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New York Times

A Tainted Water Well, and Concern There May Be More

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Published: August 3, 2011

For decades, oil and gas industry executives as well as regulators have maintained that a drilling technique known as hydraulic fracturing, or fracking, that is used for most [natural gas](#) wells has never contaminated underground drinking water.



Jim Wilson/The New York Times

Carla Greathouse is the author of a report that documents a case of drinking water contamination from fracking.

The claim is based in part on a simple fact: fracking, in which water and toxic chemicals are injected at high pressure into the ground to break up rocks and release the gas trapped there, occurs thousands of feet below drinking-water aquifers. Because of that distance, the drilling chemicals pose no risk, industry officials have argued.

“There have been over a million wells hydraulically fractured in the history of the industry, and there is not one, not one, reported case of a freshwater aquifer having ever been contaminated

from hydraulic fracturing. Not one,” Rex W. Tillerson, the chief executive of ExxonMobil, said last year at a Congressional hearing on drilling.

It is a refrain that not only drilling proponents, but also state and federal lawmakers, even past and present [Environmental Protection Agency](#) directors, have repeated often.

But there is in fact a documented case, and the E.P.A. report that discussed it suggests there may be more. Researchers, however, were unable to investigate many suspected cases because their details were sealed from the public when energy companies settled lawsuits with landowners.



Stephen Crowley/The New York Times

Rex W. Tillerson, the chief executive of ExxonMobil, has said that there are no reported cases of a freshwater aquifer having ever been contaminated from hydraulic fracturing

Current and former E.P.A. officials say this practice continues to prevent them from fully assessing the risks of certain types of gas drilling.

“I still don’t understand why industry should be allowed to hide problems when public safety is at stake,” said Carla Greathouse, the author of the E.P.A. report that documents a case of drinking water contamination from fracking. “If it’s so safe, let the public review all the cases.”

Eric Wohlschlegel, a spokesman for the American Petroleum Institute, dismissed the assertion that sealed settlements have hidden problems with gas drilling, and he added that countless academic, federal and state investigators conducted extensive research on groundwater contamination issues, and have found that drinking water contamination from fracking is highly improbable.

“Settlements are sealed for a variety of reasons, are common in litigation, and are done at the request of both landowners and operators,” Mr. Wohlschlegel said.

Still, the documented E.P.A. case, which has gone largely unnoticed for decades, includes evidence that many industry representatives were aware of it and also fought the agency's attempts to include other cases in the final study.

[The report](#) is not recent — it was published in 1987, and the contamination was discovered in 1984. Drilling technology and safeguards in well design have improved significantly since then. Nevertheless, the report does contradict what has emerged as a kind of mantra in the industry and in the government.

The report concluded that hydraulic fracturing fluids or gel used by the Kaiser Exploration and Mining Company contaminated a well roughly 600 feet away on the property of James Parsons in Jackson County, W.Va., referring to it as “Mr. Parson’s water well.”

“When fracturing the Kaiser gas well on Mr. James Parson’s property, fractures were created allowing migration of fracture fluid from the gas well to Mr. Parson’s water well,” according to the [agency’s summary](#) of the case. “This fracture fluid, along with natural gas was present in Mr. Parson’s water, rendering it unusable.”

Asked about the cause of the incident, Mr. Wohlschlegel emphasized that the important factor was that the driller and the regulator had not known about the nearby aquifer. But in comments submitted to the E.P.A. at the time about the report, the petroleum institute acknowledged that this was indeed a case of drinking water contamination from fracking.

“The damage here,” the institute wrote, referring to Mr. Parsons’ contaminated water well, “results from an accident or malfunction of the fracturing process.”

Mr. Wohlschlegel cautioned however that the comments provided at the time by the institute were not based on its own research and therefore it cannot be sure that other factors did not play a role.

In their report, E.P.A. officials also wrote that Mr. Parsons’ case was highlighted as an “illustrative” example of the hazards created by this type of drilling, and that legal settlements and nondisclosure agreements prevented access to scientific documentation of other incidents.

“This is typical practice, for instance, in Texas,” [the report stated](#). “In some cases, the records of well-publicized damage incidents are almost entirely unavailable for review.”

Bipartisan federal legislation before Congress would require judges to consider public health and safety before sealing court records or approving settlement agreements.

Dan Derkics, a 17-year veteran of the environmental agency who oversaw research for the report, said that hundreds of other cases of drinking water contamination were found, many of which looked from preliminary investigations to have been caused by hydraulic fracturing like the one from West Virginia. But they were unable to learn more about them.

“I can assure you that the Jackson County case was not unique,” said Mr. Derkics, who retired from the agency in 1994. “That is why the drinking water concerns are real.”

The New York Times was made aware of the 1987 E.P.A. report and some of its supporting research materials by Ms. Greathouse, the study’s lead author. Other records pertaining to the well were obtained from state archives or from the agency’s library.

Some industry officials criticized the research behind the report at the time. Their comments were among the dozens submitted by the industry to the agency.

“It is clear from reading the 228 alleged damage cases that E.P.A.’s contractor was careless in its investigation and presentation of this material,” [a letter](#) from the American Petroleum Institute said.

The organization faulted a draft of the report as failing to include enough comment from state regulators and energy companies, and as including cases that were poorly documented or outside the scope of the project. In remarks to the agency at the time, the petroleum institute also emphasized that safeguards in West Virginia had improved because of the incident, which the organization referred to as an aberration and said was potentially caused by a malfunction.

“As described in the detail write-up, this is not a normal result of fracturing, as it ruins the productive capability of the wells,” the institute said about the case.

A spokesman for ExxonMobil, Alan T. Jeffers, was asked about Mr. Tillerson’s comments to Congress in light of the documents relating to the West Virginia case. He said that Mr. Tillerson, whose company is the largest producer of natural gas in the United States, was only echoing what various state and federal regulators had said.

On the issue of sealed settlements, Mr. Jeffers said that investigators and regulators could use subpoenas if they really wanted access to the information.

Improvements in fracking have led to a boom in natural gas drilling, enabling energy companies to tap vast reserves of gas in previously inaccessible shale formations deep underground.

Most drilling experts indeed have said that contamination of drinking water with fracking liquids is highly improbable. Even critics of fracking tend to agree that if wells are designed

properly, drilling fluids should not affect underground drinking water. Industry officials also emphasize that all forms of drilling involve some degree of risk. The question, they say, is what represents an acceptable level. Once chemicals contaminate underground drinking-water sources, they are very difficult to remove, according to federal and industry studies. One E.P.A. official involved with a current study being conducted by the agency on the risks of fracking on drinking water said the agency encountered continuing challenges to get access to current cases because of legal settlements.

“Our hands are tied,” said the official, who spoke anonymously because he is not authorized to speak to reporters.

Brendan Gilfillan, a spokesman for the agency, said that it had indeed encountered these barriers but that there were still enough alternate cases to study.

A 2004 study by the agency concluded that hydraulic fracturing of one kind of natural gas well — coal-bed methane wells — posed “little or no threat” to underground drinking water supplies. The study was later criticized by some within the agency as being unscientific and unduly influenced by industry.

Asked about the 1987 E.P.A. report and the West Virginia well, Mr. Gilfillan said the agency was reviewing them closely.

Instances of gas bubbling from fracked sites into nearby water wells have been extensively documented. The industry has also acknowledged that fracking liquids can end up in aquifers because of failures in the casing of wells, spills that occur above ground or through other factors. However, the drilling industry emphasizes that no such cases exist in which the fracking process itself caused drilling liquids to contaminate drinking water.

Both types of contamination can render the water unusable. However, contamination from fracking fluids is widely considered more worrisome because the fluids can contain carcinogens like benzene.

The E.P.A.’s 1987 report does not discuss the specific pathway that the fracking fluid or gel took to get to Mr. Parsons’ water well in West Virginia or how those fluids moved from a depth of roughly 4,200 feet, where the natural gas well was fracked, to the water well, which was about 400 feet underground.

However, [state records](#) not included in the agency’s final report show the existence of four abandoned wells nearby that were deeper than the fracked gas well. State inspectors and drilling experts suggested in interviews that the contamination in Mr. Parsons’ well might have been caused when fracking pushed chemicals from the gas well into nearby abandoned wells where the fracking pressure might have helped them migrate up toward the water well.

This [well was fracked](#) using gas and water, and with far less pressure and water than is commonly used today.

The Environmental Working Group, a research and advocacy organization, studied the Parsons case extensively over the past year, interviewing local residents and former state regulators as well as reviewing state and federal documents.

The organization found at least four abandoned gas wells within 1,700 feet of the gas well Kaiser drilled on Mr. Parsons' property and roughly the same distance from the water well. All of these abandoned wells had been plugged with cement and other materials but had some of their casing removed, which is common for such wells, according to state records.

“The evidence is pretty clear that the E.P.A. got it right about this being a clear case of drinking water contamination from fracking,” said Dusty Horwitt, a lawyer from the [Environmental Working Group](#) who investigated the Parsons case.

The risk of [abandoned wells](#) serving as conduits for contamination is one that the E.P.A. is currently researching as part of its national study on fracking. Many states lack complete records with the number or location of these abandoned wells and they lack the resources to ensure that abandoned and active wells are inspected regularly.

A 1999 report by the Department of Energy said there were about 2.5 million abandoned oil and natural gas wells in the United States at the time.

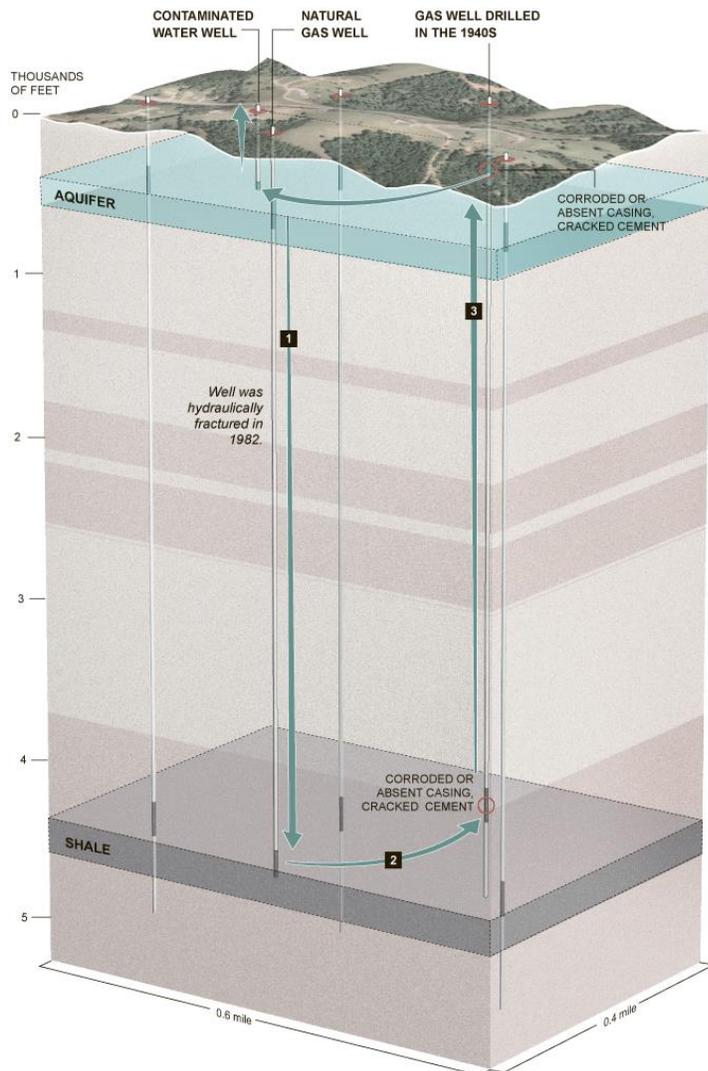
Mr. Parsons said in a brief interview that he could not comment on the case. Court records indicate that in 1987 he reached a settlement with the drilling company for an undisclosed amount.

Ms. Greathouse, the former environmental research contractor and the lead author of the 1987 E.P.A. report, said that she and her colleagues had found “dozens” of cases that she said appeared to specifically involve drinking water contamination related to fracking. But they were unable to investigate those cases further and get access to more documents because of legal settlements. All but the Parsons case were excluded from the E.P.A. study, she said, because of pressure from industry representatives who were members of an agency working group overseeing the research.

The justification for excluding the cases was usually that they lacked sufficient documentation or involved a type of contamination that was outside the scope of the study.

Contamination from Drilling

The Environmental Protection Agency in 1987 concluded that a water well in Jackson County, W. Va., had been contaminated with fluid used in a drilling technique known as hydraulic fracturing. Some drilling experts say that older wells in the area could have served as pathways for the fluid.



A natural gas drilling technique could have been the cause

1 During hydraulic fracturing, a mixture of water, sand and chemicals is injected into the well at high pressure to break up rock formations and release the gas. The pressure can create underground fractures that extend as much as 2,500 feet horizontally.

2 The mixture, which often contains gel, could have entered an abandoned well through breaks in the casing or cement.

3 Pressure from the water and gas used in hydraulic fracturing could then have pushed the mixture up the abandoned well and into the aquifer.

Other possibilities

A gel substance is often used during drilling to help lift pieces of rock created as the bit goes through the formation. The gel could have leaked into the aquifer during drilling and before fracturing.

Gel was also used to plug two of the four abandoned wells in the area. Over the years, it could have seeped up through one or both of those wells, breaking through corroded casing or a cracked cement plug.