



REPORT

# HOW STATES STACK UP ON OIL AND GAS REGULATION:

## STATES ARE NOT ADEQUATELY PROTECTING THEIR COMMUNITIES FROM THE HAZARDS OF DRILLING



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# EXECUTIVE SUMMARY

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The U.S. oil and gas exploration and production sector has boomed over the past 20 years, with 30 percent more wells in production in 2020 than in 2000. Whether we like it or not, the United States is now the world's largest oil and gas producer, with continued expansion likely in the near future. Due to lax federal regulations, the harmful environmental and public health impacts are significant. That makes state regulatory oversight more important than ever.

Oil and gas extraction is an extremely complex industry that involves many processes, including construction of well pads and compressor stations, drilling and construction of wells, fracking, periodic maintenance and reworking of wells throughout their lifetime, and decades of production, before each well is ultimately plugged at the end of its useful life and the site is reclaimed. Each of these stages presents risks to human health and the environment, including air and water. These risks can include the release of dangerous chemicals or naturally occurring harmful substances such as heavy metals, hydrocarbons, and radioactive material. There is a significant and growing body of scientific research linking oil and gas operations to serious negative health outcomes for nearby residents—particularly infants and children—in communities that are often already facing other environmental hazards. These harms are due in no small part to gaping loopholes in federal laws that exempt oil and gas production from critical environmental safeguards. Faced with these dangers, states must step up, exercise their regulatory authority, and demonstrate a commitment to protecting their residents and vital natural resources.

To take stock of whether states are keeping up with the latest science regarding how to protect communities from the harms of oil and gas extraction, this report reviews some of the regulatory changes taken by the 12 largest oil- and gas-producing states over the past 15 years. It highlights state policies in 10 key areas that impact local community health, including providing communities with notification before drilling or fracking starts; ensuring that industrial facilities are not too close to homes, schools, or other sensitive structures; seeing that inactive well sites are properly closed and that industry pays for that well plugging and site reclamation; allowing local governments the authority to protect residents; and safely managing waste, particularly toxic waste.

While these 12 states have all updated their regulations over the past 15 years, environmental and health policies differ widely by state. In some cases, states have actually weakened protections in recent years. Ultimately, across all 12 states, significant gaps remain in the oversight of environmental,

health, and safety impacts, leaving communities and workers vulnerable to a wide range of threats. For example, 3 of the 12 states do not have statewide well setbacks (i.e., a minimum required distance between an industrial site and a sensitive location like a home or school). Of the 9 states that do have setbacks, most are far smaller than is needed for adequate public health protection. Only 3 of the 12 states currently prohibit the spreading of oil and gas wastewater, known as produced water, on roads. In one of them, residents report that the practice continues despite the ban. And only 3 of the 12 states limit or prohibit the discharge of wastewater into surface waters, such as streams and rivers.

At the same time, oil and gas companies have enjoyed increased profits, despite their claims that stronger regulations will cause economic harm. Companies can afford better safeguards. As potential health risks continue to rise, states must take the lead and establish stronger rules to protect communities and workers.



Oil storage tanks beside homes in the Wilmington neighborhood of Los Angeles, California.

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# INTRODUCTION

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Despite the need to pivot to clean and renewable resources, the United States is now the world's largest oil and gas producer and is likely to remain so for the time being.<sup>1</sup> In the past 20 years, the combination of hydraulic fracturing (fracking) with horizontal drilling to extract oil and gas from deep shale, tight sandstone, and other unconventional formations has vastly expanded the scope and scale of the industry and its impacts. The change has been rapid, with 30 percent more wells in production in 2020 than in 2000.<sup>2</sup> Expansion is expected to continue. So long as these are the facts on the ground, we must attempt to mitigate the significant environmental and health impacts that come with this enormous industrial footprint.

The oil and gas exploration and production process entails constructing well pads, drilling wells, and can use extraction techniques like fracking. Over the course of decades, the amount of oil or gas produced by a well will decline to the point where it is no longer economically productive. At that point, it should be properly closed through a process known as plugging and abandonment, which reduces the risk of leaks and other problems with old wells.<sup>3</sup> Each stage of the exploration and production process presents threats to the environment and human health, including groundwater and surface water contamination; air, climate, noise, and light pollution; toxic chemical and wastewater spills; and catastrophic accidents, such as explosions.

Dozens of published, peer-reviewed scientific studies have found statistically significant adverse health outcomes for babies born to mothers living close to oil and gas operations during pregnancy. These risks include preterm births, low birth weight, small size for gestational age, decreased “infant health index” scores, birth defects (including heart defects and neural tube defects of the brain, spine, or spinal cord), and increased risk of infant mortality. Health risks increase with proximity of the operations as well as their density and production intensity. However, studies have found that the risk of these development health effects is elevated in babies that live as far as 10 miles from oil and gas activities.<sup>4</sup>

Scientists have also found health problems in older children from exposure to oil and gas drilling sites and activities, including elevated risks of childhood cancers such as acute lymphocytic leukemia (up to eight miles from drilling sites), acute lymphoblastic leukemia, and childhood lymphoma.<sup>5</sup> In addition to cancer, children show an increase in asthma severity, including higher rates of pediatric hospitalizations to manage asthma attacks.<sup>6</sup> Adult health threats include elevated risk of heart attacks and cardiovascular and respiratory disease.<sup>7</sup>

Despite increasing evidence and concerns about health risks, federal safeguards remain grossly inadequate. Bedrock federal environmental laws, including the Safe Drinking Water Act, Clean Air Act, and Resource Conservation and Recovery Act, have gaping loopholes created for the oil and gas exploration and production industry that exempt it from federal standards for groundwater contamination, toxic and radioactive waste, and dangerous air pollution.<sup>8</sup>

While stronger federal protections have long been needed, these gaps in national laws and oversight mean that states have a critical role to play in permitting and overseeing oil and gas operations. Moreover, while oil and gas companies often claim that stronger regulations will destroy their businesses due to increased costs that they cannot afford, it's clear that the industry has continued to thrive despite recent improvements to state regulations.

This report examines the statutes and regulations for oil and gas extraction of the top 12 oil- and gas-producing states (out of more than 30 states that currently produce oil and/or natural gas): Alaska, California, Colorado, Louisiana, New Mexico, North Dakota, Ohio, Oklahoma, Pennsylvania, Texas, West Virginia, and Wyoming. We assess the degree of regulatory progress that has been made in the past 15 years and the considerable gaps that remain. We evaluate these 12 states on 10 categories of regulation, then take a detailed look at each category and see how states can improve. Ultimately, our report reveals that states that are leaders in certain categories remain laggards in others. No state is leading the pack across all categories of regulation. Residents of oil- and gas-producing regions can see how their states stack up in key areas and advocate for stronger policies—because if one state can require a certain regulation, there is no reason why the others can't.

This report investigates only whether regulations are on the books, not whether they are appropriately enforced. Unfortunately, state enforcement programs nationwide are often much too lax, understaffed, and underfunded.<sup>9</sup> Even when enforced, regulations cannot, and are not intended to, permanently stop harm; only the transition away from fossil fuels can do that. Yet the adoption of stronger regulations, along with compliance by operators and robust enforcement by regulators, can give some reprieve to frontline communities and vulnerable workers and are foundational for holding operators accountable for their actions.

## TOP-LINE FINDINGS

This report analyzes 10 keystone categories of regulation that are directly tied to community harm and pollution and health impacts. As table 1 illustrates, each of the 12 states has responded to some extent to the dangers of the fracking boom by strengthening existing regulations or adopting new ones. Still, no state has addressed all 10 categories of risk, and some have even gone backwards and weakened their rules or are in the process of doing so.<sup>10</sup>

Our report also identifies which state is a leader in each category, compared with the other states. As seen in table 2, there is room for every single state to improve in one or more categories.

In sum, while some regulatory progress has been made to advance protections, the modern oil and gas industry continues to play under—and profit from—many stagnant rules of the past that expose communities and workers to dangerous health and environmental risks.

**TABLE 1: STATES THAT HAVE MADE REGULATORY CHANGES FROM 2010–2025**

	AK	CA	CO	LA	NM	ND	OH	OK	PA	TX	WV	WY
1. Statewide well setbacks		✓	✓				✓		✓	✓	✓	✓
2. Idle/inactive well requirements	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓
3. Financial assurance	✓	✓	✓	✓	✓							✓
4. Pre-drilling or pre-fracking notification	✓	✓	✓						✓			
5. Baseline water testing	✓	✓	✓						✓			✓
6. On-site waste burial	✓	✓			*	✓			✓			✓
7. Waste spreading on land			✓		✓	✓			✓	✓	✓	
8. Wastewater spreading on roads			✓					✓	✓	✓		
9. Waste discharge to surface waters	*	✓			✓			*		*		
10. Local government control		✓	✓	*	✓			*	✓	*		

\* State action taken to make rules or laws less protective.

**TABLE 2: STATES WITH LEADING REGULATIONS IN EACH CATEGORY**

	AK	CA	CO	LA	NM	ND	OH	OK	PA	TX	WV	WY
Statewide well setbacks of minimum 3,000 ft.		✓										
Idle/inactive well limit of 6 months			✓									
Financial assurance of minimum \$400,000 per well	✓											
Pre-drilling or -fracking notification to residents within half-mile radius	✓	**										
Baseline water testing for all landowners within half-mile radius	✓	**										
On-site waste burial prohibited	✓											
Waste spreading on land prohibited												
Wastewater spreading on roads prohibited			✓		✓				✓			
Waste discharge to surface waters prohibited		✓			✓	✓						
Allowing of some local control	✓	✓	✓		✓	✓		✓	✓		✓	✓

\*\* California now prohibits new wells within 3,200 feet of a residence with few exceptions, making its requirements rarely applicable.

# HOW STATES STACK UP IN EACH CATEGORY

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An oil pumpjack near homes in the town of Frederick, Colorado.

## 1. STATEWIDE WELL SETBACKS TO PROTECT HEALTH

When industrial fracking operations began to spread across the country, communities quickly realized that this was not their “grandparents’ drilling,” when a few small-scale wells dotted a property and might even have provided energy for one’s own farm or home. Even in states where oil and gas had been part of the landscape and daily life for decades, the sheer scale of this new type of operation—rigs hundreds of feet tall, waste impoundments covering up to five acres, multiple wells on a well pad, compressor stations, miles of new roads, and constant truck traffic—was something entirely different. So was the scope of impacts, from constant noise and light pollution to the storage and transport of toxic chemicals near water supplies to hazardous air pollution from compressor stations and processing plants.

Dozens of peer-reviewed, published studies have demonstrated that proximity to oil and gas development increases exposure to pollution and other environmental stressors and results in significant health impacts, particularly perinatal and pediatric risks, with the degree of risk often tied to distance from and density of the development.<sup>11</sup>

Setbacks are minimum required distances between industrial activity and a sensitive site. They have been hailed as essential to reduce exposure to pollution and associated impacts on the health and quality of life of frontline residents. Setbacks may be established for oil and gas wells or other facilities, such as waste pits or compressor stations. Generally, setbacks for wells are measured from either the well itself or the edge of the well pad to different locations, such as residences, schools, playgrounds, water supplies, parks, and health-care facilities. State setbacks may be measured to the edge of the structure itself, such as a home or school, or to the property line.

Setbacks are particularly important for oil and gas operations, which can often be located in residential areas despite zoning restrictions. This is especially critical in split-estate situations, in which someone owns the surface of a property but not the rights to the oil and gas beneath the surface, and therefore cannot stop industrial facilities from being sited on the property.

There is considerable research on setbacks, with general agreement that longer distances are more protective.<sup>12</sup> For example, on the basis of several studies and a 2020 grand

jury report released by Pennsylvania’s then attorney general (now governor), Josh Shapiro, health scientists have called for setback distances as long as 3,300–6,600 feet (0.6–1.25 miles), depending on the type of oil and gas infrastructure and the health vulnerability of the exposed population.<sup>13</sup>

Three of the states reviewed—Alaska, New Mexico, and Oklahoma—do not have any setback regulations for homes or schools that apply to oil and gas operations statewide, though some municipalities in New Mexico have established their own local setbacks.<sup>14</sup> That means that most neighborhoods in these three states could see oil or gas wells right next to homes or schools. As seen in table 3, even where states have setbacks on the books and revisions have been made in the last decade or so, most setbacks remain far smaller than what is recommended to reduce exposure and protect health. In addition, some states allow exceptions. And some states have setbacks only for “unconventional” wells (i.e., fracked wells) but lack setbacks for conventional wells.

Only two states have increased their setback requirements in a way that acknowledges recent science: California in 2024 and Colorado in 2022.<sup>15</sup> Even so, exceptions are allowed. For example, 17 percent of sites approved in Colorado in 2024 are within 2,000 feet of one or more residential buildings.<sup>16</sup>

Distance	States
< 200 ft.	OH, PA, WV (conventional wells only), TX*
≤ 500 ft.	LA, ND, PA (unconventional wells only), WY
625 ft.	WV (unconventional wells only)
2,000 ft.	CO
3,200 ft.	CA

\* Applies only to urban areas

## 2. LIMITING THE RISKS OF IDLE OR INACTIVE WELLS

Wells that are no longer producing oil or gas pose significant risks to the environment and need to be properly closed in a process known as well plugging and abandonment. Left on the landscape without plugging and abandonment, they remain a conduit between underground oil and gas formations and aquifers or the air. They often rust, degrade, leak, and crack and, in turn, continually release oil, gas, or other pollution into the air or soil and groundwater.<sup>17</sup> As one example of the harm caused, the U.S. Environmental Protection Agency (EPA) has estimated that nonproducing wells release methane equal to 8.2 million metric tons of carbon dioxide annually, or the same emissions as that from two million gas-powered cars.<sup>18</sup>

Plugging and abandonment involves sealing the well to prevent any leaks either below or above the surface and reclaiming the site. It can be quite expensive to plug a well,

which encourages companies to flout the legal requirements when they can. As the number of active oil and gas wells has grown, so too has the vast number of improperly decommissioned wells. There is estimated to be 3.5 million nonproducing but unplugged wells nationwide, and possibly three times that, scattered across backyards, farm fields, and public parks and forests in virtually every state where drilling has occurred.<sup>19</sup>

Wells may be nonproducing for a number of reasons. The volume of oil and gas being produced from a well declines over time, and wells ultimately stop producing. But a well may also be nonproducing because an operator did not proceed with fracking and production after construction and drilling a well. Or an operator may decide to halt production at an operating well due to a re-prioritization of resources, shifts in prices and markets, a mismatch in the timing between extraction and pipeline development, or reduced demand from purchasers such as oil refineries or gas processors.

States use different terms for these different statuses of nonproduction—such as “idle,” “shut in,” “suspended,” “inactive,” or “temporarily abandoned”—with different associated legal requirements. Operators often opt to keep wells in an inactive or idle status for long periods because officially closing a well triggers requirements for well plugging and site closure, which, as mentioned above, can be a complex and expensive process. But regardless of what they are called or why they are inactive, a nonproducing well is a pollution risk. It is important to limit how long a well can remain in nonproducing status before being plugged.

Only three states appear to require operators to regularly file reports of their inactive wells: California and Texas on an annual basis and Louisiana semiannually. Colorado requires operators to report “temporary abandonment” to regulators within 30 days of making that determination, while Alaska gives operators one year. The regulations of other states do not specify reporting time frames.

The periods that wells can stay in nonproducing status without being plugged also vary by state. In the last decade or so, all but one of the 12 states reviewed (North Dakota) have revised their regulations on idle and inactive wells. Oklahoma most recently enacted a new law to reduce the number of idle or shut-in natural gas wells.<sup>20</sup> However, the current rules in every state are weakened by the fact that states allow operators to apply to the regulatory agency for extensions that may last as long as the initial period. Moreover, these extensions can be renewed multiple times, allowing wells to remain unplugged indefinitely.<sup>21</sup> Some states at least require operators to conduct periodic pressure testing and monitoring on inactive or idle wells in order to reduce the risk of pollution and explosion. New Mexico is currently considering new rules to end indefinite renewals.



An abandoned gas well in Lower Rio Grande Valley National Wildlife Refuge, Texas.

### 3. FINANCIAL ASSURANCE TO COVER DAMAGE AND CLOSURE

Once an operator has determined that production at a well has permanently ceased and reported it to regulators, the well must be plugged and the site adequately remediated and closed within a certain period. The cost of properly plugging and closing down a well varies depending on the age and type of well, its condition, terrain and access, and other factors. At a minimum, it can cost \$10,000 to \$50,000 to seal off an older conventional well, and it may require up to \$1 million or more in other cases.<sup>22</sup> The company that owns the well is supposed to pay for the plugging, but the cost can be a disincentive to undertake the process. To ensure that there are funds available to cover the cost of plugging, remediation, and closing, operators are typically required to post financial assurances, or bonds, prior to drilling.

In most jurisdictions, however, financial assurance amounts are insufficient to cover the cost of properly plugging and remediating a well site. This can ultimately lead to “orphaned” wells, i.e., unplugged wells with no clear responsible party, as in the case of a bankruptcy, or wells being so old that there is no known owner. There is a high

risk that taxpayers will be left to foot the bill for orphaned well closures and clean-ups, but state and federal funds to plug orphaned wells are limited.<sup>23</sup> As a result, wells may be left to pollute the surrounding environment and threaten local property and property values, as well as the health and safety of landowners.

Of the 12 states reviewed, 6 (Alaska, California, Colorado, Louisiana, New Mexico, and Wyoming) have revised their financial assurance rules in the past decade, primarily to increase the dollar amount of required bonds. New Mexico is currently considering increases in its bonding requirements. Only five states (Colorado, Louisiana, New Mexico, Ohio, and Wyoming) require operators to post bonds specifically for persistently idle or inactive wells, but these amounts are generally still far below the likely cost to plug, close, and remediate each site. State bonds may vary depending on a well’s age, depth, status, or type. For example, in 2022, Pennsylvania passed a law that prohibits increases in oil and gas bonding requirements for conventional wells for a 10-year period and completely exempts wells drilled before 1985 from any bonding. (This law is currently being challenged in court.)<sup>24</sup>

At the same time, all of the states allow operators to post a “blanket bond,” which is basically one flat amount that covers all of a company’s wells in that state, which can number in the hundreds in the case of larger companies. This practice effectively represents a deeply discounted price that can significantly exacerbate the risk of inadequate funding and contribute to the nationwide crisis of millions of unplugged, polluting wells dotting American communities. For example, North Dakota requires a bond of \$50,000 if an operator has only one well, but a blanket bond of \$100,000 for any number of wells greater than one.<sup>25</sup> Alaska requires \$400,000 per well if an operator owns five or fewer wells and a blanket bond of \$30 million if an operator owns more than 1,000 wells.<sup>26</sup> While that blanket bond may seem high, it is at most \$30,000 per well, which may be inadequate to cover all costs.

### 4. PRE-DRILLING OR -FRACKING NOTIFICATION FOR LANDOWNERS

In much of the United States, companies can construct wells, compressor stations, and pipelines and can extract and process oil and gas in residential areas—activities that can impact land, quality of life, and health for residents and the broader community for years. In addition, landowners may find themselves unexpectedly living near these activities, even in their own backyards, without any choice, such as in a split-estate situation, or in a forced pooling situation (also known as compulsory pooling) or unitization, in which they can be forced to lease their oil and gas rights.<sup>27</sup>

Regardless of whether a resident has chosen to lease their own land for drilling, is a neighbor to a drilled property, or controls only their surface land, everyone deserves adequate

notification that oil and gas activities will occur and has a right to know what the development process entails and when it will begin. This information is critical to prepare for the light, noise, traffic, and pollution that will result and to have a chance to advocate for possible restrictions on operators (such as setbacks, hours of operation, and road placement). It is also important for landowners who wish to conduct baseline testing of their water and/or air to document conditions before industrial activity begins.

Nonetheless, transparency has not been the norm. For example, two of the nation’s longstanding oil and gas states, Colorado and New Mexico, didn’t require landowner notification until 2007.<sup>28</sup> Two others, Alaska and California, first adopted notification regulations in 2015, and those were only for fracking, not for drilling.<sup>29</sup> Only four states (Alaska, California, Colorado, and Pennsylvania) have strengthened their notification rules in the past decade or so.

Today, all 12 of the states reviewed have some form of drilling or fracking notification requirement. Some states only require notification that a drilling permit has been issued, which doesn’t indicate when drilling will commence. In some states, including Alaska and California, the notification rules differ for drilling and fracking; West Virginia has different notification requirements for horizontal wells where fracking will occur and for conventional, vertical wells. Only five of the states have predrilling notification requirements that specify how many days in advance notice has to be provided (15 days in Texas; 20 days in North Dakota; and 30 days in Colorado, New Mexico, and Wyoming). Half of the states require that notification be provided only to the owners of parcels where operations will be located (“surface owners”), not to renters if the property is rented or to neighbors who are also likely to be impacted.

In addition, operators may simply provide notification by mail, without ensuring that such communication has been received. And, as seen in table 4, there is considerable variation across the states regarding the distance from operations residents have to be located in order to receive notification.

500 ft.	LA, OH
1,500–2,000 ft.	CA (fracking), CO, WV
2,600 feet (half a mile)	AK (fracking)
3,200 feet	CA (drilling)
Surface owners only	NM, ND, OK, PA, TX, WY

## 5. OPERATOR RESPONSIBILITY FOR BASELINE WATER TESTING

When frontline residents first become aware of the environmental, health, and safety impacts of oil and gas production, one of their top concerns is the risk of contamination of drinking water supplies due to the underground migration of methane and toxic substances. Researchers and regulatory agencies now agree that dangerous groundwater and surface water contamination happens regularly during oil and gas operations, though the exact number of cases is unknown.<sup>30</sup>

Despite this being a recognized risk, frontline residents have long borne the burden of proof to demonstrate that changes to the quality (and in some instances quantity) of their water were linked to oil and gas operations on their property or



A water sample being collected for testing.

© Nilisa Garcia/U.S. Air Force

nearby. To do this, they need baseline water tests showing the condition of their water before drilling, fracking, waste storage, and other activities begin. Such information is essential for both frontline residents and state regulatory agencies to establish responsibility and accountability when contamination occurs.

Ideally, oil and gas companies would be required to conduct and pay for independent, third-party testing and make the results available to residents within a wide radius of operations. But of the 12 states reviewed, just 6 (Alaska, California, Colorado, Ohio, West Virginia, and Wyoming) require oil and gas operators to conduct baseline water sampling before drilling or fracking. Two states (Pennsylvania and West Virginia) incentivize operators to conduct baseline water tests through a “presumption of liability” rule, which means operators can be held accountable when water contamination occurs unless predrill sampling is conducted and shows that toxins existed before operations began.<sup>31</sup> As seen in table 5, state policies vary greatly as to who is eligible for baseline water testing. And, as with advance notification, state rules for baseline water testing may be different for drilling and fracking.

**TABLE 5: WHERE BASELINE WATER TESTING IS REQUIRED**

AK	All landowners within 1/2-mile radius
CA	All landowners/tenants who request testing within 1,500-ft. radius of fracking activity or 3,200-ft. radius of drilling
CO	Any four groundwater sources within 1/2-mile radius
OH	All water wells within 300 ft. in urban areas, 1,500 ft. for unconventional oil and gas wells
WV	All landowners within 1,000 ft., plus presumption of liability for landowners within 1,500 ft. of unconventional oil and gas wells
PA	Presumption of liability within 1,000 ft. of conventional, 2,500 ft. of unconventional oil and gas wells
WY	Any four groundwater sources within 1/2-mile

## 6. BURYING WASTE ON WELL SITES

Throughout the months and years that oil and gas drilling and production last, operators generate massive amounts of waste. They use various waste storage and disposal methods, among them pits of different types that are often located on or near well pads. Pits are generally dug into the ground and lined with materials to reduce leaks, although in some cases, particularly among older pits, they may be unlined.

Pits are used for solid or semisolid waste, in particular drill cuttings (i.e., extracted rock and earth), drilling muds (i.e., the mixture of fluids and chemicals needed to drill), and sludge (i.e., scale, sand, and rust that accumulates in waste tanks). Activities on a single oil or gas well pad can result in hundreds of tons of drill cuttings, muds, and other substances.

For decades, operators in some states have been allowed to backfill and bury waste pits beneath the surface as part of the process of closing down a site. However, drilling and production waste contains oil, toxic chemicals, naturally occurring radioactive material, and heavy metals that, over time, can leak into soil, damage vegetation, and eventually reach surface waters or groundwater. These risks have become even more severe with fracking, since the deeper the well or the longer the horizontal portion, the larger the volume of drill cuttings, muds, and other waste.

Despite the potential for toxic and radioactive contamination of soil, vegetation, and water, no agencies document and track the contents, location, size, and number of buried pits that have been left behind, some for decades, on both private property and public lands.<sup>32</sup> Nor do states check to ensure that pits remain intact and do not leak over time. Over the years, all of the 12 states reviewed have made changes to their waste regulations with regard to pits; these have covered, for example, design standards, the use of certain types of liners, dewatering and removal of liquids prior to burial, chemical sampling of waste prior to burial, and removal off-site of particularly toxic hydraulic fracturing wastes. However, only Alaska prohibits operators from permanently burying any waste on-site, instead requiring that it be transported off-site for treatment and disposal.

## 7. SPREADING WASTE ON LAND

As mentioned above, any increase in oil and gas drilling and production leads to a surge of waste generation, forcing operators to continually seek new locations and options for disposal. Solid and semisolid wastes, including drill cuttings, used drilling muds, and sludges, are particularly difficult to manage.

Landfills and other commercial waste facilities are often one option for disposal of these wastes. But in some states operators are also allowed to spread this potentially toxic waste on the land around well sites or in agricultural fields, in some cases without permits.<sup>33</sup> This practice of land spreading may also be called “land farming,” “soil farming,” “land application,” or “land treatment” and may differ in practice or regulation from state to state. In general, it involves depositing oil and gas wastes on the surface of the land or mixing it into soil, sometimes with additives to purportedly help degrade certain components of the waste.<sup>34</sup>

Because these waste products can contain chemicals, metals, and other toxic and radioactive substances, this practice can contaminate vegetation, surface water, or groundwater. The contaminated waste can also become airborne in dry weather if there is no dust suppression, blowing onto nearby yards or playgrounds. Risks can increase over time, such as when waste settles and rain causes it to percolate down into the soil.



A tanker truck spraying brine solution onto a road.

Nonetheless, versions of land spreading continue to be allowed in all of the 12 states reviewed. Eight states (California, Colorado, Louisiana, New Mexico, Oklahoma, Pennsylvania, Texas, and West Virginia) have restrictions on the type of waste that can be spread on land, the spreading of oil-based waste, the required distance from surface or groundwater, and the required soil depth. Three states (Alaska, North Dakota, and Ohio) do not specifically include land spreading in their oil and gas regulations, but such disposal options may be allowed under certain conditions through operating permits.<sup>35</sup> In Wyoming, regulations simply state that the practice is allowed “subject to approval” by the regulatory agency.

## 8. SPREADING PRODUCED WASTEWATER ON ROADS

The underground geological formations that contain oil and gas also contain water, which is separated during production. This “produced water” is the primary form of liquid waste from the oil and gas industry. In 2021 the industry generated nearly 26 billion barrels of this wastewater (or more than one trillion gallons).<sup>36</sup> Produced water can contain extremely high levels of salt, heavy metals, volatile organic compounds such as benzene and toluene, radiological substances, or other harmful chemicals, and it poses significant risks to the environment, including groundwater and surface

waters, vegetation, soil, and air. Because produced water is highly saline, it may also be referred to as “brine” or simply “salt water,” depending on the state. It can also be called “formation water.”

The oil and gas industry manages most of its wastewater by injecting it into underground disposal wells permitted under the federal Safe Drinking Water Act’s Underground Injection Control program.<sup>37</sup> In some states, however, it has been marketed as a saline product that can be used for de-icing roads in the winter and for dust suppression of rural dirt roads at other times of the year. For decades before the fracking boom, most of this wastewater came from conventional well sites and was long presumed to carry only moderate, if any, environmental risks. However, analyses have shown that even wastewater from these shallower, non-shale wells contains numerous chemicals and toxic and radioactive substances, such as chloride, metals, and radium.<sup>38</sup> In 2021 Pennsylvania’s conventional oil and gas industry spread nearly one million gallons of untreated drilling wastewater on roads statewide.<sup>39</sup>

The advent of fracking and unconventional oil and gas development has resulted in far higher volumes of produced water. In turn, the practice and risks of road spreading have become far more controversial—particularly because produced water from deeper shale formations contains even higher levels of salt, metals, and radioactivity than what is generated from conventional wells.<sup>40</sup>

As a result, municipalities and legislators have sought to prohibit the use of oil and gas wastewater on roads.<sup>41</sup> Nonetheless, some state regulatory agencies continue to allow the practice by classifying it as a “beneficial use” of the waste, which means it is allowed with permit applications and approvals. States that allow this practice place some restrictions on how road-spreading is conducted (e.g., only at set distances from water bodies and on roads below a certain steepness).<sup>42</sup>

Of the 12 states reviewed, only 3 (Colorado, New Mexico and Pennsylvania) currently prohibit the spreading of produced water on roads. New Mexico stopped issuing authorizations in 2019 with the passage of the Produced Water Act.<sup>43</sup> However, there is currently an industry petition to reverse New Mexico’s protective policy.<sup>44</sup> Pennsylvania stopped authorizing the practice in 2018 but has not yet adopted legislation or regulations to codify that decision, and according to reports from residents, the practice has continued.<sup>45</sup> North Dakota limits the amount of radioactive material in produced water that can be spread on roads.

## 9. DISCHARGING WASTE TO RIVERS AND STREAMS

Several years into the fracking boom, research studies confirmed that discharging oil and gas wastewater into waterways puts both aquatic life and drinking water supplies at risk.<sup>46</sup> This can include both produced water (previously discussed) and fracking flowback, a mixture of the water and chemicals that are injected underground during fracking, which returns to the surface along with salts and metals that occur naturally underground.<sup>47</sup>

In response to growing concerns over the contamination of waterways, the EPA adopted a federal rule in 2016 prohibiting the disposal of wastewater from unconventional oil and gas operations at municipal treatment plants, which discharge directly into water bodies such as lakes, rivers, and streams.<sup>48</sup> Water treatment plants may be ill-equipped to handle the myriad complex pollutants found in fracking flowback and produced water. Nonetheless, in 2021 an estimated 12 billion gallons of oil and gas wastewater were discharged directly or indirectly into water bodies such as rivers and streams.<sup>49</sup>

These wastewater discharges continue to occur for three reasons. First, there is a longstanding exemption in Clean Water Act regulations for releases into surface waters west of the 98th meridian (i.e., west of central Texas), which purportedly help to maintain water supplies for agriculture and wildlife.<sup>50</sup> Second, wastewater can be discharged into rivers and streams if it is first treated at treatment facilities that are designed to accept waste from commercial and industrial activities and can meet established contaminant limits (a process that is more common in the eastern states).<sup>51</sup> Third, wastewater from conventional onshore oil and gas wells (i.e., not from shale or tight sand formations) can still

be sent to municipal wastewater treatment plants (which are generally designed to accept household sewage) and subsequently discharged into rivers and streams.<sup>52</sup>

Recent reporting suggests that the EPA may consider expanding the exemption for produced water east of the 98th meridian and allow industry to discharge wastewater directly into waterways in a wider geographical area.<sup>53</sup> States will continue to have the authority to limit or prohibit the practice. However, of the 12 states reviewed, only three (California, New Mexico, and North Dakota) currently do so.<sup>54</sup>

Oil and gas wastewater discharges could increase in arid or drought-prone states, where industry and policymakers claim the reuse of wastewater is necessary to support agriculture and industrial operations. Texas already allows operators to discharge directly into rivers and streams if permitted, and Oklahoma has indicated it intends to do so.<sup>55</sup> In May 2025, New Mexico prohibited all discharges to ground and surface waters and began to require permits for proposed wastewater reuse pilot projects going forward.<sup>56</sup> However, industry is challenging these protections in court.<sup>57</sup>

## 10. ALLOWING LOCAL GOVERNMENT CONTROL

As oil and gas development spread to more and more places—including where it had never existed before—some local governments around the country responded by trying to rein in or even prohibit certain activities.<sup>58</sup> These efforts have largely been based on the inherent right of municipalities to address the impacts of commercial and industrial activities through zoning rules and ordinances on noise, light, traffic, siting of equipment, and other considerations.<sup>59</sup>

However, industry and state officials have challenged these local restrictions as an overreach of authority based on the premise that state agencies hold primary authority for regulating the oil and gas industry. The extent to which state laws preempt local authority can vary by state. For example, in some states, local governments can guide where oil and gas activities are conducted but may not prohibit them from taking place outright.

There have been both positive and negative developments on this issue over the past two decades. For example, in New Mexico, Santa Fe County’s 2008 ordinance requires operators to obtain local permits for their activities, a process that virtually ended industry interest in the county.<sup>60</sup> But in 2015, a Mora County ordinance seeking to ban oil and gas operations was struck down by a federal court.<sup>61</sup> In Pennsylvania in 2013, the State Supreme Court ruled that state laws cannot prevent municipalities from taking measures, in the face of oil and gas operations, to uphold the fundamental, constitutional right of residents to clean water and air secured by Article I, Section 27 of the Pennsylvania Constitution.<sup>62</sup> In 2023 a West Virginia court determined that the city of Weirton’s zoning ordinance was too restrictive and conflicted with state oil and gas law.<sup>63</sup>

Of the 12 states reviewed, 9 currently support the right of municipalities to exercise some level of local control over oil and gas operations, in particular through zoning and issue-specific ordinances. In three states (Louisiana, Texas, and Ohio), local authority has been completely curtailed to benefit the oil and gas industry. Louisiana specifically prohibits any level of government besides the state from interfering with oil and gas well drilling.<sup>64</sup> Texas law explicitly gives the state exclusive jurisdiction over oil and gas activities and preempts any municipal efforts to regulate the industry.<sup>65</sup> Ohio statute expressly gives the Division of Oil and Gas Resources Management “sole and exclusive authority to regulate the permitting, location, and spacing of oil and gas wells and production operations.”<sup>66</sup>

Only two states have recently taken steps to strengthen the role of local governments in regulating oil and gas operations. In 2024 California passed a law affirming the ability of local entities “to limit or prohibit oil and gas operations or development in its jurisdiction.”<sup>67</sup> In 2019 Colorado established that nothing in state law “constrains the legal authority conferred to local governments” to regulate oil and gas operations in a way that is more protective than state rules.<sup>68</sup>

## THE OIL AND GAS INDUSTRY CAN AFFORD TO DO BETTER

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The oil and gas industry likes to blame regulations for any decline in its fortunes. When agencies propose better safeguards for the environment and health, operators cry that compliance will be so costly and onerous that they may have to reduce production, lay off workers, and even relocate to a more “business friendly” state, thereby leading to decreases in state revenues that help fund essential services such as schools and health care. Unfortunately for frontline communities, such arguments—bolstered by the industry’s deep financial and political influence—have often stalled or prevented action by policymakers and regulators.

Yet, contrary to industry’s claims, a complex mix of factors drives fluctuations in U.S. oil and gas production. The prices of oil and gas, which determine corporate profits and the level of investment in new drilling, are shaped by global factors. When operators overproduced in the early years of the U.S. shale boom, prices dropped and a self-inflicted bust ensued.<sup>69</sup> The economic downturn during the Covid-19 pandemic and other factors decreased demand for oil and gas.<sup>70</sup> Economic

uncertainty can also constrain the industry, despite political promises to dismantle environmental regulations and speed up permitting.<sup>71</sup>

In the meantime, even though states have instituted new and strengthened regulations, U.S. crude oil production has increased by more than 140 percent over the past 15 years, and gas production has increased by more than 70 percent.<sup>72</sup> For example, although Pennsylvania strengthened oil and gas regulations for unconventional (shale) oil and gas drilling in 2016, shale gas production still increased by nearly 50 percent in 2023.<sup>73</sup> In Colorado, oil and gas production volumes have essentially remained the same since 2022, when the state strengthened well bonding amounts, setback requirements, and pollution controls.<sup>74</sup>

In addition, oil and gas corporations have enjoyed substantial profits during this same period. In the 15-year span from 2010 to 2024, the top 10 oil and gas producers in the United States earned \$316 billion in profits—despite stronger state regulations.<sup>75</sup>

## CONCLUSION

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While some achievements have been made in state oil and gas regulations, as a whole these rules remain far from adequate to provide comprehensive health and environmental protections. Progress has generally been slow and piecemeal—and achieved at all only because of the tenacity of frontline residents advocating for changes, supported by ever-mounting, undeniable evidence of harm.

Despite this evidence, the current federal administration has proposed rolling back many environmental protections, including requirements to reduce climate, air, and water pollution caused by fossil fuel development.<sup>76</sup> At no time during the long history of the U.S. oil and gas industry has it been more critical for states to step up, exercise their regulatory authority, and demonstrate a commitment to protecting their residents and vital natural resources.

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