

# **Plan Would Bury Sewage Deep Below L.A. Harbor**

**Sanitation: The city seeks U.S. permission to inject treated sludge into a nearly depleted oil and gas reservoir a mile under Terminal Island.**

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The city of Los Angeles is seeking federal permission for an unprecedented subterranean experiment that officials say could both solve a messy environmental problem and ease tensions with rural neighbors over sewer sludge dumping.

The plan calls for injecting treated sludge into a nearly depleted oil and gas reservoir a mile beneath the earth--and half a mile under the water table--at Terminal Island in Los Angeles Harbor.

The novel proposal could reduce the need to truck the coal-black muck--the final product of treated urban waste water--to farmlands in Kern and Riverside counties, where residents have felt dumped on for years. But concerns persist about potential contamination of freshwater sources and anticipated resistance from harbor-area residents, many of whom feel their neighborhoods have been the dumping grounds for various polluting industries.

Theoretically, the high temperature and pressure at that depth would kill disease-causing microbes in the stuff within 24 hours, and entombment under layers of

impermeable clay and shale would prevent contamination of ground water, according to the request filed with the U.S. Environmental Protection Agency.

But the city and its partner, Terralog Technologies USA Inc., an Arcadia firm with a patent on the untested technology, have a "lot of proving to do before a permit can be granted," said George Robin, environmental engineer for the EPA's Region 9, which includes Southern California.

"This is the first proposal of its kind in the world," Robin said. "So the city and Terralog are under a lot of pressure to show that it is safe and viable."

"We are taking it very seriously, but we don't want any mistakes," he added. "When a catastrophe happens deep underground, remediation is difficult, if not impossible." A final determination by EPA officials is not expected until early next year.

Terralog President Michael Bruno assured, however, that the technique would use a new leakproof well, advanced technology and real-time monitoring systems that would flag potential problems.

"If material starts to migrate even 10 feet above the target . . . we simply turn off the pumps," he said. "With monitoring in place, there is no way material can travel 2,500 feet upwards, even if there are fissures."

The proposal, which is being investigated by researchers at UCLA, has caught the attention of other regulatory agencies, including the California Department of Conservation.

"Right now, we're watching from afar with interest because that sludge has to go somewhere," said Conservation Department spokesman Don Drysdale.

Omar Moghaddam, manager of applied research and engineering at the Los Angeles Bureau of Sanitation, hopes to launch a \$3-million, three-year demonstration project sometime next spring at the city's Terminal Island sanitation plant.

Striding across the proposed site--a dusty, bleak industrial zone sandwiched between a coke-processing plant and a petroleum storage facility--he predicted that "the pilot project alone would dispose of 200 tons of treated sludge a day for 5 1/2 years."

Bruno was optimistic about the efficiency and safety of the technology, which his company has already used to inject a less controversial sort of waste product--oil sludge, not sewage--beneath the earth in Alberta, Canada, and in La Habra in Orange County. But the process has never been tested on treated human wastes.

"With two to four wells at Terminal Island," he said, "we could handle all of Los Angeles' treated sewer waste for at least two decades."

Terralog, a 7-year-old research and engineering services company, specializes in designing and operating waste-injection projects for petroleum producers.

Under its partnership with Los Angeles, the city would pay roughly two-thirds of the \$3 million in start-up costs, with Terralog covering the remainder, Bruno said. Additional payments would depend on the amount of sludge pumped into the earth, but Terralog expects to receive about \$2 million a year from the city during the experiment.

Eventually, Bruno said, sewer sludge from across Southern California could be injected into tapped-out oil and gas reservoirs with almost unlimited capacities near other sanitation plants in El Segundo, Carson and Newport Beach.

But time may be running out.

Kern County, which is the destination for about a third of the treated sludge hauled away from Southern California each year, plans to stop accepting the current type of smelly goop as of 2003. Riverside County recently adopted restrictions to control the spreading of sludge above ground. Many other California counties already have adopted laws ranging from mild restrictions to bans.

As a result, sanitation officials will have to apply additional costly and time-consuming steps to reduce the presence of pathogens in sludge to below detectable levels--a rendering known as "Class A"--before it can continue to be dumped at such traditional rural spreading grounds.

"To the extent that injecting the sludge into Terminal Island will reduce contamination of our farmlands, we're all for it," said James Thebeau, deputy Kern County counsel.

Officials in Los Angeles agree, especially since the city is paying more than \$5 million a year to haul the sludge away.

"By pursuing this deep-well injection project, we are trying to be proactive," said Moghaddam, of the Bureau of Sanitation. "In the meantime, we've got 50 trucks a day heading to Kern County, each carrying 22 tons of treated sewage."

Added Moghaddam, "The EPA understands the urgency of the problem."

Before a permit can be granted, the proposal will be aired in public hearings that may be emotional. Terminal Island and the adjacent Los Angeles communities of San Pedro and Wilmington have complained for years about the city's failure to deal with their region's excessive industrial pollution and port-related truck traffic.

"The key here is that it's untested technology," said Los Angeles Councilwoman Janice Hahn, who lives in San Pedro and represents the harbor area. "At a time when we've begun to make significant strides in terms of getting a handle on the port's negative impacts on surrounding communities, until I learn a lot more about this project, it's difficult for me to support it."

Deep-well injection is only the latest in a series of controversial proposals for getting rid of the city's sewage byproducts.

Los Angeles used to dump it into the ocean, but that practice was banned in the

late 1980s because of concerns that it contaminated the water. Disposal shifted to landfills, but that policy was dropped in the early '90s when the EPA encouraged the use of sludge on land used to grow nonedible crops such as cotton.

Before it gets to the fields, the sludge goes through a 15-day process at sewer plants. Sifted out of the waste-water stream, it is poured into huge, round "digester" tanks where it heats up and most of the germs are killed. The end product is a nitrogen-rich mix known as biosolids, which can be used as fertilizer.

As it stands, big-rig trucks rumble north over the Grapevine thousands of times a year to unload tens of thousands of tons of biosolids on Kern County farms.

The Terminal Island pilot project would inject the biosolids through a new, heavily protected well--a pipe inside a pipe inside a pipe--to a depth of about 5,000 feet, where the temperature is 140 degrees and the pressure about 2,500 pounds per square inch.

The target zone is a briny, porous sandstone formation separated from freshwater above by dozens of layers of clay and shale, which officials say would block any potential percolation of sludge.

Earthquakes would not move the underground sludge into contact with water supplies, Moghaddam said, and the chances of the steel pipeline breaking in a temblor, he said, "are very, very remote. Zilch."

Carbon dioxide produced by fermentation in that natural pressure cooker would be absorbed by the brine, Bruno said. Another byproduct, methane, would percolate in modest amounts through the brine and collect at the roof of the formation, where it could be extracted or stored for later use, possibly to fuel the injection operation.

It all sounds easy enough. But Bruno conceded, "We've had a hard time selling the idea."