Case Study: Micro-Nice® D-5 Descaler & Scale Preventative
H.P. Hood, LLC's Winchester, VA
Ultra High Temperature Dairy Product Facility

About the Customer:

HP Hood, LLC is one of the largest branded dairy operators in the United States. In Hood's traditional home territory of New England, Hood branded lines of milk, creams, ice cream, cottage cheese and sour cream regularly rank number one in the six-state area.

The new HP Hood facility in Winchester, Virginia which opened in the fall of 2000, manufactures extended shelf-life beverages using state-of-the-art Ultra High Temperature manufacturing with current and emerging packaging technologies. The new plant supports both Hood brand business and products for national brand partners such as Land O' Lakes, Nestle, Lactaid and Carnation. Hood's new plant is one of the largest UHT facilities in North America, Various products from this facility are enjoyed in nearly all the lower 48 states.

Trials arranged and oversight provided by:

CVA Industrial Products, Inc. of Ruckersville, VA 22973. (434) 806-9717
Technogreen USA, LLC's Virginia Manufacturer's Representative

Date of Evaluation:

Starting date: February 9th, 2007
Ending Date: April 9th, 2007

System Information:

(3) 4-Cell IMECO (York) Model SIDC-1915-4 Fluid Cooling Towers, Capacity 1,329 Tons/Each
Make up sump capacity: 10,500 gallons
Daily Make up water volume: 60,000 gallons per day

Product Information:

Micro-Nice® D-5 Non-acid, Biodegradable, Environmentally Safe Descaler and Scale Preventative.
Recommended descaling concentration: 250-500PPM
Descaling concentration at trial site: 250PPM
Average daily amount for this system: 15 gallons
Method of application: Direct injection/positive displacement pump

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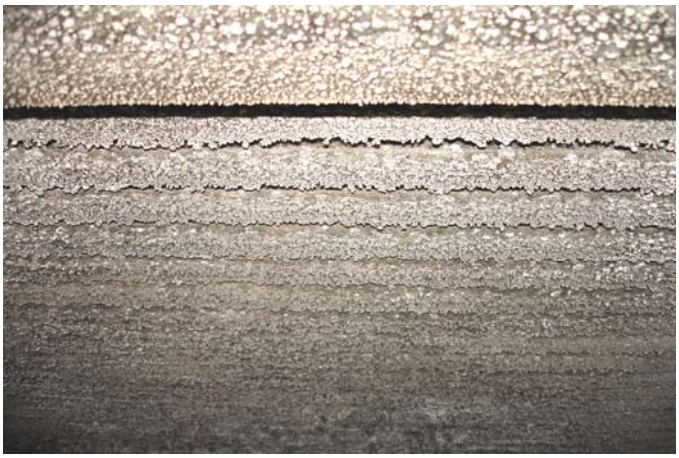
Evaluation Day 1

These photos were taken on the first day of a planned 60-day evaluation of the effectiveness of Micro-Nice® D-5. The scale can clearly be seen adhered to the fluid tubes inside the cooling towers. The blue seen in the right photo is scale stained by Hood's regularly used biocide chemical.



The photo on the left shows just how much scale can accumulate inside one of these cooling systems without an effective scale control regimen. The photo on the right shows how persistent scale can be, growing on the drift screens merely from the effect of water with a high hardness being blown against the screens.

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Evaluation Day 41

In the photo on the left, scale, up to ¼" thick in spots, was easily removed by hand from the inside of the cooling tower. Prior to the addition of Micro-Nice® D-5, this scale was so solidly adhered to the cooling tower walls that not even high pressure water could remove it. In the photo on the right, it can be seen that the scale that had formed on the drift screens has become quite soft and easily removed.

The photo on the left shows scale and salts that have precipitated out of the system due to the action of Micro-Nice® D-5. The photo on the right shows a worker simply peeling scale off of the cooling system's wall with his bare hands.

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Evaluation Day 41

Top-side drift screens on day 1 of the evaluation, encrusted with scale.

Top-side drift screens on day 41 of the evaluation, cleaned and scale-free due to Micro-Nice® D-5's action through tower sprays with no hosing or power-washing.

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Evaluation Day 54 - The System is Pressure Washed

High pressure water is used to remove the scale that has been softened and released from the tubes. The scale had lost it's adhesion due to the action of Micro-Nice® D-5.

Photos taken during a pause in the cleaning show nearly all the scale removed from the tubing. Plant technicians reported "It was incredibly easier than before D-5, and for the first time we can get them completely clean. Before, scale chunks that we could manage to get off were as hard as concrete. Now you can crumble these chunks in your hand."

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Evaluation Day 60

These photos show areas of the cooling system that were not pressure washed. The bare spots on the tubes represent areas of the cooling system that received constant wetting with the cooling system's water enriched with Micro-Nice® D-5. It can be seen that the scale has been dramatically reduced and eliminated as a result of Micro-Nice® D-5.

Actual scale removed from H.P. Hood's cooling towers on April 3rd, 2007.

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Water Analysis of H. P. Hood's cooling system water

		Prior to adding D-5	Week 2	Week 4
Insolubles		Low	Low	Slight
Color		Blue	Blue	Blue
pH		8.64	8.31	8.27
Total Dissolved Solids	ppm	867	825	665
Conductivity	umhos/cm	1240	1180	952
Total Alkalinity	ppm as CaCO3	451	457	330
Carbonate Alkalinity	ppm as CaCO3	18.3	8.8	5.8
Bicarbonate Alkalinity	ppm as CaCO3	433	448	324
Hydroxide Alkalinity	ppm as CaCO3	0.2	0.1	0.1
Phenolphthalein Alkalinity	ppm as CaCO3	9.4	4.5	3.0
Total Hardness	ppm as CaCO3	375.7	254.5	293.6
Calcium Hardness	ppm as CaCO3	229.5	159.8	197.3
Magnesium Hardness	ppm as CaCO3	146.2	94.71	96.36
Carbonate Hardness	ppm as CaCO3	376	255	294
Non-Carbonate Hardness	ppm as CaCO3	Not Detected	Not Detected	Not Detected
Chloride	ppm as Cl	88.8	96.5	90.5
Dissolved Sodium	ppm as Na	146	187	105
Dissolved Iron	ppm as Fe	Not Detected	<0.025	0.0483
Dissolved Copper	ppm as Cu	0.0354	0.147	0.193
Dissolved Manganese	ppm as Mn	Not Detected	Not Detected	<0.01
Dissolved Silicon as SiO2	ppm as SiO2	16.51	13.37	11.66
Dissolved Zinc	ppm as Zn	Not Detected	0.455	0.252
Ryznar Index		4.92	5.55	5.67
Practical Scale Index		4.88	5.17	5.45
Nitrate	ppm as NO3	36.3	7.1	4.6
Nitrite	ppm as NO2	Not Detected	1.7	6.7
Organophosphate as PO4	ppm as PO4	0.315	Not Detected	Not Detected
Orthophosphate	ppm as PO4	5.48	8.86	9.25
Sulfate	ppm as SO4	142	92.2	80.3
Total Iron	ppm	0.052	0.228	0.058
Total Inorganic Phosphate	ppm as PO4	1.82	0.14	Not Detected

Over the course of 4 weeks, water samples from Hood's cooling system were tested. A sample was taken on the day of commencement of the evaluation, but prior to the addition of Micro-Nice® D-5. Two more samples were taken at weeks 2 and 4.

The results after 4 weeks show drastic reductions in TDS (decreased 23%), conductivity (decreased 23%), alkalinity (decreased 27%), total hardness (decreased 22%), and calcium hardness (decreased 14%). All of these factors contribute to the growth of scale, and their reductions resulting from the action of Micro-Nice® D-5 will decrease the likelihood of further scale development.

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Summary

Before

After

In the past, H.P. Hood, LLC had utilized acid treatments to remove the scale from their cooling system, but those treatments failed. There is an inherent danger in using acids to clean a system such as this, since acid treatments can very easily damage the metal surfaces of equipment and tube bundles. Acids used for attempting to remove scale are also potentially harmful to plant personnel and the environment, while Micro-Nice® D-5 is not.

By using Micro-Nice® D-5, H.P. Hood has removed several hundred pounds of scale from their system like the photo on the left. This return to nearly-new equipment cleanliness will lead to an increase in system efficiency, and thus a reduction in usage of electricity and water. Micro-Nice® D-5 not only works on the parts of the system we readily see, but on interiors of system piping, pumps, strainers, vessels, heat exchangers, and boilers.

With a continued maintenance regimen of Micro-Nice® D-5 at 75-100 ppm, H.P. Hood will enjoy the benefits of a scale-free system with reduced maintenance and operating costs, and increased system longevity. If scale cannot form, under-scale corrosion cannot take place. They will also have the satisfaction that they are doing this with a non-acid, no-phosphate, no-nitrogen, metal-free, biodegradable and environmentally friendly product.

Micro-Nice® D-5 has been accepted by the FDA for use in food system heat exchangers. By the conclusion of the 60-day evaluation in the open loop cooling tower systems, H.P. Hood was so convinced of the value of Micro-Nice® D-5 for scale removal and prevention they have decided to expand its use to include their closed-loop ice water and glycol heat exchanger systems.

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