BFED Committee

From: Lowen Okamoto <lowen.okamoto@jci.com>
Sent: Thursday, October 24, 2024 2:40 PM
To: BFED Committee
Cc: Leo Caires; Lesley Milner; Chuck Collins
Subject: 10/22/24_BFED Meeting Follow Up - Johnson Controls Contract C7619
Attachments: BFED Council Meeting slideshow 10-22-2024.pdf; Bulk stored sodium hypochlorite vs NEXGEN.pdf; The Process of Electrolysis.pdf; Brochure_NEX_GEN_03-01-19.pdf

Aloha BFED Committee,

I am writing to provide follow up information that was requested during THE BFED meeting held on October 22, 2024 regarding the Johnson Controls Energy Performance Contract with Maui County C7619.

Attached are photos that were shared during Tuesday's meeting highlighting some of the work completed to date.

I have also included informational sheets pertaining to the onsite hypochlorite generation process (chlorine generation from Salt) for the aquatic facilities.

Please feel free to reach out to me if there are any questions or interest for more information on the project.

Thank you!

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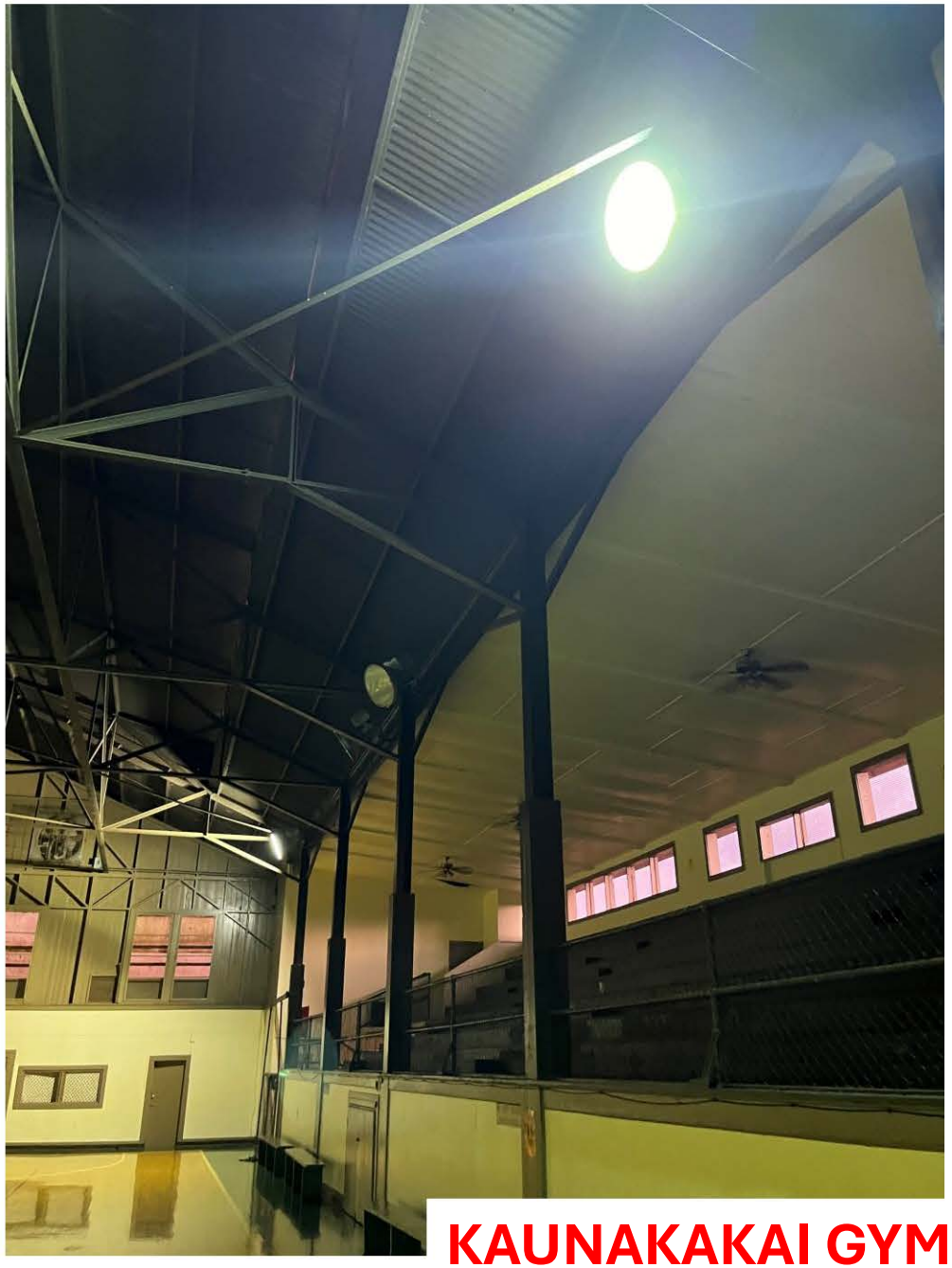
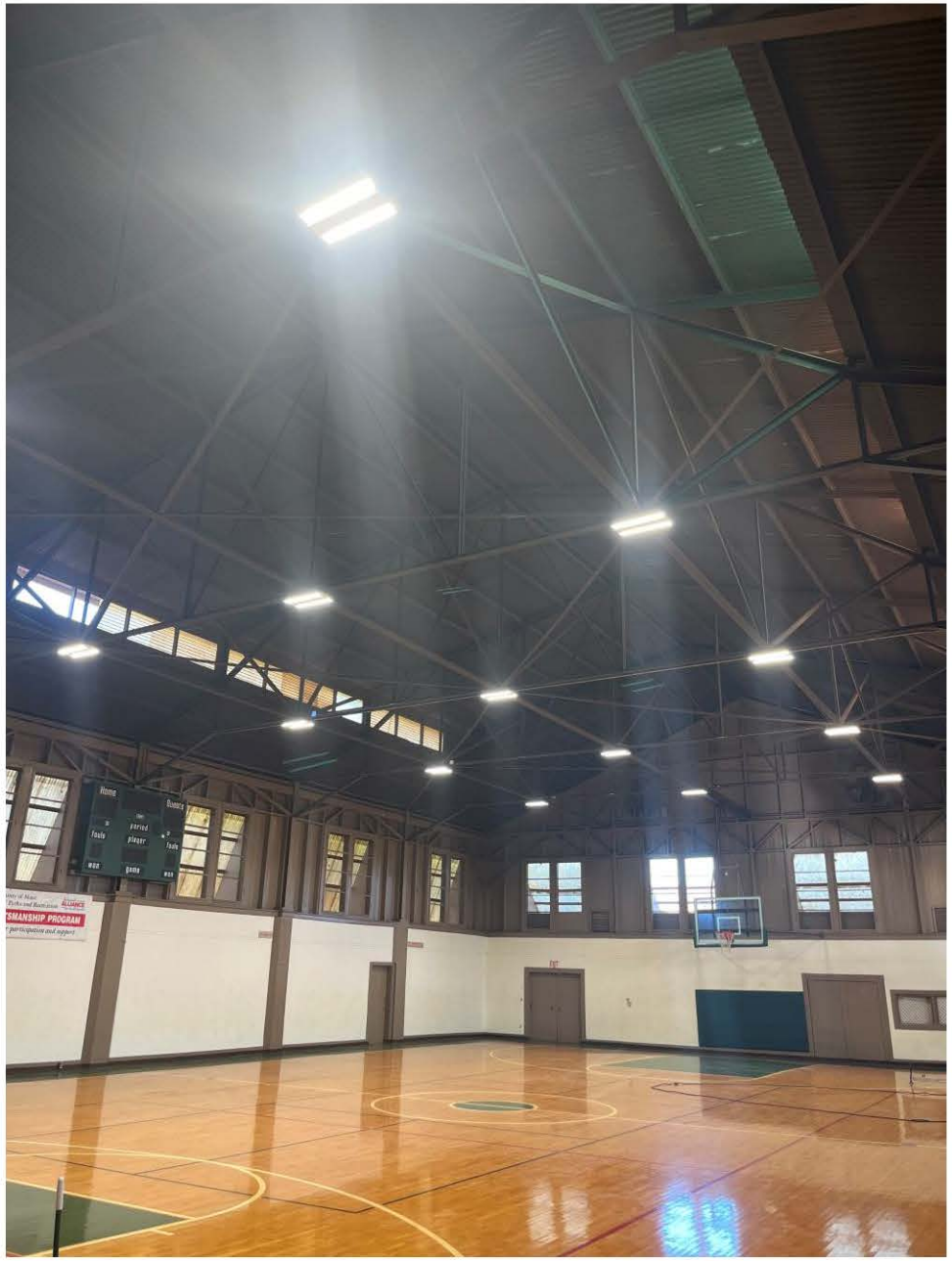


KAUNAKAKAI GYMNASIUM LIGHTING - BEFORE

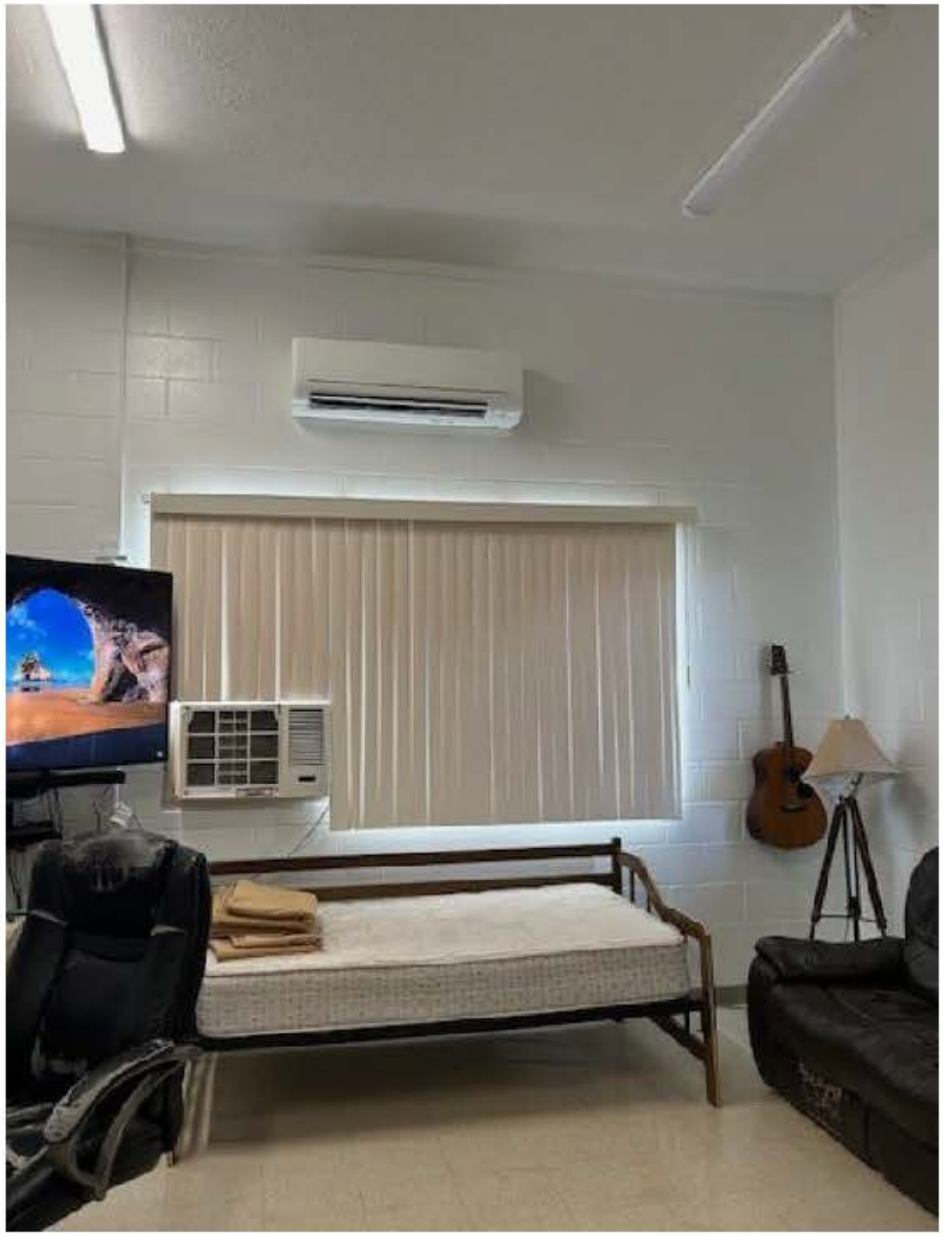


KAUNAKAKAI GYMNASIUM LIGHTING - AFTER

9/19/2024

LANAI FIRE STATION HVAC INSTALLATION

9/13/2024

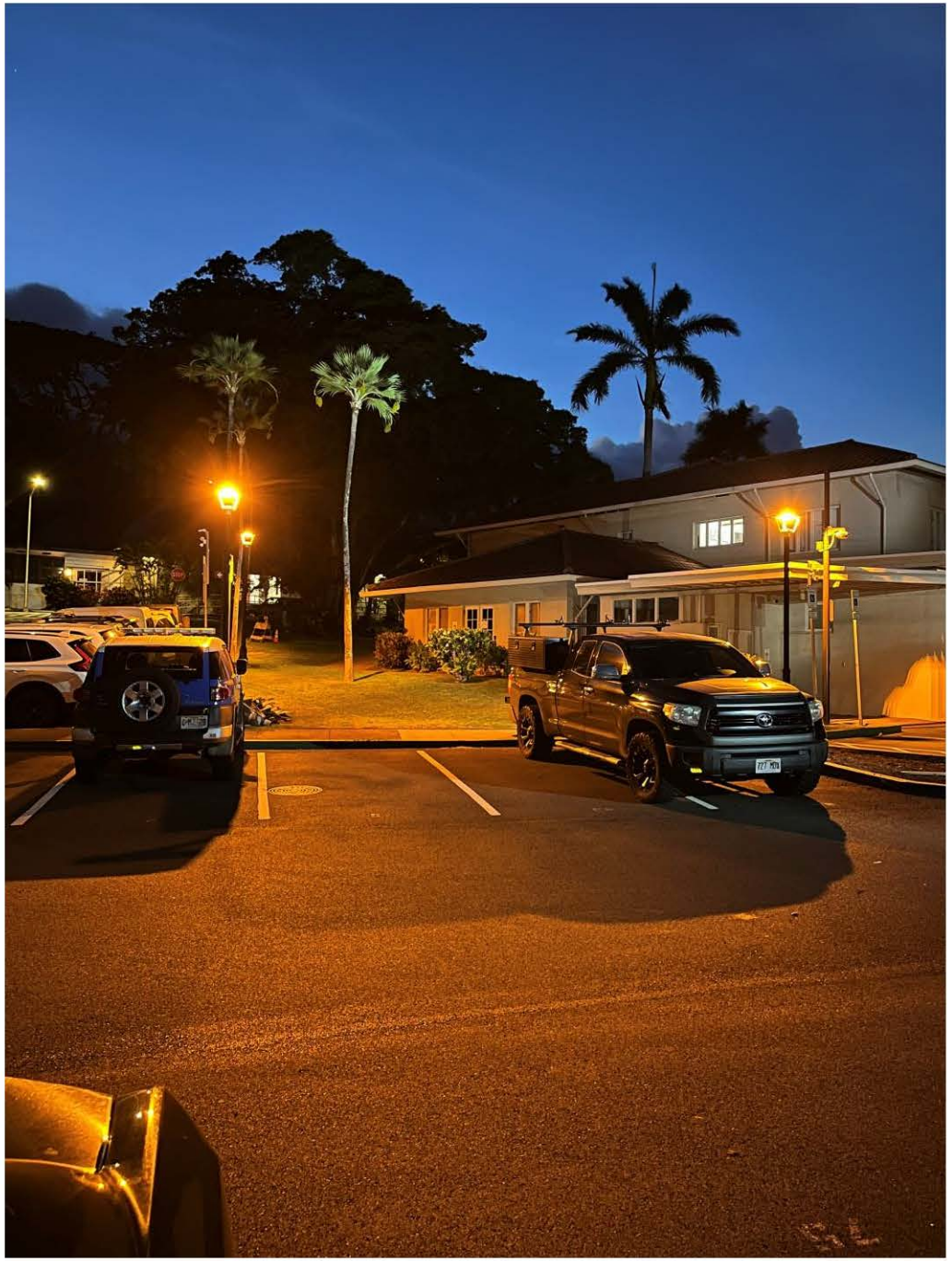


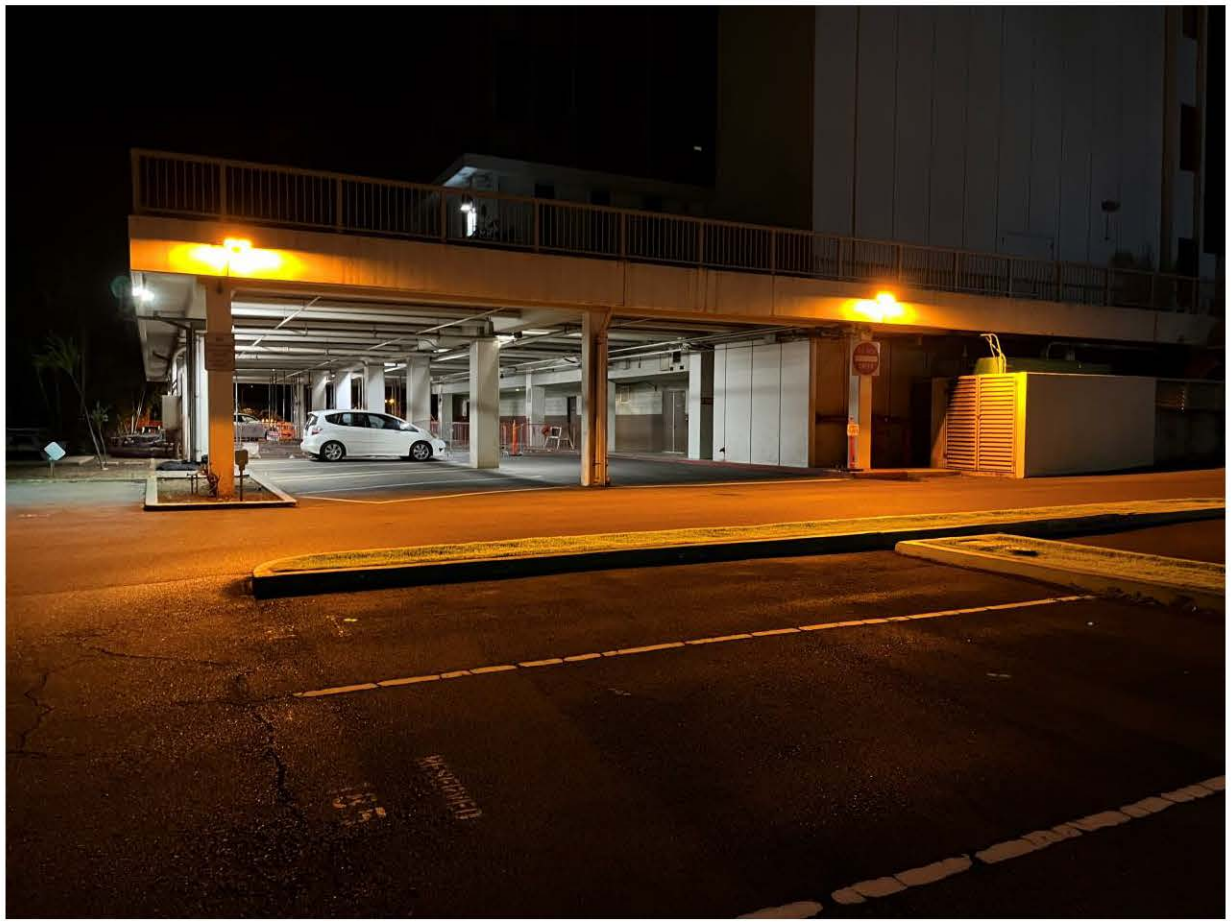
LANAI FIRE STATION HVAC INSTALLATION

9/25/2024

KULA FIRE STATION ROOFING

KALANA O MAUI EXTERIOR LIGHTING





9/22/2024

KALANA O MAUI EXTERIOR LIGHTING

LAHAINA AQUATIC CENTER

10/1/2024

LAHAINA AQUATIC CENTER

Bulk delivered sodium hypochlorite

Chemistry:

- pH: 12-13
- Concentration: 12% (120,000ppm)
- NACl: approx. 2lbs. / 1 gallon

Storage recommendations to reduce formation of chlorates and perchlorates:

- Dilute stored hypochlorite solutions upon delivery.
- Reduce temperature of stored hypochlorite.
- Control pH between 11-13
- Use fresh hypochlorite solutions whenever possible

Handling

- Hypochlorite solutions are corrosive to eyes, skin and mucous membranes.
- Care should be taken and protective clothing should be worn at all times around solutions.

Negative risks associated with stored hypochlorite

- Emergency shower and eyewash facility should be in close proximity
- Insure adequate ventilation
- Avoid breathing fumes
- Avoid contact with skin, eyes and clothing
- DO NOT mix with acids, ammonia, heavy metals, ethers or reducing agents to avoid releasing hazardous gas.
- Restricted by OSHA and EPA regulations.
- Double containment required in case of spills.
- Accidentally injecting acid and hypochlorite at the same time can result in hazardous gassing from return line of swimming pool resulting in injury to bathers.

Positives

- High concentration allows for rapid increase of ppm in the swimming pool.

NEXGEN on-site produced sodium hypochlorite

Chemistry

- pH: 9.3 produced, adjusted to 7.5
- Concentration: .25% (2,500ppm)
- NACl: approx. 2lbs. / 1lb

Storage recommendations:

- None (produced on-demand)

Handling

- None (closed loop system)

Negatives

- Diluted solution requires longer run time of equipment (correct upfront sizing of system is essential).

Positives

- Diluted solution allows for injection of muriatic acid into production tank to lower pH to 7.5 without any chance of gassing off. Approx 50% less muriatic acid used than stored hypochlorite.
- Diluted solution has no OSHA or EPA regulations.
- Producing on demand means limited storage and no formation of chlorates and perchlorates.
- Pool controllers can feed chlorine and acid at the same time without chance of gassing off.
- Swimming pool water used for sodium hypochlorite production which reduces fresh water needed, saving water.

Producing sodium hypochlorite on-site in a NEXGEN system is far safer for both operators and bathers. The risk associated with transporting and storing solutions is removed with this technology improving the “green footprint” of the facility.

Risk management is also reduced by not storing sodium hypochlorite and muriatic acid together.

The Process of Electrolysis

Reaction that takes place in a Salt Generation Cell

1. Sodium Chloride (Salt) added to pool water.

2. Anode of cell makes Hypochlorous Acid and Hydrochloric Acid.

3. Cathode of Cell makes Sodium Hydroxide and Hydrogen Gas.

(The Hydrogen gas bubbles through the Pool water into the atmosphere).

4. Hypochlorous Acid from the Anode combines with the Sodium Hydroxide from the Cathode to make Sodium Hypochlorite or Liquid Chlorine when mixed with the Pool water going through the Cell.

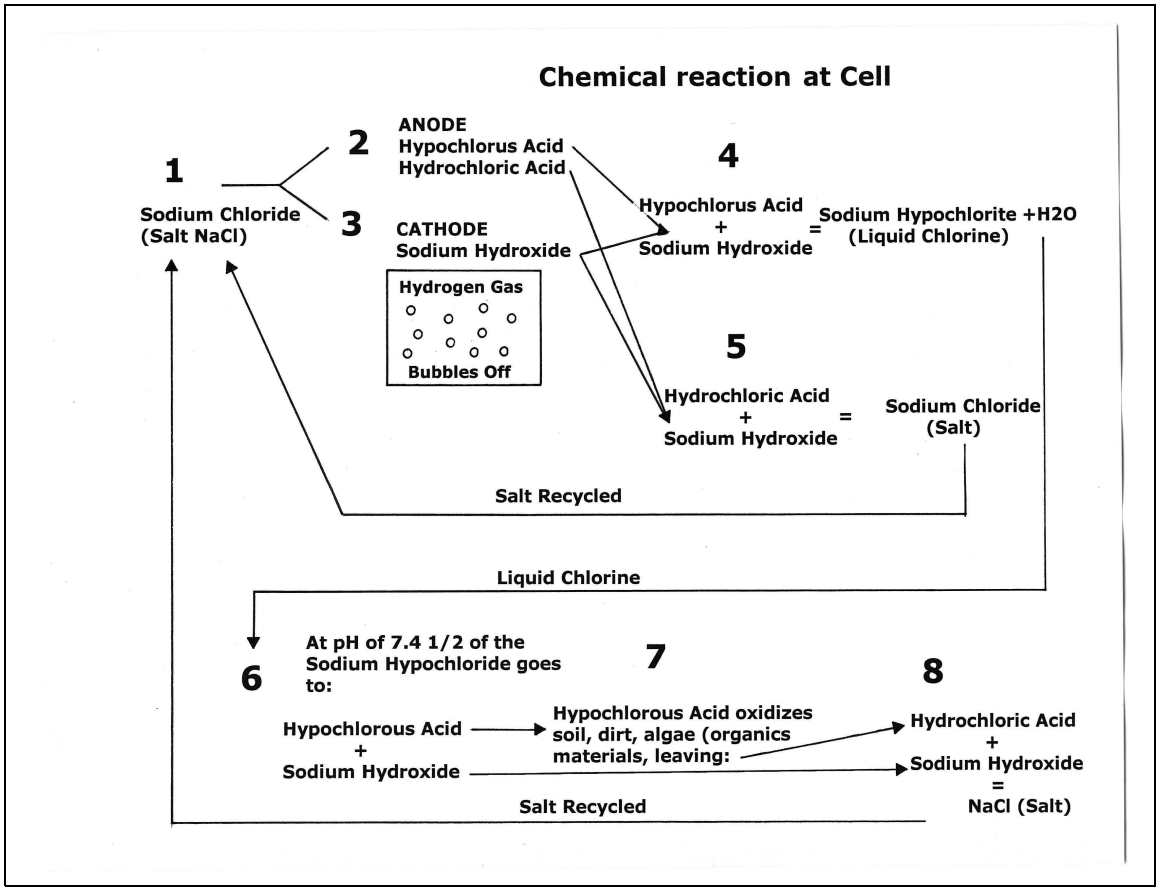
5. Hydrochloric Acid from the Anode combines with the Sodium Hydroxide from the Cathode to make Sodium Chloride (Salt) which is re-used by the Cell.

6. Liquid Chlorine at a pH of 7.4 goes half to Hypochlorous Acid and half to Sodium Hydroxide.

7. Hypochlorous Acid combines with soil, bacteria, algae, organics and UV's to convert to Hydrochloric Acid-

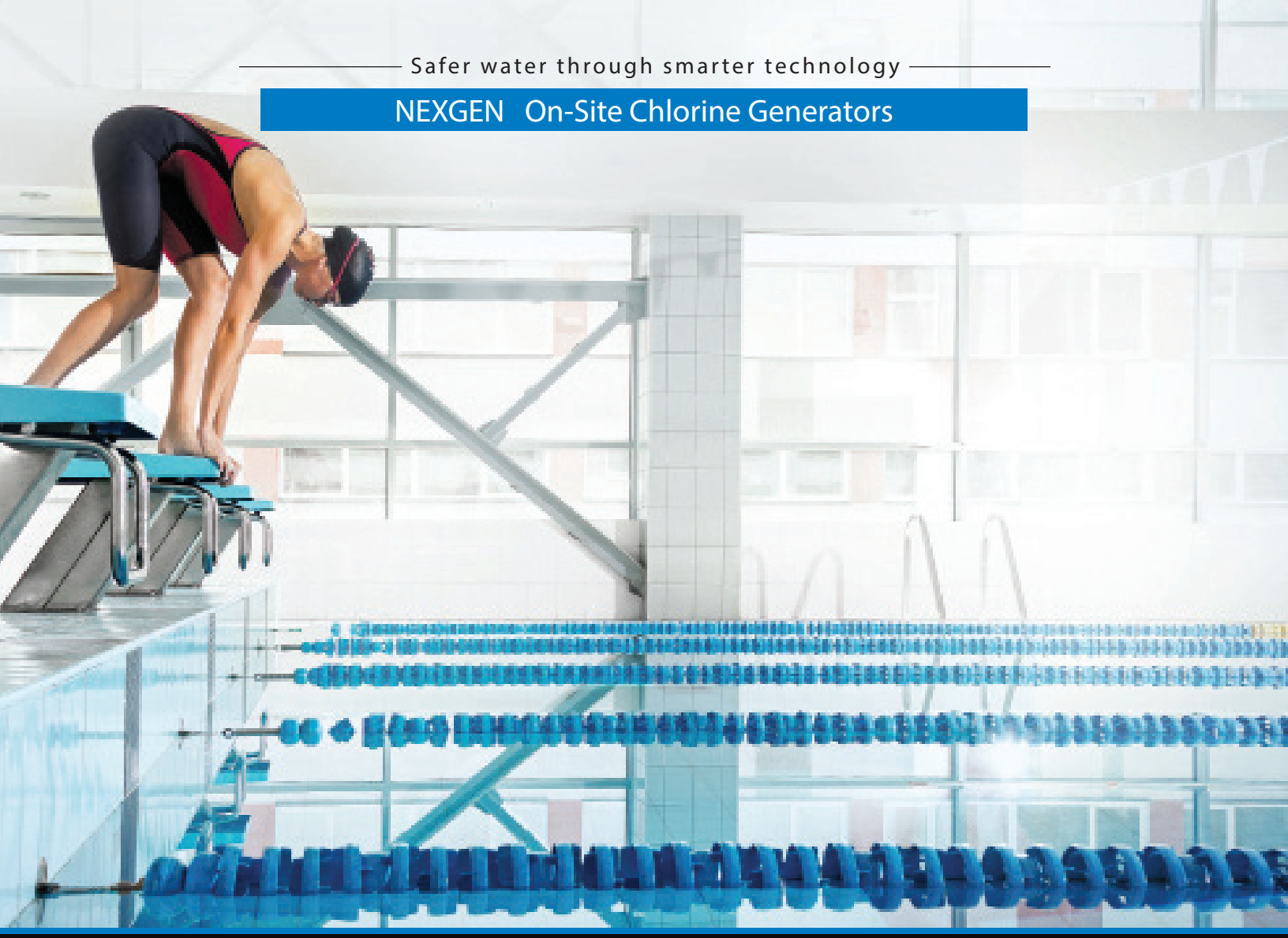
8. Hydrochloric Acid combines with Sodium Hydroxide forming Sodium Chloride (Salt) again, which is re-used by the Cell.

This is called a Closed Loop System because the salt is used over and over again and is only lost through splash out, backwashing, and rainfall.



Safer water through smarter technology

NEXGEN On-Site Chlorine Generators



Make Your Water As Incredible As Your Pool.

Chlorking® NEXGEN$_{pH}$ onsite chlorine generators are leading the way to better, safer water. Their unique, forward-thinking design generates HOCl (hypochlorous acid) from salt that is stored on site. NEXGEN$_{pH}$ eliminates the costs, risks and smell associated with shipping and storing traditional chlorine. And it pays for itself through lower cost of operation and a longer lasting system. Most often used for commercial pools and water parks, the system can be also fully customized to meet your needs. See what a difference NEXGEN$_{pH}$ could make for your water.

ChlorKing®
ULTIMATE WATER SYSTEMS

NEXGEN$_{pH}$: Advanced On-Site Chlorine Generators

ChlorKing® NEXGEN$_{pH}$ forward-thinking designs were created specifically for commercial swimming pool applications. Ranging in sizes from 10 – 120 lbs per day, these generators are ideally suited for all commercial swimming pools and water parks. The unique design, simplicity and ease of use make this line of generators the most viable alternative to traditional chlorine available on the market today.

Why generate Chlorine on-site?

With fuel costs continuing to rise and bulk storage of chlorine becoming an ever-increasing problem, many pool operators are seeking safer, more cost effective solutions for the sanitization of commercial swimming pools. On-site production of chlorine as a solution of hypochlorous acid alleviates those unnecessary risks and puts an end to ever increasing chlorine prices and storage issues. The only raw material, salt, is an inert, safe compound that is stored in a feeder on-site and used as required by the chlorine generator.

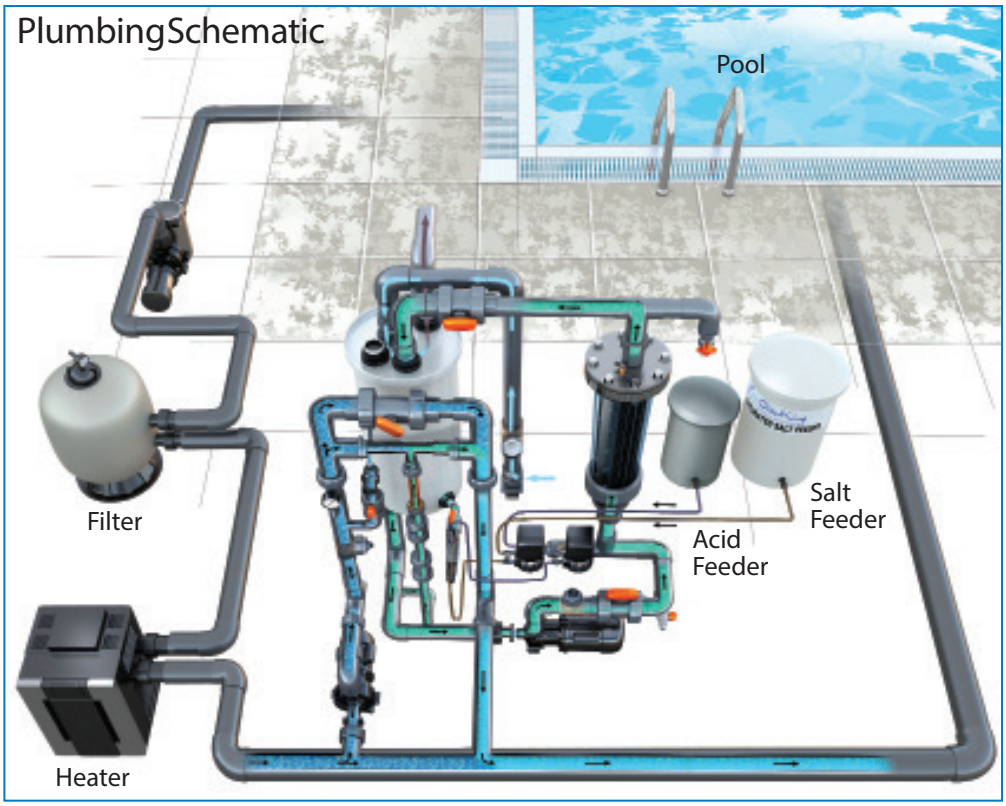
pH neutral chlorine (HOCl): The innovator.

The first of its kind in the swimming pool industry, ChlorKing® NEXGEN$_{pH}$ systems are designed to control the pH of the chlorine during the manufacturing process at a range of 7-8 (user adjustable). This unique design produces HOCl which is the primary sanitizer in bleach, and can be used for not only your pool, but sanitizing your facility aswell.

How is NEXGEN$_{pH}$ different than a salt chlorinator?

The ChlorKing® line of traditional salt chlorinators, as with all salt chlorinators available on the market, require salt to be added to the pool and maintained between 3,000 – 5,000 ppm. Salt needs to be added to the pool on a consistent basis due to water loss from backwashing, rainfall and leaks. The ChlorKing® NEXGEN$_{pH}$ line of products does not require salt in the pool, and you never add salt and never test salt levels. The NEXGEN$_{pH}$ system simply makes HOCl from salt that is stored in a vat in the pump room. If your pool leaks, has heavy use or dilution, or you simply don't want a salt pool, but still want the benefits of producing chlorine right on-site, then NEXGEN$_{pH}$ is for you.

Plumbing Schematic



NEXGEN$_{pH}$ On-Site Chlorine Generator MODELS

- NEXGEN$_{pH}$ 10 — 12 lbs/day
- NEXGEN$_{pH}$ 20 — 24 lbs/day
- NEXGEN$_{pH}$ 40 — 48 lbs/day
- NEXGEN$_{pH}$ 50 — 60 lbs/day
- NEXGEN$_{pH}$ 60 — 72 lbs/day
- NEXGEN$_{pH}$ 80 — 96 lbs/day
- NEXGEN$_{pH}$ 100 — 120 lbs/day

ChlorKing® ULTIMATE WATER SYSTEMS

Saferwaterthroughsmartertechnology.

ChlorKing pioneered on-site chlorine generating technology in the 1970s. Realizing the potential for swimming pools and commercial applications, the company began generating "ultimate water" with simple, yet highly advanced technology. Today, ChlorKing® leads the way in commercial saline chlorination and is consistently seeking new frontiers in sanitizing solutions including ultraviolet light technology and their NEXGEN$_{pH}$ onsite chlorine generators. These environmentally friendly solutions are changing the way we treat H^2O.

INTERTEK ETL LISTED US 3195607

NSF Certified to NSF/ANSI Standard 50

03-2019

Salt Chlorination Systems • Ultraviolet Light Systems • Mixed Oxidant Systems

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