

## The Myth of Water Independence Larry Truesdale

I, and many others in Morro Bay, would like the city to achieve “water independence” with some version of a Water Reclamation Facility (WRF) project as promised by the City Council and City Staff. After all, it would be wonderful not to have to depend on the State Water Project for water whether we are in drought or not. The proposition from the City of Morro Bay is that recycled water will lead to water Independence for the City so long as it is recycled within the City limits where they maintain full control of the water.

Unfortunately, a careful analysis of this prospect shows that water independence is an economically bad idea, regardless how one treats their sewage and it is physically unachievable regardless of the cost of the sewage treatment plant to be built. (Only significantly increased rainfall, well beyond anything in recorded history for the area and certainly not possible with the increased aridness that global warming will bring to the Central Coast, would enable water independence.)

Here is the analysis using the projected sewage and water volumes numbers relevant for Morro Bay. The recycled water would come from recovering it from the sewage treatment facility, purifying it to a sterile, tertiary stage, pumping it into an aquifer, recovering it downstream after at least four months underground and then repeating the reverse osmosis (RO) to reestablish the sterile, tertiary potable water purity needed for human consumption. These are the steps the best available technology can deliver today. Nothing better is on the horizon. It should also be noted that this process has not been proven and may not be permissible!

Let's put some numbers to this process to evaluate its sustainability. If the WRF treats 650,000 gallons of raw sewage in a day, one can optimistically expect to recover 490,000 gallons of sterile, tertiary treated water. That is a loss of about 160,000 gallons (~25%). Now it must be pumped into an aquifer for further treatment to be deemed potable. Since there is no “viable aquifer” in the city limits of Morro Bay, the City Council is proposing to use the Morro Valley Creek as an aquifer substitute to try to remove all viruses and pathogens in

the water. This is certainly an unorthodox and unprecedented use of a creek bed containing no known percolation ground water basins. This will certainly require the State Water Resources Control Board (Board) to permit such a use. Secondly, besides needing Board approval, modifications on water use of the creek will need Fish and Game and Coastal Commission approval. Assuming all this can be achieved, the injected water is then pumped out downstream of the injection wells. Losses in this process will likely be in the order of 50,000 gallons. A second RO treatment is then needed to remove the nitrates and pharmaceuticals in the aquifer due to agricultural activity in the Morro Valley watershed. This will further reduce the water volume by 145,000 gallons (25%). The water is now ready to be distributed for human consumption. The numbers for the entire first cycle are approximately 330,000 gallons for a loss of about 50% from the starting volume. In a year the water could theoretically go through the system three times. The second cycle would afford about 165,000 gallons and the third cycle leave only 80,000 gallons. Of the 650,000 gallons of water at the beginning of the year, 570,000 gallons will be lost to the purification process. This is nowhere near water independence.

The economic arguments for the cost of the water also show a disturbing trend. Exact numbers are more difficult to quote, but the relative costs are clear. Water from the State Water Project costs us approximately 0.5 cents a gallon. Estimates from the City (Mr. Livick said that RO water costs slightly more than bottled water at the local market) or about 75 cents a gallon or more. For cycle 1, that is the cost of the 490,000-gallon quantity per gallon (not consumable), but it will only provide 330,000 gallons of drinkable water at a cost of \$1.86 a gallon after the second RO treatment. This brings the actual cost from cycle 2 to \$2.62 a gallon. Compare this to the 0.5 cent starting cost. This is a little more than 370 times the cost of State Water Project water for the first cycle and considerably more for the second cycle. The third recycle to complete the year is even worse, but thankfully moderated by the small volume of even more expensive water. It is important to remember these cost numbers are based on a 0.5 cent a gallon cost for State Water Project water. Ultimately, the cost of the recycled water is completely driven by the costs of the RO purifications.

Lets return to the Morro Valley Creek, which is regulated by the State as a river because it flows through known and definite subterranean channels constrained by a water impermeable clay boundary. There are no percolating ground water basins present in the Creek bed. No one knows the water capacity of this river and how long it will retain the water within it. The City is proposing to inject about 500,000 gallons a day into this river, if it will hold that daily volume increase. It may only hold a small percentage of that volume and may not be able to provide the filtration/purification required for potable use. This is a critical unknown that needs to be determined before building a tertiary treatment water recycling plant.

A second major concern is that the Morro Valley Creek underground river currently plays a critical role in water management during the winter rains. If, in the name of water recycling the river is saturated, the rains would have no place to go resulting in coastal flooding in the Route 41 – Highway 1 area. A one inch rainfall could under these circumstances result in in tens of millions of dollars of property damage for which the city of Morro Bay would be responsible. Much work needs to be done before safely approving the use of this river for water recycling.

Clearly, different aquifer would be desirable. The nearest one south of Morro Bay is in Los Osos which desperately needs more water. North of Moro Bay Torro Creek might be viable. I am not sure of its hydrogeology to know if it could handle the volumes of water we will be able to produce with a WRF. Whale Rock reservoir would also be an excellent place to put the water for future human use. The need of a second RO purification is totally unnecessary reducing costs dramatically. There are good arguments for each of these options, but control of the water rights would have to be negotiated. Barring that, the purified water would have to be pumped into the ocean!

The bottom line is that technology will never give us water independence as much as we would like it to. We live in an arid region that is getting drier. More population growth strains the system and we will become even more dependent on outside water sources. The State Water Project water is incredibly inexpensive and not possible to beat.