

Soil Contamination and Remediation for Scientists

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Soil contamination is defined as the condition of land where any chemical substance or waste has been added as a direct or indirect result of human activity at above background level and represents, or potentially represents, an adverse health or environmental impact

A basic course of soil contamination didactics for Science and Engineering students is planned to address the following objectives: 1) Determine if a site is 'potentially contaminated' or if it is devoted to a 'sensitive land use', 2) Find and use the relevant policies for the assessment of potentially contaminated sites, 3) Explain the advantages of developing a conceptual site model (preliminary and detailed) for a potentially contaminated site, 4) Analyse the factors involved in identifying the components of the source-pathway-receptor model and 5) Determine the potential outcomes from an environmental audit

An integrated approach is considered. This approach is based on the fact that all aspects of environment are interdependent. Also it recognises that ecosystem structure and function are vital for healthy and sustainable ecosystems.

Bioavailability is a main issue. Therefore it is explained what bioavailability is and how different soil factors influence bioavailability. Terminology associated with bioavailability and toxicity testing is utilised. Further, it is explained how to undertake toxicity testing. Finally, also bioavailability and toxicity testing concepts in ecological risk assessments are used. Terminology associated with biomagnification, ambient background concentration, assessment endpoints, and chemical mixtures is explained. Determination of biomagnification potential and ambient background is considered. This information is used to assist in an ecological risk assessment of a potentially contaminated soil.

Remediation technologies are grouped under the classical three main categories: physical, chemical and biological. Advantages and disadvantages of different technologies are examined.

Cleanup procedures are discussed on the basis of the following principles: 1) Minimize soil and habitat disturbance, 2) Restore or create hábitat and 3) Integrate cleanup and reuse plans.