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REQUEST FOR PROPOSALS (RFP)

Demonstration of Innovation to Improve Pathogen Removal, Validation, and/or Monitoring in Carbon-Based Advanced Treatment (CBAT) for Potable Reuse (RFP 5129)

Due Date: Proposals must be received by **3:00 pm Mountain Time** on **Tuesday, November 9, 2021**

WRF Project Contact: Katie Spahr, PhD, PE, kspahr@waterrf.org

Project Sponsors

This project is funded by The Water Research Foundation (WRF) as part of WRF's Research Priority Program.

Project Objectives

This project aims to improve the monitoring and validation of pathogen removal by carbon-based advanced treatment (CBAT) via demonstration of novel technologies or process controls.

Budget

Applicants may request up to \$200,000 in WRF funds for this project. WRF funds requested and total project value are evaluation criteria considered in the proposal selection process.

Background and Project Rationale

CBAT can be an ideal and cost-effective treatment option for potable reuse, especially for inland utilities where disposal of reverse osmosis (RO) or nanofiltration brine concentrate can impede the financial viability of potable reuse. As a category, CBAT includes advanced treatment trains that meet or exceed potable water quality regulatory standards without the use of brine-generating membrane processes such as RO and nanofiltration. Many of these trains incorporate ozonation followed by biologically active filtration (BAF) and or granular activated carbon (GAC) filtration to achieve requisite removal of chemicals, organics, nutrients, and pathogens. Benefits of CBAT relative to RO or nanofiltration-based treatment include potentially lower treatment costs and lack of waste brine.

A major hurdle in advancing CBAT trains is understanding and optimizing pathogen removal. This project will increase the certainty of pathogen removal to overcome future hurdles of regulation, public perception, and cost of energy and resources for advanced water treatment. For example, the future implementation of a stage 3 disinfection and disinfection byproduct (DBP) rule would not only test whether GAC (adsorption) and/or BAF (biological) contactors can achieve DBP precursor removal ahead of disinfection, but also raise questions about the biostability of finished water and susceptibility to opportunistic pathogens such as *Legionella*.

Research Approach

A key barrier to CBAT acceptance and permitting is the lack of information regarding pathogen removal, particularly in cases where oxidant residual is challenging to monitor. This RFP includes an open-ended approach to allow for unique solutions and/or incorporate crossover technologies from other industries or applications.

This project solicits the demonstration of a technology that can improve monitoring and validation of pathogen removal by CBAT treatment trains.

The demonstration must include:

- Installation of the technology on-site at a test facility
- Field demonstration (bench-, pilot-, or full-scale testing)
- Data collection, with the data made available to WRF subscribers and U.S. regulators

Some examples of possible technological applications include:

- Deployment of a real-time monitoring network on critical control points
- Advanced process control through integration of sensor data into analytical software
- Data analysis procedures for assessing pathogen removal under varying water quality conditions
- Alternate unit processes that offer enhanced pathogen removal reliability or efficiency
- Alternate unit processes that can treat non-conventional source waters (e.g., stormwater, agricultural water) for potable reuse

This work will generate datasets to support knowledge and understanding of site-specific dependencies of the treatment train and support future regulatory decisions to allow for easier adoption of CBAT for potable reuse. The proposer should indicate in their application the number of sites and/or number of variables they will be able to test within the available budget.

Expected Deliverables

- Submission of case study in open access peer-reviewed journal
- WRF in-house publication of operational data
- Video demonstration of on-site installation
- Technology addition to WRF TechLink
- A WRF final report summarizing work performed and lessons learned

Communication Plan

Please review WRF's *Project Deliverable Guidelines* for information on preparing a communication plan. The guidelines are available at <https://www.waterrf.org/project-report-guidelines>. Conference presentations, webcasts, peer review publication submissions, and other forms of project information dissemination are typically encouraged.

Project Duration

The anticipated period of performance for this project is 15 to 24 months from the contract start date.

References and Resources

The following list includes examples of research reports, tools, and other resources that may be helpful to proposers. It is not intended to be comprehensive, nor is it a required list for consideration.

- 4560: GAC Control of Regulated and Emerging DBPs of Health Concern
 - 4743: Optimizing Filter Operation in an Ozone-Biofiltration Plant to Reduce Selection for Opportunistic Pathogens in Drinking Water Production
 - 4777: Ozone Biofiltration Direct Potable Reuse Testing at Gwinnett County
 - 4833: Impact of Wastewater Treatment Performance on Advanced Water Treatment Processes and Finished Water Quality
 - 5092: Understanding and Improving Reuse Biofilter Performance During Transformation from GAC to BAC
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Proposal Evaluation Criteria

The following criteria will be used to evaluate proposals:

- Understanding the Problem and Responsiveness to RFP (maximum 20 points)
- Technical and Scientific Merit (maximum 30 points)
- Qualifications, Capabilities, and Management (maximum 20 points)
- Communication Plan, Deliverables, and Applicability (maximum 15 points)
- Budget and Schedule (maximum 15 points)

Proposal Preparation Instructions

Proposals submitted in response to this RFP must be prepared in accordance with the WRF document *Guidelines for Research Priority Program Proposals*. The current version of these guidelines is available at <https://www.waterrf.org/proposal-guidelines>, along with *Instructions for Budget Preparation*. The guidelines contain instructions for the technical aspects, financial statements, indirect costs, and administrative requirements that the applicant must follow when preparing a proposal.

Proposals that include the production of web- or software-based tools, such as websites, Excel spreadsheets, Access databases, etc., must follow the criteria outlined for web tools presented in the Web Tool Criteria and Feasibility Study for The Water Research Foundation Project Deliverables at <https://www.waterrf.org/sites/default/files/file/2021-07/WebToolCriteria.pdf>.

Eligibility to Submit Proposals

Proposals will be accepted from domestic or international entities, including educational institutions, research organizations, governmental agencies, and consultants or other for-profit entities.

WRF's Board of Directors has established a Timeliness Policy that addresses researcher adherence to the project schedule. The policy can be reviewed at <https://www.waterrf.org/policies>. Researchers who are late on any ongoing WRF-sponsored studies without approved no-cost extensions are not eligible to be named participants in any proposals. Direct any questions about eligibility to the WRF project contact listed at the top of this RFP.

Administrative, Cost, and Audit Standards

WRF's research program standards for administrative, cost, and audit compliance are based upon, and comply with, Office of Management and Budget (OMB) Uniform Grants Guidance (UGG), 2 CFR Part 200 Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, and 48 CFR 31.2 Contracts with Commercial Organizations. These standards are referenced in WRF's *Guidelines for Research Priority Program Proposals*, and include specific guidelines outlining the requirements for indirect cost negotiation agreements, financial statements, and the Statement of

Direct Labor, Fringe Benefits, and General Overhead. Inclusion of indirect costs must be substantiated by a negotiated agreement or appropriate Statement of Direct Labor, Fringe Benefits, and General Overhead. Well in advance of preparing the proposal, your research and financial staff should review the detailed instructions included in WRF's *Guidelines for Research Priority Program Proposals* and consult the *Instructions for Budget Preparation*, both available at <https://www.waterrf.org/proposal-guidelines>.

Budget and Funding Information

The maximum funding available from WRF for this project is \$200,000. The applicant must contribute additional resources equivalent to at least 33 percent of the project award. For example, if an applicant requests \$100,000 from WRF, an additional \$33,000 or more must be contributed by the applicant. Acceptable forms of applicant contribution include cost-share, applicant in-kind, or third-party in-kind that comply with 2 CFR Part 200.306 cost sharing or matching. The applicant may elect to contribute more than 33 percent to the project, but the maximum WRF funding available remains fixed at \$200,000. **Proposals that do not meet the minimum 33 percent of the project award will not be accepted.** Consult the *Instructions for Budget Preparation* available at <https://www.waterrf.org/proposal-guidelines> for more information and definitions of terms.

Period of Performance

It is WRF's policy to negotiate a reasonable schedule for each research project. Once this schedule is established, WRF and its sub-recipients have a contractual obligation to adhere to the agreed-upon schedule. Under WRF's No-Cost Extension Policy, a project schedule cannot be extended more than nine months beyond the original contracted schedule, regardless of the number of extensions granted. The policy can be reviewed at <https://www.waterrf.org/policies>.

Utility and Organization Participation

WRF encourages participation from water utilities and other organizations in WRF research. Participation can occur in a variety of ways, including direct participation, in-kind contributions, or in-kind services. To facilitate their participation, WRF has provided contact information, on the last page of this RFP, of utilities and other organizations that have indicated an interest in this research. Proposers are responsible for negotiating utility and organization participation in their particular proposals. The listed utilities and organizations are under no obligation to participate, and the proposer is not obligated to include them in their particular proposal.

Application Procedure and Deadline

Proposals are accepted exclusively online in PDF format, and they must be fully submitted before 3:00 pm Mountain Time on Tuesday, November 9, 2021.

The online proposal system allows submission of your documents until the date and time stated in this RFP. Submit your proposal at <https://forms.waterrf.org/212023898726865>

Please ensure you upload the required documents before the deadline. **Proposals submitted after the deadline will not be accepted.**

Questions to clarify the intent of this RFP and WRF's administrative, cost, and financial requirements may be addressed to the WRF project contact, Katie Spahr at (303) 734-3478 or kspahr@waterrf.org. Questions related to proposal submittal through the online system may be addressed to Caroline Bruck at (303) 347-6118 or cbruck@waterrf.org.

Utility and Organization Participants

The following utilities have indicated an interest in possible participation in this research. This information is updated within 24 business hours after a utility or an interested organization submits a volunteer form, and this RFP will be re-posted with the new information. **(Depending upon your settings, you may need to click refresh on your browser to load the latest file.)**

N/A