

PLAQUEMINE, LA.

For the past 30 years, 243 million pounds of toxic liquid and sludge have been oozing through the dirt toward the Plaquemine Aquifer, a thin underground layer of loose sand that bears a vast reservoir of pure, fresh drinking water.

Today those hazardous chemical wastes, the equivalent of 17 Exxon Valdez spills, dumped in sprawling, unlined pits at the Dow Chemical USA plant just north of town, are within 45 feet of the municipal drinking water source for Plaquemine's 7,500 residents and hundreds more in surrounding areas, according to state documents.

If the chemicals continue to sink at their current rate, they will contaminate Plaquemine's drinking water source sometime in the next 10 years. And if that happens, the aquifer may never be clean again, groundwater experts say.

Dow insists it won't happen.

The underground pool of chemicals at the Dow plant covers an area the size of 30 football fields. Just down the river, a mixture of toxic chemicals eight times bigger has sunk 130 feet beneath the Vulcan Chemicals plant in Geismar in just two decades.

The chemicals may be within 30 feet of the Norco drinking water aquifer, state documents show, although as the chemicals have sunk deeper, Vulcan's geology consultants have moved their estimates of the aquifer's location deeper as well. But even using the revised estimates, the current rate of seepage could contaminate the Norco Aquifer in less than 15 years.

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About 140 miles away, at the PPG Industries Inc. chemical plant in Lake Charles, the company has found that a suspected cancer-causing chemical has leaked from the plant into the upper reaches of the Chicot Aquifer. The Chicot is the state's largest drinking water aquifer, covering hundreds of square miles and supplying hundreds of thousands of residents.

Under normal circumstances, water in the aquifer flows in one direction, like a sluggish river. That means any chemicals dumped into the aquifer eventually could flow from beneath the plant to a residential water well.

To prevent that, PPG is pumping millions of gallons of water every year out of the small section of the aquifer that is beneath the plant. By doing so, plant officials hope to form enough suction in the aquifer to make the underground river start flowing into the plant from all directions.

In theory, all of the toxic chemicals leaking into the aquifer then would be trapped beneath the plant and eventually pumped to the surface. Dow and Vulcan have instituted similar pumping programs.

In practice, no one knows if the pumping method will work, or how long it will take.

*** Corrective efforts slow ***

More than 3 million Louisiana residents - nearly three-fourths of the state - depend on underground aquifers for their drinking water. And dozens of those aquifers are threatened by chemical contamination at 54 operating industrial sites. The most serious threats come from Dow, Vulcan and PPG, state officials say.

Despite the dangers, efforts to solve the problem have been slow.

Consider:

The state has not required companies to dig up old chemical dumps to prevent the continued leakage of hazardous wastes into groundwater - a task that could cost more than \$1 billion. The Department of Environmental Quality's Groundwater Division was created only two years ago. While reporters researched documents in the division recently, its new director said, "We have to do that someday - read all these files."

The companies all express confidence that they will never contaminate the aquifers. But their assumptions

are based on unproven experimental recovery and treatment techniques, and often on an insufficient number of samples to prove that the chemicals won't continue to sink, state officials and groundwater experts say.

Some groundwater scientists doubt the recovery methods will work without digging up millions of yards of contaminated soil overlying drinking water aquifers.

Many of the most toxic chemicals dumped into the old pits are much heavier than water, and tend to sink rapidly. Despite extensive efforts to pump billions of gallons of groundwater to the surface, no plant has proved it can keep these highly toxic organic chemicals from continuing to sink just as they have for 20 to 30 years, eventually contaminating drinking water.

Groundwater cleanups on the scale being attempted in Louisiana have never been completed successfully. As a result, companies usually cannot say when, if ever, they will be finished treating contaminated groundwater. For example, a Dow official said the company's cleanup will last "forever."

No one knows who will pay the cost of cleanup if Dow closes its Plaquemine plant.

Some of the worst groundwater contamination is the result of leaking product storage tanks. While state and federal regulations require companies to monitor closely their old waste landfills and their hazardous waste storage tanks, a loophole lets companies ignore tanks containing product and feedstock chemicals that are just as toxic. Leaks in those tanks often are discovered only by chance.

"We have no way to get at the storage of a product until after it becomes a problem," said Joey Hebert, who worked in DEQ's groundwater division for five years before leaving last year to join a private consulting firm. "There are no tank standards. Yet it's often the product tanks that provide the risk."

In some cases, companies have used computer models in place of far more expensive sampling procedures to assure regulators that their wastes will stay in place. In the case of Dow, the company's computer analysis shows that chemicals that have dropped more than 50 feet in 30 years would not move at all for the next 110 years. Field experience has already shown the computer model to be dramatically flawed.

"If we believed the computer models, we wouldn't have any contamination at all," Hebert said. "The wastes we are encountering are moving much faster than any of the models predicted."

Officials at all three companies and their groundwater consultants express confidence that Louisiana's clay layers will protect the drinking water aquifers.

*** Raising false hopes? ***

But geologists who have studied Louisiana's clay say that is almost certainly a false hope. Research has shown that the clay layers do not stand up well to the onslaught of heavy organic chemicals such as those dumped in old chemical dumps. That is why the chemicals continue to sink despite predictions that they will stop.

"The consultants either don't read the literature, or they are ignoring it," said Jeffrey Hanor, a geology professor at Louisiana State University who has researched groundwater threats for DEQ.

"The field experience suggests that south Louisiana soil is just not well-suited for containing these wastes."

And while DEQ officials now concede the companies' claims are often wildly optimistic, the agency continues to accept the firms' lab reports as proof that the laws are followed and the aquifers are adequately protected.

At chemical plants, groundwater can be contaminated by a host of causes: spills and accidents, leaking pipes and underground sewers, faulty storage tanks. Several smaller groundwater contamination cases around the state have been caused by such problems.

But the large groundwater problems at Dow, Vulcan and PPG were caused by huge old chemical dumps.

In the 1960s and '70s, the standard method of disposal of waste chemicals was to dig an unlined pit, dump the chemicals in and throw dirt on top. It turned out to be a huge mistake. Companies across the country are spending hundreds of millions of dollars trying to clean up the damage caused by old chemical dumps.

Vulcan's dump operated from 1968 to 1979. The major chemicals dumped include several known to cause cancer in humans or suspected of doing so. Vulcan's groundwater contamination covers an area larger than 200 football fields.

Vulcan originally believed the most shallow drinking water aquifer, the Norco Aquifer, was 160 feet under ground. After the company submitted evidence that chemicals had sunk to 130 feet - within just 10 yards of the aquifer - Vulcan revised its estimate of the upper reaches of the aquifer to about 200 feet.

The company has already contaminated aquifers at around 10, 40 and 100 feet that are not used for drinking water.

Company officials say they are counting on about 70 feet of clay above the Norco Aquifer to prevent contamination from dropping further. Some rural residents use the Norco Aquifer for drinking, watering cattle and irrigation, according to officials and documents. The major municipal aquifer is the Gonzales Aquifer at about 500 feet.

In 1988, the Environmental Protection Agency, fearful that the Norco Aquifer was already contaminated, asked Vulcan to drill a well to check it. But company officials and state regulators are afraid to drill a monitoring well through the chemical pool beneath the site. They fear that if the well were installed improperly, it would act like a straw and let the chemicals drain directly into the drinking water. So no one knows if chemicals have reached the aquifer yet.

*** Sinking, spreading ***

Dow's dump, which operated from 1958 to 1973, consisted of a series of unlined pits about 15 feet deep that accepted more than 50 kinds of chemicals in the form of liquids, solids and sludges. Dow's rough estimate is that 121,800 tons of chemicals were dumped in the area.

The chemicals have spread out as they have sunk, and now cover more than 30 acres underground. Many of them are known to cause cancer in humans, and others are toxic at extremely low levels.

PPG's dump, which operated from the 1960s to the mid-1970s, originally covered about three acres. But the pool has expanded as more than 100,000 tons of toxic organic chemicals spread out underground.

Those chemicals have contaminated four aquifers - at 10 feet, 20 feet, 50 feet and 80 feet.

In a letter last year to DEQ Assistant Secretary Maureen O'Neill, former Groundwater Division head George Cramer wrote of the PPG dump, "The degree of risk to health and property is severe and long-term, given that contamination is close to the Chicot Aquifer . . . and given that the contaminants may not be removed within our lifetime using today's technology."

The PPG site includes other areas of contamination, including one from a leaking storage tank area. The chemicals there, which include ethylene dichloride and perchloroethylene, have already contaminated the upper reaches of the Chicot Aquifer, 120 feet below the surface.

Geologist Brad Hanson of the Louisiana Geological Survey said government and industry have been dangerously slow to tackle groundwater contamination.

"Groundwater is a victim of the out-of-sight, out-of-mind mentality," Hanson said. "When industry is utilizing our groundwater system for profit, it seems to me they have very little to lose in the long term, while Louisiana has everything to lose.

"The industry is creating jobs, but it's also trading in a natural resource for short-term gain," he said. "When that natural resource is no longer available, industry can move on. But when we can't drink our groundwater anymore, where are we going to go?"

Illustration:

Like tombstones in a graveyard, 224 pumps dot a sprawling old dump at Dow Chemical. Dow wants to suck up toxic sludge to keep drinking water safe in nearby Plaquemine, La. [COLOR]

A worker at PPG Industries near Lake Charles climbs a storage tank in an area where chemicals have leaked into groundwater.

2 STAFF PHOTOS BY G. ANDREW BOYD

Plant officials timetables for cleaning up contaminated groundwater:

VULCAN CHEMICALS:..... "I really don't know."

VISTA..... "Hopefully in our lifetime."

DOW..... "Forever"

BORDEN CHEMICALS & PLASTICS.. "God only knows"

PPG INDUSTRIES..... "It's under study"

STAFF GRAPHIC

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