

Frequently Asked Questions: The Feasibility of Regulating the Direct Potable Reuse of Recycled Water For Drinking

What is recycled water?

Recycled water is primarily domestic wastewater (sewage that enters a wastewater treatment plant) that has been treated to comply with the recycled water regulations. There are different levels of treatment for recycled water, depending on how the recycled water will be reused, in order to protect public health.

Where is recycled water used?

Recycled water is currently widely used for non-drinking (non-potable) uses, such as agricultural and landscape irrigation in California, as well as other approved non-potable uses listed in the [recycled water regulations](#). Recycled water is also being used for groundwater recharge - this type of reuse is called “indirect potable reuse,” because the recycled water is used to recharge large groundwater aquifers, which are environmental buffers, before the recycled water is pumped out many months later as groundwater to supply drinking water to communities. A type of groundwater recharge, where recycled water is injected into groundwater aquifers, is required by regulation to be treated to a higher degree, sometimes called “advanced treatment,” or “full advanced treatment,” in order to make sure that the groundwater is safe to drink when it is pumped out.

What is the Direct Potable Reuse of Recycled Water?

Direct potable reuse (DPR) is when highly treated recycled water goes directly into a public water system’s distribution network that delivers potable water to customers; or into a “raw” (untreated) water supply immediately upstream of a drinking water treatment plant. The big difference between DPR and indirect potable reuse such as groundwater recharge is that DPR has little to no environmental buffer. This means that instead of spending several months in a groundwater aquifer, or in another environmental buffer such as a large lake or reservoir, the DPR water is delivered to a public water system, either upstream of a water treatment plant, or directly into the drinking water distribution system. This also means that for DPR, there is very little time to discover and respond to treatment problems at the recycled water treatment plant, to review water quality monitoring data and respond to any unexpected or abnormal water quality results, and to prevent water that might not have been fully treated from being delivered to customers. Currently there are no regulations nationwide that specifically address permitting the direct potable reuse of recycled water. It is anticipated that what California does related to DPR regulations will likely serve as a guide to other states looking to develop their own DPR regulations.

What is the Report to Legislature on the Feasibility of Developing Criteria for Direct Potable Reuse?

The report provides the State Water Board's analysis on whether creating regulations for the direct potable reuse of recycled water is achievable. In its analysis, State Water Board staff considered the recommendations of the [Expert Panel](#) and [Advisory Group](#). The report concludes that it is possible to create regulations for the direct use of recycled water in drinking water supplies, but that regulations cannot be adopted until some research and knowledge gaps are addressed in order to better protect public health.

Why is this report being presented now?

Legislative action taken in 2010 and 2013 updated [the California Water Code](#) and directed the California Department of Public Health to report to the Legislature on the feasibility of creating water recycling regulations for direct potable reuse by Dec. 31, 2016. As a result of that legislation, a panel of technical experts (Expert Panel) and a group of stakeholders (Advisory Group) were created to advise the State Water Board on public health issues and scientific and technical matters relating to the feasibility of developing DPR regulations.

With continued population growth and the prospect of more drought years brought on in part by climate change, the state must explore new sustainable sources of potable water. Recycled water is just one of those possible sources highlighted in Governor Edmund G. Brown Jr.'s [California Water Action Plan](#). The plan looks at ways to better manage our water resources.

What is some of the research that is still needed in the development of DPR regulations?

The six research recommendations provided by the Expert Panel must be done while DPR regulations are being developed. The data and information from these research recommendations will help the State Water Board develop the regulations and further ensure that the regulations are protective of public health. The Expert Panel's recommendations include making sure that the State Water Board keeps up to date on the current research on compounds that could be toxic to vulnerable people, such as children and pregnant women; monitoring raw wastewater to find out the amount of human pathogens (viruses, Giardia, Cryptosporidium, etc.) that could be in the wastewater, and collect this information especially during times when communities are sick from the diseases that could increase the amount of these pathogens in the wastewater; research on ways to lower or average out possible spikes in chemicals that pass through the treatment process; research on better ways to detect for unknown contaminants that pass through the treatment process; and use a new way to look at how much pathogen removal is needed.

What are some of the knowledge gaps that still need to be addressed in the development of DPR regulations?

With DPR, there will be little to no environmental buffer, and the Expert Panel has said that the benefits of an environmental buffer, such as time to respond to recycled water treatment plant

problems, and dilution or blending with other waters to average out any chemical spikes, must be replaced by the DPR treatment system. Like any high-tech mechanical system, treatment plants can have problems and will sometimes fail. For DPR, the treatment plant must be reliable in order to protect public health. The knowledge gaps are about how to measure reliability, and how to write regulations so that any project that follows the regulations is able to reliably produce DPR water that is safe to drink at all times.

For example, the Expert Panel says that in order to be reliable, the treatment system must have multiple, independent treatment barriers that use a diverse set of treatment processes, among other things. The knowledge gaps in this example are: How many barriers are needed? How much diversity is needed? Other Expert Panel findings also lead to more questions that need to be answered. The State Water Board will gather technical experts to help us answer these questions as we develop the DPR regulations.

What happens with this report?

Once the report has been publicly reviewed and comments received, a final version of the report is expected to be delivered to the Legislature no later than Dec. 31, 2016. Once the report is delivered to the Legislature, the State Water Board will address the remaining areas of concern related to the protection of public health when using DPR. As the knowledge gaps are addressed and research is performed, State Water Board staff will include the new information in the future draft regulations for DPR.

Is Direct Potable Reuse safe for consumption?

Water is safe for consumption if it meets all drinking water standards in the drinking water regulations. Because there are no drinking water regulations for DPR at this time, and there are no communities using DPR in the state at this time, this question is premature. The State Water Board's report says that it is *possible* to develop regulations for DPR that is protective of public health, but that more research is needed in order for the State Water Board to adopt such regulations. In developing regulations for DPR, the main focus will be to make sure that the regulations, when followed, will result in water that is safe to drink at all times. There are two communities in the world that have their water supply partially provided by DPR – Windhoek, the capital city of Namibia, and the city of Big Spring in west Texas.

How long will it be before the State Water Board adopts regulations for Direct Potable Reuse?

While the State Water Board agrees that regulations for DPR are attainable, it is the Board's opinion that more research is needed, and that serious knowledge gaps remain. The direct potable reuse of recycled water has great potential but has very real scientific and technical challenges that must be addressed first before DPR can be consumed by public water system customers. Because of the requested research, and the need to answer the knowledge gaps, the State Water Board does not have a definite timeline on when regulations may be completed.

How much will it cost to construct a treatment facility that can produce Direct Potable Reuse water?

Construction costs for any treatment facility varies widely depending on considerations such as what kinds of treatment processes are needed, how reliable the treatment needs to be, the size and location of the facility, the source water to be treated, and how waste from the treatment is discharged. Along with the construction costs, there are also ongoing costs to run the facility, costs for monitoring, and costs for maintenance, repair and replacement. With this report, the State Water Board is making a recommendation of whether it is feasible to create regulations for DPR, not what the regulations are. Without specific regulations addressing specific requirements, such as what kinds of treatment processes are needed, or how reliable the treatment needs to be, giving a good cost estimate is premature at this point. However, the industry has done some rough calculations based on assumptions and what they know from the indirect potable reuse projects.

This information is available in [“Framework for Direct Potable Reuse”](#) published in 2015. The framework document was developed through a collaborative effort between [WateReuse](#), the [American Water Works Association](#) and the [Water Environment Federation](#) through an independent advisory panel administered by the [National Water Research Institute](#).

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