

SCVRWD Committee Meeting: Presentation Points.

* First, I wish to thank the committee for the opportunity to speak.

* The organization "**Food & Water Watch (FWW)**" has recently publically submitted a number of arguments against **Direct Potable Reuse (DPR)** of water. I would like to address their arguments and propose solutions to some of the problems they outline.

* FWW point out that while **Indirect Potable Reuse (IPR)** sends treated (cleaned) water into "environmental buffers" like rivers and aquifers before reuse, Direct Potable Reuse does not. There, water is sent immediately from the treatment plant to the tap of the consumers, from which they have coined the term "Toilet-to-Tap". Their issues with DPR are the following:

** "Because DPR lacks environmental buffers, any problems in the system compromising water quality would allow contaminated water to quickly make it's way into homes."*

* Unfortunately, largely due to industrial and agricultural pollution, these **buffers themselves now face potential contamination**, and many in California now ARE contaminated to varying degrees. Some buffers might thus actually degrade the input (clean) water quality.

Protecting river flows, and river and aquifer quality is vital, but is beyond the scope of what I can address here. I point out only that the **"environmental buffers" themselves are not invulnerable to pollutants.**

[While the concern that "unclean, contaminated" water could be delivered to homes is founded, the potential for aquifer contamination is completely unaddressed in their concerns.]

** "DRP isn't just "toilet-to-tap". Our sewer systems collect a variety of chemicals and contaminants."*

* Indeed, in addition to feces, sewer waters can contain various medicines, soaps and other cleaning supplies, industrial chemicals like solvents, lubricants and other more complex chemicals (aromatics, PFAS [per- and polyfluoroalkyls] chemicals, transportation fuels etc), pesticides, microplastics, inorganics (esp. metal salt ions), biologicals

(bacteria, viruses, prions, protozoans, helminthes) etc. **Any DPR system must be able to destroy or remove ALL of that, COMPLETELY, and dispose of any toxic residual material in an environmentally safe manner.**

*** End-stage Reverse Osmosis** (especially two-pass systems) will typically be able to remove these contaminants, but **require extensive “pre-treatment systems” (bioreactors, concentrators, filtration and adsorption systems) that generate: (1) very large volumes of “sludge/soil-like material” that must be shipped off site for agricultural use or disposal, AND (2) toxic concentrate from the RO process itself.** These water purification facilities also have a **large physical and environmental footprint**, and often are large **net consumers of energy.**

*** In contrast, water purification by Air-mediated Supercritical Water Oxidation (AirSCWO) is able to COMPLETELY DESTROY ALL BIOLOGICALS AND ORGANICS and remove and concentrate any inorganics as fine solids.** This technology has been under development for over a decade, and there are numerous plants around the country now employing this water purification system.

*** The basis of the technology is that, when water is brought to 374 degrees Celsius (705 degrees Fahrenheit) and 3,210 pounds per square inch (psi) of pressure, it behaves as neither a liquid, a solid nor a gas... it attains a fourth “supercritical state”.**

*** In this state organic materials are soluble while inorganics are not.**

*** Mixing in oxygen (via air) with the organic material results in an exothermic oxidation reaction that breaks carbon bonds and releases a lot of heat.** [Inorganics can be trapped then or at any later stage of the process.]

*** No pathogens (bacteria, viruses, prions etc) can survive these temperature and pressure conditions. Neither can organic chemicals remain intact, but are broken down under these conditions. Note also that there is no need to add chlorine or hydrogen peroxide or employ UV light.**

*** At a large enough scale, the intense heat created can also be used to generate electricity.**

* Since no **“toxic brine”** will be produced, and **all inorganics will by this process be concentrated to very small volumes for safe and responsible environmental sequestration or industrial reuse**, the worry that **“toxic brines”** could contaminate the environment is **done away with**.

* Since these AirSCWO units destroy and/or remove **EVERYTHING** in the water, **the water could be confidently used either in DPR or IPR applications**, removing the concern that rivers or aquifers could be contaminated.

* Moreover, these Air SCWO units have a very small footprint, with working units possessing a 6-ton capability and scalable to 30 and potentially 200 tons.

* *“Big Ag and Big Oil have been abusing (unsustainably overdrawing) State water supplies with impunity.”*

* This is a huge problem. It is the 40 million pound gorilla in the room (39, 538, 223 people is also the 2023 estimate of the California population).

* Big Ag and Big Oil together use the vast majority of water in the State, and that is a no less important **wasteful and environmentally destructive** aspect of “water use” the **MUST be addressed**. Their **water use MUST be REDUCED**, and certainly **NOT fed by** supplying them billions of gallons of water from the Sacramento River via the **“Delta Project” tunnel proposal**.

* **Big Ag and Big Oil must instead be forced to employ this new Air SCWO technology to clean and reuse water**, not drain our last remaining rivers for their profit.

* I thank the Committee for their consideration and this opportunity to speak.

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