Non-Chemical Device (NCD) Failure in High-Rise Buildings

Background
Twin high-rise office buildings in Phoenix, AZ were directed by Corporate to “be a shining example of a green building in the desert.” They were subsequently approached by a company promoting a NCD to replace their successful Chem-Aqua water treatment program. The device employed an “electrostatic treatment system” to reportedly eliminate the need for chemicals and reduce water consumption by over 50%.

The building’s system consisted of two 1,350 ton cooling towers. The cooling towers and chillers were only two years old and in excellent condition when the NCD program replaced the Chem-Aqua program.

The NCD manufacturer promised the new program would: provide results to meet or exceed chemical treatment, enable operation at a much lower blowdown rate, and pay for itself in 12-24 months.

Results
The NCD was installed on the cooling towers. Two months later there was noticeable evidence of corrosion damage and poor microbiological control. Numerous rust spots developed in the tower basin, some exceeding three inches in diameter. Severe galvanic attack occurred underneath the corrosion deposits. Although the NCD supplier initially stated the towers would only need annual cleaning (as was the case with the Chem-Aqua program), weekly cleaning was mandated after only two months.

When the chillers were inspected, the condenser tubes contained heavy scale deposits and aggressive acid cleaning was required to restore heat transfer. Scale deposits were observed in the condenser water valves throughout the buildings and the condenser water pump seals required replacement after only seven weeks (typically last two years). The pump service company stated the premature replacement was from scale deposits and poor water treatment.

Due to the complete failure of the NCD, the management company is evaluating how best to convert back to chemical treatment at this location and is considering banning use of the NCD at all locations nationwide.

The NCD resulted in damaged equipment, higher operating costs, extensive frustration, and a regression in sustainable operation initiatives.