

PMC-ND

(1.08.09.13)

**U.S. DEPARTMENT OF ENERGY**  
**OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY**  
**NEPA DETERMINATION**

**RECIPIENT:** The Water Research Foundation**STATE:** VA

**PROJECT TITLE:** Crossing the Finish Line: Integration of Data-Driven Process Control for Maximization of Energy and Resource Efficiency in Advanced Water Resource Recovery Facilities

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0002336	DE-EE0009508	GFO-0009508-001	G09508

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Policy 451.1), I have made the following determination:

**CX, EA, EIS APPENDIX AND NUMBER:**

Description:

**A9 Information gathering, analysis, and dissemination** Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)

**A11 Technical advice and assistance to organizations** Technical advice and planning assistance to international, national, state, and local organizations.

**B3.6 Small-scale research and development, laboratory operations, and pilot projects** Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to The Water Research Foundation (WRF) to develop and demonstrate data-driven process controls for five different technology applications that would improve treatment, reduce energy and chemical use, and maximize nutrient and energy recovery for water resource recovery facilities (WRRF). Controls would integrate sensors and machine learning. Applications would be assessed for five different full-scale WRRFs. In addition, a toolbox of data-driven process control approaches along with implementation guidance would be created for use by WRRF operators. The project would be completed over two Budget Periods (BPs) with a Go/No-Go decision point between each BP. This NEPA determination is applicable to both BPs.

Proposed project activities would include water sampling, data collection and analysis, computer modeling, pilot scale testing, creation of a downloadable toolbox, and outreach.

Experimental design and data collection would be conducted for 5 different WRRF process technologies (i.e. applications). Applications 1-5 would be, respectively, carbon diversion, biological nutrient removal, disinfection with peracetic acid, Airprex struvite recovery, and holistic biosolids optimization. The data collected would reflect plant operations under a variety of environmental conditions and would be used to construct computer models. For each application, an experimental plan would be developed that would include data collection and storage, analysis, and quality control. Water samples would be collected from WRRFs and studied to understand how each application affects water quality, operational conditions, and treatment performance. Datasets would be transferred as needed to the University of Michigan, Northwestern University, and Oak Ridge National Laboratory for analysis.

Results from data analysis would be used to refine models and if needed, additional samples would be collected to aid in the machine learning models. Pilot-scale implementation of the machine learning models for each application area would occur at participating WRRFs to understand the impact and effectiveness data-driven controls have on the operation of WRRFs. Techno-economic analyses and lifecycle assessments would be run throughout. WRF would develop a downloadable toolbox and implementation guide for WRRF operators. A workshop and webinar would be held with partners, utilities, consultants, equipment manufacturers, and other stakeholders to share project findings

and the toolbox.

The Water Research Foundation would oversee the project. Oak Ridge National Laboratory, University of Michigan, and Black & Veatch are subrecipients whose activities would be limited to intellectual, academic, or analytical activities. Northwestern University in Evanston, IL would compile, curate, analyze, and visualize data for Application 1 in coordination with DC Water and ORNL. Activities would also include development of a data driven model for settleability, effluent quality, and carbon/nutrient redirection.

Activities at the five participating WRRFs listed below include data collection, data analysis, model development, and developing and pilot testing controls. Applications would be tested as follows:

Hampton Roads Sanitation District

Nansemond Treatment Plant – Suffolk, VA

- Application 2 at full-scale with design flow of 30 million gallons per day (MGD).

Virginia Initiative Treatment Plant – Norfolk, VA

- Application 2 at full-scale with design flow of 40 MGD.

York River Treatment Plant – Seaford, VA

- Application 2 at full-scale with design flow of at 15 MGD.

DC Water, Blue Plains Advanced Treatment Plant – Washington, DC

- Application 1 at 100,000 gallon/day to test high-rate carbon removal and carbon re-direction in a controlled environment.
- Application 5 focusing on digested sludge dewatering. Data from acoustic sensors and existing full-scale equipment and instrumentation would be incorporated into the data-driven control scheme.

MWRD, Robert W. Hite Treatment Facility – Denver, CO

- Application 3 at full-scale in a three-pass disinfection basin.
- Application 4 at full-scale in the AirPrex phosphorous recovery reactor.

Activities would be performed at existing and continuously operating WRRFs. Usage and production of materials such as water, chemicals, and biogas would remain within the range of current operations. No changes in the use, mission, or operation of existing facilities would be required as part of this project and no additional permits would be required in order to conduct any of the work activities.

Project activities would involve field work, field sampling and testing, handling of hazardous material, and disposal of hazardous waste including microorganisms, acids/bases, and organic solvents. Any risks associated with the handling of these materials would be mitigated through adherence to established health and safety policies and procedures. Protocols would include employee training, the use of protective equipment, engineering controls, monitoring, and internal and external assessments. Additional policies and procedures would be implemented if necessary, as new health and safety concerns are identified. All waste products would be disposed of by licensed waste management service providers. WRF and its project partners would observe all applicable Federal, state, and local health, safety, and environmental regulations.

Any work proposed to be conducted at a federal facility may be subject to additional NEPA review by the cognizant federal official and must meet the applicable health and safety requirements of the facility.

## NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Advanced Manufacturing Office

This NEPA determination does not require a tailored NEPA provision.

Review completed by Shaina Aguilar on 8/10/21.

**FOR CATEGORICAL EXCLUSION DETERMINATIONS**

The proposed action (or the part of the proposal defined in the Rationale above) fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D. To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Subpart D, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Subpart D, Appendix B.

There are no extraordinary circumstances related to the proposed action that may affect the significance of the environmental effects of the proposal.

The proposed action has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.

The proposed action is categorically excluded from further NEPA review.

**SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.**

NEPA Compliance Officer Signature:

 Electronically Signed By: **Casey Strickland**  
NEPA Compliance Officer

Date: 8/13/2021

**FIELD OFFICE MANAGER DETERMINATION**

- Field Office Manager review not required
- Field Office Manager review required

**BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :**

Field Office Manager's Signature:

\_\_\_\_\_  
Field Office Manager

Date: \_\_\_\_\_