

A 1,200-room Las Vegas Luxury Hotel Protects Domestic Water System and Saves \$68,041 Per Year with Nalco Water Corrosion Inhibitor Program



BACKGROUND

From 2015 to 2019, a 1,200-room luxury hotel in Las Vegas faced tremendous challenges maintaining its domestic water system due to serious plumbing corrosion. The water supplied to the hotel was being softened and considered very corrosive with a total hardness of less than 1 grain and a pH of 8.15 – a negative Langelier-Saturation Index (LSI) value. The incoming water also had a free chlorine level of 1.00 ppm +/- 0.2 ppm and chloride levels above 90 ppm. This corrosive water supply was causing leaks in the hot water side of the domestic plumbing system, including pinhole leaks on the hot water circulation line, supply line and risers.

The leaks had a major negative impact on the hotel's profitability. Repair costs ranged from \$1,000 to \$5,000 per incident, depending on the physical location of each leak and the extent

of the damage. The property faced 70 such repair and replacement incidents per year, on average, at an annual cost of more than \$159,000. Leak repairs, both planned and unplanned, also caused room availability to fluctuate significantly. The hotel knew a major change in their water treatment program was inevitable.

"This was a perfect opportunity for Nalco Water to provide advice to address corrosive water and implement a corrosion inhibitor program to protect their pipes," Paul Fenton, Nalco Water corporate account manager, explained.

SOLUTION

The Nalco Water team proposed two solutions:

- Water softener adjustment: Opening the bypass of the water softener slightly, so that 'hard' city water can be blended into the soft water and increase the hardness to 4 to 5 grains. This yielded a slightly positive LSI. This adjustment was made in early 2018.

ANNUAL SAVINGS



COSTS

Reduced plumbing repair costs by

59%
annually



HUMAN HEALTH
& SAFETY

Decreased copper levels in the domestic water system by

67%
annually



ASSETS

Reduced pinhole leaks in the domestic water plumbing by

43%
annually

VALUE DELIVERED

**\$68,041
ANNUALLY**

eROI DELIVERED

**321%
ANNUALLY**

- C-9 corrosion inhibitor treatment program: C-9 creates a microscopic-thin coating of phosphate and zinc on the inside of the plumbing system, thereby eliminating the water-to-metal pipe contact. Zinc acts as the sacrificial anode, consequently preventing leaks. The corrosion inhibitor system was installed and commissioned on July 16, 2019, at a cost of \$21,193 per year.

The use of an inhibitor also helps reduce health risks associated with elevated lead and copper corrosion products in the water system. The EPA limits are 1.3 ppm for copper and 0.015 ppm for lead. The reduction of these levels helps ensure a healthy environment and ensure regulatory compliance.

C-9 was dosed proportional to water flow; a volume of C-9 is injected relative to the flow rate of water through the system. The flow-proportional control system consisted of an ultrasonic flow meter to determine the flow rate of the water and a Grundfos Gamma X metering pump for dosing C-9 into the flowing water. The starting dosage was 4.00 ppm of product, which consisted of 1.45 ppm as total phosphate and 0.50 ppm as zinc.

“Our year-over-year plumbing spend shows that we’re trending in the right direction,” the hotel’s director of engineering said. “But more so, time-lapsed from one major repair to the next is very telling on the effectiveness that the phosphate program is performing well.”

RESULTS

Since the start of the C-9 corrosion inhibitor dosing on cold water mains, we were able to maintain consistent phosphate residual of 1.45 ppm and zinc at 0.50 ppm. The hotel has realized the following benefits:

- **43% reduction in repairs due to pinhole leaks**
- **59% reduction in repair cost**
- **67% reduction in copper concentration**

TABLE 1

	BEFORE	AFTER
Number of Annual Leak Repairs	70 est.	40 est.
Total Annual Repair Costs	\$159,000	\$69,766
Copper Concentration	1.2 ppm max.	0.4 ppm max.
Lead Concentration	Non-Detect	Non-Detect

CONCLUSION

Working together to address corrosion concerns, the Nalco Water team worked with the hotel to deliver a comprehensive water treatment program that yielded major benefits for their domestic water system. The customer saw significant reductions in the need for repairs due to pinhole leaks and the associated costs. Decreased copper levels in their water indicates a lower corrosion rate.

Taken together, the cost of the treatment program (\$21,193/year) and the repair-related cost savings (\$89,234/year) yield net annual cost savings of \$68,041 per year for the hotel. This equates to an annual return on investment of 321%, making this a true win for both parties.



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