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"Gheorghe Asachi" Technical University of Iasi, Romania

AN ENHANCED ENVIRONMENTAL MULTIMEDIA MODELLING SYSTEM (FEMMS): PART I – DEVELOPMENT AND MODEL VERIFICATION

Zhi Chen*, Rong-Rong Zhang, Sang-Soo Han

Department of Building Civil and Environmental Engineering, Concordia University, 1455 De Maisonneuve Blvd. W., Montreal, Quebec, Canada H3G 1M8

Abstract

Public awareness and concern with impacts of pollution on multimedia environment have been greatly increased in the last few decades. There are growing needs for creating remediation strategy and setting effective standard and regulations to reduce pollutant levels in the environment. To satisfy such need, tools that can provide comprehensive understanding and characterize the behavior of chemical in the environment are required for environmental risk assessment and management. A new integrated fuzzy-set enhanced environmental multimedia modeling system (FEMMS) is developed consisting of four modules: the polluting source (landfill) module, the unsaturated zone module, the groundwater module, and the air dispersion module. The FEMMS is designed to examine complex multimedia environmental problems. Additionally, the four multimedia modules of the developed approach are embedded with a fuzzy-set method to handle system uncertainties. The FEMMS has been tested and validated through two case studies with comparisons against literature data. The verification studies indicate that the developed FEMMS is a systematic risk assessment tool for managing site contamination.

Key words: fuzzy-set; landfill, model development, multimedia, pollutant transport, risk assessment

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* Author to whom all correspondence should be addressed: e-mail: zhichen@bcee.concordia.ca; Phone: +1 514 848 2424 ext.8775; Fax: +1514 697 4813