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HYDROLATOR

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ZERO DISCHARGE APPLICATION FOR POWER PLANTS

In 1988, HYDROLATOR installed a test system in one of two identical small DX closed coolers (shown) which cool the 200° F compressed Freon gas for ice-cream production at Giant Foods in Jessup, MD. Scale was prevalent and operating temperatures high. One of the goals of the test were to prove HYDROLATOR de-scaling performance and to monitor the effects of zero discharge on the system. That is, the bleed-off or blow-down from the cooler was turned off. Within a month, all deposits were cleaned from tube surfaces and water turned crystal clear, indicating normal HYDROLATOR function. A further goal was to monitor corrosion by placement of metal specimens at the water margin, consisting of (from left to right) mild steel, galvanized, stainless steel and epoxy-coated samples. As cycling up proceeded from 3-5 cycle start, the water increased in turbidity to maximum (limited by windrift) concentration of 100 cycles, 20,000 micro mhos, 6000+ PPM of calcium hardness and 7000+ PPM of chlorides. The test period was 1 ½ years. During dry spells, a white deposit could be seen from the roof around the perimeter of the cooler.

No scale formed during the test and no corrosion was detected. The steel tubes shown were clean. Where the tubes in the photos are dry a fine white talc of aragonite is visible clinging to the bare surfaces. This layer is a microns thick nucleation, which we believe improves the heat transfer through micro-turbulence at the water/metal junction. This may explain, in part why heat transfer is dramatically improved. For example, Dave Saul (see BSC reports) had to reduce sea-water cooling to his spiral coolers, because of over-cooling of the ammonia liquor which cools and quenches the coke oven gas. In addition, surface tension (or inter-molecular attraction) is eliminated in HYDROLATOR charged water, this has been seen in many still-water vessels (swimming pools, cooling towers) where one cannot visually detect the water surface without disturbing it. In Dave Saul's and other closely monitored applications, up to 25% reduction in coolant flow or energy use have been reported.

This closed cooler test proved also that in a HYDROLATOR controlled system, solubility actually increases with temperature. The coolest part of the cooler turned out to be the access door. And, it was on this door that soft, large, nearly transparent crystals formed at saturation on the surface (see photo) while the hot tubes remained clean. For further information and demonstration call Ted Light at (410) 352-5524


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