6-1-1996

FIELD EVALUATION OF THE LAND APPLICATION OF PAPER MILL SECONDARY CLARIFIER SLUDGE

Thomas P. Ballestero
University of New Hampshire, tom.ballestero@unh.edu

James P. Malley
University of New Hampshire

George O. Estes
University of New Hampshire

FIELD EVALUATION OF THE LAND APPLICATION OF PAPER MILL SECONDARY CLARIFIER SLUDGE

Principal Investigators: Dr. Thomas P. Ballestero, Dr. James P. Malley, Jr., Dr. George O. Estes, University of New Hampshire

Descriptors: Groundwater quality, heavy metals, industrial wastewater, infiltration, sludge

Problem and Research Objectives:

Wausau Paper of New Hampshire, Inc. (formerly James River Corporation - Groveton, NH plant) was faced with high costs of landfilling its secondary clarifier sludge. The sludge is derived from the wastewater treatment process of paper mill process waters, and it is composed of 2% solids. The solids are basically microorganism husks, paper fibers and clay colloids. It was felt that the sludge could be land applied to grow crops suitable for forage, or in aiding with re-vegetation of disturbed lands. The significance of the project was specifically aimed at saving landfill space and at sludge management. More generally, the project aided with sludge management of the regional paper mill industry.

Objectives were to: monitor chemical fate and transport (soil, soil water, ground water and vegetation); characterize infiltration characteristics through time; evaluate vadose zone and ground water microbiology.

Principle Findings and Significance:

Over the project duration, over 17 million gallons were spread over the application area. The annual application rate is limited by the cadmium in the sludge. The source of the cadmium is boiler blow down water.

To date, no adverse effects on ground water have been detected by measurements. Also, although the sludge had very high TKN, no nitrate increases were seen in soil water or ground water except immediately after the application event.