

FOCUS ON THE ENVIRONMENT

Mission behind bioremediation: They conquer what can be eaten

BY ELIZABETH G. HOWARD

They do two things: eat and reproduce.

And when there's nothing left to eat, they die. Their job: to change harmful chemicals into less-toxic or non-toxic compounds.

The process is called "bioremediation" and its heroes are naturally-occurring micro-organisms like bacteria, fungi and yeast. It's one of newest and most environmentally-friendly processes used to clean up oil and fuel spills, tainted soil from leaky underground storage tanks and contaminated groundwater.

Bioremediation isn't new. In fact, it's as old as dirt—literally. It's the same natural process that turns grass clippings and leaves into compost.

These particular microbes, however, use the hydrocarbons from petroleum-based products for food and energy, transforming them into harmless substances consisting of carbon dioxide, water and fatty acids.

In the past, one of the most popular ways to take care of waste was to "dig and haul"—dump the contaminated soil or liquid into a landfill. But recent federal regulations have made dumping liquid waste illegal, and landfill companies have made use of their land more expensive. So contractors and the federal government have been looking for more viable options, including bioremediation.

Tom Cason, director of environmental

services and a microbiologist at Kingston Environmental Services, said that although bioremediation had a long way to go, it was a proven technology on certain contaminants, including petroleum.

"Bacteria are everywhere," Cason said. "At almost every site there is natural bioremediation going on. (We are just) enhancing those sites by providing the nutrients that the bacteria need to keep them going."

Frets about costs, labor

The so-called "new" technology has been around for about 15 years, but local environmental service contractors only started using bioremediation on sites contaminated by petroleum products within the last five years.

Some companies have found great success with the process, while others have found it to be less than cost-effective.

Bob Sager, president of Environmental Response Inc., does remediation of soil contaminated by underground storage tanks. He is one contractor who said his clients prefer the old methods.

"It's too labor-intensive," he said. "It is efficient to a point as long as you keep the bacteria alive, but not everybody does that, because it's too labor intensive."

Steve Lawson, manager of the remediation division for EnviroKlean, said

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Bacteria turned loose in restaurants to attack traps clogged with grease

BY ELIZABETH G. HOWARD

Bioremediation isn't just for dirt anymore.

In fact, more than 100 restaurants in the Kansas City area are using it, for a reason they'd rather not talk about.

The Andy Lorence Company, a Minneapolis-based bioremediation firm founded in Kansas City three years ago, has its hands in the grease of the Kansas City restaurant business. Its goal? To use hungry natural bacteria to clean out grease traps.

Bob Davis, CEO of Andy Lorence, says a typical fast-food restaurant uses a 2,000- to 2,500-gallon grease trap that needs to be cleaned at least once a month.

Davis and his brother Greg's firm uses just three tablespoons of their bacterial solution to devour 500 gallons of accumulated grease.

The firm is one of less than 10 in the nation that relies on bioremediation to dispose of restaurant grease.

Until recently, restaurants just sucked the excess grease from the traps and delivered them to area landfills. But new federal regulations now prohibit dumping non-contained grease in landfills.

Davis calls the new technology a win-win situation. The process reduces grease content to one-quarter of what the city considers clean and costs 25 percent less than traditional removal methods.

"We come out ahead, the customer saves money and the environment wins."



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because clean-up of a site usually involves a corporation that needs to clean up a contaminated site, environmental concerns are left behind for the bottom line.

"When it comes to corporations, the 'green record' is out the door," he said. "It's dollar-driven. The guy's heart can say 'we want to make the world a better place,' but what it comes down to is dollars and cents."

EnviroKlean, a Kansas City, Kansas-based company, builds "land treatment farms," usually on the property of the company that generated the waste. The contaminated soil is transported to the "land farm" and is treated with nutrients and is tilled.

Lawson said the process can take anywhere from six to 24 months.

This brings up another factor — time. Lawson said that two years is usually the maximum time it takes to clear the soil, but some companies are willing to risk landfill liability claims to have the contaminants taken care of immediately. In the business world, time is money.

"(A corporation) does not want to drag its stock prices down," he said. "There is a lot that is played into a decision as to what to do with your waste. A corporation will usually make a decision, and that is the decision that they will live and die by."

Threat of liability

One part of that decision is weighing the risk versus the cost, Cason said. If a corporation decides to dump the contaminants into a landfill, there can be consequences. Once a corporation uses a landfill, it's on the record, thus making them potentially liable.

"You always have the potential for liability," Cason said. "If, in the future, when something unfortunate happens to the site — it becomes a Superfund site — the regulators can examine the records and could attach clean-up damages to

those people."

There are other reasons not to use bioremediation, Lawson said. If the corporation already is on record for using a landfill, liability is no longer a factor. Also, bioremediation is more cost-effective on larger projects, Lawson said. For just a few yards of contaminated soil, it may be cheaper just to incinerate it or dump it.

One advantage bioremediation has over other options is that it is a "destructive technology."

"(Bioremediation) actually destroys the contaminant," Cason said. "Other technologies like air stripping are transfer technologies. You don't capture the vapors; they are transferred into the atmosphere."

Statistics show that despite qualms, bioremediation is here to stay. It has grown to a \$150 million business, involved in the clean-up of more than 3,000 sites, including the Exxon Valdez oil spill, according to a 1993 study by The Jennings Group, a New Jersey consulting firm. Projections for the year 2006 reach the \$10 billion figure.

Developments continue everyday. Already the technology is branching out to the restaurant business. (See related story, page 20.)

Some companies are dabbling in genetically-engineered microbes created to destroy specific chemicals other than petroleum-based products.

Wichita, Kan., is already involved in a pilot project to clean up an eight-square-mile area in the central business district in which the groundwater is contaminated. The city is developing a bacteria that specializes in destroying chlorinated solvents.

The greatest thing that bioremediation has going for it is its earth-friendliness. Doris Cellarius, chairperson of the community health committee of the Sierra Club said even environmental watchdog groups seemed to approve.

"Any new technology needs to be privately-tested and monitored," she said, "but generally, we believe it is a positive step in the right direction, as far as waste treatment is concerned."