

**THE U.S ENVIRONMENTAL PROTECTION AGENCY'S
THIRD BIENNIAL FRESHWATER SPILLS SYMPOSIUM
APRIL 6-8, 2000
ALBUQUERQUE, NEW MEXICO**

ALTERNATIVE RESPONSE AND REMOVAL TECHNIQUES - INLAND AND WITHIN LOUISIANA'S FRESHWATER HABITATS.

Louisiana Applied and Educational Oil Spill Research and Development Program (OSRADP)

The objective of projects funded through the OSRADP is to deal with the broad range of problems associated with oil spills and use this information in the oil spill response, prevention, and training process. These strategies involve understanding the ecological risks posed by particular oil spills, socioeconomic impacts, response training, clean up procedures, and using this information in decision or policy making purposes, as well as educating interested parties. As a result, a dedicated commitment exists to address a wide variety of oil spill issues.

Since the fall of 1993, the OSRADP has granted 64 awards in support of 40 projects.

Funded Projects

The program's research initiatives are divided into four categories: spill of opportunity; education, training and public awareness; remote sensing and mapping; and spill response cleanup and harmful ecological consequences. Each project's scientific merit is based on the simple question: Can the results be implemented in a spill event?

The presentation will focus on the findings from those OSRADP funded research projects that directly relate to alternative technologies in freshwater environments to include:

- **Spill Response, Cleanup and Harmful Ecological Consequences**
 - In-situ Burning
 - *"Environmental effects and effectiveness of in-situ burning in wetlands"* (Dr. Irv Mendelsohn, Phone: 225-388-8889, e-mail: imendel@lsu.edu, LSU);
 - *"Environmental effects and effectiveness of in-situ burning in wetlands: guidelines for oil spill cleanup"* (Dr. Charles Lindau, LSU); and
 - *"In-situ burning studies for onshore oil spills"* (Dr. Stephanie Farrell, Louisiana Tech University).
 - Phytoremediation
 - The two year study *"Baseline experimental studies for onshore oil spills"* (Dr. Maureen McCurdy, Phone: 318-257-3165, e-mail: hillard@vm.cc.latech.edu, Louisiana Tech University) assessed the minimum baseline requirement for Louisiana's upland plants to recover naturally from oil spill damage.
 - *"In-situ burning and phytoremediation for onshore oil spills"* (Dr. Maureen McCurdy, Phone: 318-257-3165, e-mail: hillard@vm.cc.latech.edu, Louisiana Tech

University). A detailed literature review indicates this project is one of only a few to investigate these two issues in an upland environment. Although *in-situ* burning will be considered, the initial focus is on phytoremediation.

- **Remediation**

Laboratory and field studies were performed with “*The use of ammoniated cellulolytic materials for remediation of wetland soils contaminated with crude oil*” (Dr. Gary Breitenbeck, Phone: 225-388-1362, e-mail: gbreiten@unix1.sncc.lsu.edu, LSU).

This project investigated the value of naturally occurring, nitrogen-rich absorbents, as well as other commercially available absorbents for *in-situ* remediation of wetlands contaminated with Louisiana sweet crude oil. The commercially available absorbents tested were powderize sphagnum peat, kenaf (a fibrous plant, *hibiscus cannabinus*, from the East Indies), wool pads and polypropylene pads. Tests were performed on two products not on the approved list: ammoniated bagasse (a waste by-product of the sugar industry) and ground chicken feathers. In the final analysis, ammoniated bagasse was the most effective material tested for retaining spilled oil and promoting *in-situ* disappearance. The ammoniated bagasse is in the process of being commercialized.

- In addition, two other studies are in progress that concentrate on plants and their ability to survive in an oiled environment:

- “*Development of a germination index of sensitivity to applied oil*” (Dr. William Campbell, Phone: 318-257-4573, e-mail: campbell@vmcc.latech.edu, Louisiana Tech University) and

- “*Use of donor seed banks in terrestrial vegetation recovery after an oil spill*” (Dr. Milan Vavrek, Phone: 318-257-4573, e-mail: mvavrek@vmcc.latech.edu, Louisiana Tech University).

These projects involve the survivability of plants in an oiled environment and the accessibility of seed banks that can be used to reseed the environment.

- **Spill-of-Opportunity**

Spill-of-opportunity funds are used to apply and evaluate new and/or experimental technology to enhance the recovery of spilled oil or to test experimental cleanup techniques in a field situation.

From an inland spill perspective the project “*Potential for enhanced anaerobic BTEX degradation at the Blind River spill*” (Dr. John Pardue, Phone: 225-388-8661, e-mail: jpardue@unix1.sncc.lsu.edu, LSU) looked at the Blind River gasoline incident in June 1996.

The research team determined that sediments from this swamp site appear to have a relatively low ability to naturally attenuate gasoline, especially the BTEX (benzene, toluene, ethyl benzene and xylene) components. Further, the natural attenuation of gas components of these sediments is limited with only toluene exhibiting degradation. Sulfate amendments were successful in promoting faster degradation rates and promoted degradation over a broader spectrum of compounds. Limited success was observed with nitrate amendments and none with iron. Sulfur reduction, in fact, appears to be the primary oxidation pathway

under which the BTEX and other gas components degrade. The findings indicate further studies are necessary to fully develop the use of sulfate to promote gasoline degradation in fresh-water habitats.