

**REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION**

EXECUTIVE OFFICER SUMMARY REPORT

MAY 8, 2024

ITEM 4

SUBJECT

Local Advancements in PFAS Treatment and Destruction Technologies: An Update
(*Brian McDaniel*)

STAFF RECOMMENDATION

Informational item only; no recommendation.

KEY ISSUES

Per- and polyfluoroalkyl substances (PFAS) are a group of over 5,000 synthetic fluorinated substances, produced since the 1940s, used for municipal, commercial, and industrial purposes. PFAS chemicals are found in everyday consumer and commercial products. Due to the prolonged use of PFAS in many of these products, the chemicals are known to enter the water cycle through discharges from sewage treatment facilities, landfills, and locations where the substances were used outdoors. While exposure to these chemicals often occurs through consumer products, drinking water can serve as an additional source of exposure in communities where these chemicals have contaminated water supplies. Water agencies are actively investigating and evaluating various treatment and destruction technologies as potential long-term solutions to effectively remove and mitigate PFAS contamination from impacted water supplies.

Government and private companies are collaborating to combat PFAS pollution through innovative destruction technologies to achieve a significant reduction in PFAS contamination levels, and to safeguard the environment and public health. By leveraging the resources, expertise, and research capabilities of both sectors, this collaboration can accelerate the development and implementation of effective solutions to mitigate the impact of PFAS contaminants on water sources and ecosystems. This partnership underscores a shared commitment to environmental stewardship and underscores the power of collaboration to address complex environmental challenges. The goal is to implement treatment processes that ensure water sources can consistently meet applicable state and federal water quality standards for PFAS.

PRACTICAL VISION

The informational item is consistent with Chapter 8 of the San Diego Water Board's Practical Vision.¹ Chapter 8, *Provide Effective Community Engagement and Communication*, focuses on implementing the core values of public engagement, communication, and leadership. This item provides an opportunity for the San Diego Water Board and the public to learn about the restoration efforts of PFAS-impacted public water supply wells. It also includes a presentation on the development and related test results for a commercial system aimed at reducing and destroying PFAS chemicals. This item supports Practical Vision by increasing the Board's expertise in the application of new technological approaches that are allowing advances in water quality management strategies and tools.

DISCUSSION

The purpose of this item is to provide information to San Diego Water Board members and the public regarding current efforts within the San Diego Region to address PFAS in public water supplies and technologies for PFAS removal, and destruction. Orange County Water District's (OCWD) PFAS Treatment Project was initiated to develop and install PFAS removal systems at 45 drinking water supply wells impacted by PFAS. These wells are operated by ten different cities and retail water districts within OCWD's jurisdiction. In the private sector, companies and industries are collaborating with government agencies to develop advanced solutions to address PFAS in waste streams. The Industrial Supercritical Water Oxidation (iSCWO) technology system, developed by General Atomics (GA) in partnership with the U.S. Environmental Protection Agency (EPA), is an innovative thermal treatment process designed to effectively destroy persistent PFAS contaminants in waste streams. Representatives from OCWD and GA will provide presentations regarding their innovative PFAS efforts.

Per- and Polyfluoroalkyl Substances

Section 116378 of the Health and Safety Code empowers the State Water Resources Control Board (State Water Board) to require PFAS monitoring for public water systems, targeting individual systems, specific groups, or all systems as needed. If a water system detects PFAS concentrations above the Response Level (RL) set by the State Water Board, actions such as suspending the water source, implementing treatment, or notifying customers becomes mandatory. Water districts and providers are intensifying their efforts to combat PFAS contamination following EPA's establishment of legally enforceable Maximum Contaminant Levels (MCLs) for six PFAS chemicals on April 11, 2024. Water systems must complete PFAS monitoring within three years, by 2027, and be compliant with the new MCLs by 2029. The State Water Board is also considering adopting the MCLs, which could take approximately 18 months to implement. This will accelerate compliance with the MCLs in California to 2026. Until then, existing notification and response levels will remain in effect.

¹ https://www.waterboards.ca.gov/sandiego/water_issues/programs/practical_vision/

Treatment technologies for removing and destroying PFAS from water sources are rapidly advancing to safeguard water quality and public health from these contaminants. The removal systems and processes can be applied to water systems and site remediation. EPA, along with other governmental agencies and the private sector, are currently conducting extensive testing and evaluation of treatment technologies specifically designed for removing PFAS from drinking water systems and remediating PFAS-contaminated sites.

Orange County Water District PFAS Treatment Program

Dr. Megan Plumlee, Research Director with OCWD, provided the Board with an overview of OCWD's PFAS treatment program at the April 2021 Board meeting. Dr. Plumlee presented the Phase I pilot test results and discussed the proposed plans for an additional phase of testing. The findings from the Phase I pilot test indicated successful removal of PFAS by the tested adsorbent technology, with variations observed in long-term performance, the levels of PFAS in effluent over time, and associated costs. Dr. Plumlee indicated that the second phase of testing would assess newly introduced adsorbent technology in the market for removing PFAS. Jason Dadakis, OCWD's Executive Director for Water Quality and Technical Resources, will update the Board on the current status of OCWD's PFAS treatment program.

OCWD is the public agency responsible for managing a portion of the Santa Ana River and the Orange County Groundwater Basin. OCWD's primary stakeholders are the 19 municipal and special water districts (Groundwater Producers) serving as retail public water systems for approximately 2.5 million residents in northern and central Orange County. Historically, groundwater provided up to 85 percent of the local water supply. OCWD, in formal partnership with its Groundwater Producers, designed and constructed, individual wellhead and centralized PFAS treatment systems, restoring the operation of 35 impacted wells to date, with the balance expected to be completed by the end of 2024. The treatment systems primarily use ion exchange adsorbent technology. A granular activated carbon facility is scheduled to be operational in 2024, and OCWD has also pilot tested multiple alternative novel adsorbents. The newly established EPA MCLs for six PFAS chemicals will impact about 40 additional wells within the OCWD service area, increasing the total number of PFAS-affected wells to approximately 100.

General Atomics's PFAS Destruction Technology

San Diego Water Board staff provided a briefing on the PFAS Industrial Supercritical Water Oxidation (iSCWO) technology system developed by GA in partnership with EPA in the November 8, 2023, Executive Officer's Report. John Follin, Director of Strategic Development for iSCWO and Demilitarization Technologies at GA, will present an update and overview of GA's iSCWO technology system to the Board.

Since the 1990s, GA's San Diego test facility has been developing specialty waste contaminant destruction systems for the U.S. government. In 2020, EPA entered into an agreement with GA to conduct on-site, in-depth testing at its facilities using aqueous film-forming foam (AFFF) as a source of PFAS. AFFF is a specialized class of fire-fighting foam historically containing PFAS chemicals, currently present in large stockpiles of legacy AFFF concentrate at military bases, airports, and other facilities. These sites require treatment and remediation. The purpose of the testing was to evaluate GA's technology system as an alternative to the incineration destruction and disposal approaches for the stockpiled legacy PFAS products used in firefighting applications.

GA's iSCWO system can efficiently destroy concentrated wastes directly from sources like AFFF, as well as PFAS waste containing other co-contaminants such as carbon tetrachloride or solvents. During testing, the system demonstrated greater than 99.99 percent destruction efficiencies of PFAS and total organic carbon, with only trace levels of byproducts. This system leverages the unique properties of the wastes to effectively destroy organics and PFAS contaminants. The process involves oxidizing organic materials to produce mainly carbon dioxide and water, while allowing nitrogen and other inorganics in the feed materials to pass through the system.

LEGAL CONCERNS

None.

PUBLIC NOTICE

The agenda notice for today's meeting was posted on the San Diego Water Board's website and sent to subscribers to the email list for Board meetings. This satisfies the Bagley-Keene Open Meeting Act requirements to publish the meeting notice and agenda.

SUPPORTING DOCUMENTS

None.