Fracking waste threatens Permian Basin water supplies, imperils oil industry plans

By SHELBY WEBB (HTTPS://WWW.EENEWS.NET/MEET-THE-TEAM/SHELBY-WEBB/) | 12/11/2025 06:45 AM EST

Drilling is producting massive amounts of wastewater. That has regulators and companies scrambling for places to put it.

A cattle corral sits empty at the Antina Ranch in West Texas. Ranch officials say cattle were moved, and eventually auctioned off, after water quality tests found benzene and other contaminants in a water well. Shelby Webb/POLITICO's E&E News

CRANE COUNTY, Texas — There's one thing you won't find at the Antina Ranch: cows.

That's because test showed Antina's main water well was tainted with contaminants such as benzene, chloride, sulfate and salt, according to the ranch's manager. So all 150 head of cattle were moved elsewhere — and eventually sold at auction.

Visitors will find hundreds of active and inactive oil wells across 22,000 acres at Antina, about an hour southwest of Midland, Texas. Some wells were drilled decades ago, while others that no longer produce are plugged with cement.

In recent years, a number of those inactive wells and others nearby have roared back to life. Geyser-like blowouts have erupted in West Texas, and underground pressures beneath the abandoned wells have swelled.

The culprit — state regulators, the industry and environmental groups agree — is water, and lots of it.

"I'm hoping we can get it all worked out before it gets too bad — if it's not already past that stage," said Greg Perrin, general manager of the nearby Reeves County Groundwater Conservation District.

Oil production in the Permian Basin of West Texas is churning out record-breaking amounts of briny, chemically laced "produced water" that comes out of the ground during fracking operations. Fracking, or hydraulic fracturing, is a widely used drilling technique that relies on sand, water, chemicals and high pressure to help produce oil and gas.

So much wastewater is coming up that, in some pockets of the Permian, operators are running out of places to put it.

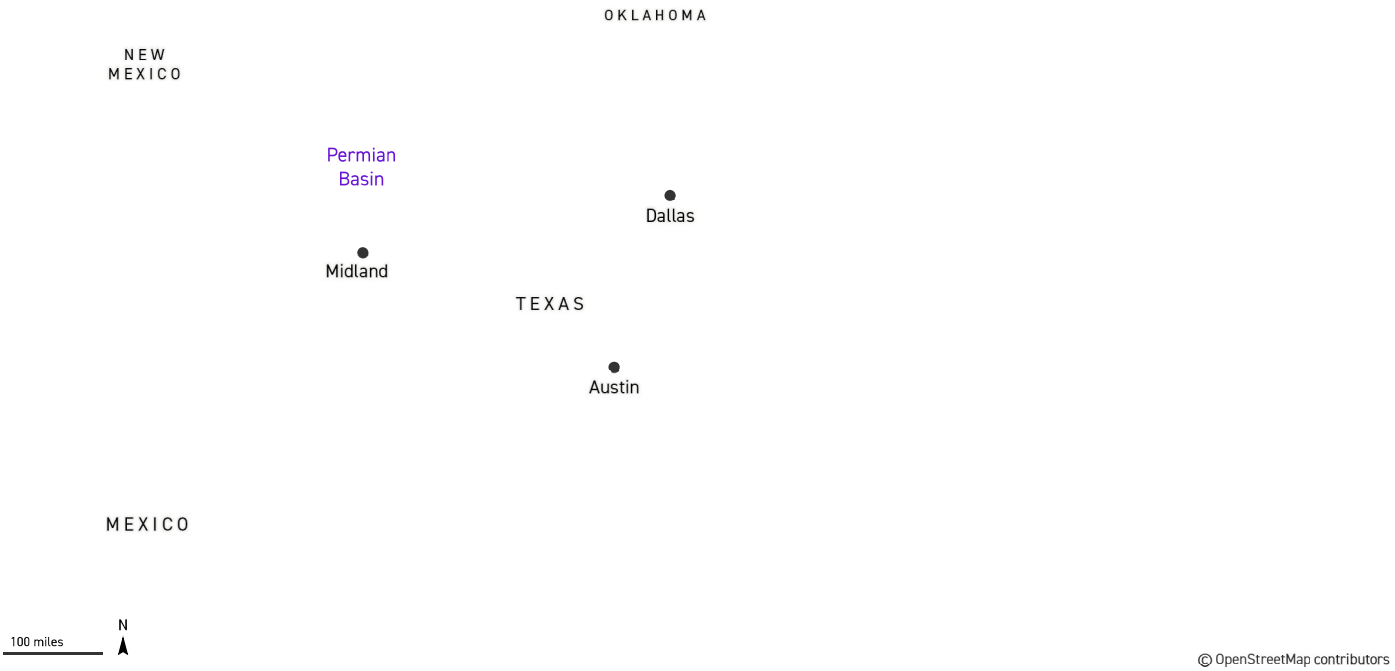
After injecting the wastewater deep underground resulted in earthquakes, Texas regulators have approved disposal wells in more shallow formations. But with record numbers of produced water being injected in the Permian, the shallower injections have come with a host of new issues, including well blowouts and ground deformation.

"While a shift to shallow injection has reduced seismicity concerns, shallow injection alone is not a viable long-term solution," said Jim Wright, chair of the Railroad Commission of Texas, in an emailed response to questions from POLITICO's E&E News.

The Railroad Commission, which oversees oil and gas in Texas, has taken action to address concerns in recent years. Still, residents and water managers say they could see more tainted groundwater and drinking water in the desert if wastewater injections continue at a high rate.

Finding ways to handle wastewater from fracking is a focus in Texas' Permian Basin region

Permian Basin boundary



Source: Bureau of Economic Geology
Claudine Hellmuth/POLITICO

On average across the Permian, four barrels of so-called produced water are pumped out of wells for every one barrel of oil, said Kelly Bennett, CEO of B3 Insight, which provides analytics on the subject. In certain pockets, there can be as much as 10 to 12 barrels of produced water for every one barrel of oil.

Produced water cannot easily be reinjected into the same well for disposal, said Katie Smye, principal investigator for the Center for Injection and Seismicity Research within Texas' Bureau of Economic Geology.

Instead, operators send the wastewater through pipelines or load it onto 18-wheelers to be injected in spots where the ground has enough permeability to allow the water to flow easily underground.

Smye said operators usually picked sites for disposal injection wells as close to wells as the ground would allow, or close to wastewater pipelines and other infrastructure. Companies usually didn't look closely at whether their injection sites were close to faults or other geologic formations that could be affected by injecting tons of produced water, she said.

"Injection historically hasn't been optimized to target the best geology," Smye said. "Injection operations have prioritized location over reservoir quality."

Bennett said when fracking started in Texas, most of the injection wells were "shallow," or drilled above the shale formations where operators access oil.

"Deep wells started getting explored even though they were expensive because they could accept significantly more water," Bennett said.

Earthquakes hit

Earthquakes were relatively rare across the Permian until 2009, when a University of Texas monitoring program logged 19 quakes with magnitudes 1 and higher near the small oil town of Pecos about 40 miles south of the New Mexico border.

The number skyrocketed to more than 1,600 earthquakes (https://news.utexas.edu/2019/11/04/historical-data-confirms-recent-increase-in-west-texas-earthquakes/#:~:text=Nov%2004%2C%202019-,Historical%20Data%20Confirms%20Recent%20Increase%20in%20West%20Texas%20Earthquakes,has%20increased%20dramatically%20since%202009.) magnitude 1 or higher in 2017.

Scientists have concluded it's not the fracking itself that is the main culprit of the earthquakes, Smye said, but injecting the produced water underground.

The deep injections, researchers have found, hit some long-dormant fault lines across the Permian, sparking earthquakes.

The Railroad Commission began to take more serious actions to stop the quakes in 2021, when it established its first seismic response area.

There are now three seismic response areas in Texas. The commission has gone as far as suspending injection permits in those areas and limiting the amount of produced water operators can inject underground — especially for deep injection wells.

But a lot of attention is now turning back to shallow injections.

In August, Hawk Dunlap walked up to a pressure gauge affixed atop one of the plugged wells that pockmark the Antina Ranch.

He shielded his eyes from the searing West Texas sun, eyeing a needle on a pressure dial that reads from 0 to 3,000 pounds per square inch. It read 800 PSI.

"I've seen it as high as 1,300 PSI," Dunlap said. "If there's positive or negative pressure on a well, it's not plugged, and you have a problem."

Hawk Dunlap, who logs damage at the Antina Ranch, checks a pressure gauge fixed to a plugged well. | Shelby Webb/POLITICO's E&E News

Dunlap, a former roughneck documenting issues at Antina, and Sarah Stogner, who manages the ranch and serves as district attorney for three West Texas counties, both previously ran viral campaigns in their individual bids to be elected as one of three state Railroad Commission members.

But they were unsuccessful. Dunlap is running again for the commission in 2026, hoping to unseat Wright.

Their main battle at Antina has been working to get operators of old, abandoned, leaking and over-pressurized wells to fix and properly plug the wells. The owner of the ranch filed a lawsuit against Chevron (https://subscriber.politicopro.com/eenews/f/eenews/?id=0000019b-0928-d392-a99f-6fac18100000) in 2022, alleging the company had been derelict in its duty to remediate its old wells.

The case was set to go to trial in January, but Antina officials are now working to finalize a settlement with Chevron out of court, Chevron said in a statement.

Still, Dunlap and Stogner remain vocal critics of the agency they say has rubber-stamped oil and gas permits — and injection well permits — for too long and has ignored surface and underground issues caused by the industry throughout the Permian.

"These operators need adult supervision," Dunlap said in August. "The rules need to be enforced."

Wright, the Railroad Commission chair, said oversight of produced water injection permits has not been lax.

"The criteria for being an armchair quarterback is that you don't need any," he said in a statement, adding that the commission has been "increasing monitoring and data collection, and following scientific research to reduce seismicity and protect drinking water."

Bryce Dubee, a spokesperson for the Railroad Commission, pointed to an EPA Region 6 review of the commission's water injection program (https://www.rrc.texas.gov/news/120517a-epa-commends-rrc-underground-injection-control-program/) in 2016, which found the agency conducted "more than adequate inspection and monitoring" of injection wells and that the agency maintains "an outstanding enforcement monitoring program."

"We only approve injection if it's demonstrated to not pose a risk," Dubee said in an email.

EPA Region 6 in July also rejected a petition (https://subscriber.politicopro.com/article/eenews/2025/07/30/epa-rejects-petition-to-revoke-texas-regulators-waste-injection-authority-00482065) filed by two environmental groups asking that the agency revoke the Railroad Commission's authority to oversee produced water injections.

EPA said it works alongside Texas agencies to make sure permits involving produced water injections "continue providing Texans with access to safe and clean drinking water and adhere to the strict regulations governing underground injection."

"At the Trump EPA, we know that we can protect the environment and grow the economy — it's not a binary choice," EPA said in a statement. "We choose both."

But local officials say state and federal agencies could do more to regulate injections.

The Railroad Commission also needs to study all the injection well permits that have been granted and the geology around those injection sites, said Ty Edwards, general manager of the Middle Pecos Groundwater Conservation District, a local water management agency.

"They can't shut down the money hole — we have to have the Permian Basin," he said. "But we can't ruin it, either."

Surging injections

Meanwhile, issues related to produced water and underground pressure are mounting across West Texas.

One old well in Toyah, Texas, located about 70 miles away from Antina, came back to life in December 2024, creating a 160-foot-tall geyser of toxic water that gushed for weeks.

A sinkhole near an old well in Crane County was so badly warped by a rural highway that the state paid an estimated $30 million (https://ftp.txdot.gov/pub/txdot/get-involved/tpp/utp/062725-draft-2026utp.pdf) to repair the road.

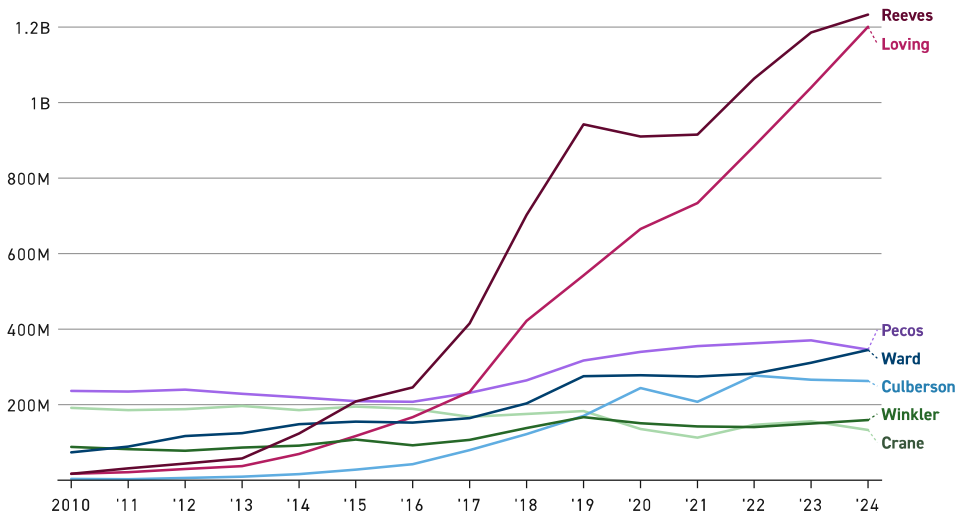
Those issues have coincided with a sharp rise in produced water injections.

Railroad Commission documents show that the average injection volume for wells that received new permits rose from fewer than 10,000 barrels a day early in the 21st century to more than 20,000 barrels a day (https://www.rrc.texas.gov/media/exolyivw/permitting-disposal-wells-in-the-permian-basin.pdf) by 2023.

In Reeves County alone, annual volumes of waste water injected have risen from 16.9 million barrels annually in 2010 to 1.2 billion barrels in 2024. That is a 7,000 percent increase in 14 years. In all, more than 8.57 billion barrels of oil have been injected underground in Reeves County alone from 2010 to 2025 — enough water to fill the Dallas Cowboys' AT&T Stadium more than 462 times.

Produced water injected in 7 Delaware Basin counties increased by nearly 500 percent from 2010 to 2024

Annual barrels of produced water injected beneath part of the Permian Basin, by county



Source: The Texas Railroad Commission
Shelby Webb/POLITICO

The increase in injections has created a jump in underground pressure in the region, Smye said. And that pressure has raised concerns about groundwater contamination.

Underground plumes of pressure can force columns of deeper water up to the surface, Smye said, potentially causing produced water to pass through more shallow aquifers and tainting them.

On top of that, according to Smye, the pressure can force produced water up through old, corroding pipelines. If the casing for those old pipes corrodes underground within an aquifer, produced water could start flowing into the groundwater.

The city of Midland filed a formal protest when Pilot Water Solutions applied for permits to inject produced water about 1,000 feet away from some of the city's drinking water wells — located in a ranch in the Permian.

The city ultimately settled in January 2024 with Pilot, getting the company to agree to reduce the number of planned wells and drilling them farther from the drinking water supply.

Officials with the city of Midland, including the mayor and City Council members,did not respond to a request for comment, nor did Pilot.

Perrin of the Reeves County Groundwater Conservation District said his agency is doing more water testing and research at the northern portion of the county, which edges up to the New Mexico border. He said none of the tests have shown major issues so far.

"But as long as we continue injecting — whichever, shallower or deeper — there's so many old oil wells and water wells, and the infrastructure is so corroded that you're going to have leakage," Perrin said.

'Every single permit'

Todd Staples, president of the Texas Oil & Gas Association, said in a statement that the Railroad Commission already requires operators to constantly monitor pressure gauges, report pressure and injection volume rates, and conduct periodic mechanical integrity tests on disposal wells.

"If valid concerns are raised to the RRC and it is determined that regulations are not being complied with, they have the ability to require the operator to curtail or even suspend operations," Staples said.

The Railroad Commission has started taking a more critical look at shallow injection wells over the past two years.

In February 2024, it began sending letters to multiple operators in response to applications to inject wastewater in part of the Permian Basin, writing that wastewater injections there have "resulted in widespread increases in reservoir pressure that may not be in the public interest and may harm mineral and freshwater resources in Texas."

The commission asked new injection well applicants for more information about their projects, including more geologic and ground pressure data.

The Texas Legislature this year approved a $100 million request (https://subscriber.politicopro.com/article/eenews/2024/11/06/texas-eyes-100m-funding-surge-to-tackle-emergency-oil-wells-00187422) from the Railroad Commission for help plugging "emergency wells," or actively leaking wells. It also gave the commission $2.7 million to create a 10-person injection well investigation team to study the impact of produced water injections above and below the ground surface.

A small produced water injection well sits at the Antina Ranch in Crane County, Texas. | Shelby Webb/POLITICO's E&E News

It set new rules that went into effect in June (https://www.rrc.texas.gov/news/05162025-permian-disposal-wells-guidance-release/), mandating operators plug older oil wells that could be vulnerable to leaks within a half-mile radius of new injection wells. The commission also limits maximum injection pressure at the surface and limits maximum daily injection volumes based on underground pressure.

Dubee said the Railroad Commission is working to reduce the risk of injections and that concerned landowners can contact the commission's Midland District office to check out any issues.

Edwards with the Middle Pecos Groundwater Conservation District said the recent regulatory changes aren't enough to fix the problem.

"The Railroad Commission needs to look at every single permit that comes before them and no longer rubber-stamp the process," Edwards said.

Industry and state officials say the way to solve the issues with produced water is to try to treat it and reuse it.

Texas' Legislature created the Texas Produced Water Consortium in 2021 to work with industry leaders and scientists to find a way to take produced water and clean it to a point where it could be used for things like crop irrigation or, potentially, for cooling a wave of data centers developers are hoping to build in West Texas.

"The real end goal is how do we safely, safely treat this kind of water at scale in a way where we can earn public trust in the ability to treat it as well as we know we can," said Bennett with B3 Insight.

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