Request for Proposals (RFP)

Analysis of High Efficiency Point-of-Entry (POE) Water Softening Compared to Centralized Hardness Reduction

RFP Issued: August 9, 2021

Submission Deadline: October 29, 2021 by 11:00 am central

Budget: Total budget shall not exceed $10,000

Anticipated Award Notification Timeframe: November 2021

- The research would start approximately 30 days after award notification depending on the time needed for contract review, unless otherwise mutually agreed upon.

Introduction

Increasing chloride levels are a concern in lakes, streams and groundwater, particularly for the protection of aquatic life. There are several contributors to chlorides in the environment, including but not limited to road de-icing, fertilizers, manure, dust suppressants, and regeneration wastes from residential and commercial cation exchange water softeners. The water softener impact becomes significant in the discharge of some municipal wastewater treatment plants. These treatment plants may struggle to meet EPA acceptable levels for chloride discharge, particularly if the municipalities where water is very hard and the point of discharge is a small stream with limited dilution.

Water treatment technology has come a long way in the last 20 years to increase efficiency and reduce the use of salt and therefore the concentration of chlorides in regeneration wastes. A previous study by the Madison Metropolitan Sewerage District (MMSD) conducted real-world case studies to evaluate the reduction of influent chlorides to the wastewater treatment plant through optimization of existing water softeners and replacement of softeners to newer, high efficiency-rated systems, finding a 27% and 47% reduction in chlorides, respectively. These findings prove there are solutions to meet chloride discharge requirements and also maintain the homeowners benefits of energy efficiency and appliance performance from use of cation exchange water softeners.

Who is WQRF?

The Water Quality Research Foundation (WQRF), formerly the Water Quality Research Council, was formed in 1952 to serve with the guidance and assistance of the Water Quality Association (WQA) and its members as a universally recognized, independent research and education sponsorship organization. The mission of WQRF is advancing knowledge and the science of high quality, sustainable water. WQRF's vision is water quality improvement through relevant research.

Since inception, WQRF has sponsored numerous research studies which have examined a broad range of water chemistry, technology and environmental impact issues, generated essential water technology use, effectiveness and consumer information, positively impacted legislative change, and helped advance efficiencies and methodologies in product certification, evaluation and testing.

Background on this RFP

The complexity of this discussion of a single point of environmental concern is significant. There are a myriad of consequences to the decision to soften or reduce hardness in water. Ion exchange water softening was introduced over one hundred years ago to protect equipment and reduce energy use – objectives even more important today. An oversimplified view of chloride discharge might lead to actions that may have negative environmental and economic results.

Not all municipalities have the funding to conduct a pilot study as was done in Madison. Therefore, WQRF is seeking to fund a literature review and modeling/analysis that any municipality could use to evaluate if optimization or replacement programs for water softeners that could be effective strategies to meet chloride discharge requirements.

Detailed information on the project concept

The literature review and modeling/analysis funded by WQRF seeks to evaluate the following:

1) Chloride impacts from softener optimization or replacement programs across the state of Minnesota
2) Economic analysis
    a) Accurate cost of point-of-entry (POE) softening vs. increased water rates to consumer
    b) Increased energy use and climate impact with moderate hardness
    c) Additional piping and pumping for central treatment
3) Comparison of benefits of centralized hardness reduction and residential softening
    a) Individual Requirements to treat water to specific quality
    b) Advantages of and the need for soft water (<1 grains per gallon [gpg])
    c) Unnecessary treatment of water
    d) Backwash wastewater discharged from lime hardness reduction
    e) Concentrate wastewater discharged from and energy expenditure by municipal reverse osmosis
    f) Discharge volume of high efficiency water softeners
    g) Increased water use in cleaning (laundry/dishes) with moderate hardness water
4) Review of long-term impacts of central hardness reduction
    a) Operating expenses
    b) Replacement and major repair costs
    c) Sludge
    d) Disinfection efficacy
    e) Formation of disinfection byproducts

Please begin by reviewing the resources WQRF provided in **"Informative References"** section of this RFP and expand the literature review appropriately.

Requirements for Researchers

Researchers must be well-qualified and have expertise in point-of-use/point-of-entry (POU/POE) drinking water treatment technologies. The names, qualifications and detailed curricula vitae of primary investigators involved in this project must be provided.

The researchers must have the facilities and capabilities to accomplish this project or must provide a list of the proposed partner organizations and their qualifications required to accomplish this project. Again, a list of the names, qualifications and detailed curricula vitae of primary investigators from those partner organizations should be provided.

Restrictions

Please read this section carefully. You are encouraged to consult WQRF if you believe your proposal encompasses one or more of these restrictions. Proposals whose scope fall within any of these restrictions will not be funded by WQRF:

- The proposal must be scoped to prevent use of the study to promote or disparage a specific product model, company/organization or brand name. It is WQRF's policy that brands, models, and manufacturers are confidential, only the specifications of the products tested can be included in the report(s).
- The research will not be of a type ordinarily expected to be carried on by private enterprises in the ordinary course of research and development, the testing and inspection of materials or products, particularized market or consumer research or the design and construction of water treatment equipment, products or parts.
- While WQRF supports the many benefits of product validation evaluation and testing, WQRF does not fund product development-related activities, such as validation testing of new products or emerging technologies.
    - Projects that involve general validation or study broadly the benefits of certain categories of technologies relative to other categories of technologies have been funded (e.g., the benefits of softening study, the evaluation of emerging scale prevention technologies) only when they were scoped to benefit the entire industry and not to promote a specific product, benefit a specific manufacturer or develop intellectual property.
    - Consistent with this policy, WQRF bylaws require that any patents or trademarks owned by WQRF resulting from research they fund shall be made available to the public-at-large on a non-discriminatory basis.
- Researchers are prohibited from having a commercial interest in any products or technologies proposed for inclusion in the research study.

Proposal Vetting/Selection Process

All proposals submitted in response to this RFP will be reviewed by the WQRF Scientific Consultant and designated WQRF Research Task Force. The proposal review process is overseen and facilitated by WQRF staff. The Task Force is comprised of subject matter experts who volunteer their time to WQRF.

Researchers may be contacted for further information regarding their proposal throughout the vetting/selection process. It is common for the Task Force to request:

1. Written responses to questions
2. For the research team present its proposal to the Task Force and answer any additional questions via a webinar
3. Minor revisions/additions to the proposed approach and/or deliverables
    a. Any requests accepted by the researcher will require a revised proposal

The length of the proposal selection process will vary depending on the number of proposals received, their complexity and the Task Force's availability to engage in discussions. Historically, the proposal selection process has taken 3-5 months. In instances where the proposals received are exceptionally detailed in the methodology section, the duration of the proposal selection process may be shortened. WQRF staff will inform all bidding researchers of the timeline as the selection process progresses.

After the Task Force has selected a proposal for its funding recommendation, all bidding research teams will be notified of the outcome as it pertains to their respective proposal. The proposal selected for the funding recommendation is then presented to the WQRF Board of Directors for review, due diligence, and a decision on acceptance and approval of funding.

Selection Criteria

Proposals will initially be evaluated against the requirements and criteria as presented in this RFP. If you are unsure of the requirements, you are encouraged to reach out to WQRF prior to submitting your proposal. Contact information is listed under the "Questions?" section in the RFP.

Proposals meeting the requirements will also be evaluated by:

- Assessing the potential impact of the research compared to the cost.
- The researcher's credibility, previous experience, knowledge of POU/POE treatment technologies as applicable to the proposed work, qualifications, and prior publications.
- The researcher's dissemination plan, which details how the results of the study will be shared with the appropriate audience(s). Reference the "Communication of Research Results" section in Appendix A for more details.

Business Requirements and Responsibilities

WQRF reserves the right to partially fund proposals by awarding portions or phases of proposed projects. If WQRF decides to partially fund a proposal, it will do so in a manner that does not prejudice any applicants or affect the basis upon which the proposal, or portion thereof, was evaluated and selected for award, and therefore maintains the integrity of the competition and selection process.

In support of an accepted research project, WQRF ordinarily would proceed as follows:

- WQRF will provide the researcher with any background information needed, such as a list of industry and other interested parties and stakeholders.
- The WQRF Research Task Force and WQRF technical staff ordinarily will take an active role in the technical review of progress/interim reports and acceptance of the final report. They may seek input from the WQA Water Sciences Committee, particularly with respect to industry specific knowledge or operations to aid the researcher.
- WQRF will track progress and provide any necessary coordination with industry stakeholders throughout the course of the research, will supply technical input and will facilitate any support and input requested from the WQA Water Sciences Committee.
- WQRF will provide public access to an executive summary and the full report. Ordinarily, upon release or publication, the researcher will be permitted to make the report available as best determined.

The researcher will enter into a research sponsorship agreement with WQRF, the terms of which broadly will include the following commitments from the researcher:

- Undertake, manage and perform all aspects of the contracted research and any necessary support activities.
- Complete the work in a timely manner according to the project schedule.
- Engage with WQRF, its Research Task Force and its technical staff and provide responses to WQRF questions relating to progress and coordination, as well as comments on progress/interim reports.

- Agree that all intellectual property will be owned by WQRF or perpetually licensed to it without royalty or charge:
    - Generally, WQRF will own the entire right, title, and interests, including all copyrights and other intellectual property rights, in and to all Project Intellectual Property developed by WQRF personnel. Project Intellectual Property that is jointly developed by the researcher and WQRF personnel will be jointly owned by the researcher and WQRF.

    - Generally, WQRF will reserve the intellectual property associated with the final report submitted to WQRF, including the copyright thereof, and all rights to distribute the final report. WQRF will make publicly available the research funded and knowledge gained through research, and the researcher ordinarily will be permitted to make available and publish sponsored research and use the knowledge gained to further its own research. However, no research results can be published by the researcher without prior review by WQRF.

- Publish the study in a peer-reviewed publication:
    - It is WQRF's preference that after review and acceptance of the final report, the researcher will seek to publish the study in a peer-reviewed publication. Whenever referencing or publishing the study, or information and/or data derived from the study, researchers must cite as its source to the report delivered to WQRF. The study should be submitted for peer-review publication within 6 months from the date that WQRF accepted the final report. WQRF does not commit that the research will be withheld from the public during the 6-month period.

Confidentiality

All proposals submitted to WQRF will be treated as confidential and will not be shared beyond WQRF, its Research Task Force and its technical staff, except that WQRF may grant access to members of the WQA Water Sciences Committee and members of identified WQA committee and task forces as well as WQA staff members all of whom would act on behalf of WQRF under specific confidentiality restrictions.

Proposal Format

Proposals shall follow the format provided in Appendix A.

Informative References

1. Baishali, Bakshi et al. 2021 Centralized softening as a solution to chloride pollution: An empirical analysis based on Minnesota cities. PLOS ONE. Retrieved from: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0246688
2. Reynolds, Kelly. 2019 Review of the Santa Clarita Valley Water Softener Ban. University of Arizona. Unpublished report. Executive Summary available from the Water Quality Association upon request. Contact Kim Redden at kredden@wqrf.org to inquire.
3. Optimization of water softeners for reduced influent chloride. Madison Metropolitan Sewerage District. Retrieved from: https://www.madsewer.org/Portals/0/ProgramInitiatives/ChlorideReduction/Water%20Softener%20Study%20Final%20Report%20111615.pdf
4. 2021 Central Water Softening. Minnesota Pollution Control Agency. Retrieved from: https://3msettlement.state.mn.us/sites/default/files/march2021-g3m-central-water-softening.pdf
5. 2021 Amboy Council Minutes:

https://amboymn.govoffice2.com/vertical/sites/%7BF5D80DB5-6E29-44E4-A768-2FC8AF6F1B5D%7D/uploads/January_4_2021.pdf

6. 2020 Clean Water Council FY22-23 Clean Water Fund and Policy Recommendations. Retrieved from: https://www.pca.state.mn.us/sites/default/files/lr-cwc-1sy20.pdf

Questions?

The contact for this RFP is Kim Redden. Questions can be directed to Kim at any time.

Contact info:
Kimberly Redden, MPH
Foundation Relations and Research Manager
630-929-2512
KRedden@wqrf.org

Due Date

Proposals must be submitted to kredden@wqrf.org no later than September 17th, 2021 by 11:00 AM Central.

APPENDIX A – Format

Proposals must *not* be password protected to restrict editing. Upon receipt, WQRF will add a watermark to the proposal to identify it as confidential and will password protect the document prior to its internal distribution. Proposals should include the following requirements, and if necessary, other sections may be added:

Proposal Summary – The proposal summary form is available as a downloadable Word document at http://www.wqrf.org/open-rfps.html. This form should be completed and included as the first page of your proposal.

Abstract – Summarize the research project, plan, timeline and objectives. Highlight your team's relevant experience and the potential impact on the industry from the proposed research project.

Introduction and literature review – Include an overview of the research project, especially focal points which are relevant to the proposed work, objective(s), and a review of related research or publications which define what is already known about the subject matter of the research. Describe any past or present experience using data sources relevant to the proposed work.

Detailed research plan and methodology – There is no word/page limit for the proposals, so the methodology should be written thoroughly. Proposals without a detailed methodology will likely not be considered for funding. Please describe:

- The proposed experiment(s), including any equipment and methods, which will be used to undertake the research. Be sure to address what data will be collected, all methods of data collection and how you intend to analyze, interpret, and present the results.
- The frequency which the Primary Investigator(s) (PIs) will meet to discuss the project.
- Who is responsible for reviewing the work for errors (typos; transcription, calculation, or other errors) before progress reports/deliverables are submitted to WQRF.
- If funded, would WQRF be given the opportunity to review any deviations from the methods as described in the proposal before those changes are made/implemented?

Deliverables – Describe all the deliverables that you will be providing for this work. The required deliverables for this project are:

- Ongoing research progress reports – Formal progress reports should be prepared and submitted at least quarterly, although more frequent, informal updates on progress are encouraged. For each progress report, WQRF will organize a conference call between the researchers and the task force. During this call, the researchers are asked to present the progress made from the last report and respond to questions from WQRF.
    - Additional updates may be requested on an as-needed basis.
- Drafts of the final report and the 1–3-page executive summary documents
    - The executive summary is a stand-alone document intended to summarize the purpose, methods, findings of the research, and future research opportunities identified. The information and data included in the executive summary must be readily understood without referring to the full report. Examples of executive summaries can be found at www.wqrf.org/completed-studies.
    - The WQRF Task Force will provide technical review of the drafts of the final report and the executive summary.
- The final report and executive summary documents
- A presentation of the findings at a relevant conference (proposals must suggest which conferences may be the most appropriate)

Consider providing additional project deliverables to make the proposal more competitive. Additional deliverables might include articles in an industry magazine, raw data, infographics, hosting a workshop, an interactive data tool, webinar presentations, etc.

Estimated project invoice and deliverable timeline – Download the template developed by WQRF, edit it based on the requirements described below to fit your specific project timeline, and incorporate the table into the proposal.

- This must be completed based on an unidentified start date (e.g., the first progress report will be submitted 3 months from the research start date).
- The total project timeline shall not exceed 3-months from the start date.
- Include an invoicing schedule along with your timeline that includes the upfront payment amounts due at the start of the project and an ongoing payment schedule. All invoices must be linked to a deliverable or scientific milestone.
    - Historically, WQRF has been able to provide 10% to 25% of the budget at the start of the project, after the contract has been signed.
    - At least 10% of the project cost must be associated with the delivery of the final report and executive summary.

Communication of research results – Include a communication/dissemination plan detailing:

- The target audience(s) for the research results – potential audiences may include: scientists/researchers, POU/POE equipment manufacturers and dealers, water quality industry members, associations/non-governmental organizations (NGOs), laboratories, policy makers, state and federal agencies, the general public, etc.
- How the research team will share the results with the target audience(s) identified
- An estimated timeframe for completing the proposed communications plans (use the project invoice/deliverable timeline template for this)

Budget – Total budget shall not exceed $10,000, the maximum funding available for the project. However, researchers should attempt to submit proposals for the lowest dollar amount that is practical. Preference may be given to a lower cost proposal that still best meets all the requirements/deliverables. At a minimum, the budget should be segmented by the following categories (as applicable): Salaries, Fringe Benefits, Equipment (including materials & supplies), Travel, Subcontract Fees, and Indirect Costs. Indirect costs only need to be included in the budget if this is something that the bidding organization ordinarily tracks through its financials. Indirect costs shall not exceed 13% of total direct costs. Other categories may be included as needed.

OPTIONAL SECTION: Future Opportunities – Describe efforts that are beyond the scope of this project, but could be completed with potential future funding to address a known data gap, and/or further the impact of the current proposed research project.

Potential conflict circumstances statement and disclosure of any additional organizations who would potentially contribute to this project – Include a statement reporting any direct or indirect facts or circumstances which could potentially create a conflict of interest. For example, if the results of proposed study could further the interests of a company with which the researcher or the research organization has a financial interest or relationship (including any contractual agreement or practice to provide testing, certification, consulting or other services (or is negotiating such an agreement), that is to be disclosed as a potential conflict circumstance. WQRF will have final authority in its sole discretion over whether a potential conflict circumstance represents a disqualifying Conflict of Interest. Please also disclose the name(s) of any organizations who you have contacted to potentially contribute to this project (in-kind or monetary contribution).

Credentials and qualifications – In this section, please include:

- Details relating to student involvement on the project (note: this section only required if the PIs are planning to have student(s) on the research team):
    a. Are the PI(s) seeking undergraduate, graduate, or doctoral student(s)?
    b. Will the student(s) be writing a thesis or dissertation based on this research?
    c. How many students will be recruited to the research team?
    d. How will the student(s) be recruited?
    e. Based on past experiences, how many students typically apply for research positions?
    f. When is an ideal time to recruit student(s)?
    g. Are there any incentives provided by the University for students to participate in the research program?
        i. If credit hours are received, how is their work evaluated (pass/fail; graded)?
        ii. Who evaluates/grades their work?
    h. What responsibilities will be assigned to the student(s)?
    i. What guidance/training will the PIs provide to the student(s)?
    j. How often will a PI meet with student(s) for status updates and to ensure the project is being conducted according to the methodology as stated in the proposal?
- A statement of qualifications, previous experience, and related publications (including full curricula vitae) of the primary and supporting investigators.

References – Cite any references used to develop the content for the proposal.