

DEVELOPMENT OF AN INTEGRATED TOOL FOR CONTAMINATED SITE REMEDICATION IMPLEMENTING BIOLOGICAL AND PHYSICOCHEMICAL TREATMENT METHODS

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EXTENDED ABSTRACT

Soil contamination has become a growing problem in industrialized countries over the last few decades, as a result of activities involving production, transport and application of hazardous substances for the human health and the environment. According to European and Greek legislation, environmental damages have to be restored, with remediation costs carried by the polluter or by the state, in case the polluter cannot be identified. Taking into account the environmental impacts and the reduction of available sites in urban areas resulting from soil contamination, there is a growing need for developing and applying an integrated strategy to deal with the problem efficiently and cost-effectively.

The present paper discusses the necessary steps to plan and implement a method for restoring a contaminated site. The first step consists in the assessment of the environmental hazard resulting from pollutant migration via different pathways (soil, water, atmosphere), towards the receptors (humans, animals, vegetation, underground and surface water). A model takes into account parameters such as site morphology and hydrogeology, plume size and speciation, land use and sensitivity of the area, and calculates an Environmental Risk Value for a specific site, which will serve as an indicator for the decision-making process of site remediation.

In the next step an investigation of the site takes place, initially collecting historical data concerning the type of activities and contaminants involved, and then conducting an environmental site investigation by sampling of soil, soil-gas and groundwater. The results of the sampling survey, combined with the hydrogeological characteristics of the area, provide a base for the design of the remediation strategy and the selection of the appropriate decontamination technique.

The project presented in the current paper aims at the development of a decontamination center, in which soil contaminated primarily with organic pollutants (e.g. oil products) will be treated by implementing biological and physicochemical methods such as bioventing.

When the concentration of pollutants reaches down to the desirable level, decontaminated soil can either be disposed of in a sanitary landfill or returned to the initial site, depending on land use and costs. Aim of the project is also to study the financial structures of the remediation process, in order to provide the parties of interest with a tool to cope with site contamination in a financially viable and environmentally sound manner.

Key words: Site Contamination, Environmental Risk, Remediation, Off-site Treatment