

# Ecolotree<sup>®</sup> Buffer Application for Chemical Spill Sites

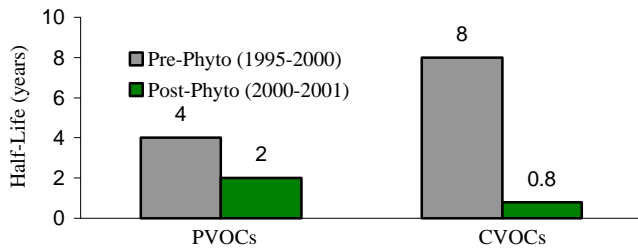


Area contaminated with petroleum-related organics and chlorinated solvents at the Ashland, Inc. facility in Milwaukee, Wisconsin

Ecolotree<sup>®</sup>, Inc. uses vegetative systems to contain and clean up problem chemicals that can harm humans and the environment.

In a process called *phytoremediation*, plants sequester or clean up contaminated soil and groundwater. The plants achieve this remediation by 1) taking up contaminants and either degrading them with plant enzymes or transpiring them with water vapor, 2) increasing the number of contaminant-degrading microorganisms by feeding them with root excretions, and 3) preventing contaminant migration off-site by hydraulically controlling precipitation or groundwater flow. Extensive research at field installations, government laboratories, and universities has shown that hybrid poplar trees are effective at cleaning up numerous organic and inorganic pollutants. Additional benefits for poplar systems include erosion prevention, greenhouse gas sequestration, and creation of a visual barrier, windbreak, and wildlife habitat.

Phytoremediation appears to have enhanced natural attenuation in shallow groundwater wells. The estimated half-life of petroleum VOCs (PVOCs) and chlorinated VOCs (CVOCs) have decreased significantly since implementation (data courtesy of RMT, Inc.).



The Ecolotree<sup>®</sup> Buffer (EBuffer<sup>®</sup>) is a patented phytoremediation system that uses trees and understory grasses. At the Ashland, Inc. facility in Milwaukee, Wisconsin, historic accidental spills resulted in soil and groundwater contamination with petroleum-related organics, PAHs, and chlorinated organics such as PCE and TCE. Phytoremediation was approved by Wisconsin regulators as the remedial solution. Ashland, RMT, Inc., the URS Corporation, and Ecolotree designed and installed (May, 2000) a 485 tree EBuffer<sup>®</sup>, using 10-15 foot tall hybrid poplar trees buried up to 10 feet below the surface. Monitoring at the site includes continual depth to groundwater measurements, groundwater and soil testing for residual organics, data-logged soil moisture sensors, subsurface root observation tubes, and leaf nutrient analysis.



Ecolotree project manager Eric Aitchison with a 13-foot tall hybrid poplar tree used for deep planting at the site. To encourage deep rooting into groundwater, an aeration system injects air at 10 feet below ground.

## Ashland Results to Date

- Tree survival: 88% initially, 99% after replanting phytotoxic areas
- Tree growth: tripled in height since planting, up to 15 feet of growth in two growing seasons
- Root growth: extensive and deep, up to 10 feet below the surface and 4 feet horizontally
- Subsurface aeration: has increased oxygen concentrations in soil from 5% to 15%
- Groundwater uptake: water table depression observed during growing season, indicating uptake of contaminated groundwater
- Contaminant removal: phytoremediation appears to be enhancing natural attenuation in groundwater, with a significant reduction in the half-life of petroleum-related organics and chlorinated solvents



The contaminant source area in August 2002, 2 years after planting 485 hybrid poplar trees.



Ecolotree, Inc.  
3017 Valley View Lane NE  
North Liberty, IA, 52317

Phone: 319-665-3547  
Fax: 319-665-8035  
Email: [info@ecolotree.com](mailto:info@ecolotree.com)  
[www.ecolotree.com](http://www.ecolotree.com)