



OPERATIONS COMMITTEE

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Agenda Report

File #: 2021-1919

Agenda Date: 11/3/2021

Agenda Item No: 8.

FROM: James D. Herberg, General Manager
Originator: Rob Thompson, Assistant General Manager

SUBJECT:

SUPER CRITICAL WATER OXIDATION RESEARCH OPPORTUNITY

GENERAL MANAGER'S RECOMMENDATION

RECOMMENDATION: Recommend to the Board of Directors to:

- A. Approve a Professional Services Agreement to 374Water Systems, Inc for the Super Critical Water Oxidation Pilot at Plant No. 1, Project No. RE21-01, to provide goods and services for demonstration of the 374Water AirSCWO Nix6 System, for an amount not to exceed \$5,139,000; and
- B. Approve contingency funds for Project No. RE21-01, for a combined total not to exceed \$514,000 (10%).

BACKGROUND

The Orange County Sanitation District (OC San) collects and processes 185 million gallons of wastewater every day. Cleaning this water results in concentrated solids called sludge and scum. These energy rich solids are processed through anaerobic digestion to create methane-rich gas and biosolids. The methane-rich gas is cleaned and used in the treatment plants to make electricity and heat. Biosolids are the residual material commonly used in the agricultural industry as a soil amendment.

OC San continues to actively pursue management options to maintain a long-term program that promotes beneficial use of biosolids. In accordance with the principles of its biosolids management policy (Resolution No. OCSD 13-03), OC San maintains a diverse portfolio of biosolids management options that utilize multiple contractors, facilities, and product markets, while maintaining fail-safe, back-up options. This portfolio ensures that we have reliable options for managing the material should regulations, market conditions, severe weather, or other situations impact any one management option.

Most of OC San's biosolids are either composted to create a soil amendment or directly applied to agricultural land. Consistent with our policy to maintain diverse biosolids options, staff has been actively researching new and innovative technologies. For example, in July 2021 OC San entered into an agreement with the Rialto Bioenergy Facility for a pilot project to process up to 100 tons per day of its biosolids in a thermal conversion process.

Staff has also been following a new technology for solids treatment for a number of years that takes advantage of a unique property of water at high temperature and pressure. The technology presents an opportunity to convert all complex organic material (including plastics and PFAS) to more basic and benign compounds like nitrogen, water, carbon dioxide, and mineral salts.

A new company, 374Water Systems, Inc. (374Water), with a novel, simpler process design, is moving to scale-up their process technology from a one-ton-per-day unit operating at Duke University in North Carolina. Assistant General Manager Rob Thompson witnessed the operation of the unit in North Carolina in May. Staff is in discussions with 374Water to engage in a research program to scale up and operate a six-ton-per-day unit and, if successful, potentially a thirty-ton-per-day unit. These first of their kind units at these flow rates will require testing under real-world wastewater plant conditions. Staff believes it is worth pursuing a demonstration scale project due to the process and mechanical simplicity.

It is also important to note that this process will only treat concentrated solids streams, not the entire water flow. Part of the research process will be to document the ability of the system to destroy plastics, PFAS type compounds, and other constituents of emerging concern that can be concentrated in sludge streams. The proposed research/demonstration program would be capable of treating raw primary and secondary sludge, biosolids, and food waste.

OC San has a long history of researching new and innovative technologies to improve wastewater treatment and resource recovery. OC San's budget contains a Master Research Program line item which can be found on page A-9 of the Fiscal Year 2021-22 Budget Update. This line item is the intended funding source for this research opportunity.

RELEVANT STANDARDS

- Provide technology leadership to the wastewater industry
- Search for technology solutions to neutralize constituents of emerging concern
- Maintain a culture of improving efficiency

PROBLEM

OC San's Biosolids Master Plan, Biosolids Policy, and 2019 Strategic Plan support diversification of biosolids management options including researching new technology. Potential future regulations could target emerging pollutants such as PFAS compounds present at low levels in biosolids and could require treatment or destruction of PFAS in biosolids.

PROPOSED SOLUTION

In continuing OC San's course of providing leadership and innovation with the evaluation of emerging technology, staff recommends entering into an agreement with 374Water to demonstrate the efficacy of the supercritical water oxidation process by procuring and operating an AirSCWO Nix6 Demonstration Unit as part of Project No. RE21-01.

TIMING CONCERNS

OC San has a unique opportunity to team with 374Water to demonstrate this emerging technology with a six-ton-per-day process unit. As part of the shared commitment with 374Water, the costs for supplying, commissioning, operating, and maintaining this unit are significantly discounted. Initiating this project now will demonstrate OC San’s commitment to this emerging technology and will provide guidance for the planning and implementation of solids treatment processes in the future.

RAMIFICATIONS OF NOT TAKING ACTION

N/A

PRIOR COMMITTEE/BOARD ACTIONS

July 2021 - Operations Committee Information Item.

ADDITIONAL INFORMATION

The site and utilities work for this project will be designed by 374Water under this Agreement. The execution of the Public Works site and utilities work will be competitively bid by OC San under a separate procurement.

CEQA

The project is exempt from CEQA under the Class 6 categorical exemptions set forth in California Code of Regulations Section 15306. A Notice of Exemption will be filed with the OC Clerk-Recorder after OC San Board approval of the Professional Services Agreement.

FINANCIAL CONSIDERATIONS

This request complies with authority levels of OC San’s Purchasing Ordinance. This item will be funded through the Research Program (M-RESEARCH) and has been budgeted. (FY2021-22 Update, Appendix A, Page A-9).

| <u>Date of Approval</u> | <u>Contract Amount</u> | <u>Contingency</u> |
|-------------------------|------------------------|--------------------|
| 11/17/2021 | \$5,139,000 | \$514,000 |

ATTACHMENT

The following attachment(s) may be viewed on-line at the OC San website (www.ocsan.gov) with the complete agenda package:

- Draft Agreement
- Presentation