

Reuse of wastewater effluents in saudi arabia

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Conference Proceedings - Joint 2002 CSCE/ASCE International Conference on Environmental Engineering - An International Perspective on Environmental Engineering
Vol. , Issue., 2002

Abstract: In the initial phase of a six-year study, laboratory investigations were carried out to establish conservative estimates of the contaminant removals that are possible by the recharge of local secondary effluents through a sand dune. In the preliminary laboratory study, chlorinated effluent was found to be more suitable than unchlorinated wastewater with respect to the development of anaerobic conditions and headlosses. In the main laboratory study, a 5-m high Plexiglass sand box column was used to investigate conservative predictions for the removal of contaminants. The average removals of BOD, COD, and TOC were over 65%, 65%, and 55%, respectively. The COD was primarily removed in the first 200 cm of the column. The effluent had a residual TOC of 1.66 mg/l and consisted of humic substances. The average removal of microbial indicator organisms: Total Coliform (TC) and Coliphage were over 85% and 66%, respectively. The product water contained only nominal amounts of TC (Average - 21.5 MPN/100 ml) and Coliphage (Average - 6 PFU/100 ml). The porous media largely remained unaffected by the recharge operation. In the second phase, a "field recharge system" was constructed and recharge operations were carried out over a two year period resulting in the following observations, a. The quality of the end product will depend entirely on the quality of the secondary effluent, b. With the soil aquifer treatment system (SATS) under consideration, it was possible to achieve product water meeting the recharge standards with respect to heavy metals, pH, BOD, TOC, fecal coliform and total coliform. c. The product water met the standards for restricted and unrestricted irrigation.