

## **Project Number**

WRF-05-008

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## ***The Effect of Salinity on the Removal of Contaminants of Concern during Biological Water Reclamation***

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**Cash Contributors (in addition to the Bureau of Reclamation):** State Water Resources Control Board (CA)

### **Objectives:**

The addition of monovalent cations to reclaimed water through the extensive use of ion exchange water softeners can limit the ability to reuse water for many purposes including agriculture. Increases in total dissolved solids concentrations of greater than 400 mg/L have been observed. The objective of this study was to evaluate the removal of hydrophobic/estrogenic compounds from wastewater as a function of increased salinity from ion exchange water softeners.

### **Summary of Findings:**

As the M/D ratio was increased from 1 to 4, a clear trend of decreasing sorption capacity for hydrophobic compounds with increasing M/D ratio was observed with biologically inhibited biosolids. The abiotic results clearly supported the hypothesis of this study as increasing the monovalent ion concentration decreased removal by sorption. However, sorption studies with biologically active biosolids did not show a statistically significant trend regarding the M/D ratio effect on sorption capacity. Biosolids from a membrane bioreactor had lower sorption capacity and poorer settling characteristics as compared to biosolids from an advanced secondary treatment system.

### **Recommendations:**

Future research should use bench-scale or pilot-scale activated sludge systems to determine if the effects observed during this study are important in actual water reclamation systems. The research should use analytical techniques capable of measuring environmental concentrations (ng/L) to avoid the problem of breakthrough that was observed in this study. In addition, a complete mass balance to determine potential losses by biodegradation should be done and the compounds chosen for study should be known to resist biodegradation.

Field studies will be very difficult since there will be limited ability to control the inputs. If one can find a set of satellite treatment plants along the same sewer line with different salt concentrations, then the data might be suitable for a field study.