INDOT Research

TECHNICAL *Summary*

Technology Transfer and Project Implementation Information

TRB Subject Code: 23-8 Ecological Abatement *October 2004*
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The Use of Vegetation in the Stabilization, Reclamation, and Remediation of Impacted INDOT Soils

Introduction

Soils can be severely impacted by transportation-related activities including highway construction, renovations, maintenance, and accidental spills. Reclamation or remediation of soils contaminated by salts, solvents, paints, petroleum, and metals may be necessary to comply with current environmental regulations and to avoid erosion of denuded areas. Vegetation as alternative for INDOT facilities in the remediation of contaminated soils and groundwater has not been fully explored.

Many uses have been found for vegetation in the recovery of disturbed and contaminated land. For example, the establishment of ground cover to prevent erosion has been used for many decades. Some fascinating and innovative uses for vegetation have been developed very recently, such as the extraction of arsenic from pesticide-contaminated soil using a fern.

Phytoremediation uses plants to degrade, extract, contain, or immobilize contaminants from soil and water. Phytoremediation is an innovative, cost-effective alternative to more conventional treatment methods used in the remediation of hazardous waste sites.

The major goal of this project was to write the manual ***PhytoRemediate®: Phytoremediation Decision Guide for Transportation Engineers*** and the attached compact disk ***PhytoRemediate®: Training Module for Transportation Engineers*** to assist transportation engineers and other professionals in the applicability of phytoremediation as an effective method of remediation engineering design. This guide is not a design manual, but identifies the decision-making processes necessary for successful remediation of contaminated sites using phytoremediation.

Findings

The major findings of this project are the writing of the manual ***PhytoRemediate®: Phytoremediation Decision Guide for Transportation Engineers*** and the attached compact disk ***PhytoRemediate®: Training Module for Transportation Engineers.***

The objectives of the manual and training module are to:

- Provide a decision guide for transportation engineers to evaluate the applicability of phytoremediation to contaminated sites. Phytoremediation projects have been proposed or applied to ecosystem restoration and soil, surface water, groundwater, and sediment remediation. This decision guide identifies and defines phytoremediation technologies, and provides examples of current research and case studies to aid in the evaluation of proposed phytoremediation applications.
- Develop a decision guide that is accessible for the Indiana Department of Transportation (INDOT) and the Indiana Department of Environmental Management (IDEM) teams and others to evaluate alternative remediation technologies.
- Present phytoremediation system characteristics that transportation engineers and other professionals need to assess the

potential applicability of phytoremediation to specific contaminated sites.

Present a summary of select case studies and their applicability to environmental problems identified by the Indiana Department of Transportation (INDOT), illustrating actual field applications of phytoremediation.

Implementation

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PhytoRemediate®:

Phytoremediation Decision Guide for Transportation Engineers

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PhytoRemediate®

PURDUE UNIVERSIY

SCHOOL OF CIVIL ENGINEERING

JOINT TRANSPORTATION RESEARCH PROGRAM

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Project Title: The Use of Vegetation in the Stabilization, Reclamation, and Remediation of Impacted INDOT Soils

Principal Investigators: M. Katherine Banks and A. Paul Schwab

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