

June 24, 2015

**Special Meeting
12:00 P.M. (Noon)**

**Commission Chamber
City Hall
Port St. Joe, Florida**



City of Port St. Joe

Bo Patterson, Mayor-Commissioner
William Thursbay, Commissioner, Group I
David Ashbrook, Commissioner, Group II
Phil McCroan, Commissioner, Group III
Rex Buzzett, Commissioner, Group IV

[All persons are invited to attend these meetings. Any person who decides to appeal any decision made by the Commission with respect to any matter considered at said meeting will need a record of the proceedings, and for such purpose may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based. The Board of City Commission of the City of Port St. Joe, Florida will not provide a verbatim record of this meeting.]

BOARD OF CITY COMMISSION

Special Meeting

12:00 P.M.

Commission Chamber, City Hall

Wednesday June 24, 2015

Call to Order

Agenda

Wastewater Treatment Plant Lagoon

Pages 1-27

Resolution 2015-04, Open Air Information Center- PSJRA

Pages 28-29

Resolution 2015-05, Phase III Lighthouse Relocation Grant Application

Pages 30-31

Citizens to be Heard

Discussion Items by Commissioners

Motion to Adjourn

Zimbra

ltodd@psj.fl.gov

Pricing for Two Sonic units**From :** Jay Barfield <jbarfield01@cfl.rr.com>

Wed, Oct 29, 2014 12:15 PM

Subject : Pricing for Two Sonic units**To :** 'Lynn Todd' <ltodd@psj.fl.gov>, 'Kevin Pettis' <kpettis@psj.fl.gov>

Lynn and Todd:

Cost for two Sonic, model SS-600 units, installed is \$10,590.

Lease options are:

\$10,590 project

\$1 Buyout (Lease to own) - "Financing"

60 months: \$215 / mo

48 months: \$262 / mo

36 months: \$339 / mo

24 months: \$499 / mo

12 months: \$975 / mo

Total Cost

\$ 12,900

12,576

12,204

11,976

11,700

Short recap on leasing:

- 1) Your pick your term
- 2) Pay two payments upon signing lease
- 3) Pay monthly payments
- 4) At the end of the term, you own both units for \$1.00

If you want this in a different format, please let me know.

Jay Barfield

Allied Group

jbarfield01@cfl.rr.com

407-908-9694

1

10/29
11:30 Conf. Call

September 24, 2014

Lynn Todd
Kevin Pettis
The City of Port St. Joe

Re: Summary: Three technology proposals to resolve algae, filtration blinding & reduce disinfection cost

Ms. Todd and Mr. Pettis:

Please see attached technologies proposals. Each addresses the primary disruptor (algae). Options 2 & 3 provide additional benefits. We recommend any one of three options. They are:

- 1) **SonicSolutions:** This dB technology controls/kills algae without chemicals. It can "stand alone" or combine with HydroFlow. Sonic will handle bulk algae control/kill.
- 2) **SonicSolutions with HydroFlow:** In addition to Sonic bulk control/kill solution, HydroFlow provides additional algae control/kill in fine or bulk. Further, HydroFlow, non chemical technology propagates floc to assist Siemens Forty X filtration, and saves on disinfection chemical by killing bacteria by osmosis.
- 3) **Allied Group/CleanFlo:** This system removes nutrients from the lagoon, thereby eliminating via starvation. Additionally, it removes 80%-90% of TP, TN, metals and other particulates from the water column by oxidation. Additionally, by adding microbes, this technology will remove bottom organic sediment further lowering nutrients. Sediment removal is a choice of Port St. Joe.

Capital/lease options that include all equipment, wiring, installation and other details in each proposal.

	24 Months	36 Months	48 Months	60 Months
a. Option 1: Sonic Solutions:	\$3,075	\$2,119	NA	NA
b. HydroFlow: Stand alone:	\$2,159	\$1,493	NA	NA
c. Option 2: Sonic & H/Flow:	\$5,234	\$3,612	NA	NA
d. Option 3: Allied/CleanFlo:	NA	\$4,945	\$4,079	\$3,585

outright purchase of 2 units & controls?

Bottom line: **Options 1** controls/kills algae. **Option 2** controls/kills algae, eliminates 40 X blinding & reduces disinfection cost. **Option 3** controls/kills algae, cleans water column, removes sediment/muck (your option), eliminates 40 X blinding, reduces disinfection costs and gets within one step of turning waste water into potable water.

We request a conference call on Thursday or Friday, September 25th or 26th. Please suggest a day and time.

Jay Barfield
Allied Group
President
jbarfield01@cfl.rr.com
908-9694

407-

September 24, 2014

Lynn Todd
Kevin Pettis
The City of Port St. Joe
Waste Water Dept.

Re: Lagoon proposal with Sonic Solutions

Ms. Todd and Mr. Pettis:

After our site visit and analyzing all data, we are confident that six SonicSolutions will control/kill algae within your lagoon.

Cost for this solution is: \$69,675

Components include:

- | | |
|---|----------------|
| a. Six SonicSolutions transducers & power packs | 11,612.50/unit |
| b. Six mounting sleds | - 500 |
| c. Six solar units for power | - 917 |
| d. Labor and misc. material | - ? |

Maintenance cost for all six units, inclusive, is \$750 per month.

10,195.50 /unit

Leasing Options/Terms:

- 1) 24 months: \$3,075 per month
- 2) 36 months: \$2,119 per month

At the end of the selected term, Port St. Joe is granted ownership with a payment of \$1.00.

Option 1: Eliminating six solar panels and allowing us to wire for Sonic units will save \$5,500.

General Information: Energy expense per unit without solar, at a KWh rate of \$0.10 per KW is \$35.00 per Sonic unit.

We suggest consideration of HydroFlow use in conjunction with Sonic.

35 x 6

Allied Group appreciates the opportunity to provide this proposal to The City of Port St. Joe.

Jay Barfield
Allied Group
President
jbarfield01@cfl.rr.com
407-908-9694



September 24, 2014

Lynn Todd
Kevin Pettis
The City of Port St. Joe
Waste Water Dept.

Re: HydroFlow option to augment SonicSolutions

Ms. Todd and Mr. Pettis:

After our site visit and review of existing conditions, we recommend HydroFlow as an option to improve clean up of the lagoon and reduce chemical cost for disinfection.

This technology would assist Sonic with "fine" algae kill prior to discharge back to the lagoon. Further, chemical cost disinfection will reduce by 40%+.

Cost for a HydroFlow unit, mounted to the 18" pipe, would be \$48,935. Our recommendation is to install HydroFlow at the west end (discharge area). Since HydroFlow is easily moved, after 60-90 days we may want to relocate the unit at the east end on the 18" pipe prior to the "pink" pipes. We will relocate at no charge and help with success factor analysis. Our cost includes electrical work (if needed) for "plug in".

Lease Options/Terms:

- 1) 24 months: \$2,159 per month
- 2) 36 months: \$1,493 per month

As discussed, at end of the term of the lease a \$1.00 payment transfers ownership to the City of Port St. Joe.

We recommend HydroFlow to supplement and improve results of Sonic Solutions.

Jay Barfield
Allied Group
President
jbarfield01@cfl.rr.com
407-908-9694

September 24, 2014

Lynn Todd
Kevin Pettis
The City of Port St. Joe
Waste Water Dept.

1/0 =

Re: Lagoon pricing for components, functions and results with Allied Group/CleanFlo Technology

Ms. Todd and Mr. Pettis:

Cost for this solution/technology has three options:

- | | |
|----------------------------------|-----------|
| 1) Three years full maintenance: | \$170,000 |
| 2) Four years full maintenance: | \$185,000 |
| 3) Five years full maintenance: | \$200,000 |

Components include:

- a. 20 sole source medium bubble diffusers
- b. One nutrient sponge per diffuser
- c. One stainless steel manifold connected to a 23.2 HP rotary claw compressor
- d. 22,000 ft. of self-sinking airline with 400 ft. of reinforced high temperature airline
- e. Drive with variable frequency
- f. Two week after start up we would add beneficial microbes & enzymes to increase biological activity
- g. Ventilated shed to house compressor
- h. Includes all wiring attached to your three phase panels
- i. Diffuser lay out attached
- j. All electrical wiring, as needed to support new equipment. Connection to your existing service.

In response to your concern about the pine sap (former industrial lagoon residue), we make this observations:

- A. Our laminar system gently rolls the water column without creating re-suspension when the diffusers are placed on the bottom. In 30 years of experience, there has never been an issue with in-organics or organics.
- B. Suspended solids decrease with our form of aeration.
- C. If the City or Port St. Joe, selects Allied Group/CleanFlo and an issue comes up the pine residue, we will install, at no cost to the city, a support system to raise diffusers to 1-1.5 feet off the bottom.
- D. If you are uncomfortable component "f" above, we can delay or cancel this process. Within 60-75 days, we can take photos with underwater cameras (due to clarity of the water column) to study/review the bottom and it's contents. At that time, staff could decide to leave "as is" or to test the pine sap to see if our bugs will eat it. If you eliminate or defer component "f", a credit will be issued for \$4,935.

This technology will eliminate filtration blinding issues because algae, will be reduced 80-90%. Of course, TP, TN and even most metals and will be reduced from 50% to 90%. Initially, "bugs" may be needed to eat decaying algae.

Leasing terms:

- | | |
|-----------------|---------|
| i. 36 months: | \$4,945 |
| ii. 48 months: | \$4,079 |
| iii. 60 months: | \$3,585 |

At the end of the selected term, Port St. Joe is granted ownership with a payment of \$1.00.

Allied Group appreciates the opportunity to provide this proposal for The City of Port St. Joe.

Jay Barfield
Allied Group
President
jbarfield01@cfl.rr.com
407-908-9694

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Lynn Todd

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From: Jay Barfield

To: Lynn Todd Kevin Pettis

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Lynn and Kevin:

Re: Lagoon: Algae and other solutions

Good morning. Attached are pricing for:

- 1) Sonic Solutions
- 2) Allied Group/CleanFlo
- 3) HydroFlow

Either SonicSolutions or Allied Group/CleanFlo would make vast improvements with algae issues. The difference between Sonic and Allied Group/CleanFlow are as follows:

- 1) Sonic will kill/control algae with a dB signal. It changes the water column by reducing TSS as it *relates to Algae*. *It has little effect* on the water column and limited effect on odor.
- 2) Allied Group/CleanFlo kills algae as well by removing the food it eats it eats (TP, TN, etc) in the *clean water column*. *It removes* fines and will "eat" organic sediment.
- 3) HydroFlow helps both Sonic or Allied Group/Clean Flow. It does assist Sonic more.

Your decision is not only money, but what you consider absolute requirement/needs. We did not resend support *data* please advise.



September 18, 2014

Lynn Todd
Kevin Pettis
The City of Port S. Joe
Waste Water Dept.

Re: Lagoon pricing with Sonic Solutions

Ms. Todd and Mr. Pettis:

After our site visit and analyzing all data, we are confident that six SonicSolutions will control/kill algae within your lagoon.

Cost for this solution is: \$69,675

Components include:

- a. Six SonicSolutions transducers & power packs
- b. Six mounting sleds ≈ 500.00
- c. Six solar units for power $\approx \$916.66$
- d. Labor and misc. material

Maintenance cost for all six units, inclusive, is \$750 per month.

Leasing terms are available.

Option 1: Eliminating six solar panels and allowing us to wire for Sonic units will save \$5,500. Annual energy expense per unit, at a KWh rate of \$0.10 per KW is \$35.00 per Sonic.

Allied Group appreciates the opportunity to provide this pricing to The City of Port St. Joe.

Jay Barfield
Allied Group
President
jbarfield01@cfl.rr.com
407-908-9694



September 17, 2014

Lynn Todd
Kevin Pettis
The City of Port St. Joe
Waste Water Dept.

Re: Lagoon pricing with Allied Group/CleanFlo

Ms. Todd and Mr. Pettis:

After our site visit and analyzing algae and nutrient loading, we are confident of confident of algae kill, minimal to no Forty X blinding, vastly improve turbidity with odor elimination.

Cost for this solution/technology has three options:

1) Three years full maintenance:	\$170,000
2) Four years full maintenance:	\$185,000
3) Five years full maintenance:	\$200,000

Components include:

- a. 20 sole source medium bubble diffusers
- b. One nutrient sponge per diffuser
- c. One stainless steel manifold connected to a 23.2 HP rotary claw compressor
- d. 22,000 ft. of self-sinking airline with 400 ft. of reinforced high temperature airline
- e. Drive with variable frequency
- f. Two week after start up we would add beneficial microbes & enzymes to increase biological activity
- g. Ventilated shed to house compressor
- h. Includes all wiring attached to your three phase panels
- i. Diffuser lay out attached

Leasing terms:

i. 36 months:	\$4945
ii. 48 months:	\$4,079
iii. 60 months:	\$3,585

At the end of the selected term, Port St. Joe is granted ownership with a payment of \$1.00.

Allied Group appreciates the opportunity to provide this pricing for The City of Port St. Joe.

Jay Barfield
Allied Group
President
jbarfield01@cfl.rr.com
407-908-9694



September 17, 2014

Lynn Todd
Kevin Pettis
The City of Port St. Joe
Waste Water Dept.

Re: HydroFlow Option

Ms. Todd and Mr. Pettis:

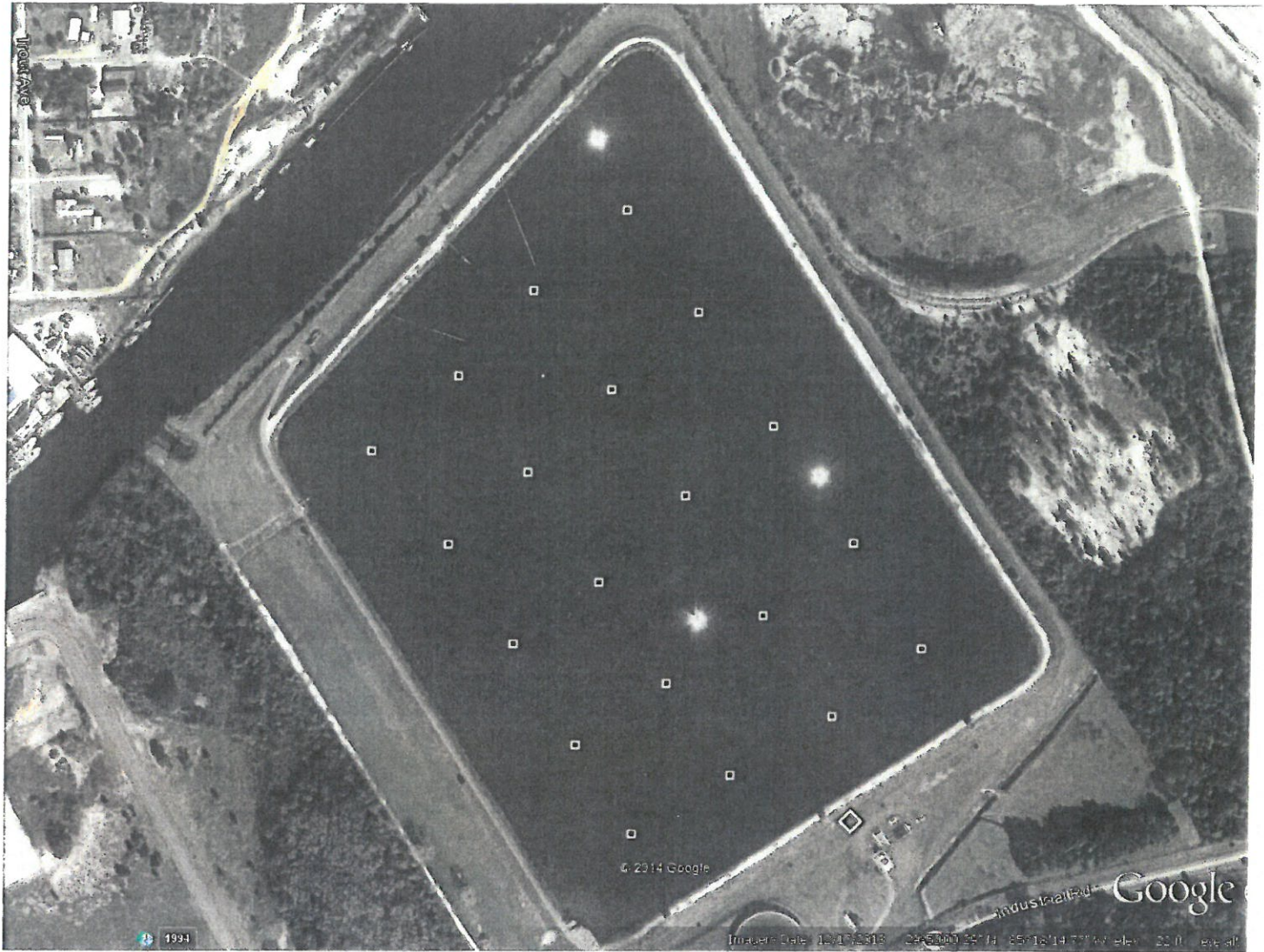
After our site visit and review of existing conditions, we recommend consideration of HydroFlow as an option improve clean up of the lagoon and reduce chemical cost of disinfection.

This technology would assist Sonic with "fine" algae kill prior to discharge back to the lagoon. Further, disinfection chemical cost would reduce by 40-60%.

Cost for a HydroFlow unit, mounted to the 18" pipe, would be \$48,935.

Note, HydroFlow would also augment Allied Group/CleanFlo technology not with "fines" (not needed) but with disinfection.

Jay Barfield
Allied Group
President
jbarfield01@cfl.rr.com
407-908-9694





<http://www.airmasteraerator.com>

P.O. Box 548 • De Ridder, LA 70634
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June 12, 2015

Lynn Todd
City of Port St. Joe
P.O. Box 278
Port St. Joe, FL 32457

QUOTE

Airmaster Aerator, L.L.C. will furnish one (1) Model #AA503SSXM, 50 Hp 460/3 Ph, 60 Hz Airmaster Aerator "Turbo X-Treme Magnum" aerator and one (1) Model #AA253SSX, 25 Hp 460/3 Ph, 60 Hz Airmaster Aerator "Turbo X-Treme" aerator for the purchase price of \$ 91,500.00 (Ninety-One Thousand Five Hundred Dollars).

Price Includes The Following:

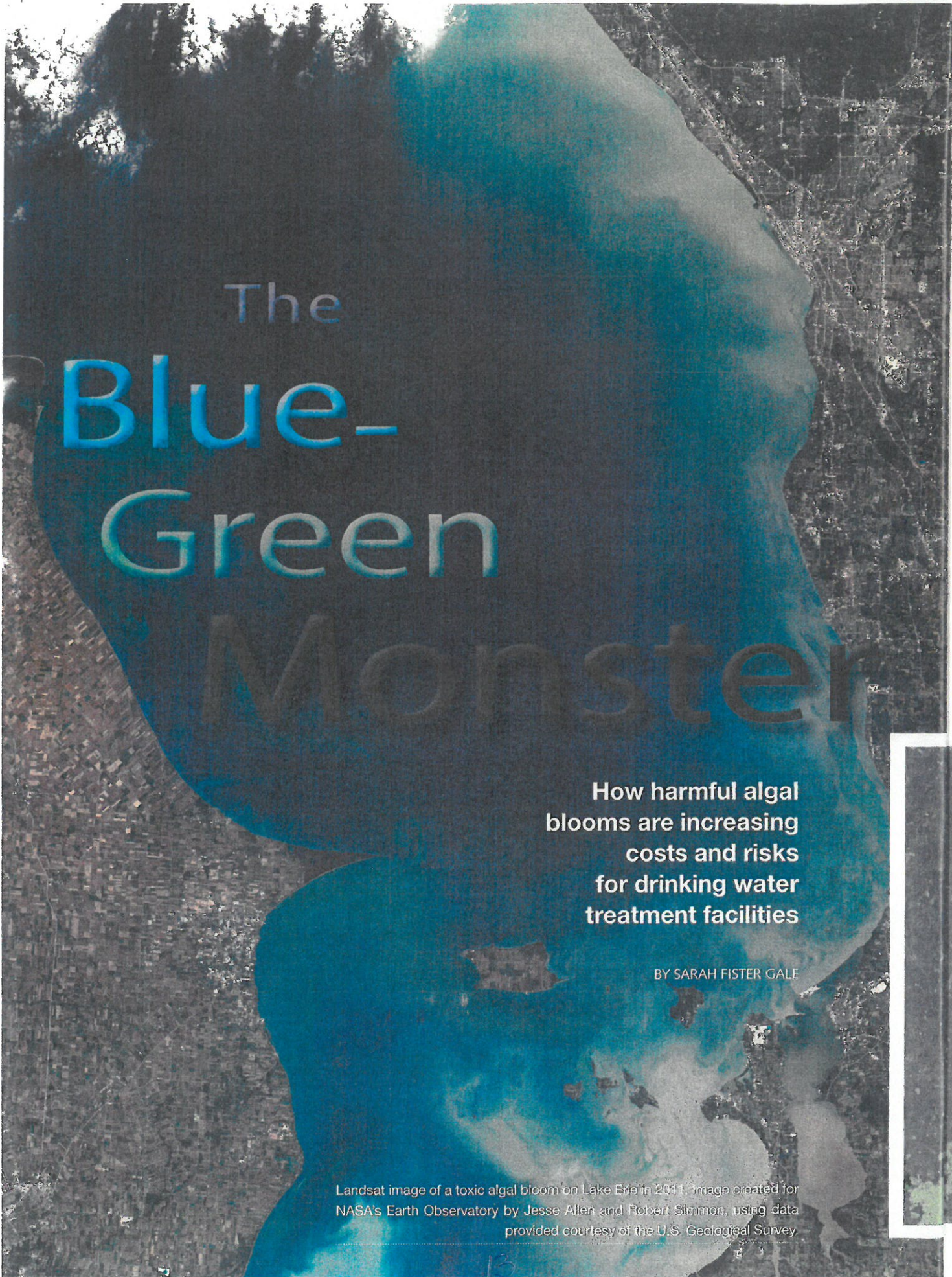
- Airmaster Aerator "Turbo X-Treme Magnum" Aerator
50 H.P., 460V/3ph, IEEE "841" Motor, Model #AA503SSXM
Pre-Wired With Stainless Steel 12"X14"X6"NEMA 4 Electrical Enclosure With Power Block
Gates® Poly-Chain GT2 Drive System
EDT Poly-Round Bearing With "NCB" Sleeve With Radyne Seals
Two Rows of 1 1/4" Spray Holes
10" Wye Oxygen Generator Tubes
\$56,500.00 Each.....Quantity 1.....\$ 56,500.00
 - Airmaster Aerator "Turbo X-Treme" Aerator 25 H.P., 460/3ph, 60 Hz Model #AA253SSX
Premium Efficiency Motor
Pre-Wired With Stainless Steel 12"X14"X6" NEMA 4 Electrical Enclosure
Gates® Poly-Chain GT2 Drive System
Poly-Round Solution® Underwater Bearing With "NCB" Sleeve
1" High Spray Holes
15 Degree Oxygen Generator Tube
Stainless Steel Installation Assembly (17 Feet)
\$ 27,450.00 Each.....Quantity 1.....\$ 27,450.00
 - Airmaster Aerator "Turbo X-Treme Magnum" Control Panel U.L. Listed System Controller (NEMA 4). Each motor circuit to include: H/O/A switch (aerator), On/Off switch (main motor), Green run light, Motor Starter w/overload protection, transformer w/ fusing, IEC motor contactor. Panel will include a non-fused main disconnect and 24 hr. timer for aerator. The control panel is to include controls for the following: 1 – Airmaster Aerator "Turbo X-Treme Magnum" Aerator, 50 hp, 460v, 3ph motor.
\$ 3,300.00 Each.....Quantity 1.....\$ 3,300.00
 - Airmaster Aerator "Turbo X-Treme" Control Panel U.L. Listed System Controller (NEMA 4). Each motor circuit to include: H/O/A switch (aerator), On/Off switch (main motor), Green run light, Motor Starter w/overload protection, transformer w/ fusing, IEC motor contactor. Panel will include a non-fused main disconnect and 24 hr. timer for aerator. The control panel is to include controls for the following: 1 – Airmaster Aerator "Turbo X-Treme" Aerator, 25 hp, 460v, 3ph motor.
\$ 2,300.00 Each.....Quantity 1.....\$ 2,300.00
 - Shipping Charges from Wisner, LA to Port St. Joe, FL.....\$ 1,950.00
- Total...\$ 91,500.00

Terms: 30 % due when purchase order is received and balance of payment due upon delivery. This proposal is effective for 60 days. The City of Port St. Joe will be responsible for all electrical requirements including, wire, and installation labor. The City of Port St. Joe will be responsible for providing the equipment for unloading the aerators. Airmaster Aerator, LLC, will deliver the aerators within 3 to 5 weeks after purchase order is received.

Sincerely,

**Dean
Caldwell**
Dean Caldwell
President
Airmaster Aerator, L.L.C.

Digitally signed by Dean Caldwell
DN: cn=Dean Caldwell, o=Airmaster
Aerator, LLC, ou,
email=dean@airmasteraerator.com,
c=US
Date: 2015.06.12 14:33:54 -05'00'



The Blue- Green Monster

**How harmful algal
blooms are increasing
costs and risks
for drinking water
treatment facilities**

BY SARAH FISTER GALE

Landsat image of a toxic algal bloom on Lake Erie in 2011. Image created for NASA's Earth Observatory by Jesse Allen and Robert Simmon, using data provided courtesy of the U.S. Geological Survey.

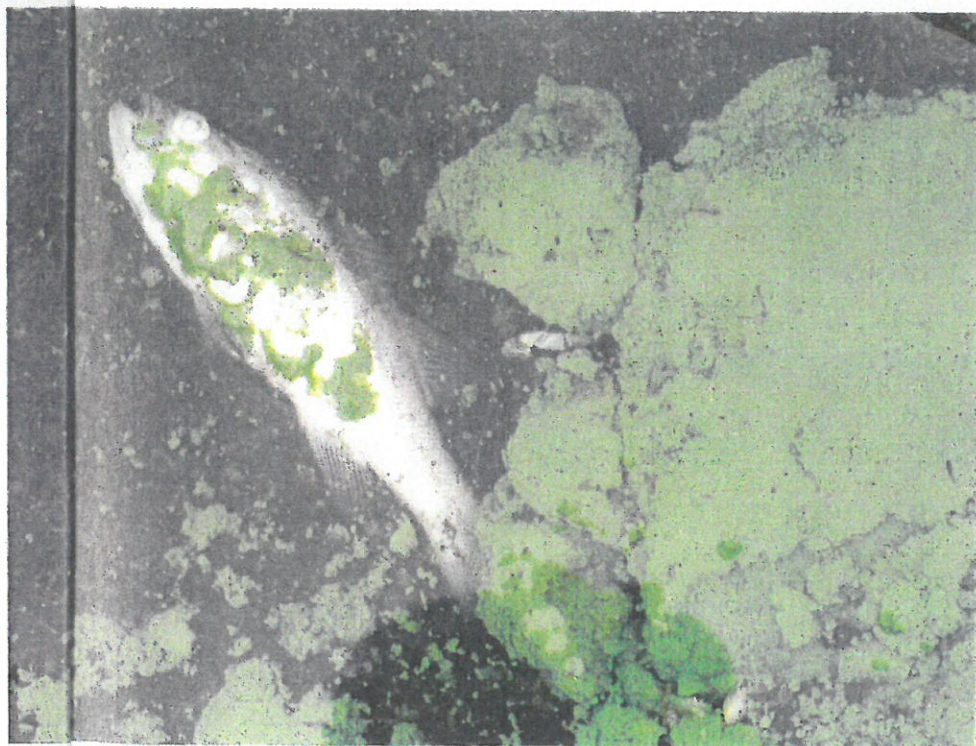
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In August 2014, the entire city of Toledo, Ohio, lost access to drinking water for three full days due to a sudden deluge of microcystin in the source water. Microcystin is a cyanotoxin found in some cyanobacteria — the blue-green algae blooms that grow on surface water in warm weather. These toxins can add a foul odor and taste to water and potentially lead to nausea, rashes, dizziness, and even liver and kidney damage.

The incident in Toledo was caused by a combination of bad luck, high winds and possibly insufficient monitoring, explained Jeffrey Reutter, director of the Ohio Sea Grant College Program at the Center for Lake Erie Area Research and the Great Lakes Aquatic Ecosystem Research Consortium. "The bloom as a whole on Lake Erie was not very big last summer," he said. But during the day, when algae blooms float, strong winds blew a bloom against the water intake pipe. At night, when blooms tend to sink, the algae was sucked into the system. "As a result, the toxin concentration was really high, and the plant couldn't remediate enough of it to achieve necessary safe drinking water levels," he explained.



Harmful algal blooms can produce extremely dangerous toxins that can sicken or kill people and animals, create dead zones in the water, raise treatment costs for drinking water, and hurt industries that depend on clean water. Photo by Eric Vance, U.S. EPA.



It was a cyanotoxin "perfect storm" that, admittedly, rarely occurs. In most cases, water utilities can monitor for and manage the presence of cyanotoxins in drinking water sources to prevent such crises, but the situation in Toledo highlights the real risk they face every summer as the presence of these blooms increases. "Cyanotoxins are a growing concern, and they are not going to go away," said Tom Curtis of the American Water Works Association.

OUT OF THEIR CONTROL

Cyanotoxins have become an ever-present adversary for cities that draw their drinking water from surface reser-

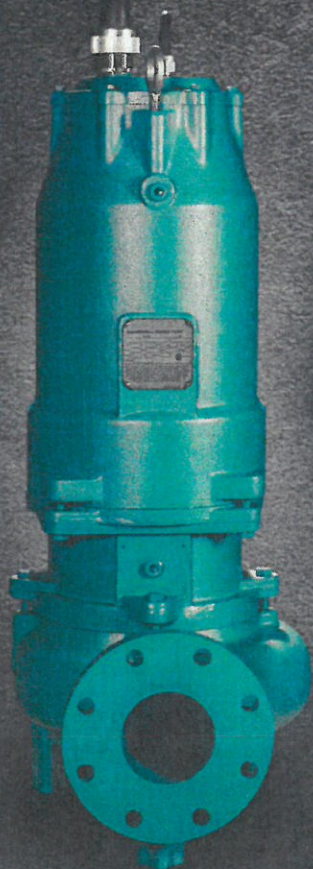
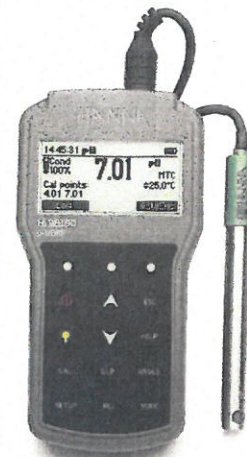
Algal blooms can cause fish deaths in areas where oxygen is depleted or when algal blooms are producing toxins. Pictured here, Binder Lake in Iowa covered in algal blooms. Photo by Dr. Jennifer L. Graham, U.S. Geological Survey.

voirs. According to the Environmental Protection Agency (EPA), drinking water sources in all 50 states are affected by these potentially harmful algae blooms, which occur in slow-moving water with high levels of phosphorus and nitrogen. While some of these nutrients enter waterways through poorly managed septic systems and urban runoff, the largest source of nutrient loading comes from farming operations with poor land management practices and extreme overuse of fertilizers and manure. Curtis noted that some farms use four to five times more fertilizer than the soil can absorb, and the rest just runs into the waterways. Unfortunately, there are few laws to prevent such runoff, he said. "Agricultural practices are largely outside of the jurisdiction of the Clean Water Act."

There are also no current regulations from the EPA for safe levels of cyanotoxins or microcystin in drinking water, although the Agency is paying close attention to this issue, said Eric Burneson, director of the standards and risk management division for EPA. The Agency has identified cyanotoxins on its Candidate Contaminant List and recently published a fact sheet on sampling and treatment methodologies. However, there are currently no enforceable regulations. "Getting on the Candidate Contaminant List is the

A Word About Disinfection

In the process of drinking water treatment, disinfectants are utilized to satisfy two objectives: The first is to kill or inactivate disease-causing organisms, and the second is to leave a residual amount of disinfectant for use in the distribution system. Chlorine is commonly used as a disinfectant in drinking water treatment and may be added as elemental chlorine, sodium hypochlorite or calcium hypochlorite. Regardless of the form that is added, the pH of drinking water plays a vital role in its efficacy. Hypochlorous acid (HOCl) is the effective disinfecting component of chlorine and is predominant at values lower than pH 7; the hypochlorite ion (OCl-) component is predominant at values higher than pH 8. The pH of drinking water should be kept at a neutral pH during and after disinfection to ensure that there is a sufficient amount of HOCl present. The pH can be tested using an electrode and meter or a digital controller.



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HYD10871-5WW-PEN (12/04/14)



first step to regulations, but it is very prospective at this point," he said.

In the meantime, water utilities must manage the related mess that these algae blooms create — and rate payers are left to pick up the cost.

WHAT'S MONITORED CAN BE MANAGED

Burneson explained that since the growth and risk of cyanotoxins in surface water is unavoidable, treatment plant operators should develop a contingency plan of action should these toxins be detected. Most utilities take a two-pronged approach: they monitor regularly for the presence of cyanotoxins in the water, and then, when they occur, they implement a multi-tiered elimination process to ensure water quality is maintained.

EPA suggests that each plant create a cyanotoxin monitoring plan that outlines when and where sampling will take place, how often, and what screening tools and processes will be used to ensure consistent tracking of these contaminants. The Agency recommends using Enzyme-Linked Immunosorbent Assay (ELISA) test kits for initial sampling, as they are inexpensive and relatively easy to use. However, if the presence of cyanotoxins is detected, treatment plant operators may need to invest in more complex mass spectrometer equipment or work with a local lab to precisely identify the level and species of toxins in the water, Burneson said.

Such proactive monitoring ensures that drinking water quality and safety can be maintained without overwhelming a utility's treatment budget, explained Richard Stumpf, oceanographer at the National Oceanic and Atmospheric Administration (NOAA) in Silver Springs, Md. "If you aren't prepared to deal with cyanotoxins, it can be an expensive problem to address," he said. Because these blooms rise to the sur-



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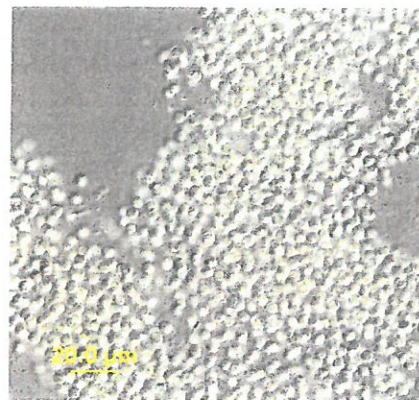
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Circle No. 11 on Reader Service Card

Microcystis aeruginosa under a microscope. This organism is a common bloom formed in many lakes and streams. Photo by Dr. Barry H. Rosen, U.S. Geological Survey.



face during the day and sink at night, treatment plant problems usually occur in the middle of the night. That means calling in extra people and paying them overtime, and finding suppliers who can deliver activated charcoal and other treatment materials right away. "It's much cheaper to plan ahead," he advised.

To help local utilities stay ahead of these toxins, NOAA conducts satellite monitoring of Lake Erie and offers daily forecasts on the size and location of algae blooms, which gives plant operators a heads up to what's coming. Reutter's team at the Ohio Sea Grant College Program offers workshops in the summer that cover water treatment plant management strategies for harmful algal blooms. "They teach plant operators how to know when they need to take action and what actions to take," Reutter said.

BECAUSE THESE BLOOMS

rise to the surface during the day and sink at night, treatment plant problems usually occur in the middle of the night.

THE ALLIANCE METHOD

Dean Reynolds, superintendent of the Water Utility Council in Alliance, Ohio, has taken his own proactive approach to managing and mitigating cyanotoxins. He conducts weekly sampling of his utility's two reservoirs to both identify the species of algae in the water and count the number present. "We always want to know when there is an algae bloom and what's blooming," he said. The Ohio EPA provided his facility with a grant to buy equipment needed to run the tests.

When the bacteria is present, which it inevitably is in the summertime, he uses an innovative multi-barrier approach to eliminate it.

One of the challenges related to cyanobacteria treatment options is that many toxins exist inside the bacteria cell. That

----- See MONSTER con't on page 82

Excess nitrogen and phosphorus cause an overgrowth of algae in a short period of time, faster than ecosystems can handle. Seen here, an algal bloom on the Sas-safras River in Virginia. Photo by Eric Vance, U.S. EPA.



----- MONSTER con't FROM page 16

means when the cell dies or its membrane ruptures, the toxins are released into the water, potentially worsening the problem. "Ideally, you want to avoid that," Reynolds said. However, it impacts the kinds of treatment options that are used. For example, a treatment plant may use chlorine dioxide as a preoxidant to control taste and odor, but this step can destroy the cell membrane. Similarly, copper sulfate and ozone at the intake removes the algal bloom but is not recommended because of the risk of lysing algal cells. "If you can coagulate the particles before destroying the cells, you can take a lot of the contaminants out of the process," he explained.

Reynold's plant uses powder activated carbon (PAC) made from wood as a first barrier. Before selecting the wood-based PAC, his team compared the efficacy of several materials, including coal, lignite and coconuts, and found that wood removed twice as much material as other carbons. "The wood is more effective for us, and we can use it at a lower application rate," he said. This approach saves the utility money and speeds up the elimination process. Reynolds noted, though, that every plant is different. "You may need to spend a few hundred dollars to test which carbon is most efficient for your needs, but it can save you a lot of money in the end."

EPA also suggests potassium permanganate, which can be effective in removing cells with no release of toxin in combination with PAC.

Reynold's next barrier is a filter capped with granular activated carbon (GAC). "The GAC becomes biologically active in the summer, which means the microbes remove chemicals even better than removal by adsorption alone," he said.

Last year, his plant installed two new ultraviolet (UV) light

reactors for advanced oxidation as a final barrier step. The process involves injecting hydrogen peroxide upstream of the reactors; the UV rays then split the hydrogen peroxide into hydroxyl radicals, which attack the organic chemicals in the water. "UV advanced oxidation is cutting-edge technology for drinking water treatment," Reynolds said. When he started looking into the solution in 2009, only four plants in the world were using it to remove organic chemicals from drinking water. He estimated that less than 30 plants in the U.S. currently use this technology.

Reynolds multi-barrier approach enables his team to stay ahead of the cyanotoxins that might develop in the water. In the meantime, he's encouraging local farmers and nearby communities to improve their land management practices and update aging septic systems to lower the nutrient loading in his reservoirs. "It's hard because we have no control over what they do, but I keep pushing," he said.

And that's likely the best that a utility can do. "The lack of regulations leaves drinking water utilities and rate payers as the victims of a pollution problem that someone else is causing," Curtis said. He is hopeful that continuing education about effective land management practices, coupled with tighter regulations in the future, could stem the occurrence of these harmful — and expensive — algae blooms. "Prevention makes a lot more sense than treatment," he said. **WW**

About the Author: Sarah Fister Gale is a freelance journalist based in Chicago, Ill. Over the last 15 years, she has researched and written dozens of articles on water management trends, wastewater treatment systems and the impact of water scarcity on businesses and municipalities around the world.

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One of four solar-powered ultrasonic algae control buoys is placed in Canoe Brook Reservoir No. 1.

Lowering the Blooms

ULTRASONIC TECHNOLOGY PROVIDES AN ECONOMIC, ENVIRONMENTALLY FRIENDLY ALTERNATIVE TO CHEMICALS FOR CONTROLLING ALGAE GROWTH IN SHORT HILLS, NEW JERSEY

By Ed Wodalski

Algae blooms are a regular occurrence at the Canoe Brook Water Treatment Plant in Short Hills, New Jersey. Over the past five years, the plant team has tried various methods to control the growth, which typically persists for weeks or months during late spring and summer.

Contributing to the problem is a fairly shallow reservoir that allows sunlight to penetrate to the bottom of the lake, and high levels of organics pumped in from the nutrient-rich Passaic River. Looking to attack the algae at its source, the plant historically applied copper sulfate at the first sign of blooms. Although a short-term fix, the chemical created long-term problems.

The Canoe Brook plant tested and deployed in one of its reservoirs a chemical-free remedy in a new device that attacks algae cells using high-frequency sound waves.

DRAWBACKS OF CHEMICALS

Copper sulfate treatments at Canoe Brook failed to pass the cost-benefit test. "The first treatment of the year would go great, but the rest would have no effect whatsoever," says Scott Brezinski, water quality supervisor for New Jersey American Water at Canoe Brook, which serves 126,000 customers in 25 municipalities. "Copper had lost its effectiveness for us."

Dying algae cells sank to the bottom of the reservoir and degraded, fur-

ther increasing organic carbon and decreasing dissolved oxygen. Copper sulfate also had the potential to lyse algae cells, releasing taste and odor compounds and possibly algal toxins. The treatments were also expensive: Material costs for application and monitoring were about \$85,000 a year.

"When the plant was reconstructed in 2012, we included ozone and granular activated carbon, so there never were any tastes or odors released from the plant," Brezinski says. "It was more treatment challenges. In the past, before the plant was redesigned, there would be periodic taste and odor complaints. The new plant eliminated that, but the plant wasn't performing well as it could have been because of the high algae levels." In particular, the algae led to short filter runs.

SONIC SOLUTION

Seeking a less costly and more environmentally friendly alternative, Canoe Brook learned about LG Sonic algae treatment technology through the American Water's Innovation Development Program in September 2011. The program, launched in 2009, seeks out innovations and brings them to the industry. To date, the program has examined more than 600 technologies.

"Isle Utilities, an independent technology and innovation consultancy that brings together technical and commercial specialists, held a se-

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American Water where a number of technologies were presented, and this is one of them," says Dr. Orren Schneider, water technology manager with American Water.

Manufactured in The Netherlands by LG Sound, the underwater device uses high-frequency sound waves to attack algae cells. The treatment is widely used in commercial and residential applications but is relatively new for municipal drinking water reservoirs, Schneider says.

In May 2014, four solar-powered ultrasonic algae control buoys were installed and placed in Canoe Brook's Reservoir No. 1. The purchase price was about \$150,000, and Schneider estimates a payback period of 1.8 years. Designed to eliminate up to 90 percent of algae, the chemical-free system is safe for fish and plants. It prevents growth by transmitting ultrasonic waves that target gas vesicles in the algae, causing them to become less buoyant and sink to the bottom of the reservoir. The sonic treatment thus prevents algae and blooms from forming; less algae means less decay. No copper sulfate is used to kill blooms or form.

LG Sonic's Chameleon Technology makes it possible to adjust the treatment according to water conditions, algae type and application, allowing the device to target cyanobacteria, green algae, diatoms and other unwanted growth.

LG Sonic's Chameleon Technology makes it possible to adjust the treatment according to water conditions, algae type and application, enabling the device to treat cyanobacteria (blue-green algae), green algae, diatoms and other unwanted growth. Deployed in spring and retrieved in November, each buoy has three ultrasonic transducers that cover about 50 acres. One main buoy also monitors water quality such as turbidity, dissolved oxygen, pH and temperature. Data linked to a cellphone card to an LG Sonic server can be tracked in real time.

"We used data received from the sensor package on the buoy and collected samples on a daily or weekly basis to look at algae, organic matter, and taste and odor compounds," Schneider says. "Toward the end of the project, we analyzed the economic and operational data and assessed how much it cost or saved."

POSITIVE OUTCOME

Test data showed a 20 percent reduction in chemical usage in 2014, allowing for 83 percent longer filter runs, despite pumping 20 percent more water than the previous year. Annual savings are estimated at \$78,000 (\$18,000 in copper sulfate and \$60,000 in monitoring costs).

Water turbidity and total organic carbon also declined, reducing the concentration of taste- and odor-causing compounds in raw water. Concentrations of geosmin (one taste and odor compound) in Reservoir No. 1 were less than 5 ng/L, compared to 55 ng/L at one point in untreated Reservoir No. 2.

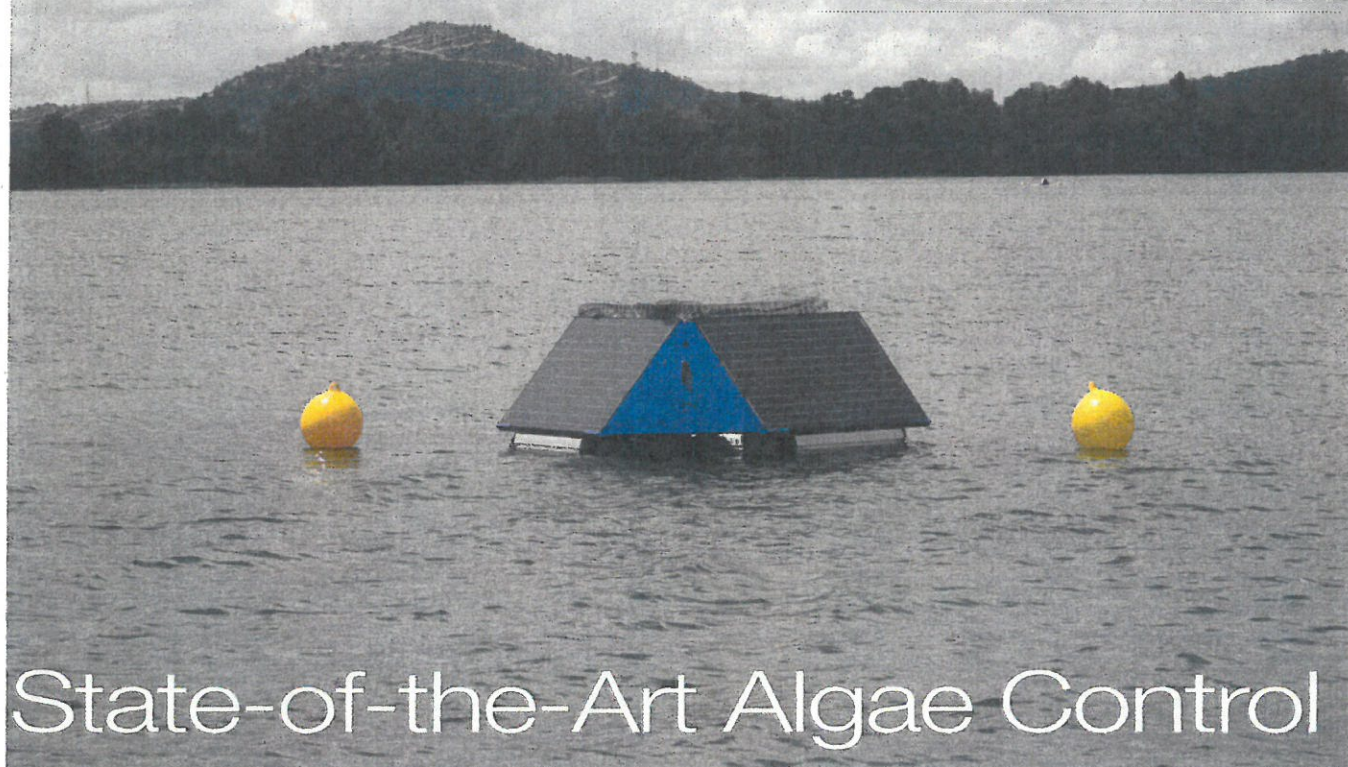


Ultrasonic waves target gas vesicles in the algae, causing them to become less buoyant and sink.

Based on the initial results, American Water is looking to install ultrasonic systems at several plants in Kentucky and Hawaii. "This was the first time the LG Sonic units had been used in drinking water in the U.S.," Schneider says. "We were surprisingly pleased with the results and how fast we saw the impact." *tpo*

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Four solar-powered ultrasonic algae control buoys were installed in the Canoe Brook Reservoir No. 1.



State-of-the-Art Algae Control

BY DR. ORREN SCHNEIDER

As much of North America has seen warmer summers, growth of algae in many surface water supplies has increased. Additionally, the 2009 National Lakes Assessment from the Environmental Protection Agency has estimated that 20 percent of the nation's lakes are highly impacted by algae, and one-third contain some level of harmful algal toxins. This presents a challenge for water treatment plants trying to control algae blooms, which can create problems for performance and increasing operating expenditure for cleaning and maintenance activities.

CHALLENGE

American Water's New Jersey subsidiary operates the Canoe Brook Water Treatment Plant in Short Hills, N.J. The reservoirs that serve as the plant's water supply are shallow and, due to nutrient loading, also eutrophic. This combination of factors leads to seasonally severe algae blooms, which in turn can lead to customer complaints of unpleasant tastes and odors (T&O). While these are aesthetic and not a cause for health concerns, they nevertheless can negatively impact customer satisfaction with service.

Typically, the algae present in the lake were treated with copper sulfate, a compound toxic to algae and other aquatic life. However, this compound is expensive and can lead to the development of copper-resistant algal strains. Further, the use of chemical algacides can cause cell lysis, leading to the

release of T&O compounds and/or harmful algal toxins.

TECHNOLOGY

As an alternative to copper-based algacides, the use of ultrasonic treatment is sometimes used to control algae. Ultrasonic treatment uses high-frequency sound waves to attack the algal cells. The treatment is widely used in commercial and residential applications but is relatively new for municipal drinking water reservoirs.

In an effort to reduce costs, improve operations and reduce customer complaints, four solar-powered ultrasonic algae control buoys manufactured by LG Sonic (Netherlands) were installed in the Canoe Brook Reservoir No. 1. These buoys continuously transmit ultrasonic waves to disrupt algal cells, causing them to sink and prevent proliferation.

These emitters have been incorporated into a buoy system that uses on-board analytical capability and algorithms to determine the type of algae present and alters the emitted frequency to control the different species. Rather than cause cell lysis, the LG Sonic devices are targeted at the gas vesicles present in the algae, causing them to collapse and thereby reducing the buoyancy of the cells. This causes them to sink to the bottom of the reservoir.

At the bottom, less sunlight is available for photosynthesis, and the cells stop growing. If other species of algae begin to predominate, the frequency can be changed to deal with the

new population. Because of these advances, much lower sonic intensities can be used and thus, the ultrasonic buoys are capable of being powered by on-board solar cells.

Because of the tunable emitter, a single device is capable of treating the range of algae that may be present in a water body, including cyanobacteria (blue-green algae), green algae and diatoms. The effective diameter of treatment using these buoys is approximately 500 meters (the effective area is approximately 50 acres). Because the algal cells are not lysed, metabolites (including T&O compounds, pigments and toxins) are contained within the cells and are not released into the water.

This was the first installation of this relatively new technology for drinking water reservoirs in North America. This new system combines online water quality monitoring, telemetering and ultrasound technology to better prevent T&O events from occurring. Additionally, in keeping with American Water's sustainability efforts, this system operates 100 percent on solar power, and the technology will not harm fish or other wildlife.

RESULTS

Extensive testing conducted during 2014 showed that the buoys had a significant impact on the algae, reducing algal counts, raw water turbidity and total organic carbon in the

water. This improved water quality, enabled the plant operations staff to reduce coagulant consumption by more than 20 percent and reduced the concentration of undesirable T&O-causing compounds in the raw water entering the plant.

Reduced chemical use resulted in lower filter effluent turbidity and significantly increased filter run lengths over the same period in 2013, all while pumping approximately 20 percent more water than the previous year. Based on the cost of the equipment and savings realized, it is estimated that the payback period for the buoys is less than two years.

Based on the results of this study, American Water has decided to purchase buoys for other reservoirs impacted by algae and is looking at other uses, including clarification basins, waste backwash lagoons and wastewater/reuse applications. **WW**

About the Author: Dr. Orren Schneider is a water technology manager with American Water, the largest publicly traded U.S. water and wastewater utility company. Schneider joined American Water in 2005 and is involved with research leading to optimization of water treatment and distribution system operations. His primary areas of focus include evaluation and design of advanced coagulation, clarification, filtration, disinfection, and membrane technologies. He has extensive experience with pilot plants that specialize in collection and analysis of data for scale-up to full-scale operations.

Circle No. 301 on Reader Service Card

The buoys continuously transmit ultrasonic waves to disrupt algal cells, causing them to sink and prevent proliferation.













RESOLUTION 2015-04

A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF PORT ST. JOE, AUTHORIZING A GRANT APPLICATION TO THE UNITED STATES DEPARTMENT OF AGRICULTURE; APPOINTING AND AUTHORIZING A PROJECT MANAGER; AUTHORIZING THE MAYOR TO ACT ON BEHALF OF THE CITY; PROVIDING FOR REPEAL; PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the City of Port St. Joe, Florida will apply to the United States Department of Agriculture for a Rural Business Enterprise Grant for improvements to certain City property known as the Open Air Information Center; and

WHEREAS, the Board of City Commissioners has determined that as a necessary part of that application certain resolutions need to be made; and

WHEREAS, the City of Port St. Joe, Florida recognizes the Mayor as the official authorized to act on behalf of the City in such matters and further acknowledges that his signature shall be binding upon the City in such matters; and

WHEREAS, The Port St. Joe Redevelopment Agency shall be responsible for grant application and project management,

NOW, THEREFORE, BE IT RESOLVED by the Board of City Commissioners of the City of Port St. Joe, Florida as follows:

1. That it approves the submission of the application and any related documents for the subject grant in the amount of \$118,000.00; and

2. That this legislative body of the City of Port St. Joe, Florida hereby authorizes the Mayor and/or the City Clerk, in his absence, to act as the appropriate official on behalf of the City of Port St. Joe, Florida in dealing with the United States Department of Agriculture and to sign any and all necessary application and other forms; as well as, submitting any additional information required and signing any necessary contracts and/or other agreements between the United States Department of Agriculture and the City of Port St. Joe, Florida, that may result from this application; and

3. The City of Port St. Joe, Florida hereby assures the United States Department of Agriculture that it authorizes the total expenditure set forth in the grant application and acknowledges that it will have available and make any contribution identified in the grant application; and

4. The Port St. Joe Redevelopment Agency, acting through its Executive Director, or its designee shall act as project manager for this grant and shall contribute an amount equal to 5% of the grant.; and

5. The City Commission certifies that this project will not result in any transfer of jobs or employment or the production of goods or services to an area where there is no demand for such.

6. Any Resolution previously adopted relative to this particular grant is repealed.

THIS RESOLUTION ADOPTED THIS 24th day of June, 2015, on a vote of _____ yeas and _____ nays, by the Board of City Commissioners, City of Port St. Joe, Florida.

BOARD OF CITY COMMISSIONERS
CITY OF PORT ST. JOE, FLORIDA

By: _____
James C. Patterson
Mayor-Commissioner

ATTEST:

Charlotte M. Pierce
City Clerk

RESOLUTION 2015-05

A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF PORT ST. JOE, AUTHORIZING A GRANT APPLICATION FOR THE PHASE III CAPE SAN BLAS LIGHTHOUSE RELOCATION; PROVIDING FOR A FUNDING SOURCE FOR ANY REQUIRED MATCH; APPOINTING AND AUTHORIZING A DESIGNATED PROJECT CONTACT; AUTHORIZING THE CITY MANAGER TO ACT ON BEHALF OF THE CITY; PROVIDING FOR REPEAL; PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the City of Port St. Joe, Florida will apply to the Bureau of Historic Preservation of the Division of Historical Resources for a Phase III Cape San Blas Lighthouse Relocation Grant for improvements to certain City property known as the Cape San Blas Lighthouse; and

WHEREAS, the Board of City Commissioners has determined that as a necessary part of that application certain resolutions need to be made; and

WHEREAS, the City of Port St. Joe, Florida recognizes the City Manager as the official authorized to act on behalf of the City in such matters and further acknowledges that his signature shall be binding upon the City in such matters; and

WHEREAS, The City Clerk shall be responsible for grant application and project management,

NOW, THEREFORE, BE IT RESOLVED by the Board of City Commissioners of the City of Port St. Joe, Florida as follows:

1. That it approves the submission of the application and any related documents for the subject grant in the amount of \$ 125,000; and

2. That this legislative body of the City of Port St. Joe, Florida hereby authorizes the City Manager to act as the appropriate official on behalf of the City of Port St. Joe, Florida in dealing with the Bureau of Historic Preservation and to sign any and all necessary application and other forms; as well as, submitting any additional information required and signing any necessary contracts and/or other agreements between the parties that may result from this application; and

3. The City of Port St. Joe, Florida hereby assures the Bureau of Historic Preservation that it authorizes the total expenditure set forth in the grant application and acknowledges that it will have available from existing BP funds and will make any contribution identified in the grant application; and

4. The City Clerk shall act as project manager and Designated Project Contact for this grant and; and

5. The City Commission certifies that this project will not result in any transfer of jobs or employment or the production of goods or services to an area where there is no demand for such.

6. Any Resolution previously adopted relative to this particular grant is repealed.

THIS RESOLUTION ADOPTED THIS ____ day of _____, 2015, on a vote of ____ yeas and ____ nays, by the Board of City Commissioners, City of Port St. Joe, Florida.

BOARD OF CITY COMMISSIONERS
CITY OF PORT ST. JOE, FLORIDA

By: _____
James "Bo" Patterson
Mayor-Commissioner

ATTEST:

Charlotte M. Pierce
City Clerk