

To: Honorable Governor Edmund G. Brown Jr.

From: Jim Soules

Date: June 18, 2015

Re: New Technology – Private Onsite Recycled Water Systems  
Summit on Water Technology & the California Drought

I am a developer ([www.soulescompany.com](http://www.soulescompany.com)) in Petaluma, CA familiar with Onsite Recycled Water Systems (ORWS) from a consultancy with an Australian ORWS manufacturer interested in the US market. I'm prepared to install an ORWS for landscape irrigation in my approved 8 home project that will save about 150,000 gallons (100%) of potable water each year. I'm frustrated - it appears ORWS technology and regulations are being ignored in California while common in Australia, EU, Israel and elsewhere.

**ORWS has the potential to be another tool in dealing with the drought. This memo is an effort to encourage ORWS be addressed at your July 10<sup>th</sup> "Summit on Water Technology & the California Drought" in published agenda sections such as:**

- What new and promising technologies could be deployed in the near future?
- Are there technologies that have been deployed outside of California that are not yet scaled up in our state?
- What are the current barriers for introduction and scaling-up of new technology?

The past year I have contacted, with no response, UCD, UCB, State staff (Crowfoot), NGO's (Pacific Institute, ImageinH2O, et al), to encourage exploration of ORWS.

**Onsite Recycled Water Systems (ORWS)?** ORWS are sophisticated manufactured package plants ranging in size from a large refrigerator for a single family home (<200 gpd) to larger units that can treat up to 10,000 gpd for a 100+ unit apartment building. Equipment is located on site from which source waste water is generated and recycled water used. Equipment has various features such as auto monitoring, failure diversion to sewer, UV or chemical disinfection, remote monitoring, and opportunity for more applied technology. The recycled water is deemed safe per NSF/ANSI Standard 350 for surface landscape irrigation. No expensive recycled public water mains need to be extended – this is a huge attribute. The most practical equipment treats blackwater, just tap into existing onsite sewer – no retrofit needed. Some equipment utilizes graywater but this requires separating black and gray water within the building.

**NSF International/ANSI Standard 350** NSF International develops public health standards and certification programs for food and water equipment – like UL. NSF/ANSI standard 350 for ORWS was completed several years ago and to date two products are certified – above. The standard requires testing of equipment and established water quality reuse standards deemed safe for surface irrigation. 2013 California Plumbing Code Section 1604.0 references NSF/ANSI as a water quality standard. [http://www.nsf.org/newsroom\\_pdf/ww\\_nsf\\_ansi350\\_qa\\_insert.pdf](http://www.nsf.org/newsroom_pdf/ww_nsf_ansi350_qa_insert.pdf)

**Onsite Recycled Water Systems (ORWS) Manufacturers?** From conferences I'm aware several large corporations are exploring ORWS products and I'm aware of following smaller manufacturers two of which have NSF 350 certification.

**BioMicrobics**, Kansas, have California rep. NSF 350 certified, black or gray water input 500 gpd modules up to 9,000 gpd, fits Petaluma project use, interested <http://www.biomicrobics.com/products/bio-barrier-membrane-bioreactor/biobarrier-high-strength-membrane-bioreactor-hsmbbr/>

**NexusEWater**, Australia, office in California. <http://www.nexusewater.com/> NSF 350 certified gray water input only, for detached single-family home, <200 gpd.

**Busse GT**, German, rep in Illinois. <http://www.busse-gt.com/> Many installations in EU. Membrane reactor. Now seems inactive now in US.

**Aquacell**, Australia, rep in Kentucky, 3-5,000 gpd, sophisticated and remote monitoring [http://www.dewater.com/water\\_recycling/blackwater.html](http://www.dewater.com/water_recycling/blackwater.html), large other state projects installed with special permit.

**Hansgrohe Pontos**, German. Seems recently not active in US now? Gray water, biological, <http://www.hansgrohe.com/en/3226.htm>

**WAHASO**, Illinois, [http://wahaso.com/greywater\\_system.php](http://wahaso.com/greywater_system.php). Greywater only, filtration and UV. Company does major rainwater harvesting projects in US.

**ORWS Objective** – Seems objective is for private ORWS to be as common as private photovoltaic is now. We know the PV startup period was rough and many lessons have been learned. I'm concerned the AB 2282 process will result in long delays and state regulators delaying progress without knowing about foreign ORWS experience.

**Significant Impact & Low Hanging Fruit** ORWS introduction will be smoother if focus is on landscape use only, thus eliminating the cross-connection concern - recycled water mixing with potable water within a building. Analysis will show major value will be landscape irrigation of apartments, clustered developments, dormitories, hotel/motels, and few single-family homes.

**Codes and Standards** –Codes need to rely on standards developed by NSF, UL and other independent trusted entities just like for very dangerous products like gas heating equipment. A building inspector now looks for a UL or AGA label on a gas furnace or smoke detector in a building. There may be resistance from wastewater engineering community that wants to custom design ORWS systems and code must allow such.

**2013 California Plumbing Code** – Section 1604.0 allows an ORWS gray water permit for an owner-occupied single-family-dwelling with reference back to Section 1601.7 for NSF 350 as the water quality standard. CPC Chapter 16 (to be Chapter 15 in new code) needs to be revised to distinguish between indoor and outdoor use as well as to allow R2 occupancies (multi-family, dormitories, and motel/hotels). It is more likely an ORWS system will be maintained by an apartment, dormitory, hotel or HOA manager than a single family homeowner who doesn't change furnace filters or program thermostats.

**Service, Reliability & Monitoring** – It's proven ORWS equipment can be produced and tested. The issue is whether they will work reliably and safely for 10 to 20 years. So good monitoring and testing is needed. The paradigm needs to shift to ORWS being equivalent of a domestic water well like in Australia –just another resource like solid waste. Then land use standards can require ORWS for all landscape irrigation like in Australia. Permits need to require long-term service contracts from factory certified licensed contractors. The service provider needs to file annual reports with water or health agency equipment operating properly with minimum water quality. If equipment not pass tests it is red tagged with a major penalty for use of potable water.

**Demonstration Projects** - Just like PV the future is in reliable robust products produced by major companies backed up with warranties and long-term service contracts. As a merchant builder I'm liable for product performance for ten years and so need reliable products. Currently there are only two NSF 350 certified systems and from my contact with them they are not well prepared. I'm aware there are several Australian and European manufacturers that have product but have not entered the market because of lack of regulatory support. We need companies like GE, Zurn, Siemens and Watts Water Technologies to engage. I recommend the state, via a nonprofit, immediately develop and fund a demonstration project program to get at least ten small to medium sized ORWS systems for landscape irrigation operating by the start of the 2016 irrigation period. This

program will do more than all the meetings and code writing to safely introduce ORWS. And I'm sure there will be many lessons learned for moving forward.

**Model Permit Application with Submittal Plans & Conditions** – During the Demonstration Projects it would be helpful if a model permit application, with submittal plans and conditions, was prepared. It is in everyone's interest if the first permits are responsible, thorough and granted smoothly. But recognizing the subject is controversial and without precedent the burden should not be on the regulator, but the product manufacturers and applicants to propose not only a great system but also a long-term protocol for monitoring, testing and maintenance.

**Economic Development** - It should be noted that Washington State kick started PV product manufacturing and jobs by increasing the net metering rebate depending on WA product content. It seems very odd that ORWS product technology does not appear to be pursued in California. The demonstration projects will get a great deal of media attention and might highlight the economic potential of California made ORWS products. Your Executive Order B-29-15, Section 17, Invest in New Technologies, opens the door to explore new technologies, especially if jobs in California.

**ORWS Threat to Municipally Treated Vested Interests** – This may be an unseen elephant in the room. I was rebuffed by several reuse consultants because they feared work on ORWS would offend their major municipal treatment clients and suppliers – like GE and Siemens. It is also possible municipal water departments and their major contractors (AGC) will see ORWS as a threat to funding for new treatment facilities and/or extend purple pipe mains. It is unrealistic to think major purple water mains will be extended with insufficient funding to replace failing existing hundred year old potable water mains. Australia and Europe have already moved to decentralized recycled water treatment by requiring ORWS systems in most new construction and major remodels.

**Workshop with NSF, ORWS Manufacturers, Regulators & WW Engineers** As an immediate next step it seems the state needs to fund an independent and aggressive NGO to hold an ORWS workshop ASAP with a focus on gathering information and setting up the Demonstration projects. The Demonstration projects will determine what is possible, and/or what needs to be done to improve the opportunity.

I believe ORWS are a real opportunity for California. There is much to be learned and shared. I hope this paper may get some attention and action. Enough for now.

**“You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.” — R. Buckminster Fuller**