UNDERGROUND HAZARDS: DRINKING-WATER FEARS SPREAD - Times-Picayune, The (New Orleans, LA) - March 25, 1991 - page A1

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When it comes to pumping toxic waste underground, Louisiana is in select company.

The state is second in the nation in total injection of hazardous waste underground by industries, accounting for a third of the total U.S. volume. Texas is first.

Two plants in Louisiana - American Cyanamid in Waggaman and Shell Chemical in Norco - each discharged more toxic waste underground than the total discharged by any one of 48 states in 1988, the latest year for which comprehensive statistics are available. Those plants were the two biggest industrial disposers in the nation that year.

An investigation of chemical industry disposal practices reveals widespread disagreement about the safety of injection, considerable evidence that in many cases it is unnecessary and an emerging view in the industry that alternative disposal methods work as well or better.

Many of the biggest injectors, including Shell, recently have decided to switch to alternative disposal methods that in some cases completely eliminate the waste, and thus the need for any special disposal methods.

*** Going underground ***

Underground injection involves pumping liquid hazardous wastes down a pressurized well drilled several thousand feet into the ground. It is the most common form of hazardous waste disposal in Louisiana. State officials estimate that 15.2 billion pounds of hazardous liquids were pumped underground in 1988, enough to fill the Superdome to the roof 15 times.

The most ardent practitioners of underground injection have long hailed it as a near-perfect solution to the hazardous waste problem: Pump it underground and forget about it. But a growing chorus of critics fears that the vast quantities of toxic waste pumped out of sight and out of mind pose an enormous threat to the environment and to wells that supply drinking water for nearly three-fourths of the state's residents.

To understand the controversy over injection, it is helpful to understand a little about Louisiana's geology.

The underground environment consists of alternating layers of different materials, similar to a very tall cake.

Near the surface, layers of clay or silt are interrupted by layers of sand that hold large supplies of water. These sand layers are known as aquifers, and they provide fresh drinking water to nearly three-fourths of the state's residents. Deeper down, layers of rock-like shale begin to appear. The sandy layers here are filled with saltwater unsuitable for drinking. It is into these deeper sandy layers, or zones, that hazardous wastes are pumped through an injection well.

*** Water safety concerns ***

The concern over injection revolves around two fears, both related to the safety of underground drinking-water supplies:

* A major failure or a leak in the upper reaches of an injection well could cause hazardous wastes to escape directly into drinking-water aquifers.

* Wastes injected deep underground could be forced upward under intense pressure through underground cracks and faults into drinking-water supplies. Another potential route for wastes back to the surface is one of about 200,000 old oil wells that have been drilled into the Louisiana crust, then abandoned. Those wells could act like straws, providing an easy pathway up from injection formations.

To address these concerns, Congress in 1984 banned injection except in those instances where companies

could show the wastes would stay in the "zone" into which they were injected for 10,000 years.

The injection zone had been defined as the specific geological layer into which wastes were pumped, such as a single sandy aquifer.

But in drawing up rules under which it would grant exemptions, the federal Environmental Protection Agency changed that definition. Instead of a single layer being considered a "zone," EPA let companies combine several geological formations into one broad injection zone encompassing many different layers of sand and shale underneath drinking-water sources.

So companies do not have to prove that their wastes will stay where they are injected - only that if they do move upward into other layers, they won't make it all the way to drinking water sources.

*** Getting around the rules ***

Freed of the more restrictive requirement, companies have applied for exemptions to continue operating their wells. In Louisiana, eight companies have applied for exemptions to the ban. The EPA has approved seven and determined that the eighth company didn't need an exemption to continue injecting, prompting state Department of Environmental Quality officials to refer to the federal exemption process as a "rubber-stamp" approval.

"What they're doing is manipulating the data to get where they want to be," said Brad Hanson of the Louisiana Geological Survey, a state agency that has reviewed injection applications for the state. "Once they concede that the waste can get out of one zone, it seems to me they can't absolutely guarantee it won't get out of other zones and into the drinking water."

When EPA changed the definition of the injection zone, five U.S. senators who had sponsored the law that was supposed to phase out most injection wrote a sharply worded letter to then-EPA administrator Lee Thomas.

In the letter, the senators called EPA's logic "ludicrous" and cited "gross deficiencies" in the regulations.

"By proposing to allow the injection of these wastes in a manner that will not ensure containment within the injection zone, the agency is needlessly allowing the potential exposure of tens of millions of Americans to threats to their health and environment," the senators wrote.

So far, EPA has not changed its position.

*** The latest solution ***

Viewed in historical context, injection is just the latest disposal method hailed as the solution to the hazardous waste problem.

In the 1970s and early '80s, chemical plants relied upon open, unlined pits for the disposal of wastes, confident that Louisiana's soils would contain the waste and protect the environment. Today, plants are spending millions digging up those pits and battling contamination of underground aquifers.

In the early 1980s, EPA approved a new sort of dump, a pit with special clay and plastic liners, topped by another layer of thick clay. EPA called them "vaults" and assured citizens that no wastes would escape. The agency was so confident that it required companies to watch their vaults for signs of leakage for only 30 years.

But shortly after they were filled, many of the vaults started leaking. In 1986, Congress ordered EPA to discourage building new vaults for hazardous wastes and to move toward more permanent solutions. And the agency now concedes someone will have to watch some of the old vaults for more than three decades.

Today, the EPA is an avid proponent of injection as a waste disposal method. Agency officials assure citizens that injected wastes present no threat to groundwater.

But one major shortcoming in EPA's injection regulations, state officials say, is a lack of monitoring requirements.

*** Monitor wells requested ***

When companies develop computer simulations that show their wastes won't migrate for 10,000 years, EPA takes the company's word that the model approximates real life, even though all the simulations are too new to have been tested against experience.

So in passing its regulations, the state asked companies to put monitoring wells in the deepest aquifer of fresh water closest to the injection zone. Those deep aquifers, known as USDW or U.S. Drinking Water aquifers, are fresh only as defined by the federal government. In fact, they are too salty to be considered suitable for drinking water except in an emergency, thus providing a margin of safety for real drinking-water supplies.

The monitoring requirement, which is not in force because industry has challenged the rule in court, is designed to ensure that if any wastes escaped from the injection zone, companies would discover it soon enough to halt injection, depressurize the zone or take other steps to check contamination.

The regulations would represent the first time DEQ has been given some authority over injection.

Currently, control of injection falls to the state Office of Conservation, whose primary responsibility as an arm of the Department of Natural Resources is promoting and overseeing oil and gas development.

Injection of hazardous waste is unrelated to oil and gas development. Nevertheless, repeated efforts in recent years to move authority over injection to DEQ have been blocked by heavy lobbying from industry, which argues that DNR is more technically versed in injection, and more sympathetic to their concerns about what they view as burdensome and excessive regulation.

*** DEQ gains some clout ***

The Legislature changed that in part in 1989 when it gave DEQ the authority to regulate what was going into the wells, while the Office of Conservation retained authority to inspect and regulate the wells.

DEQ drew up regulations that require the companies to drill groundwater monitoring wells around their injection wells. But when the new rules were approved by the Legislature, the Louisiana Chemical Association sued the agency, challenging DEQ's authority to require monitoring. The computer models should be sufficient, the industry argued.

"We think the regulations are designed to put injection wells out of business," said Dan Borne, president of the LCA, which represents 66 chemical companies. The case has not yet gone to trial and the regulations are on hold.

The concerns expressed by environmentalists echo some of those advanced by companies who have stayed out of the injection business.

"Once you've injected it, you've really lost control of it," said Tom Clausi, plant manager at Ciba-Geigy in St. Gabriel.

Ciba-Geigy drilled an injection well on its site, but then decided not to use it.

"No matter how bad a landfill might be, it has defined boundaries," Clausi said. "If you have to, you can go back in and get that waste. I'm not a hydrogeologist, but I can't envision how you'd go back in and get something you injected 8,000 to 10,000 feet down into the ground."

In most cases in South Louisiana, wastes aren't injected that deep. Wells usually range from 2,000 to 5,000 feet - but that concerns some experts who worry the wells aren't deep enough.

"We looked at applications in the Geismar area where the injection zone was in the area of only 1,200 feet,"

said Hanson of the state Geological Survey. "The base of USDW (that lowest semisalty drinking water source as defined by the federal government) was only 800 feet. That's too close."

Those concerns and others have prompted some longtime advocates of injection to end the practice.

Shell, which was one of the largest injectors in the country, has closed wells at its Geismar and Norco chemical plants, transforming the company from one of the nation's giants in toxic pollution discharge in 1988 to an also-ran in 1989.

"Deep-well disposal has a set of risks and a public concern that are not easily dealt with over a long period of time," said Ray Torgerson, manager at Shell's Geismar plant. "Put it all together, and a decision was made to get out of the wells and treat the material in alternative ways."

Shell's Norco plant is neutralizing its injection waste, which is mostly acid, into a non-hazardous calcium chloride that the plant is selling for use in manufacturing a variety of products, from paper to drugs to batteries.

The state's leading injector, however, has no plans to close its wells. American Cyanamid's Waggaman plant injected 175 million pounds of toxic waste into its wells in 1988, and believes the technology is completely safe. The company injects 16 different kinds of hazardous waste into its five wells, including acetonitrile, a suspected human carcinogen.

The plant's reliance on injection gives Jefferson Parish a dubious distinction as the nation's leading parish or county for the discharge of known or suspected cancer-causing chemicals into the environment, based on 1988 data, the latest available.

"We're confident this is the best and safest form of disposal for our waste stream," said Jim Ducher, American Cyanamid spokesman.

Many researchers are not reassured that injection is as foolproof as the industry hopes.

Recently, research has shown that shallow underground formations down to about 1,000 feet, which are easier to study than deeper zones, have been widely misunderstood. Studies of what happens to fluids in deeper geological formations are in many respects preliminary.

"I don't know if injection is a good idea," said Jeffrey Hanor, a geologist at Louisiana State University. "I sure hope it is, because look at the volume of wastes we've been pumping underground."

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Illustration:

The American Cyanamid plant on the West bank of Jefferson Parish is the nation's second leading underground injector of hazardous wastes, pumping more underground in 1988 than the totals of 39 other states. [COLOR]

Brad Hanson, geologist, La. Geological Survey - [COLOR]

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3 STAFF PHOTOS BY G. ANDREW BOYD

AN INJECTION GIANT, TOXIC CHEMICAL INJECTION IN POUNDS:

Texas:.....480,826,922

LOUISIANA:.....423,320,002

Kansas:.....90,766,710

Ohio:.....56,920,293

Tennessee:.....49,906,110

Source: Toxics Release Inventory

STAFF GRAPHIC

INJECTION WELLS: WHAT CAN GO WRONG

[Graphic is filed separately.] STAFF GRAPHIC BY MICHAEL JANTZE