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**OCCURRENCE, FATE AND TRANSPORT OF TRACE CONTAMINANTS AND ENDOCRINE DISRUPTING
COMPOUNDS IN A PILOT WATER RECLAMATION SYSTEM FOR GROUNDWATER REPLENISHMENT**

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ABSTRACT: An increase in water reuse projects across the US necessitates an improved understanding of the activity of trace contaminants through reclamation systems. Due to increasing pressures on water resources, LTMUA and M&E developed a proposal for a 750,000 gpd indirect potable reuse treatment and injection system based on a wastewater treatment plant (WWTP) upgrade. The NJDEP awarded a \$4.1-million grant for this groundwater replenishment system, the first of its kind in the northeastern US. The treatment train was selected based on an alternatives evaluation, with finished water quality goals set to meet or exceed drinking water standards. The multiple barrier treatment train incorporates membrane bioreactors which provide a high sludge age and a physical barrier to microbes and organics; reverse osmosis to remove dissolved contaminants and provide a second microbial barrier; and an advanced oxidation process with UV light and hydrogen peroxide to provide final disinfection and oxidation of any ultra-low molecular weight organics. The treatment train was pilot tested from August-November, 2005 to test for regulated parameters set by the US EPA and NJDEP. During this time M&E and USGS conducted extensive sampling of both the pilot plant and the existing WWTP for chemical and in vitro analyses of over 100 trace contaminants (natural and synthetic hormones, household and industrial chemicals, pharmaceutical and personal care products) to address growing concern over a range of unregulated contaminants that have the potential to adversely affect public health. Ground and surface water samples were also collected to allow for comparison of the reclaimed water with existing sources of public water supply. This sampling was not required for permitting; however anticipation of public concern about their occurrence prompted the team to include this important investigation. Preliminary results show that the pilot system outperformed the WWTP for the majority of compounds. Bioassays indicate a 10-fold reduction in estrogenic activity in the MBR Effluent and non-detection following the AOP process. This study provides an opportunity to compare best available technologies for water reuse with conventional treatment technologies and improves understanding of removal of trace contaminants through a state of the art reclamation system.

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