

CITY OF LAS VEGAS, NEVADA HITS JACKPOT \$\$ WITH SCALEBLASTER



Premiere wastewater recycling facility uses cost-saving advanced technology to eliminate mineral scale fouling without chemicals or maintenance

In one of its biggest public works projects ever, the **City of Las Vegas** spent \$37 million to construct the **Durango Hills Water Resource Center** (formerly called the Northwest Water Resource Center). This state-of-the-art facility, which started service in 2001, collects municipal sewer wastewater and treats it to standards that make it safe for irrigation of 11 area golf courses.

Designed to meet demand for years to come, the wastewater reclamation plant includes four treatment 'trains'—two on its “south” side and two on its “north” side—capable of processing a total of 10 million gallons per day (mgd). Current needs are met by operation of two trains, one per side of the facility, with a combined output ranging from 2.5 mgd in the winter, when demand is low, to 6 mgd in the summer when demand is high.



Aerial view of Durango Hills Water Resource Center.



ScaleBlaster - the electronic descaler.

From the start, however, Durango Hills' ultraviolet (UV) disinfection system failed to meet staff expectations. This made it necessary to rely on sodium hypochlorite injection to ensure that output to the recycled water distribution system met safety standards with respect to microorganisms. In turn, this entailed a high cost in time spent by plant mechanics contending with rapid mineral scale fouling of the two operating sodium hypochlorite disinfection systems. From the injectors to the contact basins where disinfection occurs, these systems include extensive networks of pipeline as well as valves, pumps, and other equipment.

Descaling by traditional methods, personnel spent a minimum of eight hours per week on acid washes and on cutting out and replacing blocked sections of pipeline, most of it running beneath concrete.

After two years of this, Durango Hills operations staff met with **Ken Matthews**, Southwest distributor for **Clearwater Enviro Technologies, Inc.**, to learn about the company's **ScaleBlaster** electronic descaling device. If the product performed as described, it would entirely eliminate the maintenance burden, as well as the costs of scale-removing chemicals and replacement parts for scale-corroded equipment. Staff decided to try the product first on the facility's south-side sodium hypochlorite system.

The **ScaleBlaster** product line includes 12 models for residential, commercial and large industrial applications. Matthews recommended



In June 2003, just before installation of the SB-200, the chemical feed line and valve are packed full of rock-sized chunks of scale.



Close-up view of the feed line valve plugged up with scale.

the SB-200—the smallest of the company's commercial-size units—based on the characteristics of the system. These factors included, among others, pipe diameters, pipe composition, and volume and hardness of the flow.

Prior to installation in June 2003, plant mechanics photographed a detached section of the injector's one-inch outgoing chemical feed line. The photos show the feed line, and its adjoining valve, packed full of rock-sized chunks of calcium carbonate scale.

The SB-200 was then installed and turned on. Installation of the product is quite simple. Signal coils are wrapped around the incoming pipeline—in the case of Durango Hills, the incoming dilution water line to the sodium hypochlorite injector (purple pipeline in photo)—and then the control unit is turned on with the flip of a switch. All models are designed to operate continuously. The SB-200 operates on four watts of electricity. The average nightlight uses seven watts of electricity.

After one month of operation, in July 2003 plant mechanics detached the same section of the chemical feed line as before. As the photographs taken at this time show, they found that the line was now completely scale-free.

Flow rates were now optimal throughout the disinfection system—from the injector to the contact basin—and have remained that way ever since. Scale-related maintenance ceased altogether.

Nine months of automatic, maintenance-free descaling on the south side was sufficient to prompt the City of Las Vegas to order a second SB-200 for Durango Hills. Matthews returned in April 2004 to supervise installation of this unit in the plant's north-side sodium hypochlorite system. After one month of operation, in May 2004 the plant mechanics conducted the same before-and-after inspection as with the south-side system, and with the same results. The north-side chemical feed line showed entirely scale-free and, again, flow rates throughout the disinfection system were optimal. Likewise, scale-related maintenance ceased. Conditions on the north side of the plant have remained this way since that time.

The **ScaleBlaster** product includes two principal components: (1) a control unit containing a microprocessor that sends out a square-wave current that rapidly sweeps back and forth across a broad range of select frequencies; and (2) signal coils that carry this current and that wrap multiple times around an incoming water pipeline. This arrangement induces an electromagnetic field perpendicular to the water stream inside the pipeline. Because of the rapid back-and-forth sweep of the current—from one end of the frequency range to the other—the induced field is highly dynamic and agitating in character.

This molecular-level agitation causes calcium carbonate—the mineral overwhelmingly responsible for scale—to precipitate out of solution as soft, nonadhesive, submicron particles. These remain suspended in the water and flow harmlessly through the system. In this way the product prevents formation of the tenaciously adhesive calcite crystal that would otherwise accumulate and foul pipelines and downstream appliances and equipment such as faucets, showerheads, sprinklers, valves, pumps, water heaters, boilers, heat exchangers, chillers, cooling towers, and evaporators.

Removal of already-existing scale comes as the necessary byproduct of this scale-prevention process. The radical reduction in calcium-carbonate hardness yields a corresponding increase in water solvency. This flow of highly solvent water steadily removes already-existing scales—not only of calcium carbonate, but also of magnesium carbonate and other scale-forming minerals. Once already-existing scales are removed, the prevention process stops any further buildup.

The American Institute of Chemical Engineers reports that the total yearly cost of scale fouling in the U.S. is currently \$18 billion. That is greater than the total 2003 expenditures of each of 27 states, more than twice as much as each of 14 of those states, and seven times as much as Vermont and North Dakota each.

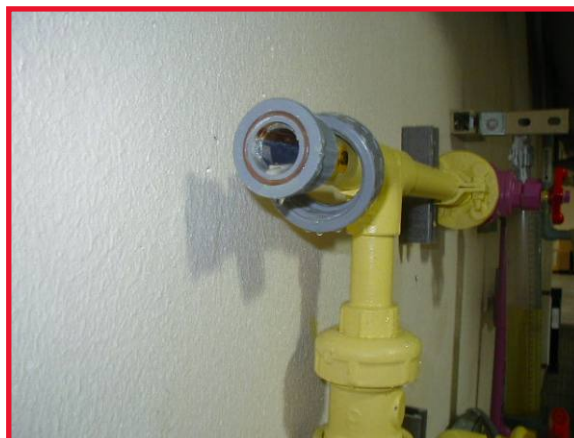
In a time of tight budgets, high energy costs, and pollution penalties that reflect the high level of concern about environmental degradation, electronic scale prevention and removal represents a cost-saving, energy-saving, and environmentally friendly alternative to the traditional use of corrosive chemicals that only remove already-existing scale.



View of the SB-200 installed and operating at the south-side hypochlorite injection system.



In July 2003, after one month of operation of the SB-200, the chemical feed line is now completely scale-free.



The chemical feed line assembly is now also completely scale-free.

CASE HISTORY SUMMARY

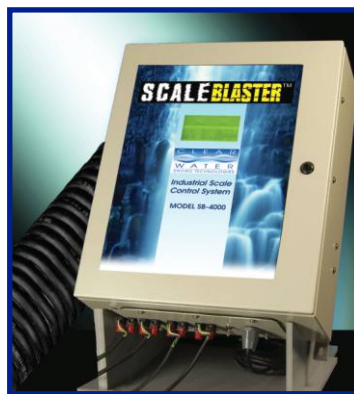
ScaleBlaste Benefits Enjoyed by the City of Las Vegas

- ◆ Effective, automatic, maintenance-free, & nonpolluting scale prevention.
- ◆ Pipelines, valves, pumps and all other equipment making up the plant's two wastewater disinfection systems remain scale-free to this day.
- ◆ Huge savings in time and money.
- ◆ No more downtime spent on laborious scale-related maintenance.
- ◆ No scale or chemical corrosion of pipelines and other disinfection system equipment.
- ◆ Extended equipment life.
- ◆ No pollution-prevention costs.
- ◆ Return on investment in less than 3 months!

SEVERAL MODELS FOR ANY SIZE PIPE



Model SB-200



Model SB-4000



Model SB-300



Model SB-400



Model SB-600



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