Scientist focuses on bio-remediation

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the ocean, providing a constant source of oil for bacterial consumption. Around the channel there are also dense pine forests, which add terpene from pine tar to the Sound in rain runoff. These factors combined to ensure there was a bacterial presence in the contaminated area.

"The bacteria population is usually restricted by the availibility of hydrocarbons, but oil supplied that," Stiefel said. "The bacteria multiplied until restricted by something else— the availability of nitrogen and phosphorous.

"We sprayed Inipol, an oily fertilizer developed in France which sticks to oil on the beach, and biodegradation increased 90 percent," he said. "We sprayed it on a test strip of contaminated beach, and in 10 days the rocks were clean."

The EPA joined with Exxon in the research program, and eventually $4.6 million was spent on testing to guard against environmental damage, Stiefel said. Because of strong currents in Prince William Sound, the extra fertilizers caused no algal blooms, and cold temperatures did not hinder the bacteria.

A major reason bioremediation was more successful than other methods of cleanup was that the oil-contaminated areas of Prince William Sound were very remote, and nearly impossible to access with more conventional clean up equipment, Stiefel said.

The nearest civilization, Valdez, Alaska, was three hours by boat or 45 minutes by helicopter from the nearest oil.

"Just getting to the contaminated sites was a major accomplishment," he said. "We eventually had more than 11,000 workers cleaning up the coastline, living on big personnel ships along the coast.

Once the armada of cleanup ships arrived at a contaminated site, personnel equipped with liquid fertilizer sprayers would saturate the beach, then the ships would move on to the next site, Stiefel said. The bacteria were so effective, nothing else had to be done.

"Many of the organisms damaged by the spill have increased population, and most of the oil has been incorporated into the food chain," Stiefel said. "Recovery of the area is well on its way."

A&M researchers develop oil-eating microorganisms

By Jayme Blaschke
The Battalion

An oil spill can be one of the most environmentally damaging man-made disasters, but researchers at Texas A&M are developing an innovative cleanup method for spills using microorganisms.

Bioremediation gained national attention during the Mega Borg oil spill off the Texas coast, when A&M researchers used microorganisms in an effort to break up part of the spill.

Dr. Roy Hahn of the environmental engineering program at A&M said it has taken a while, but federal and state money is becoming available.

"In the past several months there has been a tremendous resurgence of interest in bioremediation," Hahn said. "Because of that, federal and state money promised over a year ago is finally starting to make it through the bureaucracy."

He said one part of the Texas A&M University System — Lamar University in Beaumont — has already received some significant state funding.

Dr. James Bonner of the A&M Civil Engineering Department said two-thirds of his work involves bioremediation, and emphasis on it is increasing dramatically.

"The Coast Guard is a key proponent of bioremediation, and is in a major evaluative phase right now," Bonner said. "The Mega Borg was big publicity for us, because a year ago no one had heard of bioremediation, and it made up only a small percentage of oil spill research. It makes up about 18 percent now.

"Results have been so positive that we just received $2.5 million from the Department of Defense to develop a program that will use bioremediation to break down nerve gas," he said. "That's kind of a razzle-dazzle program, but it shows the potential applications of these organisms."

Despite its promise, bioremediation is not a magic remedy, Hahn said. Because the process uses living microbes to break down the oil, it is only effective in certain situations.

"Several things are necessary for the process to work," Hahn said. "A carbon source, which is the oil, nutrients, and enzymes to make the 'bugs' grow faster.

"They will be most effective in areas with poor accessibility,

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where physical cleanup and chemical agents can't be used," he said. "They will be excellent for oil-damaged soil around well blowouts, in marshes and remote areas."

Bioremediation will never replace all other forms of cleanup, because each case has specific conditions that may or may not be favorable for organisms to work, Bonner said.

Oil spills on the open ocean would be particularly difficult for microorganisms to break up.

"The problem with spills in the open ocean is that the bugs need nutrients in order to break down hydrocarbons," he said. "Because of the ocean currents and huge areas involved, the bugs go one way, the nutrients go another, and the oil goes another.

"On an oil-soaked beach, however, the logistics are right for the nutrients and bugs to settle in and break down the oil," Bonner said. "There's not really another process that is more suitable for such a cleanup."