

Journal of Environmental Hydrology

ISSN 1058-3912

Electronic journal of the International Association for Environmental Hydrology

On the World Wide Web at <http://www.hydroweb.com>

JEH Volume 9 (2001), Paper 17, November 2001

Posted November 8, 2001

THE USE OF ARTIFICIAL BIOFILMS TO STRIP NUTRIENTS FROM AN INDUSTRIAL SMELTER'S WASTE WATER UNDER CONDITIONS OF LOW TEMPERATURE AND HIGH PH

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ABSTRACT

The Victorian Environment Protection Authority (EPA) has identified Alcoa's Point Henry aluminium smelter as being a major source of recognized pollutant input due to its disposal of effluent into Corio Bay. Historically, the water quality parameters that have most often exceeded Point Henry's EPA limits have been pH and suspended solids from the smelter's discharge points. These waste water discharges also experience high nitrogen and phosphorus concentrations which result in algal blooms that occur at the onset of warm weather. The main hypothesis of this study was that "prevention of algal blooming with the onset of warm weather by removal of nutrients during the cooler months, and continued removal thereafter, is better than curing the problems chemically". Biofilms have been used to remove nutrients from waste waters, but not under the conditions experienced at Point Henry. The aim of this study, therefore, was to determine if significant biofilm growth would be observed on floating structures suspended in the Point Henry waste water stream during the cooler, winter months of the year. Statistically significant biofilm growth occurred on all suspended structures in all discharge ponds during the winter and early spring of 2000. The use of suspended structures, such as AquaMatTM, as an artificial substrate to attract and support periphyton and bacterial communities (biofilms), which are then able to out-compete phytoplankton communities for available nutrients, is therefore a viable option for the Point Henry smelter. However, further research on the competitive performance of biofilms in the Point Henry ponds during the summer months is required before adequate biofilm management strategies can be developed.

Reference: James, R., G. Allinson, F. Stagnitti, R. J. Hill, and S. Salzman; *The Use of Artificial Biofilms to Strip Nutrients From an Industrial Smelter's Waste Water Under Conditions of Low Temperature and High pH*, Journal of Environmental Hydrology, Vol. 9, Paper 17, November 2001.

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