

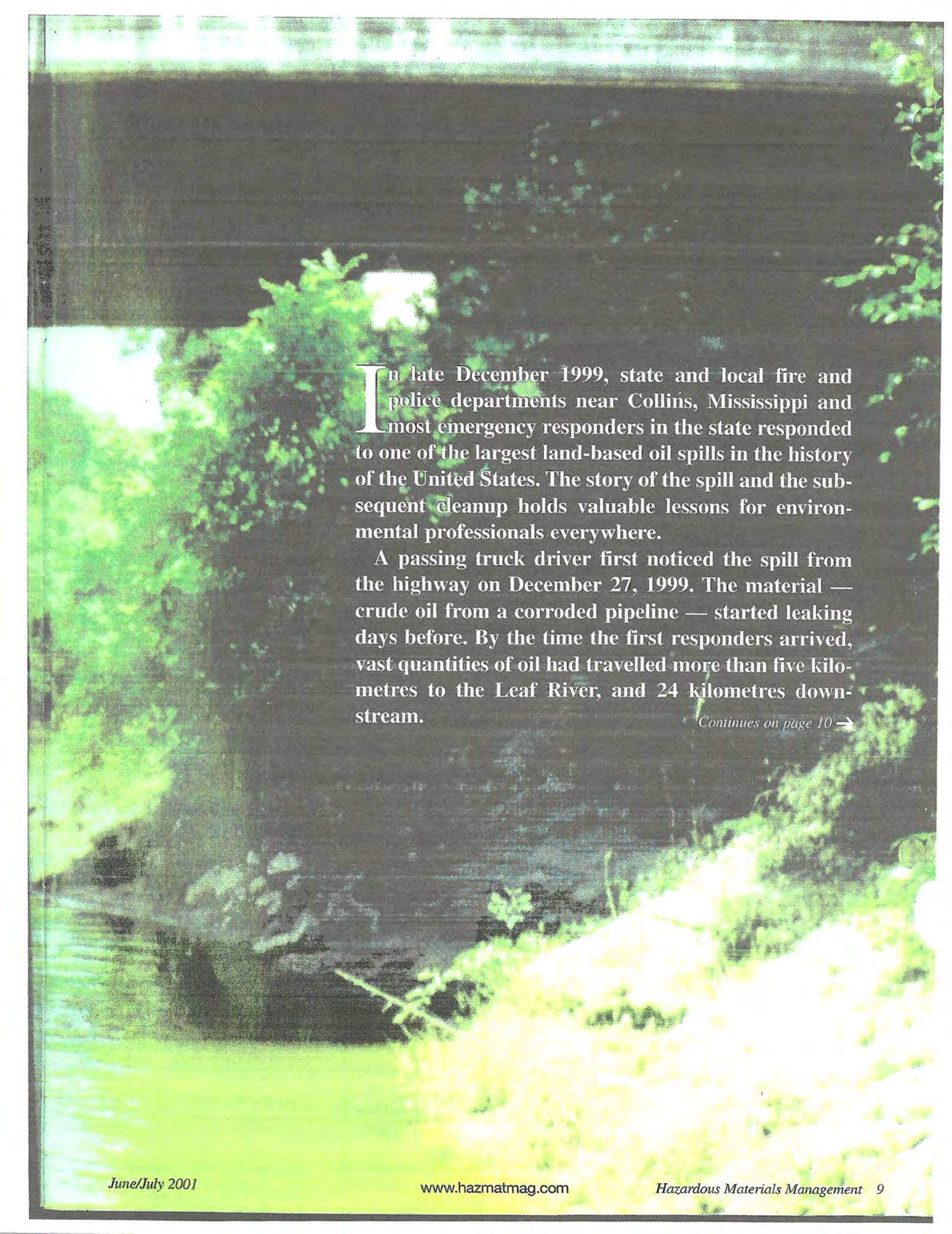
MISSISSIPPI MUD PIE

Cleaning up a large land-based oil spill

by *Connie Vitello*



The Leaf River in Collins, Mississippi.



In late December 1999, state and local fire and police departments near Collins, Mississippi and most emergency responders in the state responded to one of the largest land-based oil spills in the history of the United States. The story of the spill and the subsequent cleanup holds valuable lessons for environmental professionals everywhere.

A passing truck driver first noticed the spill from the highway on December 27, 1999. The material — crude oil from a corroded pipeline — started leaking days before. By the time the first responders arrived, vast quantities of oil had travelled more than five kilometres to the Leaf River, and 24 kilometres downstream.

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Corroded pipelines are common in this extensively drilled area. Most are more than 50 years old. The company (whose name is withheld for liability reasons) acknowledged that pipe pressure was low, but it didn't suspect an actual leak. The first report in the local newspaper said that approximately 71,000 gallons (or 325,000 litres) had been spilled. In fact, the amount was later revised to more than 320,000 gallons (1.5-million litres).

Initial response

Sonny Hughes, a product distributor for Jackson, Mississippi-based Gator International, was one of the first people to receive a call. Mr. Hughes had just set out on the first day of a one-week hunting trip but he turned around his Ford F250 Super truck right away. It helped that he always keeps two changes of clothes in the back seat in case of an emergency.

The first 36-hours proved to be non-stop action. Along with the Highway Patrol, the local Sheriff's Department, multiple landowners and the U.S.

Department of Environmental Quality, Mr. Hughes says, "All available emergency contractors in the State of Mississippi were onsite. The Fish & Wildlife folk, the Coast Guard — we were all waiting on the DEQ to decide who would get a piece of the pie."

"The first 36 hours proved to be non-stop action."

He adds, "Even the 'fish heads' [local fishers and pirates] made their way over to see how much damage had been done, and if the fishing would be affected."

The chief emergency response contractor, George Mulvaney of the Industrial Maintenance Corporation, coordinated the cleanup project. He has worked with the DEQ and the Coast Guard for over ten years and has successfully treated many Gulf Coast spills over the years.

The first priority was to contain the spill and prevent further leaching to the river. Skimmers and pumps were used

to back the contaminated water into a main collection area where it was recovered by vacuum trucks. Water containment was actually the easy part in the swamp-like condition that is characteristic of the area at that time of year. It was the lack of road access that threatened to stall the project.

Roads were built as quickly as possible using bulldozers, track hoes and a Wood Tiger. Over 500 people — including emergency response and cleanup crews — worked at the site steadily for more than six weeks. The number decreased after that initial period to about 30 workers to take care of maintenance needs. Clark Thomas, the president of Earth Consulting Group, performed groundwater testing.

Cleanup

After containment on the river, the next step was to clean up the oil that had spread throughout the wetland area. Traditionally, the contaminated soil would be encapsulated and disposed. However, by using Oil Gator — a patented material that enhances

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The first cleanup priority was to contain the spill to prevent further leaching to the river.

Photos courtesy of Gator International.

Oil Eater

In 1988, inspired by the Exxon-Valdez oil spill, the founder of Gator International, Ted Dickerson, set out to develop a hydrocarbon absorbent that was both incinerable and biodegradable. He tested several raw material sources (corncoobs, sugar cane, peat moss, peanuts and cotton) and chemical treatment combinations, including different oxidizing agents. After numerous tests, the value of naturally occurring microbe-fungi was determined. After almost 10 years of research and development Oil Gator was patented in 1997.

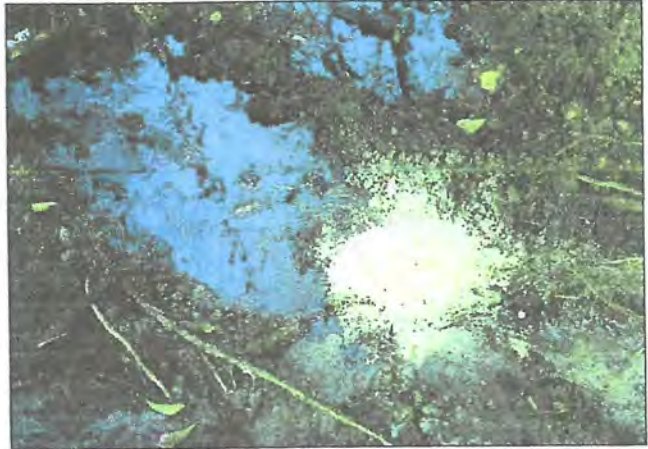
The product is a chemically modified plant fibre that contains all the necessary ingredients (10 parts nitrogen, one part phosphorous and sulphur) to enhance biodegradation of hydrocarbons by indigenous bacteria. The naturally occurring bacteria are safe for human and animals and will not harm the environment. When activated by air or moisture, the petrophilic bacteria multiply and utilize hydrocarbons as a food source. Under optimal conditions of 30 per cent moisture, degradation



Ted Dickerson, founder and president of Oil Gator International. After years of experimenting in the lab with various raw sources, he decided that cotton is his weapon of choice.

of 40 per cent per month can be expected. (See *microscopic image*.)

The encapsulating feature is critical. For instance, when faced with a rainstorm or flood, the sorbent won't leach contaminants as it prefers to encapsulate oil instead of water. Ammonium sulphate, an effective delayed-reaction nitrogen source, renders the absorbed hydrocarbon less flammable.



Oil Gator used to soak crude oil from wetlands.



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The product is approved by the U.S. EPA's Superfund Innovative Technologies and Evaluation program and is promoted by the U.S. Department of Agriculture's Alternative Agricultural Research and Commercialization Corporation.



Sonny Hughes, a product distributor for Gator International.

The cotton-based raw material is readily available in Mississippi, the cotton capital of the world. Unlike peat or clay, which require mining and stripping respectively, cotton is an easily obtained renewable material. The product is incinerable (with 7,000 BTU and less than 3 per cent ash) and 100 per cent biodegradable.

A million bags of the product are stored at

Gator's 600,000 square foot facility in Flora, Mississippi, and an estimated 70 truckloads (or 1.2-million kilograms) are sold each month. Bud Cary, CEO of Gator International, also manages a smaller storage facility in Calgary, Alberta. Companies that have used Oil Gator in Canada include AT Plastics in Edmonton, Alberta and the Insurance Corp. of B.C. in Williams Lake, B.C. ♦



Oil Gator absorbent lint seed magnified 320 times to demonstrate encapsulation of hydrocarbons.



The sand-like product is 100 per cent biodegradable.



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Cover Story

On March 22, 2001, a smaller oil spill was detected from a corroded pipe in Purvis, Mississippi. The Enron pipeline leaked 24,600 litres across eight kilometres, reaching several small streams. This time the spill was detected immediately and Mr. Hughes and his crew arrived the very next day.

A massive flood occurred one week after cleanup commenced. In most circumstances, this would be a major setback, but due to Oil Gator's critical encapsulating properties, leachate was effectively prevented. Even when wet, the product will seek to absorb hydrocarbons instead of water. Bobcats were used to navigate the swampy terrain.

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"The absorbent was effective and very little vegetation had to be removed except certain trees that were soaked to the root."

At the Collins site skimmers and pumps were used to back the contaminated water into a main collection area.

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"The major benefit of any remediation process is transformation and not transportation," says **Bud Cary**, CEO of Gator International. "The cost of transformation is always lower and does not require as much specialized personnel or expensive equipment."

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HMM Editor **Connie Vitello** applies absorbent to the "hot spots" left at the Purvis site in early May.

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"Water containment was actually the easy part in the swamp-like condition that is characteristic of the area at that time of year... It was the lack of road access threatened to stall the project."

Cover Story

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Collins site conditions on July 11, 2000.

the biodegradation of hydrocarbons — most of the contaminated soil was remediated onsite. Workers wore Tyvek protective suits, hard hats and dust masks. No further protection was required because the sand-like product passes an LC50 toxicology testing and is not harmful to humans, animals or plant life — nor is it WHMIS or OSHA regulated. (See sidebar, page 12.)

Workers in all-terrain forklifts and four-wheelers transported the product onsite. They applied the product with a Samsung Track hoe with a Rhom rake attachment, a mini bobcat hoe and rototillers. The absorbent was effective and very little vegetation had to be removed except certain trees that were soaked to the root.

After the first month of cleanup an emergency contractor attempted to use a peat moss sorbent product to finish the job. But after three weeks government officials decided that this product — which may

leach over time — was not effective, especially after a day of rain, and returned to the use of the original sorbent.

“Lab results demonstrate that hydrocarbons have been remediated to non-detect levels.”

The cleanup effort, which cost about US\$17-million, used thirty truckloads (560,000 kilograms) of sorbent product, ten truckloads less than was initially

estimated. In a letter to Mr. Hughes, Congressman Ronnie Shows wrote that everyone involved did an excellent job. No charges were brought against the company and lab results demonstrate that it has remediated hydrocarbons at the site to non-detect levels.

From his car phone, Sonny Hughes reports that all is well. “With no other spills right now, I’m finally heading on my hunting trip,” he says.

Then there’s a beep on the line.

“Could y’all hold for a moment?” he asks. “There’s an emergency call on the other line.” ♦

Connie Vitello is editor of this magazine.



Collins site current day conditions. The spill source is now covered by two-foot-tall grass. Markers indicate testing points for regular third-party monitoring tests.