

Statement by Dr. Edo McGowan

I was the Water Quality Planner for Ventura county during the mid 1980s and dealt with the LA RWQCB (RB) on several occasions. I also dealt with the Central Coast Board, which I will also discuss.

As a regulator, the LA board seemed to be either timid or just plain ineffectual. During this time frame, I was also rewriting the 208 Plan for the county so I had some appreciation for the various water quality requirements. As an example, we were dealing with an enforcement issue through the regional board on the water quality contamination by the business known as Halaco, a scrap metals smelter and reprocessor. The discharge from this facility had been corrupting the surrounding environment, including the area water quality. The RB had a long history of failed attempts to quell this pollution which ultimately turned into a Superfund Site.

The county was also ineffectual in dealing with this site.

Because of the proximity to the marine environment and the continuing and long-standing failure of the LA-RB, the Santa Barbara ChannelKeeper stepped in, took Halaco to court, and within two years accomplished a shut down and court ordered clean up, something that the RB had failed to accomplish over an ineffectual period of perhaps decades of feckless effort.

Now to discuss the Central Coast Board. My analysis in 2004 and 2005 of the Title 22 recycled water as produced by both the City of Santa Barbara through its WWTP El Estero and the plant owned by Goleta San, demonstrated that both were pumping out substantial quantities of drug resistant bacteria. If this water was analyzed for indicator bacteria with the standard coliform multi-tube MPN, the numbers looked fine, but if disk diffusion Kirby Bauer on Mueller-Hinton was simultaneously run, the numbers were quite high for drug resistant organisms. Additionally, if both of these tests (MPN and Kirby Bauer) were run at the sprinkler heads where the water was actually applied, down the pipe, numbers were off the charts.

This information was transmitted to the CC RB, the county's health departments and the two sewer plants. No action was taken by any of these agencies and the distribution to the environment of drug resistant bacteria continued. This was circa 2005. At the same time WERF was doing a comprehensive study on six sewer plants across the U.S. (See WERF Report 00-PUM-2T) This included Florida, Arizona, and California.

Later, Harwood republished the WERF data in a peer reviewed journal (

PMID:

15933017) and the abstract included the following statement: **The failure of measurements of single indicator organism to correlate with pathogens suggests that public health is not adequately protected by simple monitoring schemes based on detection of a single indicator, particularly at the detection limits routinely employed. Monitoring a suite of indicator organisms in reclaimed effluent is more likely to be predictive of the presence of certain pathogens, and a need for additional pathogen monitoring in reclaimed water in order to protect public health is suggested by this study.**

Following that, again the issue was brought before the CC-RB to no avail. By 2013, a study on both Santa Barbara and Goleta recycled water was undertaken by Fahrenfeld et al (

PMID:

23755046) and demonstrated the following: Numbers of indicator bacteria were evidently in the viable but non-culturable state, thus blind to the standard MPN tests. These VBNC bacteria resuscitated while traveling in the warm nutrient-rich recycled water as it coursed from the treatment works to the end user. Thus what the end user actually saw was vastly different from it assumed it was getting.

Again, based on these new data, the issue was brought before Santa Barbara City and County to no avail. Again, based on this, several comments were presented to the State Board and finally the topic was seen by an expert panel. That panel recommended that because of the inclusion of drug resistant pathogenic microbes could be included within the finished recycled water, those contemplating its use for IPR or DPR should establish a well coordinated epidemiological tracking system.

Again, these findings and suggestions, including the expert panels recommendations were presented to the local public health and regulatory community and again the topic was rejected. Thus, it is evident from a number of perspectives that the system may badly fail to protect public health. Nonetheless, the throttle seems to be pushed forward with a full head of steam for the progression of converting heavily pathogen loaded recycled water in a questionable process to recycled water being used for a variety of purposes, which affect public health, including irrigation of crops consumed raw. Data in the peer reviewed literature document the uptake and internalization of bacteria into produce consumed raw. Once internalized, scrubbing recycled water grown produce at the kitchen sink will have little if any impact on these internalized pathogens.

It is common knowledge that we are losing the race against superbugs. It is also common knowledge that superbugs and their genes are generated and dispersed via recycled water. Further, the pharmaceutical industry is disinclined to invest in new antimicrobials. Thus, as warned by the WHO and UN, elective surgeries, without adequate coverage with functional antimicrobials and increasing superbugs, may see a cessation of such surgeries. This same scenario also represents a national security dilemma as absent functional antimicrobials battle wounds will become problematic. This may see us falling back on limb amputation and that will be a detractor for an enlisted arm forces, necessitating conscription, hence the potential for social unrest.

In summary, there are several unsolved issues related to the use of recycled water and the current water quality standards. This tends to point for a need to review the design of treatment trains for the production of recycled water, as well as standards.

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