



NEW YORK STATE CENTER FOR CLEAN WATER TECHNOLOGY

2017 REQUEST FOR PROPOSALS

PILOT GRANT PROGRAM: REMOVAL OF 1,4-DIOXANE FROM DRINKING WATER

BACKGROUND AND PURPOSE

In 2015, the New York State Center for Clean Water Technology (CCWT) was founded at Stony Brook University and is supported through funding from the New York State (NYS) Department of Environmental Conservation, NYS Department of Health, NYS Environmental Facilities Corporation, and the Bloomberg Foundation. The CCWT's primary mission is two-fold: (i) to develop affordable, reliable and effective innovative/alternative on-site wastewater treatment systems, and (ii) to develop and commercialize affordable, high performance water quality protection and restoration technologies that are suitable for widespread deployment. Toward this end, the Center is focusing on developing and evaluating methods to remove emerging contaminants from drinking water supplies, with an initial focus on 1,4-dioxane. This effort represents the initial phase of a State-sponsored, multi-year program to proactively address emerging contaminants in drinking water. With this Request for Proposals (RFP), the CCWT is soliciting proposals from water providers in NYS to install and test pilot-scale, advanced water treatment technologies to remove 1,4-dioxane from drinking water.

STATEMENT OF NEEDS/ SCOPE OF SERVICES

1,4-Dioxane is a probable human carcinogen and a widespread contaminant in Long Island water supplies, with some of the nation's highest concentrations detected here ($33 \mu\text{g L}^{-1}$) (U.S. EPA, 2012). Analysis of the Unregulated Contaminant Monitoring Rule 3 data from the U.S. EPA revealed that 39 water districts/distribution areas in Long Island had detections of 1,4-dioxane greater than the EPA's cancer risk guideline level of $0.35 \mu\text{g L}^{-1}$ (CCE, 2017). Due to its high solubility, high boiling point and low vapor pressure, conventional water treatment processes do not remove 1,4-dioxane efficiently from waters. Advanced oxidation processes (AOP), techniques that involve the generation of hydroxyl radicals, have been shown to be very effective in oxidizing 1,4-dioxane in drinking waters (Stefan and Bolton, 1998; Adams et al., 1994). Though AOP technology has been widely studied under laboratory conditions, very few reports are available that evaluate their performances on larger scales (pilot- and full-scale systems). In order to commercialize such systems, in-depth understanding of the system performance, optimum conditions, source water quality impacts, potential degradation pathways of 1,4-dioxane, and by-product formation in treated waters and in distribution systems are needed. Toward this end, the CCWT is soliciting proposals from water providers in NYS to install and test pilot-scale AOP treatment systems to evaluate the system performance in removing 1,4-dioxane. Other advanced/alternative treatment techniques for removal of 1,4-dioxane may also be considered under this RFP provided sufficient details regarding the efficacy and feasibility of the technology under consideration are described in the proposal. The goal is to identify systems

and operating conditions that are effective in removing 1,4-dioxane to levels lower than the U.S. EPA cancer risk guideline ($<0.35 \mu\text{g L}^{-1}$) in treated drinking waters.

General Requirements

- A. The water utility shall provide all necessary professional services, i.e. scoping, permitting, design, and construction of pilot plant and associated equipment, operation and all necessary measurements and testing of pilot plant, preparation of reports outlining results and recommendations resulting from pilot study and other services as necessary.
- B. The system shall be designed to treat approximately 60 to 200 gallons per minute. Other flows may be considered upon prior approval by the Center. Water treated by the system shall not be introduced into the water supply distribution system.
- C. All sample analyses shall be performed in certified laboratories with appropriate quality control and quality assurance protocol. CCWT researchers shall perform additional analyses (e.g. byproducts and other performance parameters) on samples collected from the pilot treatment systems. The water utility shall provide access to the system and/or provide samples to CCWT researchers on a frequent basis.
- D. The Center reserves the right to use pilot system data for peer-reviewed publications and conference presentations. In the event that the water provider does not wish to be identified in publications, all data shall be anonymized prior to its use by the Center.
- E. A mandatory pre-pilot kick-off meeting will be held at Stony Brook University with the awardees to finalize system parameters, testing conditions, performance evaluation time period and goals of the pilot study.
- F. A water utility representative shall attend required meetings and shall be available to present updates and final performance report to the CCWT, or their subcommittee.

PROJECT ELIGIBILITY

- A. Only water providers located in in the State of New York are eligible to apply for this CCWT funding. Priority will be given to facilities that have documented high levels of 1,4-dioxane in source waters.
- B. The water utilities must clearly outline the plans for the design and construction of the pilot treatment system. If necessary, the utility may team up with a consulting firm to provide such services and accordingly budgeted within the proposal.
- C. The water utility shall clearly describe their capabilities to collect and analyze samples in certified laboratory following established protocols (U.S. EPA method 522).
- D. Only proposals which can demonstrate that the project deliverables are achievable within 18 months from notice of award will be supported.

APPLICATION PROCESS

The applicants must submit proposal, which demonstrates and provides evidence that the water utility (and/or the teamed-up consulting firm) has the capabilities, professional expertise, and experience to provide the necessary services described in this RFP. The treatment system design shall provide written direction to the Center for the proper collection and sampling regimen

needed to obtain minimally sufficient information to develop flow rates, ranges and protocols needed to conduct the pilot study, and assure the effects on other system parameters are understood and controlled to avoid any parameter violation and/or to optimize pilot system performance. Necessary equipment to obtain samples shall be described. Laboratory analyses and testing protocols should be sufficiently described. The pilot study shall evaluate 1,4-dioxane removal in addition to typical water quality parameters as required by the Safe Drinking Water Act (SDWA). Based upon the analysis of the data collected, the water utility shall make recommendations for the optimal operation condition and configuration of the system to maximize the effectiveness of the treatment technique and perform a detailed cost analysis. The applicant shall also evaluate the impact of the pilot-scale treatment systems on other regulated parameters.

Proposals must be no more than twenty (20) pages in length (see below for the page limit for each sections), use a font size of 11 points or larger, and at least one inch margins (top, bottom, left, and right) for all pages. Funding decisions will be made by CCWT by January 31, 2018 and the decision will be communicated promptly by written notice from the CCWT to the project's principal investigator.

Applications must contain:

1. **(1 page)** A cover page with the names and contact information for all staff proposed to be part of the project team and the name of an institutional official who will be responsible for ensuring compliance with the obligations identified in a CCWT funding agreement;
2. **(1 page)** An executive summary describing the problem to be addressed by the project, the solution offered by the proposal, why it is likely to be successful, the project aims and the budget proposed;
3. **(15 pages)** A project narrative that includes:
 - ***Technical background and problem:*** Describe the science and technology related to the proposed treatment technique, expected level of treatment, as well as the current on-site 1,4-dioxane problem at the facility. Outline key studies and findings to date that supports the viability of the project and list related peer-reviewed journal publications as applicable.
 - ***Proposed method to accomplish the project:*** Demonstrate an understanding of the requested scope of services. Include proposed work schedule and methodology for accomplishing the project, showing insight to the specific details of the project.
 - ***Design and construction approach:*** Describe the design plans, provide flow diagrams, technical specifications, methods, and approach to construct the pilot-scale treatment system.
 - ***Sampling and analyses plan:*** Describe briefly the frequency of sampling, sampling methods and analytical methods to be used. Summarize the parameters that will be monitored in the pilot-scale system with appropriate EPA approved QAPP (Quality Assurance Project Plans) listed.
 - ***Intellectual Property:*** Describe the nature of any intellectual property that may be claimed.
 - ***Licenses and certifications:*** The proposal must include a statement indicating that all required corporate, all required professional occupational licenses, required

- laboratory certifications, and all other necessary licenses/certifications are currently held. License/certification numbers must be provided.
- **References** to the literature.
 - **Proposed timeline and schedule** of events and deliverables.
 - **Budget** and a one-page budget description.
4. **(1 page)** A description of the roles and responsibilities of the project staff (project management plan);
 5. **(2 pages)** A description of the organization and capacity of the water provider: Identify the qualified team proposed for this project and demonstrate their ability to perform the desired services within the established schedule. Proposal should include a list of projects of similar scale and scope conducted by the organization, succinctly described;
 6. **(1 page each)** Feedback or letters of support from industry partners, investors, or seasoned entrepreneurs;
 7. A letter of support from the organization's Superintendent or designee;
 8. Two-page biography/CV for all senior staffs involved in the proposed project.

Applications for CCWT funding should be submitted to Hilary.Wolfskill@stonybrook.edu and copied to Arjun.Venkatesan@stonybrook.edu by **December 15, 2017**.

PROPOSAL EVALUATION PROCESS

All applications will be reviewed for compliance with the eligibility criteria identified above. Noncompliant applications will be rejected without further review. The Center shall appoint a Technical Advisory Committee (TAC) to review and evaluate proposals submitted by water utilities responding to this RFP. The TAC will consist of experts in the field, CCWT Executive Directors and Research Scientists, and a representative from the NYS Department of Health. The proposals will be evaluated and ranked based on the evaluation criteria listed in the general requirements and eligibility section, proposed budget and the experience/qualification of the proposal team. Clarification of submitted material may be requested during the evaluation process.

SELECTION AND AWARD PROCESS

The project period is expected to begin between March 1, 2018 and April 1, 2018, and duration is up to 18 months from the start date. CCWT funds cannot be used for overhead/indirect costs, renovation, legal fees, patent costs, or permits. Funds may be used for salary and fringe benefits for project personnel if a definitive need is outlined in the proposal budget submitted. All funds must be used solely for the project described in the application.

By applying for CCWT funds, the project manager and all project participants hereby consent to this process and agree to be reasonably available to the CCWT Directors and Lead Scientists to answer any questions that may arise in this process and to cooperate with the CCWT team and institutional official. Awardees will be required to submit a final report upon conclusion of the project.

OPERATING REVIEWS

CCWT awardees may be required to present project findings, facilities, and experiences at the request of the CCWT Directors. Reasonable efforts will be made to accommodate the schedules of all parties.

INTELLECTUAL PROPERTY POLICY

The project manager and project staff shall abide by all SUNY policies, with particular attention to Patents, Inventions and Copyright and Computer Software policies.

CONTACTS AND QUESTIONS

Any questions related to the RFP and submission process should be directed to Hilary.Wolfskill@stonybrook.edu and Arjun.Venkatesan@stonybrook.edu.

REFERENCES

Adams, C. D., Scanlan, P. A., & Secrist, N. D. (1994). Oxidation and biodegradability enhancement of 1, 4-dioxane using hydrogen peroxide and ozone. *Environmental science & technology*, 28(11), 1812-1818.

Citizens Campaign for the Environment (CCE), (2017) 1, 4-Dioxane: The Hidden Carcinogen: <https://www.citizenscampaign.org/PDFs/1-4-Dioxane-Report-CCE.pdf>. Accessed September, 2017.

Stefan, M. I., & Bolton, J. R. (1998). Mechanism of the degradation of 1, 4-dioxane in dilute aqueous solution using the UV/hydrogen peroxide process. *Environmental Science & Technology*, 32(11), 1588-1595.

U.S. EPA, 2012. Unregulated Contaminant Monitoring Regulation (UCMR 3) for Public Water Systems. *Federal Register* Volume 77, Issue 85 (May 2, 2012).