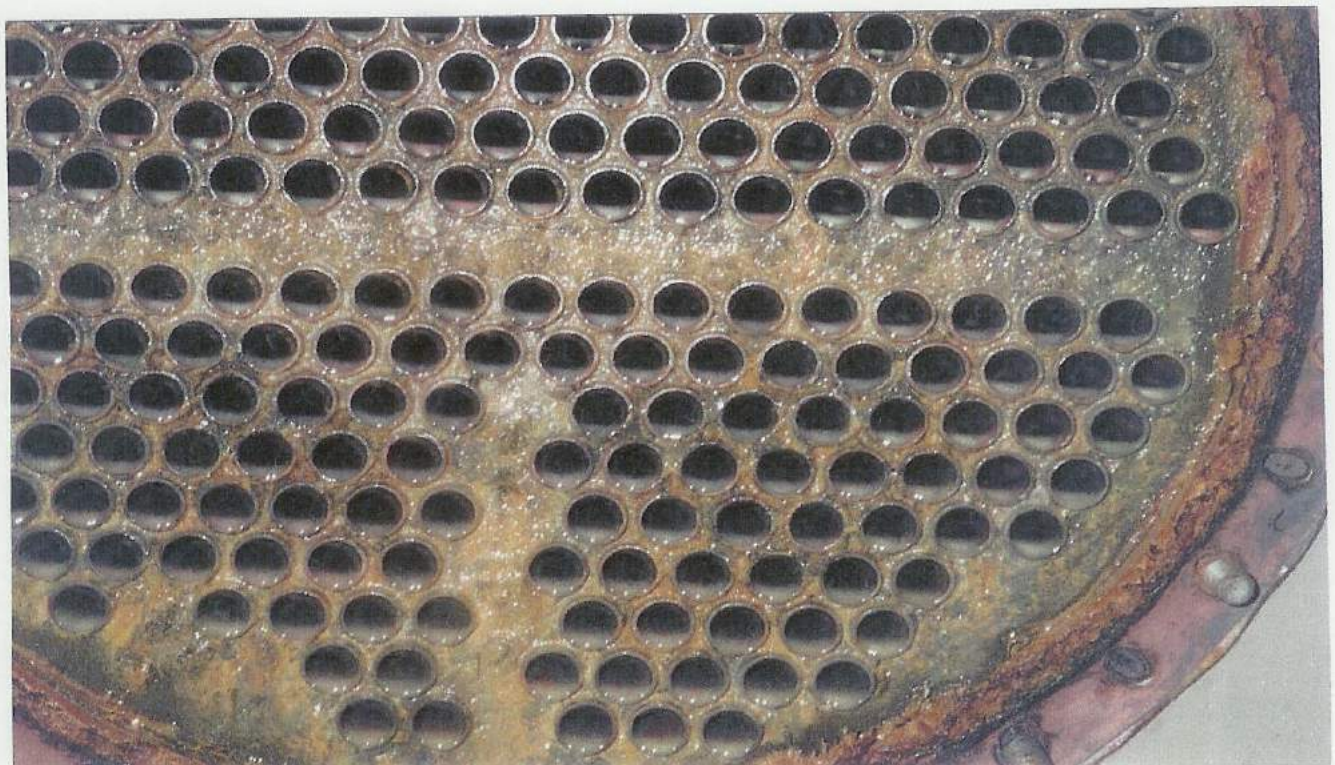
SINCE 1964

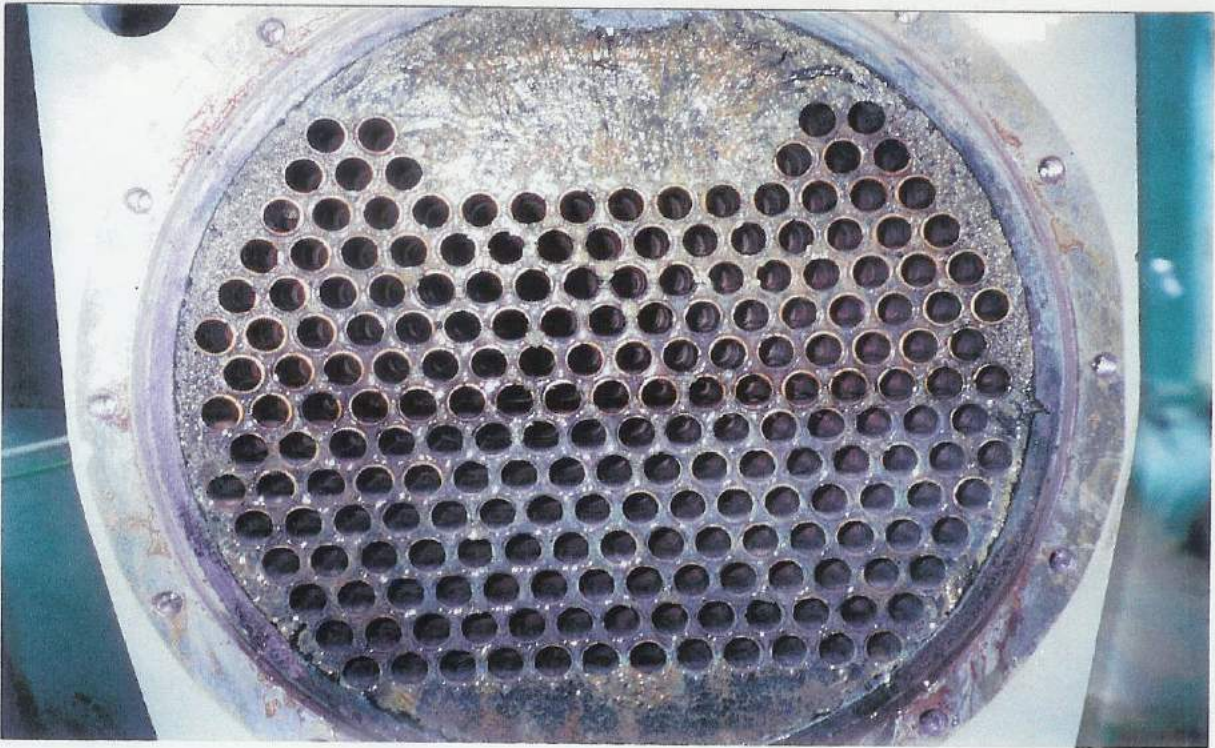
U.S. and Foreign Patents

The Superior Solution to Hard Water Problems
Non-Chemical Water Treatment to Control Lime Scale



**FT. MYERS, FLORIDA POST OFFICE
700 TONS/COMFORT AIR COOLING TOWERS
SUPERIOR WATER TREATMENT SYSTEM
INSTALLED AUGUST 27, 1999
CHILLERS OPENED FEBRUARY 14, 2000**





**FT. MYERS, FLORIDA POST OFFICE
700 TONS/COMFORT AIR COOLING TOWERS
SUPERIOR WATER TREATMENT SYSTEM
INSTALLED AUGUST 27, 1999
CHILLERS (RETURN END) OPENED FEBRUARY 14, 2000**





J-B SUPPLY CO.

P.O. Box 897
BRANDON, FL 33509
(813) 689-5965
(800) 330 5965
FAX (813) 689-9598

"FOR SERVICE
OTHERS ONLY PROMISE"

April 18, 2001

Charlie Sanderson
Superior Mfg. Div.
2015 S. Calhoun Street
Ft. Wayne, IN. 46802

Dear Charlie;

We had the opening of the Ft. Myers Post Office chillers yesterday. When I arrived, I found the strainer going to the controller and bleed blocked. The conductivity was beyond my meter of 5000. The FWMU is 110. Not knowing what we might find, I told everyone of the blockage and high conductivity.

Those attending were from the Tampa and Ft Lauderdale Post Office. Also the building maintenance supervisor from Alachua County, Gainesville, FL. The University of Florida is located in Gainesville. Everyone had a camera plus Alachua had a video camera.

Well, the chillers were opened (had my fingers crossed). They looked very good and everyone was surprised at the condition of the chillers. All but Ed Morgan of the Ft. Myers PO and me. Ed said the chillers looked good every time they were opened. The mechanic working on the chillers said that they always had scale before SWC was installed.

Everyone attending asked me to visit them and quote on their systems.

Photos in the mail.

Sincerely,

Jack Bernauer



SINCE 1964

U.S. and Foreign Patents

The Superior Solution to Hard Water Problems
Non-Chemical Water Treatment to Control Lime Scale

**U.S. POST OFFICE
FT. MYERS, FLORIDA**

**START UP DATE
09/04/01**



**(2) MODEL
ACV-10-K,
(2) MODEL
SF-1250-AK
SUPERIOR
WATER
CONDITIONERS;
(1) MODEL
CT-400-ZB
ENVIRONMENTALIST/
ZERO-BLEED**



August 1, 1997

Mr. Scott Sanderson, Sr.
Superior Manufacturing
2025 S. Calhoun Street
P. O. Box 13343
Fort Wayne, IN 46868-3343

Dear Scott:

I am sending a long overdue letter to thank you for your professionalism and expertise in helping Miller Valentine Group solve an ongoing problem with our towers. As you know, the towers were accumulating a lime build-up due to the hard well water that was being run through the towers. Even though chemicals were automatically injected into the recirculating water and various adjustments were made frequently by the chemical salesman, the towers were still shutting down at least once a year which, in effect, eliminated all air conditioning. This is a Class A, 60,000 square foot building, so this became a major problem.

Through Superior's expertise and recommendation, (4) CT-150-APD Environmentalist® 2000 and (4) RT-1000-K units were installed on the four towers and have been working great!

I truly appreciate your follow-up to ensure that the units are working properly, and for educating us on things that we need to do to ensure the continual smooth running of the non-chemical magnetic water treatment systems. All of you at Superior have gone above and beyond the call of duty.

I stand ready to serve as a reference and offer the units that you have installed for us as a model to your future clients. Thank you again for all your hard work.

Sincerely,



Denise Shaw
Client Service Manager



April 18, 1996

Mr. T. Craig Molden
Molden Associates
1804 Lake Shore Drive
Michigan City, IN 46360

Dear Craig,

More than a year has passed since we installed your Superior Water Conditioners on our 60" hot strip mill (Fall/Winter 1994-95).

We have a total of eight units installed in our present motor room water supply lines. These units supply three unique but dependent heat exchanger applications:

<u>MODEL</u>	<u>CAPACITY</u>	<u>APPLICATION</u>	<u>LOCATION</u>
SF-1250-AK	30 GPM	Air Conditioning Unit	Mill Computer Room
SF-3000-AK	165 GPM	Transformer, Rectifier and Motor Generator Bearings	Motor Room
SF-5000-AK	340 GPM	Air Heat Exchanger	Motor Room Coolers
SF-5000-AK	335 GPM	"	"
SF-5000-AK	355 GPM	"	"
SF-6000-AK	399 GPM	"	"
SF-6000-AK	460 GPM	"	"
SF-8000-AK	561 GPM	"	"

Prior to the installation of the Superior Water Conditioners, and during the summer months of high ambient temperature, we were plagued with lengthy electrical delays because of inadequate motor room cooling. This down time was unacceptable, and costly counter measures had to be instituted every summer. The capacity of the heat exchangers was adequate; however, the hard calcite build-up perpetually plugged the heat exchanger tubes.

Six months after the installation of the Superior Water Conditioners, we experienced one of the hottest summers of record in the Detroit area (1995). During that summer, we had no mill delays that were attributed to motor room cooling. All of this can be attributed to the Superior units. At this point, our confidence in the Superior units, permitted us to convert our mill computer room heat exchanger from city water to river water.

After approximately one year of service, the inspection plates were removed from some of our motor room coolers. The tubes were free of hard calcite formation, but there was a soft mud build-up which was easily removed by flushing the tubes with a water hose. Pictures were taken of the tubes to document how clean they were after flushing.

We took a sample of the mud and had a laboratory analysis performed. The calcium accounted for only 2.96% of the sample. The small amount of calcium in the sample conforms to the manufacturer's claim that the dissolved calcium would be kept in a suspended aragonite formation and passed through the tubes, not forming a hard calcite formation on the heat transfer surface of the tubes. It was determined that the heavy particles, silica and river "mud" (which accounted for the remaining part of the sample) settled in the tubes because of low water velocity. A large manual blow-down will be installed at a low point on the exchangers which will increase the velocity in the tubes, removing the "mud".

In summary, McLouth Steel has saved hundreds of thousands of dollars by preventing the normal downtime associated with scale deposition that plagued our cooling system. The return on investment of the Superior units was less than one year.

The system has certainly been a worthwhile investment for us; however, this is not an endorsement from McLouth Steel of the Superior Water Conditioners. The results set forth in this letter are specific to these applications at McLouth Steel Company.

Best regards,



Thomas Chulibrk
General Manager
Rolling Operations And Finishing

**COOLERS BEFORE INSTALLATION OF
THE SUPERIOR WATER CONDITIONER**



MCCLOUD STEEL



**COOLERS AFTER
ONE YEAR OF SERVICE**

**COOLERS AFTER
ONE YEAR OF SERVICE**



MCCLOUD STEEL



**COOLERS WASHED WITH WATER HOSE
AFTER ONE YEAR OF SERVICE**



Superior Manufacturing Division, Magnatech Corporation

15 Years of Saving the Environment

Some companies seem to always be ahead of their time. Rather than going with the flow, they choose to step out and try something different. That's what often leads them to success. L&L Products of Romeo, MI, is one of these mastermind companies. The intellectual wheels of Robert Ligon and Eugene Lane started turning in 1958 after realizing a need for automotive sealants. What started out as an experiment in a kitchen oven led to the creation of L&L Products, one of today's top manufacturers of engineered sealing and structural solutions.

Throughout the years, L&L Products, has undoubtedly faced many challenges, as all companies do, but they seem to have a knack for making wise decisions based upon the impacts those decisions will have on the future. In the late 1980's, a problem arose for L&L regarding their water treatment. At that time, their Romeo North plant used well water, which had 3.5 ppm of iron and 43 grains (735 ppm) of hardness. They were using biodegradable chemicals along with an iron filter and sodium ion exchange softener on each of their four cooling towers to control the lime/scale. They were also draining bleed-off water into the wetlands located behind their facility. After employing this procedure for a period of time, Engineering Manager, Jurg Hauptli decided enough was enough. Hauptli knew that putting chemicals, heat, and additional water into the environment would have a negative impact on their surroundings. But, he was uncertain of what option, if any, he had. At that point, he began to investigate alternative *non-chemical* water treatment methods.



Hauptli knew that putting chemicals, heat, and additional water into the environment would have a negative impact on their surroundings. But, he was uncertain of what option, if any, he had. At that point, he began to investigate alternative *non-chemical* water treatment methods.

In the nineties the phrase "going green" was not often used, but that was exactly what L&L was about to do. In 1990, Hauptli discovered the Superior Water Conditioner[®], which used no chemicals in its process and promised equal results (to chemical water treatment) for lime/scale control. Since Hauptli had not previously heard of this technology, he began extensively researching magnetism and their effect on water. Shortly after, Hauptli recom-

mended that L&L purchase Superior's "Environmentalist/Zero Bleed 2000[®]" water treatment system, which would do the job without requiring blow-down, meaning time and money savings for the company.

Fifteen years later L&L Products continues to use the Superior Water Conditioner[®] systems for their lime/scale control. Over the years they have incorporated several more Superior units within their plants, and look to add more with any expansions.

When asked his feelings regarding the Superior systems Hauptli said, "The equipment just keeps running, running, and running...it's great, we have had no problems with it." However, Hauptli confesses he, like many, was first hesitant to try a technology that was new to him, and feels that most engineers do not choose magnetic water treatment solely based on their unfamiliarity with it.

By choosing inline permanent magnetism for their water treatment needs, L&L has come out on top, substantially reducing their annual operational costs. Hauptli said the cost of one Superior system was equal to what L&L was paying the laboratory to have their water tested when using chemicals, giving them a payback of just one year in laboratory costs alone. The company has also profited in environmental ways, by conserving in excess of 2 million gallons of water annually and keeping an additional 2 million gallons of polluted water from being dumped into the wetlands (or hauled away) annually. Also eliminated was the air pollution that would have been caused with the normal evaporation and drift of the chemically treated water recirculating from the sump to the top of the towers.



Stepping out to try something new is never easy for any company. However, L&L realizes the rewards they receive by looking beyond the norm, and that's why they continue to step out again and again. This way of thinking has afforded them the ability to stay on the cutting edge in new product development, awarding them issuance of patents on new products year after year.

Looking Beyond Chemical Water Treatment

When you think of an environmentally friendly company, a steel processing plant does not typically come to mind. However, Stripco Inc. of Mishawaka, IN, a manufacturer of production-ready, cold-rolled steel coils, is the exception.



In August of 1995, Stripco made a wise decision that also proved to be cost-effective and environmentally-friendly when they installed a Superior Environmentalist 2000[®] System, in the place of chemicals, to control lime/scale and corrosion on one of their cooling towers. A few months later they installed another Superior system on a second cooling tower.

When calcium, magnesium, and other water-borne minerals are exposed to heat, pressure, friction and other physical changes within water-using equipment, they precipitate out of solution and form layers of calcium carbonate, (commonly known as lime/scale) on the heat transfer surfaces. According to the United States Bureau of Standards, just 1/2" of this mineral scale build-up can increase energy costs by as much as 70%, as it creates a great insulating barrier between the heat transfer surface and the water. Another common concern in water-using equipment is corrosion, especially in situations where the water is aggressive due to low pH, excessive free oxygen content, and under or over chemical treatment.



For years, chemicals have been the traditional and conventional method used to control these problems in heat-transfer equipment. Yet, when the Superior Water Conditioner[®] is used in conjunction with centrifugal separation and filtration equipment (Superior's "Environmentalist/Zero-Bleed 2000[®]"), no chemicals are needed and bleed requirements are totally eliminated.

Prior to Stripco's opening in 1994, Steve Mihojevich, Director of Engineering, recommended that his newly appointed Project Engineer, Richard Smith, check into magnetic water treatment (MWT). Having had prior experience with MWT, Mihojevich felt confident in choosing magnetics over chemicals. Smith, on the other hand, had never used anything other than chemicals and was somewhat apprehensive. However, the thought of the ease and savings this process might offer them over traditional water treatment helped him to be more open to trying something new and different.

Smith said his acceptance of MWT was not easily won, taking him about five years to totally believe in the treatment. Smith went on to say "Problems don't usually happen immediately; they show up years down the road. But after five years without any problems, that's when I was convinced it was working." It has now been 10 years since Stripco began using the Superior Water Conditioners, and Smith says his favorite benefit of the products is the low maintenance and the environmental aspect of them. He mentioned that some of the men in the plant think the ease of their water treatment system is "the norm"; but Smith knows what "the norm" (chemical water treatment) is all about, and is thankful he doesn't have to deal with it any longer.

Over the past decade, by choosing the SWC, along with ultraviolet equipment for biological control, Stripco has eliminated hundreds of thousands of gallons of chemically contaminated water from going to waste and into the environment. They have also saved tens of thousands of dollars in the operation and maintenance of their cooling tower systems by reducing, if not entirely eliminating, expenses in the following, which are usual and customary when chemical treatment is applied.

The cost of:

- *Chemicals
- *Labor of receiving and handling chemicals
- *Testing and continually adjusting chemical dosage
- *Parts, labor, maint. and operation of chemical feed pumps
- *Freight
- *Water test kits and test reagents
- *Periodic outside laboratory testing
- *Storage and disposal/removal of chemical containers
- *Time reporting/permitting of hazardous materials stored/used/disposed
- *Liability insurance
- *Periodic acid cleaning
- *Bleed water
- *Heat transfer loss as a result of lime/scale build-up
- *Corrosion of cooling tower system and equipment
- *Damage to pump and other equipment caused by harsh chemical use

When asked to compare his treatment systems to chemical treatment, Smith emphasized the low maintenance and operating cost of the Superior Water Conditioner[®]. The only work Stripco performs on their conditioners is monitoring the conductivity of the cooling tower water in order to determine if they need to adjust the bleed rate. The bleed rate is approximately 25% less than when treating with chemicals, as Superior's unique treatment process effectively controls mineral scale deposition in cooling systems with cycles of concentration as much as 5-10 times greater than what is required for chemically treated systems to effectively do the same job. "It pretty much runs on its own and we do not have to worry about it," Smith said.

Stripco is delighted they made such a cost-effective decision when they installed their first Superior Water Conditioner[®] ten years ago. They should be commended for the choices they have made resulting in obvious savings in their operational costs as well as their contribution to preventing pollution and preserving our natural resources.

