

Removal of Perchlorate Through River Bank Filtration and Aquifer Recharge and Recovery

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Abstract. Limited water sources and increasing water demand is one of the key problems for highly populated areas. If the possible source water is polluted, treatment applications may be costly. To overcome this problem, passive, on-site treatment techniques such as river bank filtration and aquifer recharge and recovery are increasingly being applied.

The scope of a current, on-going project envisions the use of South Platte River as a water source for the City of Aurora. Water treatment alternatives include the application of River Bank Filtration (RBF) and Aquifer Recharge and Recovery (ARR) as initial steps of multi-barrier treatment approach. The study consists of examining removal efficiencies and kinetics of observed macro and micro pollutants in the South Platte River.

One of the most important and soon-to-be regulated pollutants, perchlorate, was studied in terms of the removal efficiency and kinetics through RBF and ARR. An analytical method using HPLC/MS TOF was developed for perchlorate, due to the low MCL being considered for this contaminant (2 µg/L) and interferences during analyses with IC (EPA Method 314.1). Column studies were conducted to simulate RBF and ARR. Column studies also considered the use of water treatment residual as an amendment to ARR for increased biodegradability and adsorption. Finally, pilot scale RBF and ARR sites were studied to observe the effects of real environmental conditions on the pollutant's removal efficiency and kinetics.

Results of this study show that both RBF and AAR are appropriate for perchlorate removal as long as sufficient electron donors (e.g. carbon) are present in the environment.