

Project Number

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Development of Regulatory Protocol for Incidental Environmental Reuse of Title 22 Recycled Water

Principal Investigator:

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Document Title: A Protocol for Estimating Potential Water Quality Impacts of Recycled Water Projects, Framework and User Guidance

Objectives:

The research developed a standardized process, or Framework, with associated analytical tools, for evaluating potential groundwater quality impacts that could result from incidental recharge by recycled water beneficially used for irrigation or stored in ponds. A pilot test was conducted to provide data to test the framework and to highlight the operational differences between a small wastewater treatment system producing effluent meeting secondary and tertiary criteria, respectively.

Highlights:

The framework provides a methodology for assessing potential water quality impacts based on detailed site analysis early in the recycled water project development process thereby allowing project proponents the greatest flexibility in adjusting and/or modifying the reuse scenario and/or treatment process to mitigate those potential impacts. The analysis also identifies those constituents of potential concern in recycled water and help focus the discussion of appropriate permit requirements relative to the risk those constituents pose to soil and groundwater. Finally, the study showed that operation of small wastewater treatment systems employing membrane bioreactor (MBR) technology compared well with more traditional packaged wastewater systems.

Results/Findings:

The pilot study confirmed the documented fact that MBR systems produce effluent of superior quality over more traditional wastewater systems. The study also found that proper sizing of the MBR system was critical in obtaining operational efficiencies for small treatment systems (less than 10,000 gallons/day). The Framework was extremely useful in evaluating potential groundwater quality impacts. The Framework consists of two steps; a preliminary screening and a detailed site screening to identify water quality constituents of concerns in effluent relative to the quality of the groundwater in the area where the recycled water will be beneficially reused for irrigation or stored. The preliminary steps compare the anticipated recycled water quality to groundwater quality relative to applicable federal and California regulatory standards and guidance. A list of constituents of potential concerns are developed and then subjected to further analysis using more site specific data. Tools to evaluate the fate of nutrients, salts, metals and organic carbon are provided. These tools are used to estimate the interaction of these constituents in effluent migrating through site soils prior to reaching groundwater. The tools are particularly useful in estimating effluent organic matter attenuation and the potential for formation of disinfection by-products in groundwater. Furthermore, the tools allow the project proponent to estimate the impact of nutrient, salt, and metal build-up in soils and their affects of recycled water use over time.