

PRODUCT DESCRIPTION

This report presents the results of a study conducted to test the potential effectiveness of vertical flow cells (VFCs) for the removal of selenium, mercury, and other parameters from a flue gas desulfurization (FGD) wastewater discharge. These contaminants commonly are found in and regulated for coal-fired utility water discharges. There is a widespread need for a cost-effective alternative to physiochemical treatment to maintain compliance for these parameters. VFCs are a passive treatment technology with very low operational and maintenance costs, and the potential for order-of-magnitude savings over conventional treatment methods.

Results and Findings

The findings of this study are that VFCs are very effective for removal of selenium and mercury from FGD wastewater at Duke's Marshall Station. Final results demonstrate that VFCs will be a cost-saving wastewater treatment option for Marshall and are a potentially viable technology for consideration at other FGD wastewater applications. These findings, however, are specific to the results for that power plant and may not be applicable to other wastewater discharges with dissimilar water chemistry.

Challenges and Objectives

The primary goal of this study was to demonstrate that VFCs could meet selenium and mercury reduction goals by augmenting an existing surface flow wetland treatment system at Duke's Marshall power plant with VFCs. The main challenge of this work was developing sizing criteria for applying VFCs on this site.

Applications, Values, and Use

This report presents VFC technology as a cost-effective alternative for the reduction of selenium and mercury in wastewaters at other utility sites. While VFCs may be applicable to treatment of wastewater at other utility sites worldwide, further pilot tests are warranted to evaluate VFC selenium and mercury removals on other FGD wastewaters of differing compositions.

EPRI Perspective

Evaluation of the potential of VFC treatment will require results from further pilot-and full-scale treatment of other varied FGD wastewater sources. Although the Marshall VFC system is successful, it is treating waters that are generally lower in concentration for parameters such as nitrate, sulfate, chlorides, selenium, and mercury than are considered to be typical for other FGD sources. The reader should exercise caution in extrapolating the results from this one site to other FGD wastewater sources until additional pilot testing and research projects are completed.

The reader is encouraged to follow future EPRI reports on this topic before determining applicability of this technology to a specific site, and to participate in development of new VFC performance standards by contributing information from their own studies

Approach

The goal of this study was to evaluate the applicability of VFCs for FGD wastewater treatment and better understand the variables that impact performance in order to assist other power plants that are considering FGD wastewater treatment options for selenium and mercury.

Keywords

Water Treatment, Wetlands, Vertical Flow Cells, Selenium, Mercury, Flue Gas Desulfurization