The ARCH Briquette

Volume 1, Number 2

A Report On Innovative Water & Wastewater Treatment Products & Technologies From Arch Chemicals, Inc.

In Wastewater Treatment Applications:

Cal Hypo Briquettes Offer Effective Disinfection Option

Keeping up with demands for environmentally compliant wastewater treatment poses significant challenges for municipal personnel. One major challenge is meeting strict fecal coliform discharge limits while adhering to exacting chlorine discharge standards.

Disinfection followed by dechlorination are typically the final stages of treatment at wastewater facilities before effluent is discharged. Gaseous chlorine (Cl_2) and sodium hypochlorite (NaOCl, or liquid bleach) have long been the conventional methods for disinfection.

But tough regulatory requirements and a greater need for process optimization and safety are now pressuring wastewater utility managers to reconsider their facilities' disinfection strategies. Many are searching for an alternative to gas or liquid chlorine to further enhance the efficiency, reliability, safety and performance of their plants.

Switching To Cal Hypo Briquettes

For water reclamation facilities and many small to medium sized wastewater treatment plants (up to 6 MGD), switching to Constant Chlor® Plus calcium hypochlorite briquettes and chlorinator systems can provide numerous advantages.

Consistently accurate chlorination is achieved at all times under an Arch calcium hypochlorite program. This is crucial today as precise chlorination becomes increasingly paramount. And, by converting to calcium hypochlorite briquettes and chlorinator systems, many long-standing operations, performance, maintenance and safety concerns associated with using chlorine gas and bleach are effectively eliminated.

Consistent Residuals

Constant Chlor Plus briquettes and feed systems provide the superior accuracy obtainable only from a solid chemical combined with a highly accurate delivery system. Studies have shown that Constant Chlor Plus briquettes and chlorinators can provide chlorine residual in the desired range far more consis-

continued, page 2

Today, meeting the requirements for accurate chlorination in wastewater applications is paramount. The Constant Chlor® Plus calcium hypochlorite briquette system provides the superior accuracy obtainable only from a solid chemical combined with a highly accurate delivery system.

For many wastewater applications, such as small to medium sized wastewater treatment plants and water reclamation facilities, Constant Chlor® Plus briquettes and feed systems are ideal for gaining reliable and efficient chlorination.

Arch Introduces New Constant Chlor® Feed System For Higher Volume Applications

Arch Chemicals, Inc. has introduced a new generation Constant Chlor® Plus briquette feed system to meet the growing demand for effective calcium hypochlorite use in drinking water and wastewater treatment applications requiring higher feed rate capacities.

The new generation Constant Chlor feed system retains all of the key features of the first generation system – including Arch's patented Spray Technology, an engineered design providing a well-packed spray bed for optimum solution consistency, easy installation, and a small footprint. But in addition, the new system provides much higher dry chemical loading and feed rate capacities, SCADA monitoring capabilities and many other new features that further enhance operation, maintenance and safety.

Quadruple Capacity, Still Small Footprint

Arch's second generation Constant Chlor feed system has a much higher feed rate capacity – up to 250 lbs./day AvCI, compared to only 62.5 lbs./day with the original system. Plus, the new feeder's larger hopper provides a dry chemical capacity of 220 lbs.,

continued, page 3

Cal Hypo Briquettes Offer Effective Disinfection Option *(continued from page 1)*

tently than typical NaOCl systems. This is important because, by greatly reducing or eliminating fluctuating chlorine residuals, the need for excessive chlorine overfeed and, in turn, a correspondingly high rate of dechlorination chemical, is eliminated.

Long Shelf Life

NaOCl can begin to show degradation in less than 30 days. Constant Chlor® Plus briquettes, on the other hand, provide a long storage shelf life (up to two years), allowing facilities to avoid the rapid degradation of chemical strength that can impede chlorination consistency and performance.

This long shelf life, combined with the on-target chlorine solution provided by Arch's patented "Spray Technology" feed system, ensures the same solution strength is delivered at all times. Due to its consistency, operators no longer have to continuously monitor solution strength or constantly adjust chemical metering pumps. Nor do operators have to contend with the all-too-common and time-consuming problem of metering pumps becoming air-bound due to NaOCl off-gassing. Solution produced by Arch calcium hypochlorite chlorinators will not air-bind pumps.

Easy Storage, Easy Use

Constant Chlor Plus briquettes are specifically designed for use in the Arch feed system and contain a minimum of 65 percent available chlorine (AvCl) by weight. Unlike NaOCl, which is 85 percent water, the briquettes are in dry-solid form, making them far easier to handle and store.

On an equivalent AvCl basis, only one-sixth the space is required to store briquettes on site than to store NaOCl. The briquettes also do not require expensive secondary containment, like bleach storage does; nor are the dry briquettes bound by restrictive chemical tank and transfer station requirements.

Safety First, and Foremost

Finally, worker safety, facility safety and security are of utmost concern today for publicly-owned facilities using and storing large amounts of chemicals. Based on solution strength (less than 2.0 percent versus 15 percent with NaOCl), calcium hypochlorite improves safety and reduces potential hazards for facility personnel. With liquid bleach, spills and leaks present hazards and can cause significant damage. Briquettes, since they are in dry-solid form, can't leak.

In addition, potential plant vulnerabilities are reduced with the Arch calcium hypochlorite system because there are no chemical storage tanks and no pressurized vessels. The briquettes are easy to store in large quantities. And with its small footprint, the Constant Chlor feeder can be easily located indoors and out of sight. ■

The use of Constant Chlor® Plus briquettes allows facilities to avoid the rapid degradation of chemical strength that can impede chlorination consistency.

Want to learn more about how to achieve reliable chlorination while eliminating concerns associated with Cl_2 and NaOCl use? Simply fill out and mail the enclosed postage paid reply card today.

Answers To Frequently Asked Questions About:

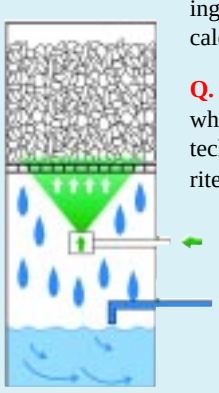
Constant Chlor® Plus Briquettes & Feeders

Q. What wastewater applications does the Arch system serve?

A. Using Constant Chlor® Plus briquettes and tandem Arch feed systems are an excellent choice to serve small to medium sized wastewater treatment facilities (up to 6 million gallons per day). The briquettes and feed system are also well suited to serve the disinfection needs of water reclamation systems.

Q. How difficult is it to install the Constant Chlor feed system?

A. Installation is extremely simple. After the feeder is set in place, a water connection is made using flexible tubing and the unit is then plugged into a 110V-20 Amp circuit. Once the facility's existing injector is replaced with one for delivering calcium hypochlorite solution, it's ready to go.



Arch Spray Technology

Q. What is Arch's Spray Technology and why use it instead of saturation or erosion technology, as with other calcium hypochlorite feed systems?

A. Spray Technology is a means for controlling the flow, pressure and time of contact for water applied to the calcium hypochlorite briquettes. This is critical and a key to consistent feed rate control, because cal hypo is very water-soluble and continual water contact changes the briquette properties.

Arch Spray Technology Ensures Safety, Efficiency For N.Y. Water Reclamation Facility

Constant Chlor® Plus Feed System has brought consistent, reliable disinfection of reclaimed water serving multiple resort golf courses

The installation of a Constant Chlor® Plus calcium hypochlorite feed system at its water reclamation facility has helped provide a safe and efficient irrigation water supply for multiple area golf courses.

The Oneida Indian Nation and the City of Oneida, N.Y., have jointly developed a beneficial reuse program that successfully utilizes reclaimed water from the city's wastewater treatment plant to irrigate new golf courses at the tribe's Turning Stone Casino Resort.

When it came to selecting the type of disinfection system to serve the new reclamation facility, plant management, wanting an alternative to gaseous chlorine (Cl_2) and sodium hypochlorite (NaOCl), ultimately chose the Constant Chlor® Plus chlorination system from Arch Chemicals, Inc. The Constant Chlor system, featuring Arch's patented Spray Technology, has been providing a safe and efficient irrigation water supply for the resort golf courses since its start-up in May, 1998.

Background

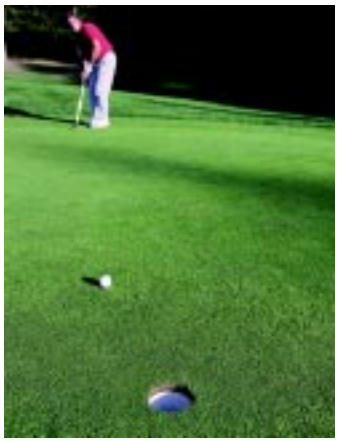
The Tribe and the City of Oneida determined it unfeasible to tap into a groundwater source for irrigating new golf courses at the resort. As an alternative solution, they developed a joint water reclamation system that uses reclaimed water from the city's 2.5 MGD wastewater treatment facility to keep the courses green.

Disinfection is a critical component in reclaimed water applications where irrigation is provided in areas accessible to the public. Water leaving the Oneida reclamation facility must maintain a minimum of 0.5 mg/L and maximum 2.0 mg/L chlorine residual at all times.

Wanted: Cl_2/NaOCl Alternative

In selecting the type of disinfection system for the new water reclamation facility, Oneida plant management wanted to avoid the regulatory restrictions and safety issues involving the use of either gaseous chlorine or sodium hypochlorite.

"We use gaseous chlorine at our wastewater plant, but our low usage keeps on-site storage (less than 1,250 lbs.) below the regulatory threshold requiring extensive oversight and restrictions," says Oneida Public Works Department Sanitary Engineer Daniel Ramer.



Reclaimed water from the city's wastewater facility keeps the resort's golf courses healthy and green. Disinfection is a critical component where reclaimed irrigation water is provided to areas accessible to the public.

Management did not want to use commercial sodium hypochlorite at the reclamation facility either, for a number of reasons, including the heavy regulatory oversight and expensive transfer and storage requirements involved. New York State's requirements for chemical containment, delivery and off-loading are some of the most stringent

continued, page 4

The **ARCH** Briquette

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Arch Introduces New Constant Chlor® Feed System For Higher Volume Applications *(continued from page 1)*

more than twice that of the original feeder.

This greatly expanded capacity is accomplished without sacrificing space efficiencies. The footprint of the second generation feed system is 14.5 sq. ft. – just a few inches larger than that of the original unit. The new feeder features dual position controls, thereby allowing it to be configured to fit a variety of installation requirements.

Same Reliability, Plus New Operations, Maintenance & Safety Features

The new Constant Chlor® feeder provides a convenient AvCl solution sample feature, plus an optional dilution feature that enables the operator to adjust solution concentrations from 0.5 to 1.7 percent AvCl. For ease of maintenance, the new system's nested configuration provides for easy disassembly, plus three large inspection ports allow convenient observation of components without disassembly. Maintenance can be performed on the unit without service interruption.

The new Arch feed system features a low chlorine solution alarm, plus an optional low briquette alarm is available – both with dry contacts for sending alarms to a SCADA system or over a modem. For safety, the unit's electric lid safety switch automatically terminates nozzle flow when the lid is opened.

Arch has taken its tough, reliable, and accurate calcium hypochlorite feed system and made it even better. It's the perfect system for potable water and wastewater treatment applications where consistent solution feed is paramount. ■

Arch System Benefits N.Y. Water Reclamation Facility

(continued from page 3)

in the nation. NaOCl use would have also brought specific maintenance concerns, such as the high potential for creating a corrosive environment within the water reclamation building and the common problem of chemical metering pumps becoming air-bound due to NaOCl off-gassing. Management was also concerned about the potential safety issues associated with using commercial NaOCl in a pressurized system.

Choosing Constant Chlor® Plus

Having previously participated in a research project using dry calcium hypochlorite $Ca(OCl)_2$ feed systems for disinfection at the wastewater facility and a nearby drinking water plant, the city ultimately selected the Constant Chlor Plus chlorinator for disinfection at the new water reclamation facility.

The system uses solid calcium hypochlorite briquettes containing a minimum of 65 percent available chlorine (AvCl) by weight, along with an inhibitor to reduce the potential for carbonate scale.

The highly soluble briquettes are loaded into the unit's hopper. Supply water from the reclaimed water line is injected into the chlorinator through a level/timer controlled solenoid valve and sprays upward into the bed of briquettes. A short intermittent spray cycle produces an approximate 1.0 percent available chlorine solution, which is stored in the lower solution tank. The solution is then pumped on demand to the reclamation facility's filter through a chemical metering pump.

"By generating hypochlorite solution on site, we make it only as the facility needs it, thereby eliminating the need for bulk solution storage or large cylinder storage," says Ramer.

In 2003, the water reclamation system provided more than 90 million gallons of irrigation water to the resort complex. When a third 18-hole course opened in 2004, demand for water became even higher, and the Constant Chlor® calcium hypochlorite feed system from Arch is meeting the challenge, consistently and efficiently.

The briquettes have up to a two-year shelf life, as opposed to commercial sodium hypochlorite, which can begin to show signs of degradation in less than 30 days. Plus, facility management has found that bulk dry chemical delivery and storage is easy to handle, and secondary containment, a necessity for NaOCl storage, is not required.

"Our calcium hypochlorite feeder has operated as designed since start-up," says Ramer. "It's been very simple to use and the maintenance requirements of the system have been minimal." ■

Want to learn more? Simply return the postage-paid reply card to receive a detailed article reprint discussing Oneida's water reclamation system.

Remember: Not All Calcium Hypochlorite Tablets The Same

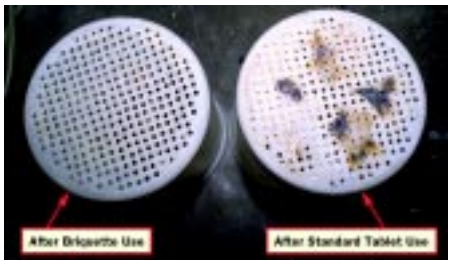
Constant Chlor® Plus briquettes are specifically designed for use in Arch's Spray Technology feed system. These relatively small, smooth, "pillow shaped" briquettes are designed for maintaining optimum packing in the feeder's spray bed. Standard calcium hypochlorite tablets, which are much larger and "pill shaped," have sharp edges that can hang up on each other in the bed and create voids in the spray surface.

These voids can result in lower residual concentration in the final solution. Once these larger tablets dissolve and the voids are collapsed, it can abruptly bring higher concentrations in the final solution.

Lesson Learned

For a period of time, the Oneida, N.Y., water reclamation facility *(see article, page 3)* used standard tablets not designed for the Constant Chlor system. This created performance and maintenance problems for the plant staff. When the plant went back to using the Arch briquettes, the problems went away.

"We maintain consistent chlorine residual in the solution at all times using the Arch briquettes," says Daniel Ramer, sanitary engineer for the City of Oneida. "There's also a lot less maintenance hassles using the Arch briquettes." Ramer says scaling was a major problem when using the standard tablets.



When using standard tablets, hard mineral scale would quickly form at the bottom of the feed hopper.

"Hard mineral scale quickly formed at the bottom of the feed system hopper, which hindered performance and we had to scrape and clean the hopper bottom every three or four days."

A Constant Chlor Plus scale inhibitor in the briquettes helps prevent scale formation on internal surfaces in the chlorinator to provide reliable performance and reduce the need for cleaning or maintenance.

"Using the Arch briquettes, the bottom of the hopper only has to be cleaned every two or three weeks," says Ramer. ■

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