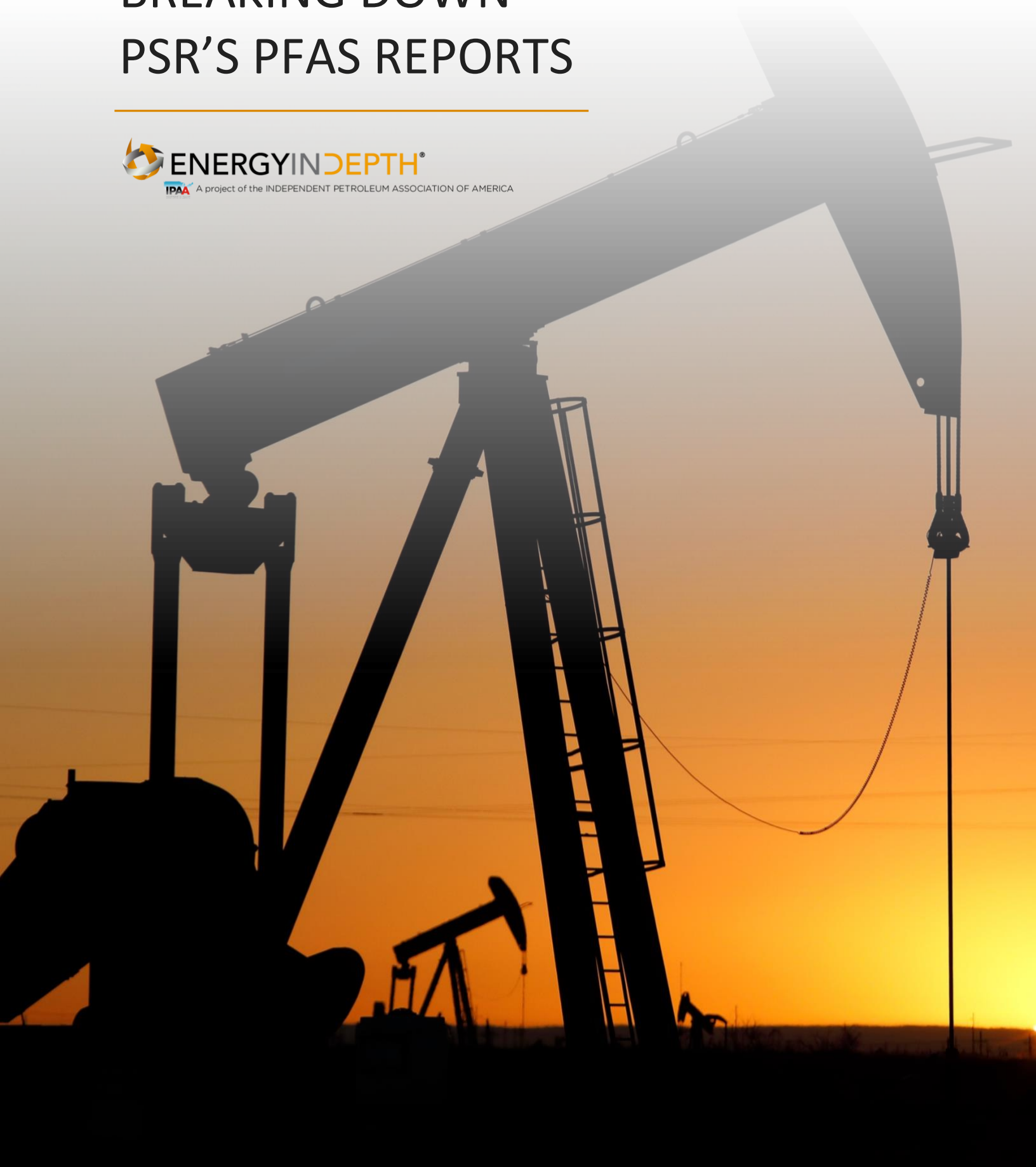

BREAKING DOWN PSR'S PFAS REPORTS



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Executive Summary

There has been much discussion for more than a decade about the chemical additives used in hydraulic fracturing fluid and the disclosures associated with these chemicals.¹ On both fronts, the natural gas and oil industry has consistently delivered in the name of transparency and accountability.

Even so, every few years, a familiar group of activists repurpose old data and rehash claims to create unfounded alarm about completions operations. Physicians for Social Responsibility (PSR),² a group that vocally opposes fracking,³ published a series of state-by-state reports in recent years in which it makes sensationalistic and misleading claims about the **possibility** of undisclosed per- and polyfluoroalkyl substances (PFAS) in hydraulic fracturing solutions.⁴

Here's what you need to know about PSR's recent claims about fracking and PFAS – more commonly referred to as “forever chemicals:”

Key Findings

- The U.S. oil and gas industry is highly regulated at the federal and state level, which includes chemical disclosure requirements. Twenty-eight states currently have chemical disclosure laws.
- PFAS have not been used in the majority of oil and natural gas wells in the states PSR has analyzed.
- While PSR claims that any mention of proprietary information **could** be PFAS, the available records across the country show this is unlikely.
- Disclosing a chemical as proprietary is a common business practice across industries and sectors but fracking additives labeled proprietary trade secrets are still disclosed to key parties, including the U.S. Environmental Protection Agency, state environmental agencies, first responders, and medical staff upon request.

What's in the Reports?

PSR has found very limited evidence of companies using PFAS in fracking fluid solutions in **any** of the states they've investigated over the last decade. Take the group's September 2022 Ohio report⁵ for example. PSR claimed PFAS – more specifically polytetrafluoroethylene (PTFE) – had been used in 101 wells across eight counties from 2013 to 2022, according to publicly available data sourced from the chemical disclosure database FracFocus.⁶ For perspective, a quick search of FracFocus.org reveals there are 2,896 individual disclosures in the database for January 2013 through August 2022, meaning PSR found PTFE to have been used in about three percent of the disclosures available. **Ninety-seven percent of wells in the state did not turn up any evidence of having used the chemical.**

¹ <https://www.energyindepth.org/the-frack-pack-is-stuck-in-the-past/?154>

² <https://www.energyindepth.org/media-activist-group-aim-to-build-a-fracking-straw-man-but-come-up-empty-on-negative-impacts/?154>

³ <https://psr.org/pennsylvanias-fracking-boom-is-hurting-its-oldest-residents/>

⁴ <https://www.energyindepth.org/new-health-study-compendium-is-repackaging-of-the-same-old-discredited-fracking-studies/?154>

⁵ <https://psr.org/resources/fracking-with-forever-chemicals-in-ohio/>

⁶ <http://www.fracfocus.org/>

Rather than report the fact that PTFE has rarely been used in oil and natural gas development, PSR instead claims that any well operator that disclosed use of a proprietary or “trade secret” chemical **could** be using PFAS, and therefore, it’s likely that extensive use of PFAS has gone unreported. PSR makes this claim despite there being no evidence that the proprietary chemical in question is PFAS.

This misleading claim is repeated in all of PSR’s state reports. The reports’ authors use nonconclusive language like “may,” “possibly,” and “could” to make serious assertions that aren’t backed by sound data.

In one report, the authors cite a toxicologist who warned “that if PFAS were to enter drinking water, it could subsequently volatilize or become airborne inside homes.”⁷ The cited example is a hypothetical scenario – and an outlandish one, at that, since experts broadly agree that fracking has not caused widespread, systemic impacts to groundwater.⁸ But that doesn’t stop PSR from using hypothetical situations to justify solving imaginary problems.

In PSR’s Pennsylvania report, the authors do just that, arguing that “oil and gas operations in Pennsylvania deserve scrutiny as a **possible** source of PFAS contamination.”⁹ This is despite only finding instances of PTFE being used in eight wells since 2013 out of more than 8,200 disclosure forms for the Commonwealth. **More than 99 percent of wells in Pennsylvania included in the FracFocus database have not used PFAS in completions operations.**

Despite the legitimate commercial reason for protecting companies’ proprietary information, and the guardrails in place to make sure these additives are safely and appropriately used, PSR’s sensationalized reports are targeted at renewing momentum for repeatedly failed attempts to get federal legislation passed that is aimed at closing nonexistent “loopholes” in hydraulic fracturing regulations.¹⁰

Activist calls surrounding PFAS are often hypocritical, exaggeratory, and distort the evidence. The fact is: oil and gas development is being done safely and responsibly – with decades of evidence to prove it.

Fracking 101

Hydraulic fracturing (fracking) is a method of oil and gas production that involves injecting fracturing fluids into underground rock formations to extract oil and gas.¹¹ The majority of fracking fluid – up to 97 percent – is water.¹² The next largest component of fracking fluid is the “proppant,” generally sand, which props open the rock crevices.¹³ The final components of fracking fluid are additives that serve a number of purposes such as carrying the proppant, preventing corrosion, and minimizing harmful microbial growth.¹⁴

⁷ <https://psr.org/resources/fracking-with-forever-chemicals-in-ohio/>

⁸ <https://www.energyindepth.org/no-epa-did-not-reverse-course-ten-things-to-know-about-finalized-groundwater-report/?154>

⁹ <https://psr.org/resources/fracking-with-forever-chemicals-in-pennsylvania/>

¹⁰ <https://www.energyindepth.org/the-frack-pack-is-stuck-in-the-past/?154>

¹¹ <https://www.epa.gov/hfstudy>

¹² <https://www.nrdc.org/stories/fracking-101#work>

¹³ <https://www.epa.gov/hfstudy>

¹⁴ <https://www.epa.gov/hfstudy>

Despite the protections under state laws to protect “confidential business information” (CBI) or trade secrets, a large number of the chemicals disclosed do not include a CBI exemption.¹⁵ Between 2011 and 2013, the EPA found that **nearly 90 percent of all chemicals added were publicly reported without a CBI exemption** and **30 percent of fracking fluid disclosure forms did not use the CBI exemption** for any chemical additives.¹⁶

Importantly, the inclusion of a proprietary chemical in a fracking fluid solution does not automatically signify a chemical is PFAS or toxic. One of the most common additives are acids, such as hydrochloric acid, which help dissolve minerals and clays.¹⁷ Hydrochloric acid is also found in corn syrups, sodas, cookies, ketchup, and cereals.¹⁸

Fracking Impacts

Scientists and researchers from more two-dozen governmental organizations, universities, and nonprofits confirm that fracking has not had systemic impacts to groundwater, including PFAS contamination.¹⁹ For example, New Mexico’s Energy, Minerals and Natural Resources Department said that its Oil Conservation Division “is unaware of any PFAS contamination associated with completion or injection activities. This is despite having worked on remediation activities at various sites across the state.”²⁰ Additionally, studies conducted by the EPA in Texas and Pennsylvania, found insufficient evidence that the water byproduct produced from fracking (“produced water”) impacted local groundwater.²¹

Moreover, even if a chemical used in fracking is discovered in groundwater, the chemical’s origin cannot necessarily be attributed to oil and natural gas operations. The EPA’s 2016 report on the impact of fracking on drinking water resources cautioned that “a constituent in groundwater that is also found in hydraulic fracturing fluids or produced water does not necessarily implicate hydraulic fracturing activities as the cause.”²² This is because, according to the EPA, some chemicals used in fracking are “ubiquitous in society” and other constituents of fracking fluid can be found naturally in some groundwater resources.²³

Federal Regulatory Landscape

Hydraulic fracturing has never been regulated by the federal government. Instead, it is up to states to regulate completions operations and determine the best chemical disclosure framework for oil and natural gas producers operating in their jurisdiction. As the University of Oklahoma Law journal explains:²⁴

¹⁵ <https://digitalcommons.law.ou.edu/cgi/viewcontent.cgi?article=1299&context=onej>

¹⁶ <https://www.epa.gov/sites/default/files/2015-03/documents/fracfocustanalysisreportandappendicesfinal0320155080.pdf>

¹⁷ <https://www.epa.gov/hfstudy>

¹⁸ <https://www.chemicalsafetyfacts.org/chemicals/hydrochloric-acid/#:~:text=The%20food%20industry%20uses%20hydrochloric,enhance%20flavor%20and%20reduce%20spoilage.>

¹⁹ <https://www.cred.org/scientists-fracking-doesnt-harm-water/>

²⁰ <https://www.env.nm.gov/wp-content/uploads/2023/05/2023-05-23-EMNRD-NMED-WAG-PFAS-Response.pdf>

²¹ <https://www.epa.gov/hfstudy>

²² <https://www.epa.gov/hfstudy>

²³ <https://www.epa.gov/hfstudy>

²⁴ <https://digitalcommons.law.ou.edu/cgi/viewcontent.cgi?article=1299&context=onej>

“...the federal government has removed itself from the regulatory arena when it comes to fracking, leaving issues like fracking fluid disclosure to the states.”

This is because states are best equipped to tailor regulations that fit their unique geographies and situations, implementing regulatory requirements that are often times more restrictive than federal regulation.

Despite this, activists have long claimed that the Energy Policy Act of 2005 excluded hydraulic fracturing via what they refer to as the Halliburton Loophole.²⁵

The so-called Halliburton loophole refers to a provision in the law that provides clarity over the EPA’s regulatory authority.²⁶ While segments of the U.S. oil and gas industry are regulated under the Safe Drinking Water Act (SDWA),²⁷ which grants the EPA the authority to regulate public drinking water supply, the completions process has always fallen under separate regulatory requirements at the state level. The 2005 amendment clarified that EPA does not have authority to regulate fracking fluids under SDWA.²⁸ Recall that in 2005 the Shale Revolution was just kicking off, and the federal government passed laws and adjusted regulations to properly steer and encourage the new technologies that were soon to be responsible for a boom in domestic production.²⁹

The activists’ suggestion that the law created a “loophole” is erroneous. There is no loophole that excludes hydraulic fracturing liquid from being regulated. There was, and continues to be, a state-based regulatory framework for managing fracturing fluids. This fact, however, has not stopped politicians and activists from trying to change the law.

²⁵ https://earthworks.org/issues/inadequate_regulation_of_hydraulic_fracturing/

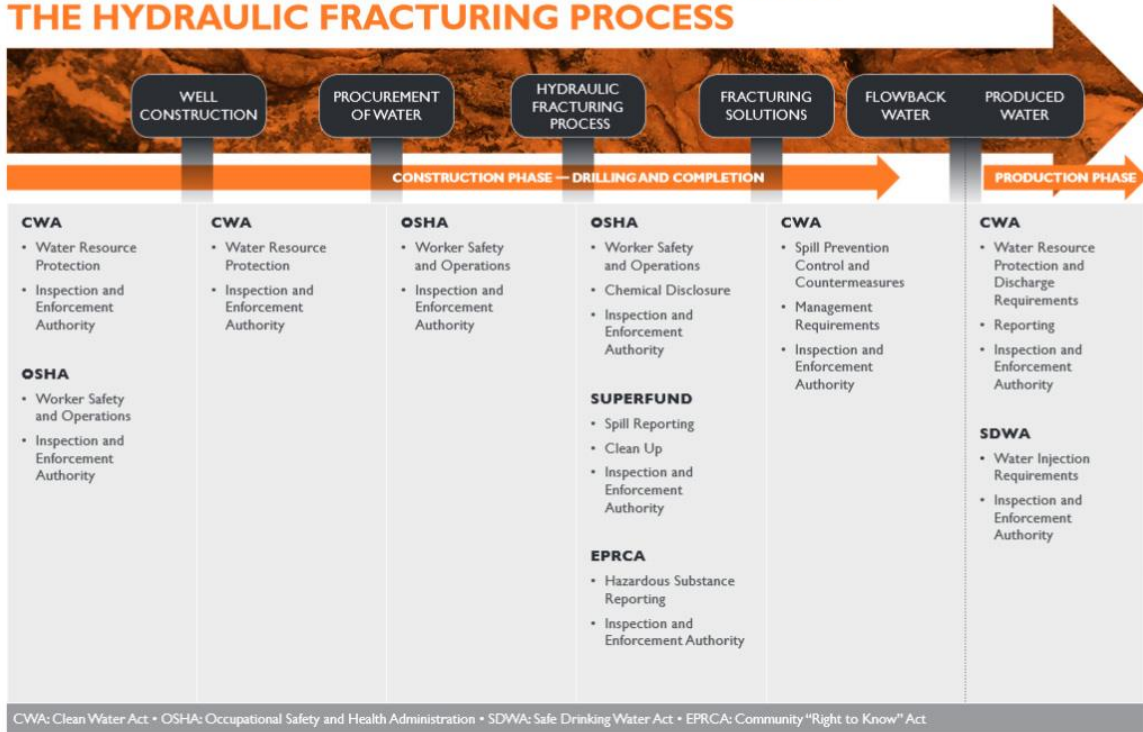
²⁶ Ibid.

²⁷ <https://www.epa.gov/sdwa>

²⁸ <https://bigthink.com/the-present/halliburton-loophole/>

²⁹ <https://www.forbes.com/sites/rpapier/2017/04/21/how-the-shale-boom-turned-the-world-upside-down/?sh=4c23a07977d2>

FEDERAL STATUTES REGULATE EVERY STEP OF THE HYDRAULIC FRACTURING PROCESS



Source: Energy in Depth³⁰

State Regulatory Environment

As of 2019, 28 states have passed laws regulating chemical disclosure of fracking fluid composition, often using the public disclosure registry FracFocus.³¹ FracFocus, which has become the de facto standard for oil and gas industry disclosure,³² is managed by the Ground Water Protection Council (GWPC).³³

FracFocus provides the general public with access to information about chemicals used in hydraulic fracturing. This includes: a “comprehensive picture of this information and how it corresponds to related factors, the site also provides objective information on hydraulic fracturing, the purposes these chemicals serve, and the steps individual companies and regulatory agencies are taking to protect groundwater.”

State chemical disclosure laws are not uniform, but they share several similar characteristics:

³⁰ <https://www.energyindepth.org/forbes-contributors-agenda-driven-anti-fracking-series-chock-full-of-long-debunked-claims/?160>

³¹ <https://digitalcommons.law.ou.edu/cgi/viewcontent.cgi?article=1299&context=onej>

³² <https://fracfocus.org/about-us>

³³ <https://www.gwpc.org/>

- Generally require operators to disclose composition of fracking fluids, often through FracFocus.
- All statutes include trade secret exemptions.³⁴
- Require operators to disclose chemical information to first responders in the case of industrial accidents, medical emergencies, or chemical spills— overriding trade secret protections in those instances.³⁵

Some states, like Wyoming and Colorado, also require an additional degree of verification or attestation from companies claiming trade secret exemptions, and select states have legal avenues for challenging trade secret claims.

The Frack Pack Is Back

In 2009, twin bills from Democrats in both chambers of Congress were introduced to change the federal policy around hydraulic fracturing fluid disclosure. The bills, titled the *Fracturing Responsibility and Awareness of Chemicals Act* (FRAC Act),³⁶ would:

- Repeal the exemption under the SDWA.
- Amend SDWA to allow the EPA to prescribe regulations that authorize states to seek primary enforcement responsibility for fracking operations without seeking to assume primary enforcement responsibility for other types of underground injection control wells.
- Require that chemicals used in underground injections be disclosed before hydraulic fracturing occurs.³⁷

The bills were led by Reps. Diana DeGette (D-CO-1), Maurice Hinchey (D-NY-22) and Jared Polis (D-CO-2) in the House and Sens. Bob Casey (D-PA) and Chuck Schumer (D-NY) in the Senate – a group that has since been called the “Frack Pack.”³⁸ The 2009 bill died in committee,³⁹ and multiple attempts to pass similar bills have been introduced since, with each one failing as well.⁴⁰

- In 2015, the “Frack Pack” introduced a series of bills to amend landmark environmental laws, including the Safe Drinking Water Act, Clean Air Act, Clean Water Act, and Resource Conservation and Recovery Act, with more stringent federal regulations on the oil and gas industry. Like previous attempts, the legislative package was not successful.
- Rep. DeGette attempted to revive the Frack Pack in 2019 but once again failed to garner the needed support.
- In 2021, the Frack Pack once again revived the FRAC Act, but the legislation met a similar fate to prior attempts.⁴¹
- Rep. DeGette most recently introduced the FRAC Act in July 2023.⁴²

³⁴ <https://digitalcommons.law.ou.edu/cgi/viewcontent.cgi?article=1299&context=onej>

³⁵ <https://digitalcommons.law.ou.edu/cgi/viewcontent.cgi?article=1299&context=onej>

³⁶ <https://www.congress.gov/bill/115th-congress/senate-bill/865>

³⁷ Ibid.

³⁸ <https://www.beaconjournal.com/story/news/2015/03/19/frack-pack-rules-in/10652124007/>

³⁹ Ibid.

⁴⁰ <https://www.naturalgasintel.com/house-democrats-frac-act-taking-aim-once-again-to-boost-unconventional-drilling-oversight/>

⁴¹ <https://www.congress.gov/bill/117th-congress/house-bill/2202/actions?s=1&r=16>

⁴² <https://degette.house.gov/media-center/press-releases/degette-introduces-legislation-regulate-chemicals-used-fracking-process>

The FRAC Act has repeatedly failed to garner bipartisan support because it seeks to close non-existent loopholes, while also encouraging high levels of private and government spending to comply with new, duplicative proposed regulations, bolted on to existing environmental laws.

Diving Deeper Into “Fracking With Forever Chemicals”

PSR has published several state reports in which they claim oil and gas companies have been using PFAS in their hydraulic fracturing operations, regardless of the lack of evidence demonstrating this to be true. In each of these state reports, PSR makes misleading claims about the *possibility* of undisclosed PFAS in wells located in the state because of some additives receiving proprietary exemptions.

Background on PSR and Report Authors

PSR is an active member of the “Keep It In the Ground” movement and has been a vocal supporter of banning fracking for years,⁴³ going as far as to praise its own efforts to “give natural gas a black eye.”⁴⁴ In 2022, PSR used its Colorado report⁴⁵ to call for a ban on fracking in the state, according to CPR News:⁴⁶

“Physicians for Social Responsibility said the findings bolster its recommendation that Colorado policymakers take steps to ban fracking and require greater transparency from the oil and gas industry.”

The screenshot shows the PSR website header with the logo and text: "PSR PHYSICIANS FOR SOCIAL RESPONSIBILITY U.S. affiliate of International Physicians for the Prevention of Nuclear War, recipient of the 1985 Nobel Prize for Peace". There is a mailing list sign-up form and a "DONATE TODAY" button. The navigation menu includes: HOME, About, Support PSR, Environment & Health, Nuclear Weapons, Safe Energy, Resources, News & Events, Chapters. The main content area is titled "Hydraulic Fracturing" and includes the text: "PSR is working in multiple ways to 'give natural gas a black eye.'" and "PSR Calls for a Ban on Fracking. Read PSR's revised position statement here." There are also "Print This Page" and "Send This Page to a Friend" buttons, and an "Action Alerts" button.

Each of the state reports (Pennsylvania,⁴⁷ Colorado,⁴⁸ Texas,⁴⁹ New Mexico,⁵⁰ and Ohio⁵¹), were written by the same authors: Dusty Horwitt, J.D., Barbara Gottlieb, and Gary Allison. Horwitt, the report lead, is a consultant who serves as the Commissioner for the Lansing Board of Water & Light. PSR lists Horwitt

⁴³ <https://psr.org/new-report-makes-strong-case-to-ban-fracking/>

⁴⁴ <https://www.energyindepth.org/three-important-facts-missing-from-stateimpacts-article-on-fracking-and-health/>

⁴⁵ <https://psr.org/resources/fracking-with-forever-chemicals-in-colorado/>

⁴⁶ <https://www.cpr.org/2022/02/03/colorado-fracking-oil-gas-pfas-forever-chemicals/>

⁴⁷ <https://psr.org/resources/fracking-with-forever-chemicals-in-pennsylvania/>

⁴⁸ <https://psr.org/resources/fracking-with-forever-chemicals-in-colorado/>

⁴⁹ <https://psr.org/resources/fracking-with-forever-chemicals-in-texas/>

⁵⁰ <https://psr.org/resources/fracking-with-forever-chemicals-in-new-mexico/>

⁵¹ <https://psr.org/resources/fracking-with-forever-chemicals-in-ohio/>

as a consultant. In his previous role at the Environmental Working Group, he campaigned for increased chemical disclosure in the state of New York.⁵²

State Report Data Comparison

The PSR state reports did not conduct all the research within the same time periods, nor did they standardize the set of chemicals evaluated across the reports.

PSR State Report Findings				
State	Author(s)	Data Collection Period	Chemicals Researched	Findings
Pennsylvania	Dusty Horwitt, J.D., Barbara Gottlieb <i>Data</i> <i>Analysis:</i> Gary Allison	January 1, 2012 – September 29, 2022	PTFE/Teflon, trade secret chemicals, and/or trade secret surfactants	Oil and gas companies injected eight unconventional gas wells with PTFE/Teflon (purpose unspecified). Oil and gas companies injected 5,062 unconventional gas wells with at least one trade secret chemical. Oil and gas companies injected 1,234 wells with least one trade secret surfactant.
Colorado	Dusty Horwitt, J.D., Barbara Gottlieb <i>Data</i> <i>Analysis:</i> Gary Allison	2011– 2021	PTFE/Teflon, trade secret chemicals, and/or trade secret surfactants	Oil and gas companies used PTFE/Teflon in 282 oil and gas wells (purpose unspecified). Oil and gas companies injected 12,623 unconventional wells with at least one trade secret chemical. 3,221 oil and gas wells were injected with at least one trade secret surfactant.
Texas	Dusty Horwitt, J.D., Barbara Gottlieb <i>Data</i> <i>Analysis:</i> Gary Allison	January 1, 2013 – September 29, 2022	PTFE/Teflon, fluoroalkyl alcohol substituted polyethylene glycol, fluorosurfactants that are likely to be PFAS or PFAS precursors, ⁵³ trade secret chemicals, and/or trade secret surfactants	Oil and gas companies injected 1,625 wells with PTFE/Teflon (purpose unspecified). Oil and gas companies injected 1,222 oil and gas wells with fluorosurfactants or potential fluorosurfactants that are PFAS, likely PFAS, or PFAS precursors that can degrade into PFAS (purpose unspecified). Oil and gas companies injected 58,199 wells with at least one trade secret chemical, and 30,700 wells with at least one trade secret surfactant.

⁵² <https://www.ewg.org/news-insights/testimony/statement-dusty-horwitt-jd>

⁵³ PSR explains this in the Texas state report saying, “These chemicals were listed as “fluoroalkyl alcohol substituted polyethylene glycol” and “nonionic fluorosurfactants.” Fluoroalkyl alcohol substituted polyethylene glycol, injected into 65 wells, is clearly a PFAS because it is listed on EPA’s Master List of PFAS Substances. The FracFocus records showed that this substance has a CAS number of 65545-80-4. This identifier enabled PSR to locate the chemical on EPA’s Master List of PFAS Substances where it is listed under a different name.”

New Mexico	Dusty Horwitt, J.D., Barbara Gottlieb <i>Data Analysis:</i> Gary Allison	January 1, 2013 – September 29, 2022	PTFE/Teflon, fluoroalkyl alcohol substituted polyethylene glycol, fluorosurfactants that may be PFAS or PFAS precursors, trade secret chemicals, and/or trade secret surfactants	Oil and gas companies injected 227 wells with PTFE/Teflon (purpose unspecified). Oil and gas companies injected 34 wells with fluoroalkyl alcohol substituted polyethylene glycol (purpose unspecified). Oil and gas companies injected 8,293 wells with at least one trade secret chemical, 3,681 wells with at least one trade secret surfactant, and 24 wells with at least one nonionic fluorosurfactant.
Ohio	Dusty Horwitt, J.D., Barbara Gottlieb <i>Data Analysis:</i> Gary Allison	2013 – 2022	PTFE/Teflon, trade secret chemicals, and/or trade secret surfactants	Oil and gas companies used PTFE/Teflon in 101 oil and gas (purpose unspecified). Oil and gas companies injected 2,164 wells with at least one trade secret chemical, and 688 wells with at least one trade secret surfactant.

State Report Data Analysis

The data collected by PSR from FracFocus does not show a pervasive PFAS problem in wells. In each state, over 95 percent of wells that reported chemicals used during the study period – and in the case of Pennsylvania, 99 percent of all wells – did not use PFAS or related chemicals.

PSR Identified Use of PFAS in Fracking in Oil and Gas Wells via FracFocus				
	Report Research Period	Total # of wells identified during research period	Total # of wells Identified by PSR as using unspecified amount of PFAS***	Percent of wells not identified as using PFAS
Ohio	Jan. 1, 2013 – Dec. 31, 2021*	2,761	101	96.34%
Pennsylvania	Jan. 1, 2012 – Sept. 29 2022	9,025	8	99.91%
Colorado	Jan. 1, 2012 – Dec. 31, 2020**	17,460	282	98.38%
Texas	Jan. 1, 2013 – Sept. 29, 2022	79,201	1,625	97.95%
New Mexico	Jan. 1, 2013 – Sept. 29, 2022	8,979	227	97.47%
* PSR did not specify the exact dates outside of 2013 – 2022. These dates are an assumption.				
** PSR did not specify the exact dates outside of 2012 – 2021. These dates are an assumption.				
*** The purpose of the chemical use is unspecified.				

Data Pulled From Non-FracFocus Site

PSR analyzed chemicals recorded in FracFocus,^{54,55} by using a non-affiliated open-source website, Open-FF,⁵⁶ that compiles data available on FracFocus. The site's intention is to "transforms the FracFocus data into an easier-to-use resource available to anyone."

PSR used the Open-FF data to look for chemicals that are classified as PFAS, chemicals that can break down into PFAS, and types of chemicals that are often comprised of PFAS, utilizing Chemical Abstracts Service (CAS) numbers – unique numerical numbers assigned to chemicals by the American Chemical Society – to account for variations in names or proprietary disclosures.⁵⁷

While the authors claimed that Open-FF is "more accurate and informative than the original version of FracFocus,"⁵⁸ the accuracy of the data has not been verified and could have errors from data transfer. Likewise, companies will update the data provided to FracFocus if an error is identified, which may not have been included at the time data was pulled on the Open-FF site.

Sweeping Assumptions

In every report, PSR makes the incredibly broad assumption that a chemical that is undisclosed due to its status as a trade secret *must* be PFAS. In other instances, like in Colorado, PSR claims that a lack of data showing PFAS use is because the state's disclosure regulations are lacking – not that companies aren't using PFAS.

"PSR did not find further evidence of [PFAS] use in Colorado beyond the single gas well in Moffat County, despite searching in Open-FF and other online sources. This surprising lack of evidence, as is discussed below, may be due to the significant gaps in reporting requirements for the oil and gas industry in Colorado, rather than to lack of use of fluorosurfactant chemicals."⁵⁹

The Colorado report utilizes a map (pictured below) that charts: 1) Wells Fracked with PTFE/Teflon, 2) Wells Fracked with Trade Secret Surfactants, and 3) Wells Fracked with Trade Secret Chemicals. The chart is trying to lead the reader to believe that where wells fracked with PTFE/Teflon exist, PFAS chemicals (undisclosed as trade secret) must also exist. But in reality, all this map does is provide an overview of where oil and natural gas production in Colorado is most concentrated.

⁵⁴ <https://fracfocus.org/>

⁵⁵ For New Mexico, PSR first utilized data from the New Mexico Oil Conservation Division under the Energy, Minerals and Natural Resources Department. This was data collected from oil and gas well operators and disclose the fracking chemicals used in each well. PRS relied on this platform to gather data from January 1, 2013, until early 2018. The platform changed in 2018, when the state made it so fracking chemical disclosures had to be made to FracFocus instead of the state data base.

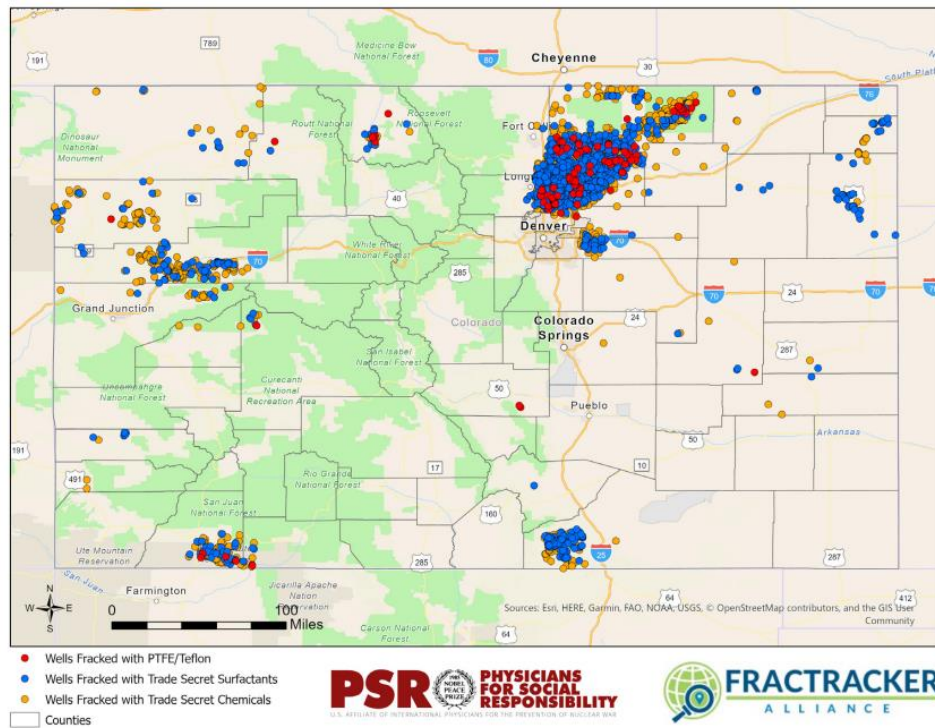
⁵⁶ <https://frackingchemicaldisclosure.wordpress.com/>

⁵⁷ <https://psr.org/resources/fracking-with-forever-chemicals-in-new-mexico/>

⁵⁸ <https://psr.org/resources/fracking-with-forever-chemicals-in-new-mexico/>

⁵⁹ <https://psr.org/resources/fracking-with-forever-chemicals-in-colorado/>

Colorado Oil & Gas Wells Fracked with PTFE and Trade Secret Chemicals, 2011-2021



60

The authors show similar charts for Pennsylvania, Texas, Ohio, and New Mexico in each state report, respectively, that make the same illogical leaps.⁶¹

Nonconclusive Language

PSR constantly uses nonconclusive language while making serious conclusions. While it is true that reports do not always have direct conclusions and only supported hypotheses, PSR consistently relies on phrases such as, “may,” “possibly,” “could,” etc., without any evidence to support these possibilities.

In fact, the New Mexico report directly states, “Information about these chemicals [fracking fluids] was limited, but scientific experts told PSR that chemicals injected into two dozen wells in the Permian Basin were PFAS, may be PFAS, or are precursor chemicals that could degrade into PFAS.”⁶² The authors do not disclose who the “scientific experts” are or their qualifications to make such assertions, and the “expert” opinions do not mean that PFAS chemicals were found, only that it is a possibility it could be present by virtue of the chemicals being classified.

This use of nonconclusive language is also used by PSR when making serious accusations about oil and gas operations in relation to the health of local residents. In the Ohio report, the authors state that toxicologist Dave Brown “warned that if PFAS were to enter drinking water, it could subsequently

⁶⁰ <https://psr.org/resources/fracking-with-forever-chemicals-in-colorado/>

⁶¹ See Appendix C

⁶² <https://psr.org/resources/fracking-with-forever-chemicals-in-new-mexico/>

volatilize or become airborne inside homes. Brown also added another potential pathway for airborne exposure: PFAS could become airborne when gas is burned off during flaring at the wellhead.”⁶³

While Brown’s warnings sound like staggering and plausible conclusions, Brown is in no way saying that airborne PFAS from hydraulic fracturing is currently contaminating the air. Rather, Brown is explaining this could be possible if various other factors were true:

1. PFAS being present;
2. PFAS entering drinking water;
3. PFAS-contaminated drinking water volatilizing; and
4. PFAS-contaminated drinking water volatilizing inside of a person’s home.

PSR intentionally uses an alarmist and misleading framing of Brown’s comments – despite multiple steps needing to happen for this claim to materialize.

Disregard for Current Regulations

In a related fashion, in the Pennsylvania state report, PSR says that “Oil and gas operations in Pennsylvania deserve scrutiny as a possible source of PFAS contamination, given the documented use of PFAS in the state’s oil and gas wells and the potential that people could be exposed to such PFAS via multiple pathways.”⁶⁴ The phrasing ‘deserve scrutiny’ implies that the oil and gas industry, and fracking in particular, are not an already heavily scrutinized sector. The reality is that the oil and gas sector is “highly regulated at multiple levels of government,”⁶⁵ including in Pennsylvania.

In 2016, the Pennsylvania state government implemented new standards and regulations around unconventional shale wells that typically utilize hydraulic fracturing in completions processes.⁶⁶ The new rules granted the Pennsylvania Department of Environmental Protection the ability to require additional rules (on top of the already extensive ones dictating strict permit requirements⁶⁷) and protections in situations where fracking was occurring near public resources, as well as placed further responsibility on oil and gas companies for any alleged impacts to waterways.⁶⁸ Robust regulatory landscapes exist in each of the states analyzed, including New Mexico,⁶⁹ Ohio,⁷⁰ Texas,⁷¹ and Colorado.⁷²

⁶³ <https://psr.org/resources/fracking-with-forever-chemicals-in-ohio/>

⁶⁴ <https://psr.org/resources/fracking-with-forever-chemicals-in-pennsylvania/>

⁶⁵ <https://guides.loc.gov/oil-and-gas-industry/laws#:~:text=The%20oil%20and%20gas%20industry,groups%20responsible%20for%20enforcing%20regulations.>

⁶⁶ <https://www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/025/chapter78a/chap78atoc.html&d=>

⁶⁷ Ibid.

⁶⁸ <https://www.reuters.com/article/us-usa-pennsylvania-fracking/pennsylvania-adopts-new-fracking-regulations-idUSKCN1272B3>

⁶⁹ <https://www.srca.nm.gov/nmac-home/nmac-titles/title-19-natural-resources-and-wildlife/chapter-15-oil-and-gas/>

⁷⁰ <https://epa.ohio.gov/static/Portals/0/general%20pdfs/OhioRegsShaleGasWellDrilling.pdf>

⁷¹ <https://www.rrc.texas.gov/about-us/faqs/oil-gas-faq/hydraulic-fracturing-faqs/>

⁷² <https://leg.colorado.gov/bills/hb22-1345>

Misleading Statistics

These overextended connections are found throughout each of the reports. PSR includes inflammatory statistics without evidence that the statistic can be linked to current chemicals used in hydraulic fracturing. For example, PSR states that “Colorado officials estimated more than 100,000 residents have relied on public drinking water systems where elevated PFAS levels have been detected in source wells – more people than in any other state.”⁷³ However, they never provide evidence that those elevated levels are due to oil and gas-related activities. Similarly, using “wells” to talk about drinking water resources makes it easy to confuse water wells with the wells used for energy development.

The authors’ statistical methods are also misleading. They extrapolate how much water would be contaminated by one cup of PFAS chemicals.⁷⁴ However, PFAS are measured in parts per trillion, and they provide no indication that any past usage of PFAS were measured in cups. PSR also draws a link between surfactants in fracking fluids and PFAS. When looking at Colorado, for example, there is only one case where fluorosurfactants were used, and no indication that PFAS were used. PSR also offers hypothetical situations, such as one in which PTFE, if used in high temperature wells, could create a separate toxic chemical, perfluoroalkyl carboxylic acid.⁷⁵

PSR even blatantly states that the discovery of PTFE in a well does not mean it was being utilized for fracking, but seems to disregard this information in its conclusions:

“It is unclear for what purpose the PTFE was used; however, PTFE, which is marketed as Teflon, is known for its slipperiness, and fracking chemicals are sometimes used as friction reducers.”⁷⁶

This, again, points the reader to a desired conclusion without evidence.

Body of Research Contradicts PSR Claims

Beyond the unclear and misleading methods employed by PSR, there have also been numerous studies contradicting the claims the organization attempts to present as facts. A 2017 Duke University study^{77,78} explored, “the geochemical variations of groundwater and surface water before, during, and after hydraulic fracturing and in relation to various geospatial parameters in an area of shale gas development in northwestern West Virginia, United States.”⁷⁹ The researchers concluded that:

“Based on consistent evidence from comprehensive testing, we found no indication of groundwater contamination over the three-year course of our study. . . The bottom-line assessment. . . is that groundwater is so far not being

⁷³ <https://psr.org/resources/fracking-with-forever-chemicals-in-colorado/>

⁷⁴ <https://psr.org/resources/fracking-with-forever-chemicals-in-ohio/>

⁷⁵ <https://psr.org/resources/fracking-with-forever-chemicals-in-pennsylvania/>

⁷⁶ <https://psr.org/resources/fracking-with-forever-chemicals-in-colorado/>

⁷⁷ <https://www.sciencedirect.com/science/article/abs/pii/S0016703717302004>

⁷⁸ <https://www.sciencedirect.com/journal/geochimica-et-cosmochimica-acta>

⁷⁹ <https://www.sciencedirect.com/science/article/abs/pii/S0016703717302004>

impacted, but surface water is more readily contaminated because of the frequency of spills.”⁸⁰

While the lack of evidence and apparent leaps in logic that PSR utilizes hurt the validity of the claims made within their state reports, they do, however, lend themselves to sensational headlines. This – the media storm that arises when these reports are published and the headlines that come with them – appears to be the purpose of these reports. The reports garner media attention and dramatic headlines that play into a media campaign orchestrated by PSR. From there, the headlines continue to spread and evoke health fears and clear calls to action, causing readers to form their opinions on fracking and associated health impacts through misleading quotes and sensational media, not through actual evidence or critical analysis.

It’s a playbook PSR has employed for years, following a 2012 memo that called on the reliance of quantity over quality in studies to discredit the safety of fracking.⁸¹ In 2023, PSR, in collaboration with Concerned Health Professionals of New York, released the ninth iteration of its annual compendium of research showcasing alleged health impacts from fracking⁸² that includes all research – regardless of the credibility of the findings.^{83,84,85}

This media strategy is then used to garner public support, with the hope that enough of a public outcry will encourage legislators to take a stand and eventually lead to a fracking ban or significantly increased regulation.

This strategy is currently being deployed in real-time in New Mexico, where PSR’s New Mexico report was the subject of significant local media coverage alongside a new rulemaking being debated by state legislators that would ban the use of “forever chemicals” in fracking and mandate oil and gas companies to report all chemicals within their fracking fluid.⁸⁶

Following a barrage of media coverage on the report in local and national media, a petition was filed by WildEarth Guardians⁸⁷ calling for “a ban on cancer-causing chemicals in fossil fuel operations and the repeal of a trade secrets rule allowing companies to conceal hazardous chemicals.”⁸⁸ In October 2023, a hearing was scheduled for February 2024 in front of the New Mexico legislative Radioactive and Hazardous Materials Committee to address whether or not the state legislature should draft a letter backing a proposed state rule to ban the use of PFAS in hydraulic fracturing.⁸⁹

⁸⁰ <https://earth.stanford.edu/news/rob-jackson-wins-dal-swaine-award-fracking-contamination-paper#:~:text=%E2%80%9CBased%20on%20consistent%20evidence%20from,that%20spill%20water%20associated%20with>

⁸¹ <https://eidhealth.org/anti-fracking-donor-memo-strategy-questionable-health-claims/>

⁸² <https://psr.org/resources/fracking-compendium-9/>

⁸³ <https://eidhealth.org/multi-state-health-analysis-exposes-flaws-of-fracking-health-studies/>

⁸⁴ <https://eidhealth.org/npr-uses-debunked-studies-support-claims-fracking-harms-health/>

⁸⁵ <https://eidhealth.org/rolling-stones-latest-anti-fracking-report-hilariously-awful/>

⁸⁶ <https://www.currentargus.com/story/news/2023/10/11/lawmakers-talk-ban-on-forever-chemicals-pfas-in-new-mexico-oil-and-gas/71121227007>

⁸⁷ <https://wildearthguardians.org/>

⁸⁸ https://www.santafenewmexican.com/news/local_news/state-to-consider-environmentalists-petition-about-pfas-in-fracking/article_978fdf8c-0545-11ee-99a4-87d7e9f6d3fd.html

⁸⁹ https://www.santafenewmexican.com/news/local_news/hearing-on-banning-cancer-causing-chemicals-in-fracking-set-for-february/article_61b69f84-6780-11ee-9b33-bf66d6e2a46e.html

PSR's reports are not meant to be peer-reviewed studies that undergo scientific scrutiny, but rather are designed to spark a conversation and then be utilized in a public campaign to stop energy production.

Conclusion

PSR's activist reports and associated media coverage should be received with a healthy dose of caution. In each of their state reports, PSR attempts to make conclusions based on flawed methodology and utilizes their faulty data across their campaign strategies. The state reports serve more as fodder for a coordinated anti-fossil fuel media strategy, rather than a rigorous research effort meant to inform public health knowledge. Meanwhile, undermining PSR's claims, the evidence shows that energy companies are thorough and forthcoming in their chemical disclosures and consistently avoid the use of PFAS chemicals in fracking operations.

Appendix

Appendix A: Evidence That Fracking Does Not Impact Groundwater

1. Environmental and Community Impacts of Shale Development in Texas⁹⁰
 - a. Publisher: The Academy of Medicine, Engineering and Science of Texas
 - b. Key Findings:
 - i. "The depth separation between oil-bearing zones and drinking water-bearing zones in Texas makes direct fracturing into drinking water zones unlikely, and it has not been observed in Texas."⁹¹
 - ii. "In Texas, both economics and risk considerations dictate the amount of produced water that will continue to be injected in deep wells or used as fracturing fluid to minimize impacts on other water sources."⁹²
2. The geochemistry of naturally occurring methane and saline groundwater in an area of unconventional shale gas development⁹³
 - a. Publisher: Geochimica et Cosmochimica Acta
 - b. Key Findings:
 - i. "The integrated geochemical data indicate that the saline groundwater originated via naturally occurring processes, presumably from the migration of deeper methane-rich brines that have interacted extensively with coal lithologies."⁹⁴
 - ii. "These observations were consistent with the lack of changes in water quality observed in drinking-water wells following the installation of nearby shale-gas wells."⁹⁵

⁹⁰ <http://tamest.org/wp-content/uploads/2017/07/Final-Shale-Task-Force-Report.pdf>

⁹¹ <http://tamest.org/wp-content/uploads/2017/07/Final-Shale-Task-Force-Report.pdf>

⁹² <http://tamest.org/wp-content/uploads/2017/07/Final-Shale-Task-Force-Report.pdf>

⁹³ <https://www.sciencedirect.com/science/article/abs/pii/S0016703717302004>

⁹⁴ <https://www.sciencedirect.com/science/article/abs/pii/S0016703717302004>

⁹⁵ <https://www.sciencedirect.com/science/article/abs/pii/S0016703717302004>

- iii. “Based on consistent evidence from comprehensive testing, we found no indication of groundwater contamination over the three-year course of our study.”⁹⁶
- 3. Water Use Associated with Natural Gas Shale Development: An Assessment of Activities Managed by the Susquehanna River Basin Commission July 2008 through December 2013⁹⁷
 - a. Publisher: Susquehanna River Basin Commission
 - b. Key Findings:
 - i. “[T]he Commission’s monitoring programs have not detected discernible impacts on the quality of the Basin’s water resources as a result of natural gas development, but continued vigilance is warranted.”⁹⁸

Appendix B: Most Reported Fracking Chemicals and Non-fracking uses⁹⁹

Additives	Function	Chemicals reported in 20% or more of disclosures in the EPA FracFocus 1.0 project database for given additive	Other Uses
Acid	Dissolves cement, minerals, and clays to reduce clogging of the pore space	Hydrochloric acid	Found in corn syrup, sodas, cookies, crackers, ketchup, and cereals. ¹⁰⁰
Biocide	Controls or eliminates bacterial growth, which can be present in the base fluid and may have detrimental effects on the long term well productivity	Glutaraldehyde; 2,2-dibromo-3-nitripropionamide	
Breaker	Reduces the designed increase in viscosity of specialized treatment fluids, such as gels and foams, after the proppant has been placed and flowback commences to clean up the well	Peroxydisulfuric acid diammonium salt	
Clay control	Prevents the swelling and migration of formation clays that otherwise react to water-based fluids	Choline chloride	
Corrosion inhibitor	Protects the iron and steel components in the wellbore and treating equipment from corrosive fluids	Methanol; propargyl alcohol; isopropanol	

⁹⁶ <https://nicholas.duke.edu/news/west-virginia-groundwater-not-affected-fracking-surface-water#:~:text=West%20Virginia%20Groundwater%20Not%20Affected%20by%20Fracking%2C%20but%20Surface%20Water%20Is,-April%2024%2C%202017&text=Accidental%20spill%20of%20fracking%20wastewater,or%20vengosh%40duke.edu.>

⁹⁷ <https://www.srbcc.gov/our-work/reports-library/technical-reports/299-natural-gas-water-use-susquehanna/docs/water-use-natural-gas-report.pdf>

⁹⁸ <https://www.srbcc.gov/our-work/reports-library/technical-reports/299-natural-gas-water-use-susquehanna/docs/water-use-natural-gas-report.pdf>

⁹⁹ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7225182/>

¹⁰⁰ <https://www.chemicalsafetyfacts.org/chemicals/hydrochloric-acid/#:~:text=The%20food%20industry%20uses%20hydrochloric,enhance%20flavor%20and%20reduce%20spoilage.>

Crosslinker	Increases the viscosity of base gel fluids by connecting polymer molecules	Ethylene glycol; potassium hydroxide; sodium hydroxide	
Emulsifier	Facilitates the dispersion of one immiscible fluid into another by reducing the interfacial tension between the two liquids to achieve stability	2-Butoxyethanol; polyoxyethylene(10)nonylphenyl ether; methanol; nonyl phenol ethoxylate	
Foaming agent	Generates and stabilizes foam fracturing fluids	2-Butoxyethanol; Nitrogen, liquid; isopropanol	
Friction reducer	Reduces the friction pressures experienced when pumping fluids through tools and tubulars in the wellbore	Hydrotreated light petroleum distillates	
Gelling agent	Increases fracturing fluid viscosity allowing the fluid to carry more proppant into the fractures and to reduce fluid loss to the reservoir	Guar gum; hydrotreated light petroleum distillates	
Iron control agent	Controls the precipitation of iron compounds (e.g., Fe ₂ O ₃) from solution	Citric acid	
Nonemulsifier	Separates problematic emulsions generated within the formation	Methanol; isopropanol; nonyl phenol ethoxylate	
pH control	Affects the pH of a solution by either inducing a change (pH adjuster) or stabilizing and resisting change (buffer) to achieve desired qualities and optimize performance	Carbonic acid, dipotassium salt; potassium hydroxide; sodium hydroxide; acetic acid	
Resin curing agents	Lowers the curable resin coated proppant activation temperature when bottom hole temperatures are too low to thermally activate bonding	Methanol; nonyl phenol ethoxylate; isopropanol; alcohols, C12-14-secondary, ethoxylated	
Scale inhibitor	Controls or prevents scale deposition in the production conduit or completion system	Ethylene glycol; methanol	
Solvent	Controls the wettability of contact surfaces or prevents or breaks emulsions	Hydrochloric acid	

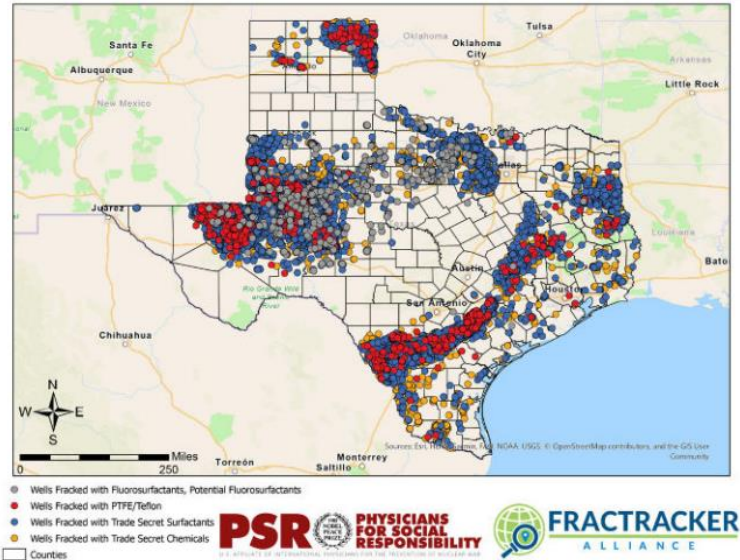
Appendix C: Individual State Report Findings

In every state report, PSR makes the incredibly broad assumption that a chemical that is undisclosed due to its status as a trade secret must be PFAS. In other instances, PSR claims that a lack of data showing PFAS use is because the state's disclosure regulations are lacking – not that companies are not using PFAS.

In each report, a map is included that PSR claims shows: 1) Wells Fracked with PTFE/Teflon, 2) Wells Fracked with Trade Secret Surfactants, and 3) Wells Fracked with Trade Secret Chemicals. The authors lead the reader to believe that where wells fracked with PTFE/Teflon exist, PFAS chemicals (undisclosed as trade secret) must also exist. What the maps really provide is an overview of where oil and natural gas production is most concentrated in the state.

Texas State Report:

TEXAS OIL & GAS WELLS INJECTED WITH PTFE, FLUROSURFACTANTS, POTENTIAL FLUROSURFACTANS, AND TRADE SECRET CHEMICALS

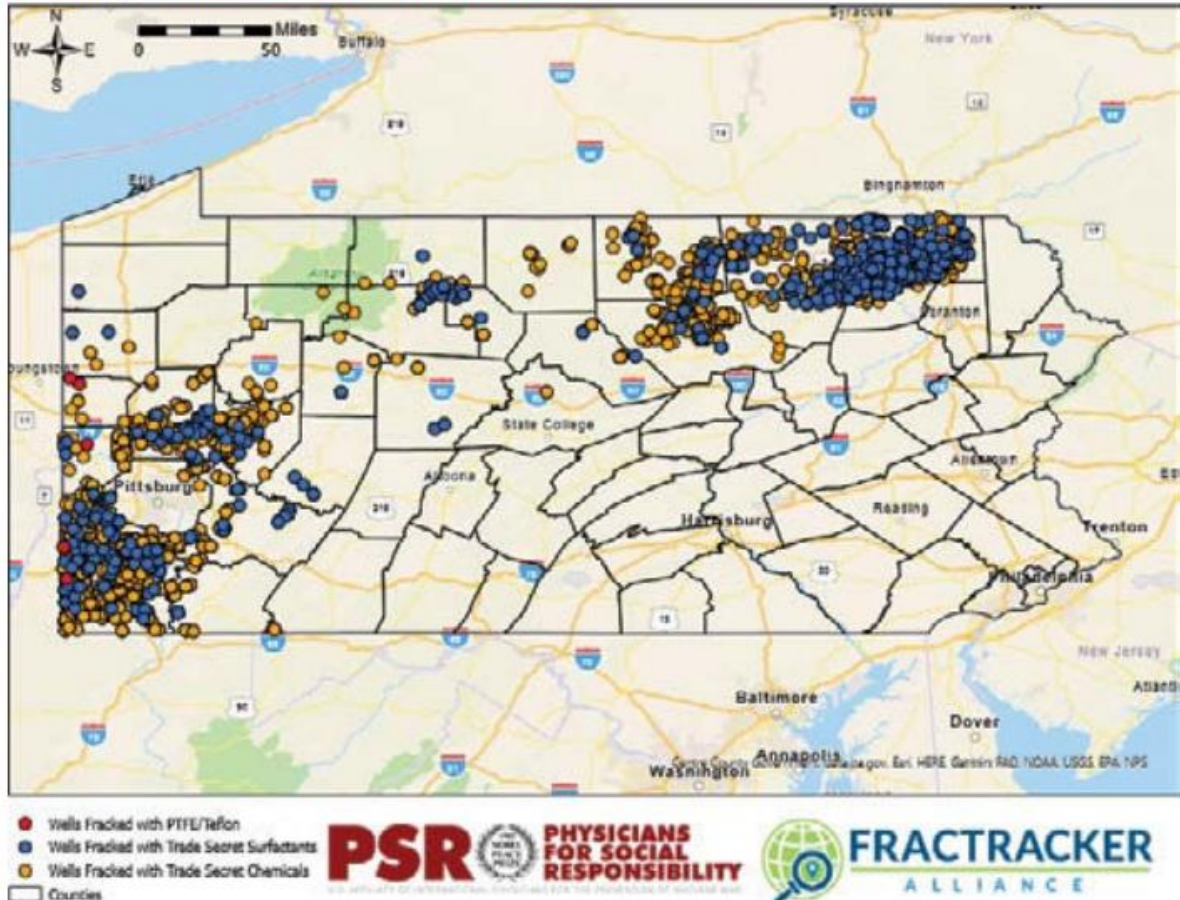


This map shows the location of oil and gas wells in Texas known to have been fracked between January 1, 2013 and September 29, 2022 using PTFE/Teflon (a known PFAS), fluoroalkyl alcohol substituted polyethylene glycol (a known PFAS), fluorosurfactants that are likely to be PFAS or PFAS precursors, trade secret chemicals, and/or trade secret surfactants. An interactive version of the map and detailed explanation of the data are available at <https://ft.maps.arcgis.com/apps/webappviewer/index.html?appid=9cff28a549d84fbef908444bbcaf16bf>.

¹⁰¹ <https://psr.org/resources/fracking-with-forever-chemicals-in-texas/>

Pennsylvania State Report:

Figure 1. Pennsylvania Oil & Gas Wells Fracked with PFAS and Possible PFAS, Including Trade Secret Chemicals, 2012-2022



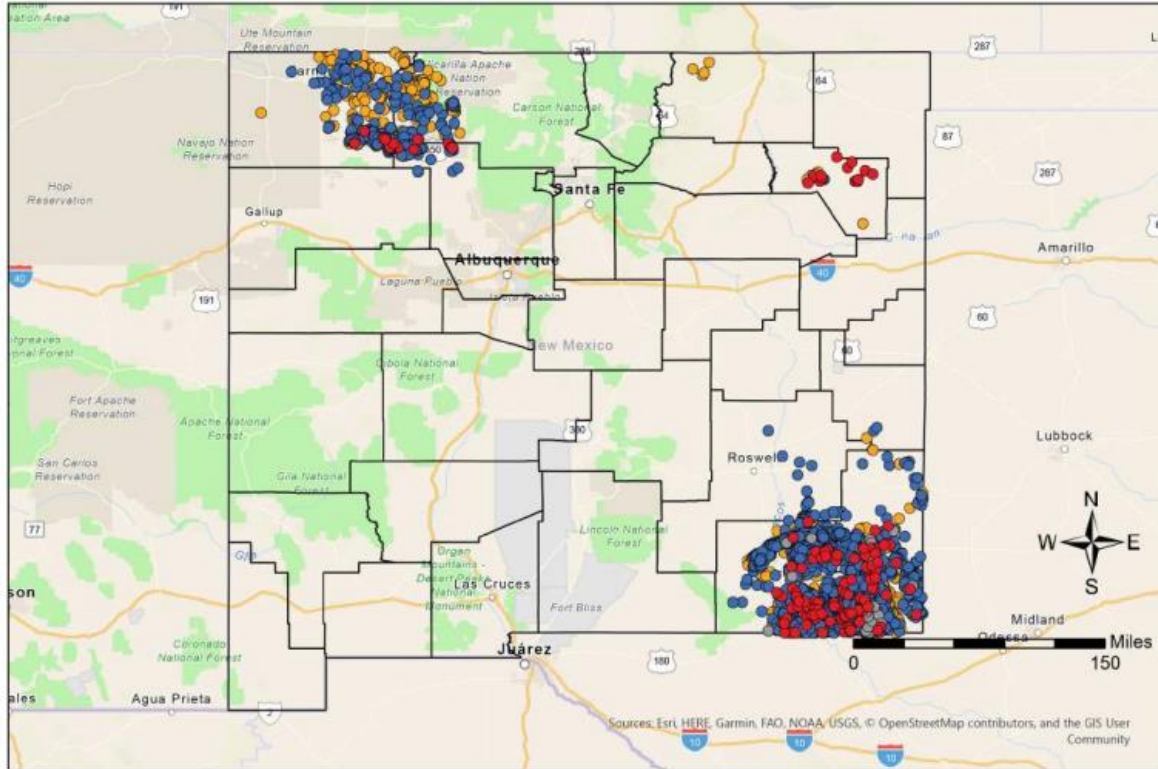
This map shows the location of oil and gas wells in Pennsylvania known to have been fracked between January 1, 2012 and September 29, 2022 using PTFE/Teflon (a known PFAS), trade secret chemicals, and/or trade secret surfactants. An interactive version of the map is available at <https://ft.maps.arcgis.com/apps/webappviewer/index.html?appid=dc81f7ec3af64541a1875e8e6e5add60> where users can zoom in to identify wells near them. For a detailed explanation of data sources, see Appendix A.

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¹⁰² <https://psr.org/resources/fracking-with-forever-chemicals-in-pennsylvania/>

New Mexico State Report:

New Mexico Oil & Gas Wells Fracked with PFAS and Possible PFAS, Including Trade Secret Chemicals, 2013-2022



- Wells Fracked with Fluoroalkyl Alcohol Substituted Polyethylene Glycol (a PFAS), Fluorosurfactants (possibly PFAS)
- Wells Fracked with PTFE/Teflon (a PFAS)
- Wells Fracked with Trade Secret Surfactants (possibly PFAS)
- Wells Fracked with Trade Secret Chemicals (possibly PFAS)
- Counties

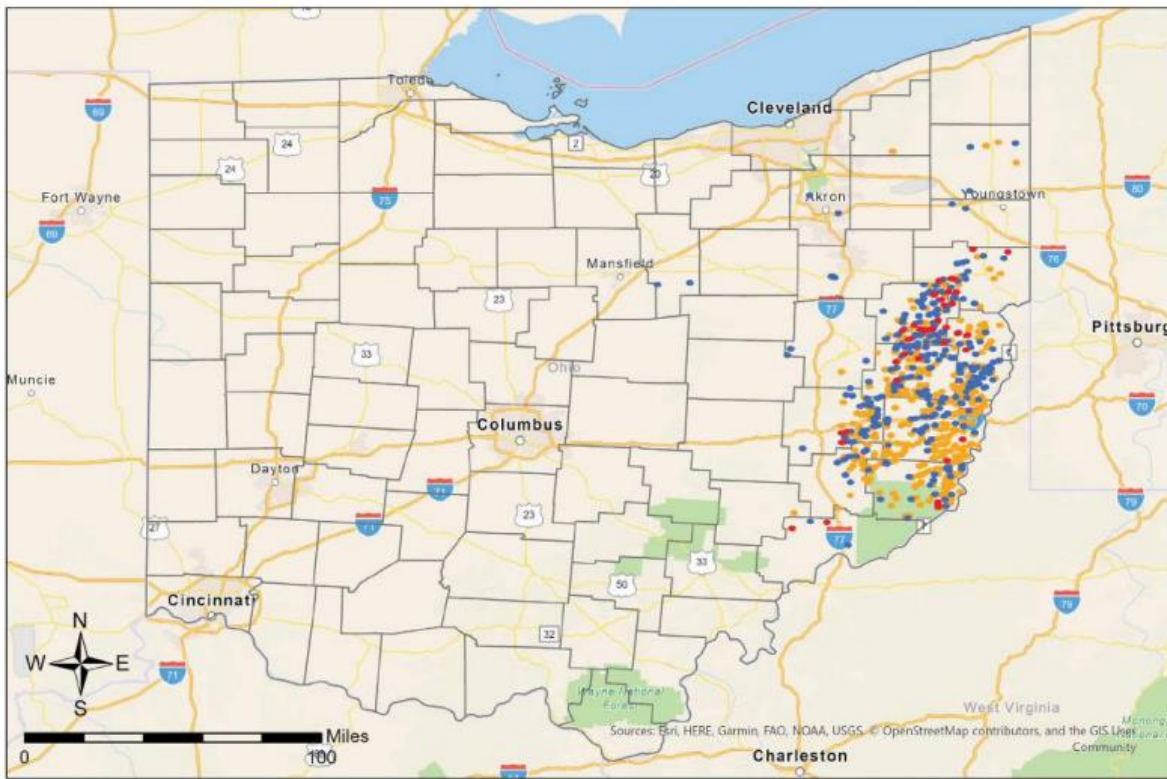


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¹⁰³ <https://psr.org/resources/fracking-with-forever-chemicals-in-new-mexico/>

Ohio State Report:

Ohio Oil & Gas Wells Fracked with PTFE and Trade Secret Chemicals, 2013-2022



- Counties
- Wells Fracked with PTFE/Teflon
- Wells Fracked with Trade Secret Surfactants
- Wells Fracked with Trade Secret Chemicals



This map shows the location of oil and gas wells in Ohio known to have been fracked between 2013 - 2022 using PTFE, trade secret chemicals, and/or trade secret surfactants. An interactive version of the map is available at <https://ft.maps.arcgis.com/apps/webappviewer/index.html?appid=4fe19ca9a17141a6a1f5ac35728ac0fa>.

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¹⁰⁴ <https://psr.org/resources/fracking-with-forever-chemicals-in-ohio/>

Colorado State Report:

Colorado Oil & Gas Wells Fracked with PTFE and Trade Secret Chemicals, 2011-2021

