

Project Number

WRF-03-001

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Pathogen Removal and Inactivation in Reclamation Plants - Study Design

Principal Investigator:

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Cash Contributors (in addition to the Bureau of Reclamation):

State Water Resources Control Board (CA)

Southwest Florida Water Management District

Objective:

This purpose of this project is to develop a study design for assessing and evaluating pathogen removal and inactivation in reclamation plants. The specific objectives of this project are to:

- Design a study that evaluates pathogen removal and inactivation achieved by reclamation treatment technologies.
- Develop a design that evaluates concentrations of the pathogens, surrogates, and indicators in reclaimed water and the log-removals achieved.
- Design a study that evaluates what constitutes adequately treated/disinfected recycled water under different types of treatment and disinfection methods and for various end uses.
- Develop a detailed work plan for a pilot/full scale study at various plants of sufficient size to be meaningful and that operate 24 hours per day.

Executive Summary:

The document is a study plan to use for a monitoring study that will be carried out based on this Study Plan.

There are three components to this Study Design:

- 1) *Laboratory or bench-scale studies* are included to investigate the effectiveness of chlorine disinfection on specific pathogens and/or on selected indicator organisms that are shown to respond similarly to such pathogens.
- 2) *Pilot-scale studies* are necessary to provide a realistic simulation of variability in treatment process performance and interaction between processes in series, at a scale that is small enough for spiking studies to remain feasible.
- 3) *Full-scale studies* are necessary to verify that performance is not significantly worse and variability is not significantly higher, when the processes studied at the pilot scale are constructed and operated at the much larger capacities that are typical of actual wastewater treatment and reuse facilities.

The unit processes to be investigated includes secondary treatment followed by direct filtration and chlorine disinfection with 90-min modal contact time and CT1 of approximately 450 mgmin/ L. Pilot- and bench-scale studies will also include testing at shorter contact times and lower chlorine doses. Indigenous microorganisms will be monitored at selected points in the treatment process with emphasis on enteric viruses and bacteriophage indicator organisms.