Computer Simulation System for Environmental Health Risk Assessment

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Abstract

Interest with the environment and information technology (IT) has grown a great deal since the early 70's of the last century, but more recently increasingly among the general public and its institutions. However, the multidisciplinary aspect of environmental issues and the sensitivity of the subject have been always the main hindrance of scientists and experts to provide clear guidance on how to protect the environment and provide cost-effective mitigation measures to assess man made environmental degradation. In the meantime rapid advancement in science and Information Technology in particular, has made possible to develop integrated computer simulation systems to assess impacts of different human activities on the environment

This paper presents a computer simulation system developed to estimate the impact of industrial pollution on human health and the environment. The system was built to provide an expert support assessment tool for scientists, practitioners and regulators to evaluate potential risk at industrial facilities. It is developed in a series of modules, with powerful visual interface utilities, to integrate knowledge-base, database, mathematical modeling and statistical techniques to simulate transfer of pollutants from sources of pollution to human and environmental targets via a number of pathways.

The system provides an easy data entry of environmental settings of specified industrial facilities such as field sampling results, physico-chemical characteristics of detected pollutants and other environmental indicators. Knowledge-base and mathematical

modules provides users with a series of options to choose from to build exposure scenarios describing links between the source of pollution and different receptors. Finally, the system quantifies risks associated with exposure to each potential contaminant and provides assessors with defensible arguments to manage these risks.

Such computer simulation systems could be of interest to a wide spectrum of users such as regulatory authorities, environmental agencies, environmental consultancy companies, insurance institutions, banks and other fund providers for industrial development and judiciary departments for environmental liability assessment and related disputes.