Rec 9/29/20

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MTSU Clean Energy Initiative Project Funding Request

There are five (5) sections of the request to complete before submitting. See http://www.mtsu.edu/sga/cleanenergy.shtml for funding guidelines. Save completed form and email to cee@mtsu.edu or mail to MTSU Box 57.

1. General Information	
Name of Person Submitting Request Ray Wiley	
Department/Office Campus Recreation	Phone # (Office) 615-785-7805
MTSU Box # 556	Phone # (Cell) 615-898-5701
E-mail ray.wiley@mtsu.edu	Submittal Date 9-29-2020

2. Project Categories (Select One)			
Select the category that best describes the project.			
X	Energy Conservation/Efficiency		Sustainable Design
	Alternative Fuels		Other
	Renewable Energy		

3. Project Information
a. Please provide a brief descriptive title for the project. **b.** The project cost estimate is the expected cost of the project to be considered by the committee for approval, which may differ from the total project cost in the case of matching funding opportunities. **Any funding request is a 'not-to-exceed' amount. Any proposed expenditure above the requested amount will require a resubmission.** c. List the source of project cost estimates. d. Provide a brief explanation in response to question regarding previous funding.
3a. Project Title Ultraviolet light System for Indoor pool
3b. Project Cost Estimate $45,000

3c. Source of Estimate DC Pool Company, Powder Springs, GA
3d. If previous funding from this source was awarded, explain how this request differs? N/A

4. Project Description

(Completed in as much detail as possible.)

a. The scope of the work to be accomplished is a detailed description of project activities.
b. The benefit statement describes the advantages of the project as relates to the selected project category.
c. The location of the project includes the name of the building, department, and/or specific location of where the project will be conducted on campus.
d. List any departments you anticipate to be involved. Were any departments consulted in preparation of this request? Who? A listing may be attached to this form when submitted.
e. Provide specific information on anticipated student involvement or benefit.
f. Provide information for anticipated future operating and/or maintenance requirements occurring as a result of the proposed project.
g. Provide any additional comments or information that may be pertinent to approval of the project funding request.

4a. Scope: Work to be accomplished

- This project would involve the installation of an advanced ETS UV system that is designed to use a spectrum of light for all our pool water to flow through that would result in destroying all viruses and bacteria in the water. The project cost would include all the plumbing and electric parts and labor associated with the project.

4b. Scope: Benefit Statement

- Installing this UV system, will help us be much more environmentally friendly because we can reduce our pool chemicals use. The purchase of this system will result in significant improvement in air quality and help protect our HVAC units by reducing the presence of chloramines in our pool water. Additionally, this system will help us better protect our patrons and all remaining pool equipment and surfaces from corrosion. Please note: We will still need a chemical sanitizer (chlorine) to take care of bacteria in the pool that's slower to reach the filter, however, we will use considerably less (approximately 2/3 less) than if chemicals remain our primary cleaning method. This UV system will ensure the pool is clear of harmful parasites and pathogens. To summarize, this new system:
- Requires fewer chemicals
- Is more affordable now that previous systems
- Is safer than chemicals alone
- Considered by many in the pool industry as the best form of cleaning technology
- Lowers our maintenance cost to replace HVAC, stainless steel gutters and door and other pool related equipment

4. Project Description (continued)

4c. Location of Project (Building, etc.)

This advanced system would be installed at the indoor pool pump room at MTSU Campus Recreation

4d. Participants and Roles

Ray Wiley – Associate Director Campus Recreation

Micah Reiss- Recreation Technician Campus Recreation

Joe Whitefield- Assistant VP for Facility Services Department- Advisor

4e. Student participation and/or student benefit

Student leadership representatives for our department (head lifeguards and aquatic programmers) will be trained to record daily levels on the system display and be trained to recognize proper levels of UV operations and report any discrepancies. This ETS UV system is the most advanced system in the market today and will help ensure the best water quality available for all our patrons to use. The knowledge and experience our students will gain using this system will help them when they apply for future full-time employment or graduate assistant positions.

4f. Future Operating and/or Maintenance Requirements

The entire UV unit is serviced annually by the manufacturer which includes bulb replacement and a detailed inspection for 3,000.00 The daily cost for the system is broken down to $2.50 per day.

4g. Additional Comments or Information Pertinent to the Proposed Project: **Over time, we have experienced damage to our stainless steel gutters and storage room doors and our HVAC Units have suffered due to poor air quality and the negative impact of chloramines that are present in our water. The UV system will reduce these Chloramines thereby improving overall air quality and reducing irritation to everyone's mucous membranes, eye stinging, red eyes, and irritated respiratory systems. This will eliminate the strong chlorine odor often smelled at poorly operated pools caused by chloramines, not free chlorine.**

5. Project Performance Information

Provide information if applicable.

a. Provide information on estimated annual energy savings stated in units such as kW, kWh, Btu, gallons, etc.
b. Provide information on estimated annual energy cost savings in monetary terms.
c. Provide information on any annual operating or other cost savings in monetary terms. Be specific.
d. Provide information about any matching or supplementary funding opportunities that are available. Identify all sources and explain.

5a. Estimated Annual Energy Savings (Estimated in kW, kWh, Btu, etc.)

5b. Annual Energy COST Savings ($)

5c. Annual Operating or Other Cost Savings. Specify. ($) The annual chemical savings to reduce the daily residual of chlorine and the need for shocking the pool with higher levels of chlorine is estimated at $4,230.00. With the reduction of chloramines, we will reduce labor cost of an average of 12 hours per week at 8.00 per hour = $120.00 times 49 weeks =$5,880 for a grand total of $10,110 annually. There should be some additional savings with reducing the number of work orders cost associated with having our HVAC system repaired less frequently.

5d. Matching or Supplementary Funding (Identify and Explain)

There are two past dated projects that have some remaining funds that I am requesting the remaining balances to be used for this project if this proposal is approved. Here are the two accounts # **13.017.F18 -- $1739.00 and #13.015.S19 – $2086.40**

Totaling: $3,825.40

Additionally, The dept. of Campus Recreation is willing to provide some matching funds (if needed) in the amount of either 25% or up to 50%.

WHY INSTALL UV SYSTEMS

In order to keep any pool facility *clean and safe* there is a need for chlorine-based chemicals. When chlorine-based chemicals kill bacteria in pool water, corrosive gases are released into the natatorium. These gases, commonly referred to as *chloramines*, not only irritate patrons but also create severe maintenance problems, often indicated by unsightly staining on interior equipment such as ladders, guard stands, gutter systems, and HVAC components just to mention a few.

Many attempts have been made to address the problem of *chloramines*, but none has been 100% effective—until now.

Ultraviolet Chloramine Destruct & Disinfection Systems are rapidly and dramatically improving the air quality for indoor pool facilities throughout the world, by virtually eliminating the *chloramine* problem. UV also kills harmful, chlorine-resistant bacteria such as *Cryptosporidium,* which is responsible for the viral outbreaks we've heard so much about recently. The UV System is a product that lives up to its billing and should be considered a necessity with **all indoor pool facilities**. Here is a short list of advantages and benefits that you and your customers can expect from the UV System.

1. Reduces the *chloramine* levels below the Health Department maximum of (0.2 ppm.)

2. Reduces the corrosive atmosphere inside the building, dramatically improves the air quality and virtually eliminates respiratory problems normally associated with chloramines.

3. Reduces maintenance and extends the life of the metal components in the building, such as windows, pool equipment, ladders, and HVAC components, etc.

4. Eliminates 99.9 % of all water-borne viruses and bacteria, including the chlorine resistant *Cryptosporidium.*

5. Reduces the need to superchlorinate or "shock" the pool, and the subsequent down-time associated with it.

6. Reduces the overall operating costs by reducing chemical usage.

7. Reduces occurrences of swimsuit fading, eye irritation, respiratory problems, stomach discomfort-common complaints of swimmers.

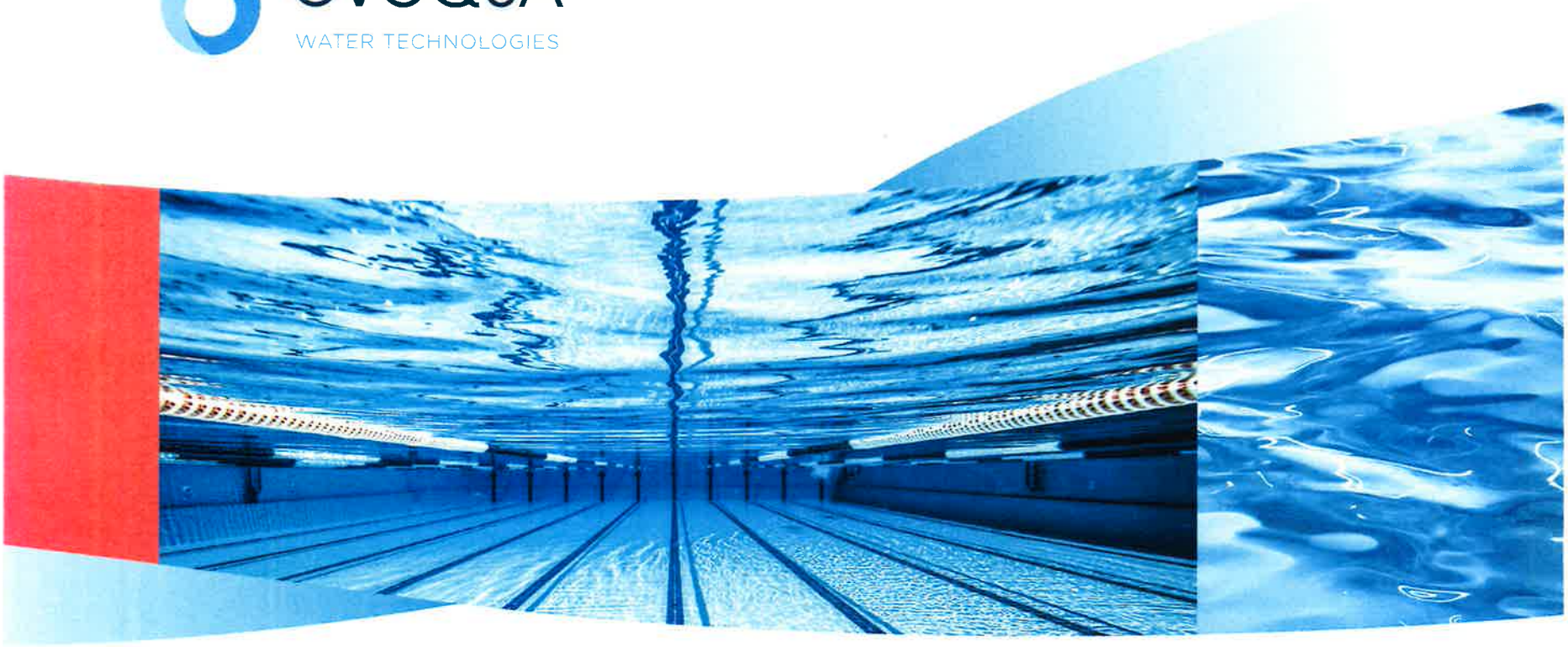
8. The system requires very low maintenance, once installed. After a few minor adjustments once the unit is operational, only a bulb change once per year--about a half-hour's work--will be needed.

9. The unit is installed directly in the filtered water return line—not in a side stream—and therefore treats the entire volume of water during recirculation.

10. No additional chemical are required for use with the UV system.

The main thrust of using the UV Chloramine Destruct System is to address the chloramine issues, but a side factor is that multiple parasites, including *Cryptosporidium* have become chlorine resistant and the UV will address this issue as well. There is a major increase in viral outbreaks due to this chlorine resistance. **The use of UV will provide a safer pool environment for our bathers. It will extend the life of our building, building equipment, metal components in the natatorium, HVAC system, and improve the air quality significantly.**

evoqua
WATER TECHNOLOGIES



ULTRAVIOLET DISINFECTION SYSTEMS

THE MOST EFFECTIVE WAY TO INACTIVATE HARMFUL PATHOGENS IN YOUR AQUATICS AND RECREATIONAL WATER

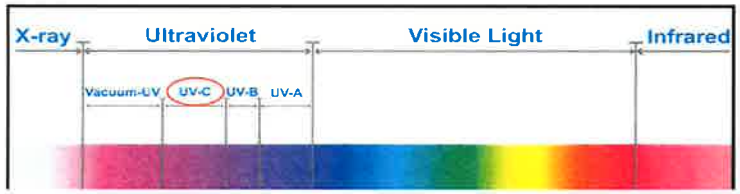
WHY EVOQUA UV SYSTEMS?

TRANSFORMING WATER. ENRICHING LIFE.

Evoqua is committed to helping the aquatics industry solve challenges impacting the safety and satisfaction of their bathers and guests. Thousands of ultraviolet (UV) disinfection systems are deployed across the globe, protecting bathers at many of the most well recognized aquatics venues. Years of experience and technical expertise are core to our success. Our engineers utilize the most advanced modeling and emulation tools to ***design superior solutions that set the standard for safety, efficiency, serviceability and installation flexibility.***

WHAT IS ULTRAVIOLET LIGHT?

Ultraviolet light is technically energy in the electromagnetic spectrum (100-400 nm) with wavelengths shorter than those visible to the human eye. UV is used in a wide variety of applications across many industries, including municipal treatment of drinking water. In aquatics, UV systems are used to accomplish disinfection and chloramine reduction.



ADVANTAGES OF UV DISINFECTION

- Reduces risk of recreational waterborne illnesses
- Improves air quality by reducing chloramines
- Reduces demand for treatment chemicals

UV & CHLORAMINE REDUCTION

Chlorine in pool water reacts with organic compounds to form disinfection byproducts such as mono-, di-, and tri-chloramines. Volatile in nature, chloramines off-gas and concentrate at the water/air interface, where swimmers breathe, causing burning eyes and respiratory issues that can affect both performance and long-term health. Chloramines further dissipate into the natatorium causing corrosion and that offensive "chlorine smell" we are all

WAFER™ UV SYSTEM

The Wafer™ UV disinfection system is specifically designed for the aquatics industry. Not only is this model the most compact UV solution available today, it features leading-edge technologies including a hydraulically optimized treatment chamber and polychromatic medium pressure lamps - making it the most efficient and highest performing UV system. Innovative design paired with advanced technologies delivers ***a system capable of inactivating 99.9% of microorganisms while also reducing chloramines.***

The Wafer UV system's unique UV chamber makes it the most compact system available today. At about one third the size of comparable UV systems, an installed length between flanges of under 8" and a significantly reduced maintenance envelope, the Wafer delivers a compelling UV solution for new installations and retrofits that will fit in even the tightest of pump rooms.

Innovative TwistLok™ lamps and PulseLok technology facilitate Wafer commissioning and maintenance. TwistLok lamps make lamp changes quicker, easier and safer with plug & play connections and a mechanical safety interlock. With an improved seal arrangement, quartz maintenance is simplified while reducing the risk of breakage. An ultra-compact automatic wiper incorporating PulseLok technology provides a one-button

Controlling the Wafer is the Spectra controller, providing a wide range of capabilities including programmable set points, data stream monitoring and process interlocks. System power can be varied from 30-100% in 1% increments to supply only the amount required to efficiently achieve disinfection. Remote monitoring and control are possible using a web browser or mobile device. Data including UV intensity, flow rate and faults can be logged and exported for archiving and/or process optimization.

WAFER™ UV SYSTEM BENEFITS & ADVANTAGES

- *Enhances bather safety & satisfaction*
- *Reduces chloramine formation*
- *Improves air quality*
- *Small installation footprint*
- *Can be oriented horizontally or vertically*
- *Improved power control for maximum performance & efficiency*
- *Reduces chemical use and handling*
- *Safer & easier to maintain*
- *NSF-50 certified*
- *Third-party validated*
- *Compliant with Model Aquatic Health Code*