

Non-Confidential Description - PSU No. 1887
"Process for Treating Perchlorate-Contaminated Drinking Water"

Keywords:

Purification, contaminated water, bacterial solutions, biofilm

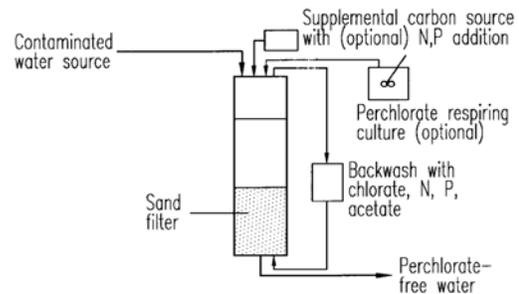
Links:

[Inventor Website](#)

[Patent Information - 6,214,607](#)

Inventor:

Bruce Logan



Background

Perchlorate—a water-soluble salt derivative of perchloric acid—is used frequently in solid rocket propellant and can be found in a variety of consumer and manufacturer products, including fireworks, airbags, analytical chemistry supplies, and certain thyroid medications. To date, perchlorate has been detected in the groundwaters of 35 states. The perchlorate-contaminated water is potentially a national concern with few known methods of economical removal. Currently, there is no large-scale process being used to treat low concentrations of perchlorate in drinking water. Typical water treatment technologies such as conventional ion exchange, air stripping, carbon absorption or advanced oxidation have little effect on perchlorate.

Invention Description

The disclosed technology treats perchlorate-contaminated water using an anaerobic biofilm filtering system. A packed bed reactor is used to grow perchlorate-respiring microorganisms (PRMs). These bacteria are capable of reducing perchlorate levels in large water volumes to the parts-per-billion range or lower. In this invention, perchlorate serves as an electron acceptor, and hydrogen gas or other oxidizable substrates serve as electron donors. Unlike previous biofilm reactors that have been used to remove nitrate contaminants from drinking water, the disclosed process does not lead to the accumulation of toxic intermediaries during breakdown.

Advantages/Applications

- Proven effective in reducing perchlorate to below detectable levels of less than 4 µg/L.
- Economical
- When using hydrogen gas as the electron donor also minimizes subsequent biological growth in the water distribution system
- Effectively removes nitrate from the groundwater if present

Contact: Bradley A. Swope
Sr. Technology Licensing Officer
The Pennsylvania State University

Phone: (814) 863-5987
Fax: (814) 865-3591
E-mail: bradswope@psu.edu

Dec-08