

Reported independently by Health Care Laundry News, div. Indumark®, New York, NY

## Nursing Home Chain Saves Over \$1,000,000 On Annual Laundry Costs Through Installation of Reliable Ozone Systems

*Also Improves Quality of Care, Reduces Environmental Impact, Enhances Facilities Appearance*



More reliable ozone units are credited with providing \$1,000,000 annual savings. In addition, new units take up wall space of only about 44 in. x 20 in. total, compared to 48 in. x 48 in. with previous units.

Table #1:  
Key Results

- Over \$1,000,000 annual savings in laundry costs
- 9-step wash load with 8 hot fills reduced to 7-step load with one hot fill
- About 25 min. shorter for each load
- Average savings on natural gas costs for each facility \$1500-2500/mo.
- Save significantly on air conditioning
- Cut bleach usage in half
- Reduced laundry soap by  $\frac{1}{3}$  to  $\frac{1}{2}$ ; removed softener altogether
- Half as much lint from lint trap
- Linens replacement costs drop 47-48% over three year period
- Softer goods for patient skin protection
- More time for staff for general housekeeping
- Less chemicals down drain; operating greener

Pensacola, FL— The environmental and engineering manager for a 44-property nursing home chain reports over \$1,000,000 annual savings in laundry costs through the installation of more reliable ozone systems in 42 of its properties. The company's original three installations could not be expanded to other properties because of frequent service outages.

The more reliable ozone units, which will also be replacing the two remaining original installations, are credited with providing the \$1,000,000 annual savings through a combination of reductions of laundry load steps; laundry step times; natural gas usage; air conditioning costs; bleach, soap, and softener usage; and linens replacement.

Also noted are improved quality of resident care through softer, odor-free linens with more frequent changing; reduced environmental impact through decreased water use and chemical discharge; and enhanced facilities appearance through increased availability of laundry workers for housekeeping tasks.

"For anyone who has a laundry running more than 12 hours a day, it's a no-brainer to put ozone in," said Larry Petty, engineering and environmental services director for Gulf Coast Healthcare, which operates nursing homes in Florida, Mississippi, and Alabama. "You streamline the laundry process by leaps and bounds when you cut 25 minutes off a load, by cutting washing steps and reducing drying time."

"We started in 2006 with units at three locations, and they were being shut down for two days at a time because the ozone was eating up the rubber parts in the water valves in the ozone generators and washing machines," he recalled.

"That was happening at least three or four times a year, and sometimes every 4-6 weeks. That stopped when we went to a different manufacturer in 2008, which also allowed us to install in more facilities more easily. The new units take up a wall space of only about 44 in. x 20 in. total, compared to 48 in. x 48 in. previously."

The more reliable units were manufactured by Guardian Manufacturing, Inc. of Co-coa, FL, who has also taken on the supplier of the original units as a new distributor.

"We're still using two of the original units because they had paid for themselves, and we'll keep them until they're more trouble than they're worth because of parts replacement," Petty said. "The third one we already had to replace because it hadn't been maintained properly. Besides being much more reliable, the new units add ozone to the water in a much less complex process. We now have them installed in 42 of our 44 properties."

In the first new ozone installation in a 158-bed nursing home, the laundry runs 20 hrs/day, through two 100-lb. washers and one 60-lb. unit. The original one-hour, 9-step wash load with 8 hot fills was reduced to a 7-step load with one hot fill, that takes only 45-50 min.

"The average savings on natural gas costs for each of our facilities is \$1500-2500/mo.," Petty noted. "When we looked at one monthly bill for March compared to the previous year, we saw a savings of \$6,000, and allowing for the heating needs, came up with \$2500 savings for the laundry part."

"And in the summer now, it's a lot cooler in the laundry, with no radiant heat from all the hot fills, so we also save significantly on air conditioning. In addition, using ozone means we cut bleach usage in half. We're only continuing to use bleach at all because of state regulations."



Ozonated water is injected directly into the wash wheel, using a premium Venturi-type system that consistently provides mass transfer efficiency at the level of 90% or more.

"We've reduced laundry soap by 1/3 to 1/2, and removed softener altogether," he continued. "We don't like to send chemicals down the drain any more than we have to, so we are now also operating greener."

"We are now pulling only half as much lint from the lint trap, so linens are lasting longer. When we tracked replacement costs, we came up with a 47-48% drop over a three year period."

"When we cut the two wash steps, we gained 10-15 min. per load, and when it goes into high speed extract, more water is slung out, so drying time is cut at least 5-10 min./load. And when the ozone comes into contact with the goods, it opens the fibers, so they come out cleaner."

The total time of about 25 min. shorter for each load varies with sheets versus spreads, and there are no hot fills at all for clothing.

"We could have cut laundry hours, but we chose not to," Petty noted. "Instead, we put the savings into other parts of housekeeping, like cleaning rooms and mopping floors, which is done 8 hrs/day by staffs of 4-6 in each building."

"I see the difference when I go to a hotel that doesn't use ozone in the laundry operation. You pull a towel off and smell bleach, it's not fresh, and it's more hard than soft. When I check out the linens in our nursing homes, I know the residents aren't going to suffer skin breakdown, and will have a softer experience, which comforts me. Our certified nursing assistants (CNA's) have commented how much better the linens are, without being prompted."

"For the total of all our facilities, savings of \$1 million/yr for the company is a conservative estimate, and that's after paying for the ozone unit leases."

Guardian Manufacturing regards its success in ozone applications like Gulf Coast as deriving from long-term research and development for its products, and an integrated, customized approach to manufacturing and installing them.

Thoram Charanda, senior scientist for the company and manager of its research and development laboratory, noted the importance of a reliable, energy-efficient ozone generator.

"We saw from the laundry industry's unhappy prior experience with ozone that without a reliable generator that provides consistent production, great challenges would occur," he said. "If the ozone is not there, you're not going to have good linens."

"The very consistent ozone production we've been able to provide starts with the core piece of the design, the inside block part of the generator that actually creates the ozone, which has been extraordinarily reliable for over 10 years now. The dielectric material on the charged plate evenly spreads out the discharge so that the electricity is clean, without spikes or erratic wave forms that could cause interruptions in ozone production and its subsequent injection into the wash water."

"We also strive to maximize the amount of oxygen converted to ozone, using the least amount of energy. When oxygen passes through the microgap within the block, it experiences electric current at a frequency of 23 kilohertz (kHz) and 3-5,000 volts," he continued. "Ozone is converted at the rate of 5 to 10% by weight, aided significantly by an oxygen concentrator that provides a source of oxygen that is consistent at 94%. And the very high frequency is also well above the audible range, so there is no high-pitched whine, which we had learned was an additional complaint about ozone."

Charanda is a chemist by training who previously worked extensively with ozone applied in sensitive aquatic life environments.

"When I first came to Guardian, I saw that the results they had achieved in their various field applications also derived from their expertise and experi-

ence in the integration of the complete ozone system. The unique generator they had developed was very effectively supported by careful selection of the rest of the key electrical, water delivery, and controls components, and they were all integrated within their own manufacturing operation."

For laundry applications, in addition to generator reliability and efficiency, he also noted the critical need for efficient delivery of the ozone into laundry wash water, and the importance of knowing ahead of time the chemistry of that water, including chemicals added to it during the wash process.

"We are injecting ozonated water directly into the wash wheel using a premium Venturi-type system that consistently provides mass transfer efficiency at the level of 90% or more," he said. "Meanwhile, we never assume the water is okay in the first place."

"The key issues are the presence of inorganics that could react with the ozone and cause problems. For example, iron and manganese can serve as ozone "consumers", while chlorine can be a combatant. So prefiltration may be advisable. Meanwhile, detergents can introduce very complex issues, as can surfactants, brighteners, bleach, and other additives. Our applications experience with the water chemistry, as well as the different types of washing machines, has helped us greatly in our ability to deliver our high level of performance."

Tom Allen, Guardian's senior applications specialist for laundry operations, noted additional factors.

"It's been very helpful for us to gain hands-on experience with front-load, side-load, and tunnel washers of varying manufacturers, models, sizes and complexities, operating within different plant heating and cooling conditions," he said. "We've also learned not only to carefully consider the chemistry of the wash water, but the derivation of the soiled goods, and consequent organic and inorganic introductions to the wash process."

"As a result of our long-term, diversified experience, we're now able to routinely provide a preliminary savings analysis, and also offer a 90-day money-back guarantee."

Guardian has integrated almost 1000 ozone generators into systems manufactured by the company since 2003. For further information on its Ensure-PCR™ ozone systems for laundry applications, featuring PlasmaBlock® advanced oxidation generators, and opportunities for preliminary site analysis, contact Guardian Integrated Services, 2971-A Oxbow Circle, Cocoa, FL 32926, Tel. 321-631-4580, Fax 321-631-4517, laundry@guardianmfg.com, www.guardianisd.com.



Ozone has allowed reductions in wash load steps and hot fills, as well as cuts in bleach and soap, and removal of softener.