ChemTreat
Case History

ChemTreat CN3803 and CL2852 Correct and Improve Cold Brine Chemistry

BACKGROUND

The construction of a 6,500-seat, 154,400 ft² (14,340 m²) multi-purpose event center was completed in January 2009. Events hosted at the center include arena football, arena soccer, and ice hockey. Within five years of operation, the brine system was experiencing temperature control issues on the ice floor, premature piping corrosion, and brine equipment failure. The conditions were so severe that the Arena and City announced they would be issuing claims to the contractors and subcontractors who designed and built the ice plant.

ChemTreat began investigating the situation in April 2014 and found the brine chemistry was acidic (6.05 pH) and lacked key corrosion inhibitor concentrations. Deposit sampling also found high percentages of iron oxides.

SOLUTION

ChemTreat used CN3803 cooling system cleaner and CL2852 closed system corrosion inhibitor to perform a thorough cleaning and re-passivation of the cold brine system. CL2852 is designed to mitigate corrosion in calcium chloride brine closed systems operating between -5°F and 158°F.

Once the ice sheet was off for the season, the cold brine loop was given a thorough flush to replace the corrosive system volume with fresh city water. Once measurements confirmed the flush was successful, the loop was closed after 55 gallons of CN3803 was introduced and permitted to recirculate for 24 hours. CL241 defoamer was on hand for potential foaming.

After 24 hours of CN3803 recirculation, the cold brine loop was put into a running flush, cracking the drain farthest from the makeup source. This running flush (bleed and feed) continued until the volume was within 10 percent of the city pH and makeup conductivity. Once these targets were achieved, the running flush was terminated and arena personnel were instructed to add calcium chloride to the desired concentration target of 25 percent. The volume was then recirculated for 24 hours to mix the calcium chloride into the solution, and the volume pH was recorded. CL2852 was introduced at a rate of 10 gallons per hour, and the pH was monitored until the target of 8.8–9.2 was achieved. An entire 30-gallon drum of CL2852 was utilized.

RESULTS

The cleaning and re-passivation of the arena cold brine loop was a huge success. The cold brine system was back on track with ample corrosion inhibitor concentrations and a healthy pH of 8.80 by May 2014. Chemistry maintenance has been minimal with the loop requiring 2.5–5.0 gallons of CL2852 annually upon seasonal start-up.

In addition to routine monitoring and CL2852 dosing, arena personnel are encouraged to bring the calcium chloride concentration up to saturation, approximately 36 percent, to push oxygen out of the solution and create a less corrosive chemistry. With continued ChemTreat treatment, the brine loop holds excellent chemistry and produces better sheets of ice.

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