



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: MN3382

Title: A Novel in situ technology for the treatment of groundwater contaminated with agriculturally-derived nitrate

Focus Categories: Nitrate Contamination, Groundwater

Keywords: Biodegradation, Denitrification, Autotrophic, Membranes, Gas Transfer

Start Date: 03/01/2001

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Federal Funds: \$5,000

Non-Federal Matching Funds: \$5,039

Congressional District: 5

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Abstract

Many rural communities are impacted by groundwater contaminated with nitrate, primarily from agricultural activities. In numerous areas nitrate concentrations are approaching or have already exceeded the maximum contaminant level set by the Safe Drinking Water Act. An inexpensive and effective technology is needed to treat these contaminated drinking water supplies. The proposed research will use recently developed membrane technology to safely dissolve hydrogen gas (H₂) into shallow aquifers for the purposes of removing nitrate from the groundwater in situ.

The use of H₂ to remove nitrate from groundwater is well known, relying on microorganisms that use H₂ to reduce nitrate to harmless N₂. Until now, adding H₂ to groundwater has been shunned because of the safety hazard associated with the use of an explosive gas. However, new membrane technology allows H₂ to be dissolved without losses and with a high degree of control.

This study will evaluate the viability and technical feasibility of membranes to dissolve H₂ into groundwater for the in situ treatment of agriculturally impacted groundwater. This study will provide the basic performance data required to assess the suitability of the process. The data will also assist in scale up for field scale studies.