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State Hydraulic Fracturing Disclosure Rules and Enforcement: A Comparison

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This analysis compares state hydraulic fracturing disclosure rules that: 1) require some identification of the substances used in hydraulic fracturing for oil and gas; and 2) make records available to the public online without a public records request.¹ Fourteen states require some level of public hydraulic fracturing disclosure as of the date of publication.² However, there is hydraulic fracturing activity in at least twenty-nine states. More than half of the states with hydraulic fracturing activity currently have no disclosure requirements at all. Of the existing state rules, none provide comprehensive disclosure. Enforcement of state rules is also found to be uneven.



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I. INTRODUCTION

Advancements in hydraulic fracturing—or “fracking”—have fueled an explosion in domestic oil and gas development in recent years. Fracking is a technique in which large volumes of water, sand (or similar material), and chemicals are pumped into the ground at extremely high pressure to break up rocks containing oil and gas to release the resource.

It is essential that the public, and health and safety professionals, have full access to information on the constituents of hydraulic fracturing fluids and waste, and the details of how and where fracturing was performed. Often fracking takes place in close proximity to homes, schools, and workplaces. Yet, without requirements for disclosure, members of the communities in which it occurs have no right to information about the procedures or chemicals involved.

Many of the substances used in the fracking process are toxic.³ Some, like formaldehyde, are known carcinogens.⁴ There are significant risks associated with the release of dangerous substances used in fracking. Blow-outs have occurred during fracking operations and spills of fracking fluids and other chemicals have polluted streams and lakes.⁵ Fracking is a suspected cause of groundwater contamination.⁶ Documented reports link fracking contamination with medically-confirmed health impacts in animals, including diseases, deaths, and second-generation birth defects.⁷ And contaminants from fracking have been found at levels that pose a threat to human health.⁸

After the fracking process is complete, a portion of the fluids that were pumped into the ground flow back to the surface. This wastewater is called “flowback” and, in addition to fracking chemicals, this flowback can also contain toxic substances that are naturally-occurring underground, including arsenic, barium, lead, mercury, and radioactive elements like radium.⁹

THE IMPORTANCE OF COMPREHENSIVE HYDRAULIC FRACTURING DISCLOSURE

Disclosure of the chemicals used in fracking, the waste generated and its management, and the details of how and where fracturing was completed, is essential for the following reasons:

- Adequate pre-fracking disclosure allows owners and users of nearby water sources to conduct baseline testing to establish the quality of their water prior to hydraulic fracturing, including the presence or absence of identified chemical constituents of frack fluids.
- Chemical disclosure is crucial to aid in determining the source of any subsequent groundwater contamination.
- First responders need the information to appropriately respond to accidents and emergencies.
- Medical professionals require full access to information on what their patients may have been exposed to, and in what concentrations, for diagnosis and treatment.
- Chemical disclosure allows the public to fully assess the risks that chemical use, transport, and storage pose to their communities.
- Disclosure of water use provides the public information about the impacts of fracking on state supplies of fresh water.
- Disclosure of information regarding waste creation and disposition provides an accounting of the waste created, its contents, and the societal costs of its disposal.
- A robust public disclosure regime is essential for scientific research that will provide a better understanding of the cumulative environmental and health effects of fracking and serve as a basis for well-informed policies to protect the public.
- A disclosure regime highlights responsible corporate actors while calling attention to practices that jeopardize the environment and public health.

Disclosure does not, by itself, make fracking safer. An adequate regulatory regime must also include, among other things, standards requiring best practices in well siting and construction, spill and leak reduction and containment, pollution capture, waste disposal, and the minimization of impacts from wellpads, roads, and pipelines. However, a comprehensive disclosure rule is one important component of a full suite of fracking safeguards and is essential to investigate contamination that occurs when proper safeguards are not in place or accidents occur.

Additionally, hydraulic fracturing is only one step in the oil and gas exploration and development process. Each phase of oil and gas development poses risks to the environment and public health. Among these are air, water, and soil pollution, and the use of dangerous chemicals during other phases of development. The public should be provided with accurate information on all hazards posed by the oil and gas industry. Disclosure rules should provide the public with information concerning the hydraulic fracturing process, and also on practices and materials employed throughout the lifecycle of an oil and gas well. This analysis, however, focuses narrowly on the issue of hydraulic fracturing disclosure. NRDC is currently undertaking research concerning other aspects of states' regulation of oil and gas development, beyond disclosure. Comparisons of state regulations in other areas will be released in the coming months.

II. DISCLOSURE RULES

The effectiveness of a disclosure rule depends on a number of important factors, including: when disclosure is made, what information is provided, and whether the information is provided in a manner that is accessible to those who seek it.

ADVANCE DISCLOSURE AND NOTICE

One essential function of disclosure rules is to give nearby parties the information they need to fully understand the risks to their air and water and any impacts that may occur. With advance disclosure and proper notice, those who live or own property near a well can document pre-fracturing conditions, including air and water quality in the area, in case of pollution or spills. In particular, nearby water sources can be tested to determine baseline levels of the substances that will be used in the fracturing fluid in order to document whether water contamination was a result of hydraulic fracturing. To ensure that baseline testing can measure pre-fracking levels of all potential contaminants, disclosure of the chemicals must be made in advance, allowing sufficient time for testing to be arranged and performed before fracking begins. In addition, parties must be aware that fracking is about to occur. In order to ensure that nearby parties are aware of upcoming fracking, disclosure rules should require advance notice to nearby landowners, those who own water wells, and non-owner residents. Prior disclosure and notification may also facilitate a conversation between local stakeholders, regulators and companies which can encourage the use of safer chemicals and practices, when they are available.

SUBSTANCE OF DISCLOSURE

Disclosure rules provide an array of information that is necessary to assess the effects of hydraulic fracturing.

Information concerning the geological and environmental context of the well improves scientific understanding about what factors may be associated with problems like groundwater contamination and allows contamination of ground and surface waters to be more reliably traced to its source. To fulfill these functions, disclosure reports should include the depth of groundwater zones in the area, the distance from the well to aquifers, surface waters,

and storm drains,¹⁰ and identification of abandoned oil and gas wells and drinking water sources nearby. These data provide the public and regulators with important facts about whether nearby resources might be affected. Identification of abandoned oil and gas wells makes both regulators and the public aware of potential conduits for groundwater contamination, since unplugged or improperly plugged oil and gas wells may provide a channel that allows contaminants from deeper geological zones to travel upwards into underground sources of drinking water.

Disclosure about the hydraulic fracturing “treatment” itself should include information on the pressures used, and the volume, type, and source of the “base” fluid.¹¹ Reporting the maximum pressure used in fracturing provides information on whether fractures will remain confined to the intended zone. Annulus pressure measurements can indicate whether fracking has compromised a well’s structural integrity (for more information on annulus pressure measurement, see part III, page 10). Reporting should also cover the intervals of the wellbore that were fractured and the estimated depth to the top of fractures, allowing a comparison to the depth of groundwater. Disclosures regarding the base fluid should include information on whether fresh water, “recycled” water, or some other fluid is used. Recycled water is flowback or “produced water,”¹² or a combination of these, that typically has been treated to reduce the concentration of salts and other contaminants. Information on the type of base fluid used provides information about the use of a state’s fresh water resources. It may also provide information about the potential presence of chemical constituents in the frack fluid that were not removed by the recycling process.

All chemicals added to the “base” fluid must also be identified, as well as the volume or concentration of each chemical. In addition, reports should include information on the composition of the proppant (the granular material, often sand, that is included in the fracturing fluid to prevent the fractures from closing after injection is complete) including any chemicals with which the proppant is coated (for more information on proppant, see part III, page 11).

Disclosure rules are also instrumental in assessing the waste created by hydraulic fracturing and its management and disposition. To serve these functions, disclosure rules should require reporting the volume of flowback that returns out of a well after fracking, the contents of the flowback, and the way it is stored and disposed of.¹³

TRADE SECRET EXEMPTIONS

Hydraulic fracturing disclosure rules provide an exception to the reporting requirements when companies have confidential information that qualifies for “trade secret” protection. However, exemptions must only be used for legitimate trade secrets, and regulators must ensure that requirements to make information public are not subverted by effectively creating a loophole that companies can exploit to avoid disclosure. Many states already have detailed requirements and processes for trade secret protection that apply to other sectors. Yet some of these states have granted special treatment to the oil and gas industry, allowing them to claim trade secret exemptions with no oversight.

To ensure that trade secret claims are legitimate, companies should be made to provide specific factual justification which demonstrates that they are entitled to prevent public disclosure of the information. There should be a clear process for evaluating each claim and the public should be able to challenge exemptions that are granted. In

addition, it should be made clear that trade secret status for the formula of a product (i.e. the amount of each chemical that goes into the product) is not equivalent to trade secret status for the identity of the chemicals that constitute it. Companies should have to provide separate factual justification for each claim.

If trade secret protection is warranted, a company should still be required to disclose trade secret information to the regulator, to be held confidentially. In addition to providing information essential to the evaluation for trade secret status, this ensures that the state can respond appropriately in case of emergency. Medical professionals and emergency responders should be able to obtain trade secret information for the purposes of diagnosis or treatment, based on a clear process that also ensures they can receive the information immediately in the event of an emergency. To ensure that the information is provided without delay, they should be able to obtain the information from both the regulatory agency and the company.

III. ANALYSIS

This analysis provides a comprehensive comparison of the fourteen U.S. states with existing hydraulic fracturing disclosure requirements. The states with disclosure requirements in effect are: Alabama, Arkansas, Colorado, Indiana, Louisiana, Michigan, Montana, New Mexico, North Dakota, Ohio, Pennsylvania, Texas, West Virginia, and Wyoming. However, there is confirmed fracking activity in at least twenty-nine states.¹⁴ Fracking has occurred in each of the fourteen states with disclosure requirements. But there is also fracking activity in at least fifteen others: Alaska, California, Illinois, Kansas, Kentucky, Mississippi, Missouri, Nebraska, New York,¹⁵ Oklahoma, South Dakota, Tennessee, Utah, Virginia, and Washington. Thus, more than half of the states with fracking activity have no disclosure requirements at all.

We compare the fourteen state rules on a range of dimensions. For convenience, in the tables that accompany this analysis we also include Oklahoma, which has a rule that has not yet gone into effect,¹⁶ and three proposed disclosure rules:¹⁷ Illinois, New York, and the Bureau of Land Management (BLM).¹⁸

Major findings of this analysis include:

1. Required disclosures differ widely from state to state. Many states which have relatively strong disclosure requirements in one area fail to require any disclosure in other important areas.
2. State enforcement of disclosure requirements is uneven. We found numerous instances where disclosure reports were accepted by state agencies despite the absence of required information.
3. Barriers prevent widespread public access in many states. For example, in some states, certain information may be accessed only by physical inspection of records at agency offices.
4. FracFocus.org does not collect all the information required by states that use the website for public reporting and appears to reduce compliance with certain state reporting requirements.
5. Seven states mandate the chemical identification of all additives used in fracking fluids. Two require that the concentration of all additives be disclosed.
6. Five states provide for some pre-fracturing disclosure of the chemicals that will be used in hydraulic fracturing. Two of these states require disclosure of all components of the frack fluid in all wells.
7. Two states require notice to landowners before fracking occurs on their property.
8. In eight of the fourteen states with existing disclosure requirements, companies may withhold information they deem confidential without any justification or oversight. Only one state has a clear process for evaluating and approving or denying trade secret exemption claims.
9. Six states provide for access to trade secret information by health care providers.

Below, we provide a summary of how state hydraulic fracturing disclosure rules stack up in a number of important areas. Following the textual analysis, we provide tables and an appendix with more detailed information. Table I covers notice provisions and pre-fracturing disclosure of chemicals. Table II details requirements associated with the geological and natural context of a well, providing a comparison of reporting rules related to the geological formations the well traverses and the distance to ground and surface water sources. Table III provides a comparison of state disclosure requirements related to the hydraulic fracturing treatment itself. Table IV compares provisions relating to wastewater generated by hydraulic fracturing. Table V compares the exemptions that states grant to companies that claim certain information is a “trade secret” and should not be subject to disclosure. Tables VI through X cover the three proposed rules included in this analysis. Appendix I provides links to each state rule, and proposed rule, the agency that administers it, and examples of actual disclosures and trade secret exemption requests.

LIMITED PUBLIC ACCESS TO DISCLOSURES

Hydraulic fracturing disclosure is only effective if the reported information is genuinely comprehensive, transparent, and accessible to the public. Yet, in many states, significant obstacles reduce access to information. First, many state disclosure websites are difficult to navigate and do not provide a user-friendly interface where a member of the public can easily search for fracked wells based on multiple criteria. For example, a number of states only allow searches by county. Upon generating a list of wells in a county, most of these states provide only latitude and longitude data (or other difficult to understand geographic information such as township and range) for individual wells. Without other options, members of the public may find it extremely difficult to determine which wells are situated near their homes, schools or workplaces.

FracFocus.org is a website that a number of states utilize as a disclosure location. FracFocus provides a user-friendly interface with a mapping function, but disclosure via FracFocus is severely limited. The standardized disclosure form on FracFocus contains fields for only a very limited subset of the information that state disclosure rules require. Because the information provided by FracFocus is so limited, there is not a single state in which disclosures on the site contain all information required by the state rule.¹⁹

Some states which use FracFocus do not provide any other public website that contains disclosure information, severely limiting access to the information not reported to FracFocus. In some of these states, the information not available on FracFocus can be obtained if one purchases an expensive subscription to a state database. But in other states, the information can only be obtained by physically inspecting the well records at a state agency office. This would be particularly problematic for emergency responders or health care professionals who need information in an emergency. Therefore, a state's choice to use FracFocus may provide a user-friendly method of finding some information, but severely limits access to other information. Use of FracFocus also appears to reduce compliance with some state reporting requirements. For instance, concentration ranges, rather than exact concentrations, are routinely reported on FracFocus—even where state rules do not allow them.

For more information on public access to disclosure reports, see Tables II, III and IV, and Appendix I.

POOR COMPLIANCE AND ENFORCEMENT

Compliance with existing disclosure requirements is inconsistent. Actual disclosures were available for analysis in only seven states since some states have enacted their rules very recently. However, it is clear from these seven that compliance and enforcement is uneven.

The seven states with available disclosures were: Alabama, Arkansas, Michigan, Montana, Ohio, Texas and Wyoming.²⁰ Information was consistently missing from disclosures in four of the seven: Montana, Ohio, Texas, and Wyoming.²¹ Yet state regulators had accepted these disclosures as adequate. In Wyoming we reviewed a sample of disclosure forms and not one contained all of the information required by rule. In a telephone conversation to inquire about this discrepancy, a Wyoming Oil and Gas Conservation Commission staff member indicated that reporting of certain information was unnecessary in areas of the state. Regardless of whether these failures are due to overburdened state enforcement staff or an overly-cozy relationship with industry, the findings of our analysis raise questions about the ability of states

to adequately administer a robust set of disclosure rules. Inconsistent enforcement eliminates many of the benefits of these rules and should not be tolerated.

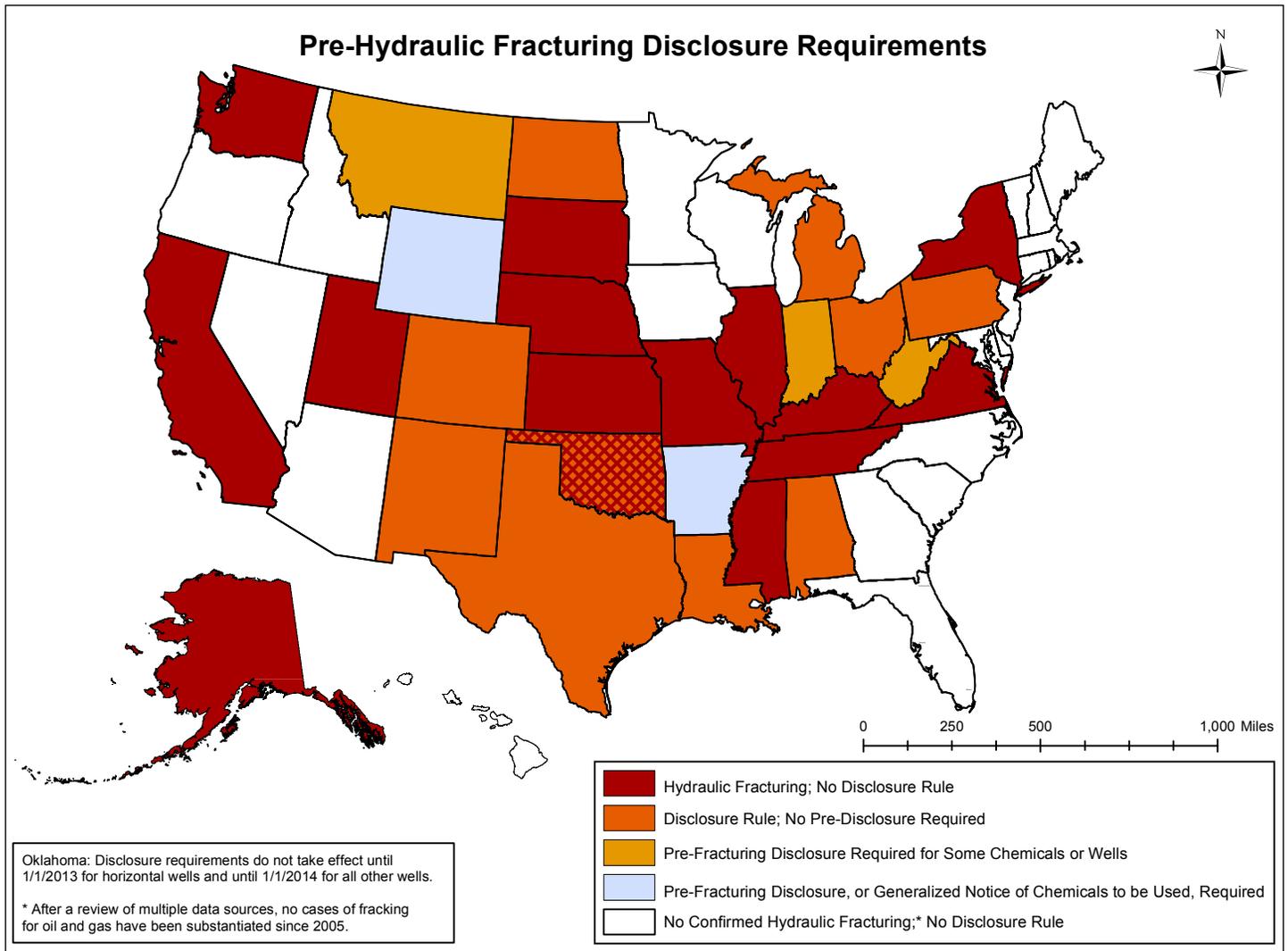
For more information on enforcement and compliance, see Table III and Appendix I.

NOTICE AND PRE-FRACTURING CHEMICAL DISCLOSURE

Provisions that require notification to local parties prior to fracking ensure that landowners, residents, and those with water wells can perform baseline testing of air and water quality and a survey of conditions in the area before fracking begins. This ensures that parties are made aware of preexisting problems and aids in tracing any contamination from fracking to its source. Unfortunately, a shockingly small number of states ensure notice of an upcoming hydraulic fracturing treatment.²² Only two states, Colorado and West Virginia, ensure that landowners are notified of hydraulic fracturing. West Virginia is the only state to require notice to owners of nearby water wells. And only Colorado ensures that local residents (other than landowners) are notified that fracking is about to occur.

Prior disclosure of chemicals that will be used in fracking is also necessary to allow comprehensive baseline testing. NRDC supports disclosure at least thirty days in advance in order to allow adequate time for testing to occur. Five states provide some kind of pre-fracturing chemical disclosure. Arkansas gives a form of generalized notice by providing a “master list” of chemicals used by each operator in the state while Wyoming requires operators to provide a full list of chemicals they propose to use in fracturing.²³ West Virginia and Indiana require operators to provide a list of anticipated chemicals but only apply the requirement to a subset of hydraulically fractured wells.²⁴ Montana requires a list of the “principle components” (sic) of fluid the operator plans to use. Ten of fifteen states leave this basic and essential element of hydraulic fracturing disclosure completely unfulfilled.

Landowners, water well owners, and residents are best protected when a state requires both prior disclosure of chemicals and notification of hydraulic fracturing. The purposes of notification and disclosure may be frustrated if only one or the other is mandatory. For instance, if landowners are unaware that fracking is about to occur, prior disclosure of chemicals on a state website is useless to them. But only one of the five states that require prior disclosure of chemicals, West Virginia, provides advance notice to landowners and water well owners of fracking. And West Virginia requires prior disclosure of chemicals only for a subset of wells.²⁵ Non-owning residents fare even worse than



landowners and water well owners. No state requires both notification of fracking and prior disclosure of chemicals to non-owning residents. While pre-fracturing disclosure has been shown to be feasible in multiple states, it must be accompanied by notice and include all relevant information to make it an effective policy.

For more information on pre-fracking chemical disclosure and notice provisions, see Table I.

GEOLOGICAL AND ENVIRONMENTAL CONTEXT OF WELL

In order to understand the potential risks that a well poses and the resources that it may impact, it is important to have a picture of the geological and natural environment in which a well is situated and the nearby water sources that it could potentially affect. Yet no state requires reporting of all the

information that should be available to decision-makers and the public.

Five states require companies to disclose a full list of the geological formations that the well traverses: Montana, New Mexico, North Dakota, Ohio, and West Virginia. Of these five, only Ohio requires disclosure of the fluids and gasses associated with those formations. This information is important to understanding the risks of fluid or gas migration and to determine the causes of contamination that does occur.

Seven states require nearby water wells to be identified.²⁶ These seven are: Alabama, Colorado, Indiana, Michigan, Montana, Ohio, and Wyoming. Yet Alabama, Indiana, and Ohio all exempt certain wells from the requirements. Three states, Arkansas, Colorado, and Indiana, require that abandoned oil and gas wells nearby be identified.²⁷ Abandoned wells are an acknowledged conduit for

contaminants from deeper geological zones into groundwater when fracking occurs nearby. Ohio is the one state that requires companies to monitor and disclose baseline water quality in nearby water sources, but the requirement only applies to a subset of wells and the testing is done before drilling, but not before fracturing or refracturing that occurs later.

For more information on disclosure of the geological and environmental context of wells, see Table II.

DISCLOSURE OF HYDRAULIC FRACTURING CHEMICALS AND OTHER FACTORS

The core of most state hydraulic fracturing disclosure rules relates to the hydraulic fracturing treatment itself, including the chemicals used, the volume of fluid, and the pressure at which fluids are injected. Many states all but ignore other aspects of disclosure. But even in this area, our analysis found significant gaps in the disclosure of basic information.

To put this analysis in context, some background is necessary: A number of state programs differentiate between what they term “products” and “additives.” Products are substances made up of one or more chemical constituents. Products generally have a “trade name” under which they are sold (e.g. “Bactron K-31W”) and a function they serve (e.g. biocide).²⁸ Additives are the individual chemical constituents which constitute products.²⁹ Additives generally have a Chemical Abstract Service number, (CAS #) which is a unique numerical identifier for the chemical assigned by the American Chemical Society. CAS numbers are the global standard for authoritative identification of chemicals and allow each chemical constituent to be unambiguously identified, which is essential to provide an accurate picture of the substances used in each hydraulic fracturing treatment.

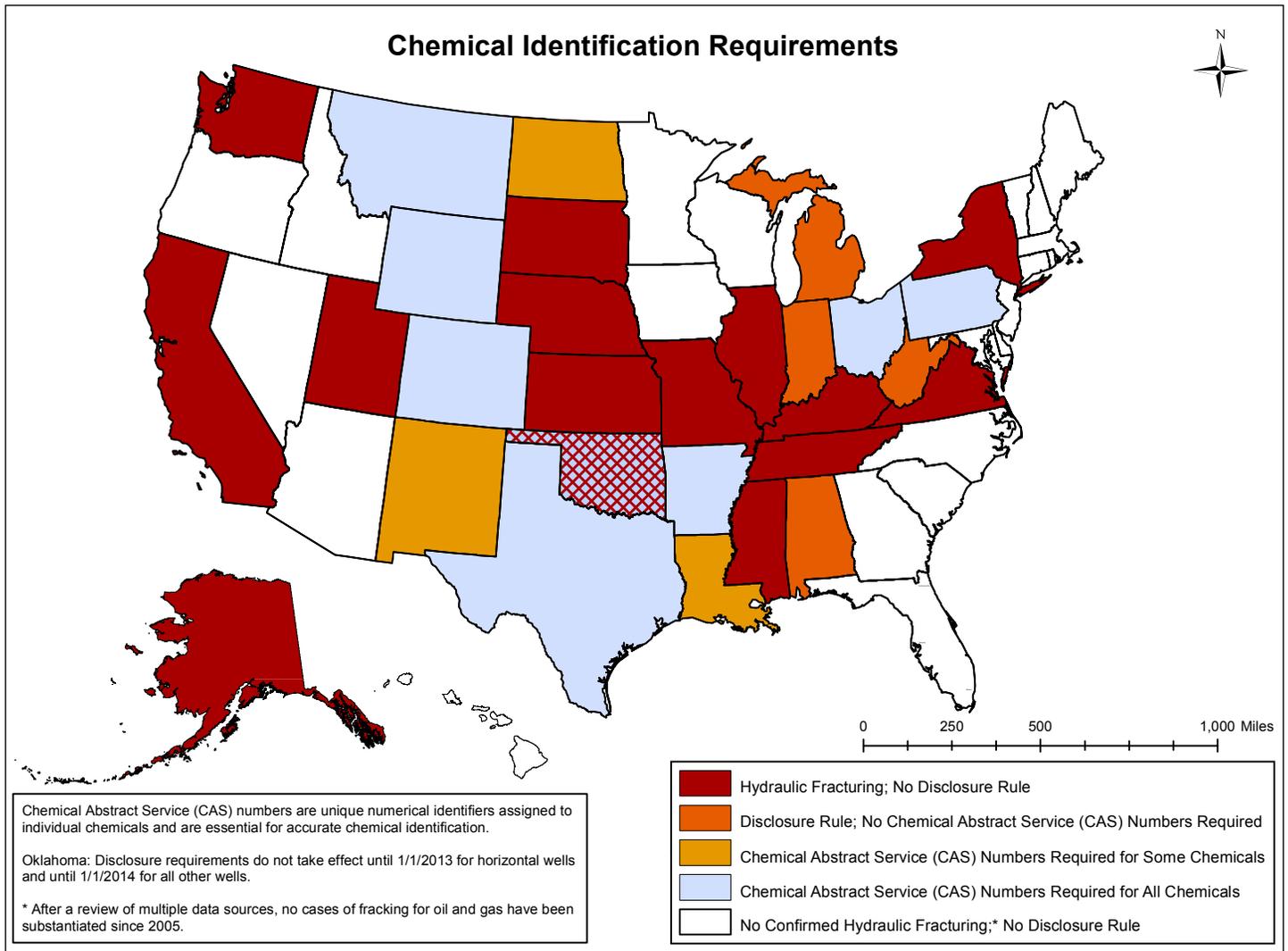
Only seven states require that CAS numbers be disclosed for all additives used. Yet without CAS numbers for every additive, it is impossible to determine precisely what chemicals were injected during hydraulic fracturing and what contaminants to test for. The seven states which require CAS numbers for all additives are: Arkansas, Colorado, Montana, Ohio, Pennsylvania, Texas, and Wyoming. Only two of these states, Montana and Wyoming, require the actual concentrations of all additives with their corresponding CAS numbers. Yet both Montana and Wyoming regulators have accepted reports that provide a range of potential concentrations instead of the actual concentrations. Thus, there is no state in which all chemicals and their concentrations can be determined for all hydraulic fracturing treatments. Three more states require that the “maximum

concentration” of all additives is disclosed: Colorado, Ohio, and Pennsylvania. This language allows operators to set an upper bound on the concentration, rather than providing the actual concentration used.

Three states, Louisiana, New Mexico, and North Dakota, limit disclosure of chemical identities to “hazardous substances”³⁰ as defined by the Occupational Safety and Health Administration (OSHA).³¹ But OSHA does not classify all dangerous chemicals as hazardous. OSHA requires that chemicals be identified as hazardous if studies show that they are dangerous in a workplace setting. But many chemicals used in the hydraulic fracturing process have not been adequately studied. If chemicals have not been studied, they are not identified as hazardous. Additionally, the rules focus on workplace safety. Potential transmission pathways like drinking water contamination are unlikely to be studied in the workplace context. The public should be made aware of all chemicals used in fracking, not just those deemed hazardous under a standard that was designed for an entirely different purpose.

Hydraulic fracturing treatment disclosure requirements are also lacking in other areas. Only nine states require reporting of the maximum pressure used during fracturing: Alabama, Arkansas, Indiana, Michigan, Montana, North Dakota, Ohio, Pennsylvania, and Wyoming. Yet this pressure is a key factor in whether the fractures will be limited to the intended zone. Two states, Michigan and Wyoming, require reporting of annulus pressures. An annulus is the space between two sets of well casings or between the well casing and the borehole. Annulus pressure measurements are a key indicator of whether a well’s structural integrity is maintained throughout fracturing. A jump in annulus pressure may indicate that the well casing has been breached or that the cement in the annuli is no longer providing the necessary barrier to prevent migration. Fluid or natural gas migration along an annulus can lead to contamination of groundwater and other health and safety hazards. Continuous monitoring, recording, and public reporting of annulus pressures should be required for all fracturing treatments.

All fourteen states require reporting of the base fluid volume used in fracturing, while eight require the type of base fluid to be reported. These eight states are: Arkansas, Colorado, Indiana, Louisiana, Montana, New Mexico, Ohio, and Texas. The base fluid used in hydraulic fracturing is the fluid to which chemicals are added and is often water. However, some hydraulic fracturing uses “recycled water” or other fluid as a base. Disclosure of fluid type is important to understand the extent to which industry is recycling wastewater for use in fracturing treatments and the extent to which it is using a state’s fresh water resources.

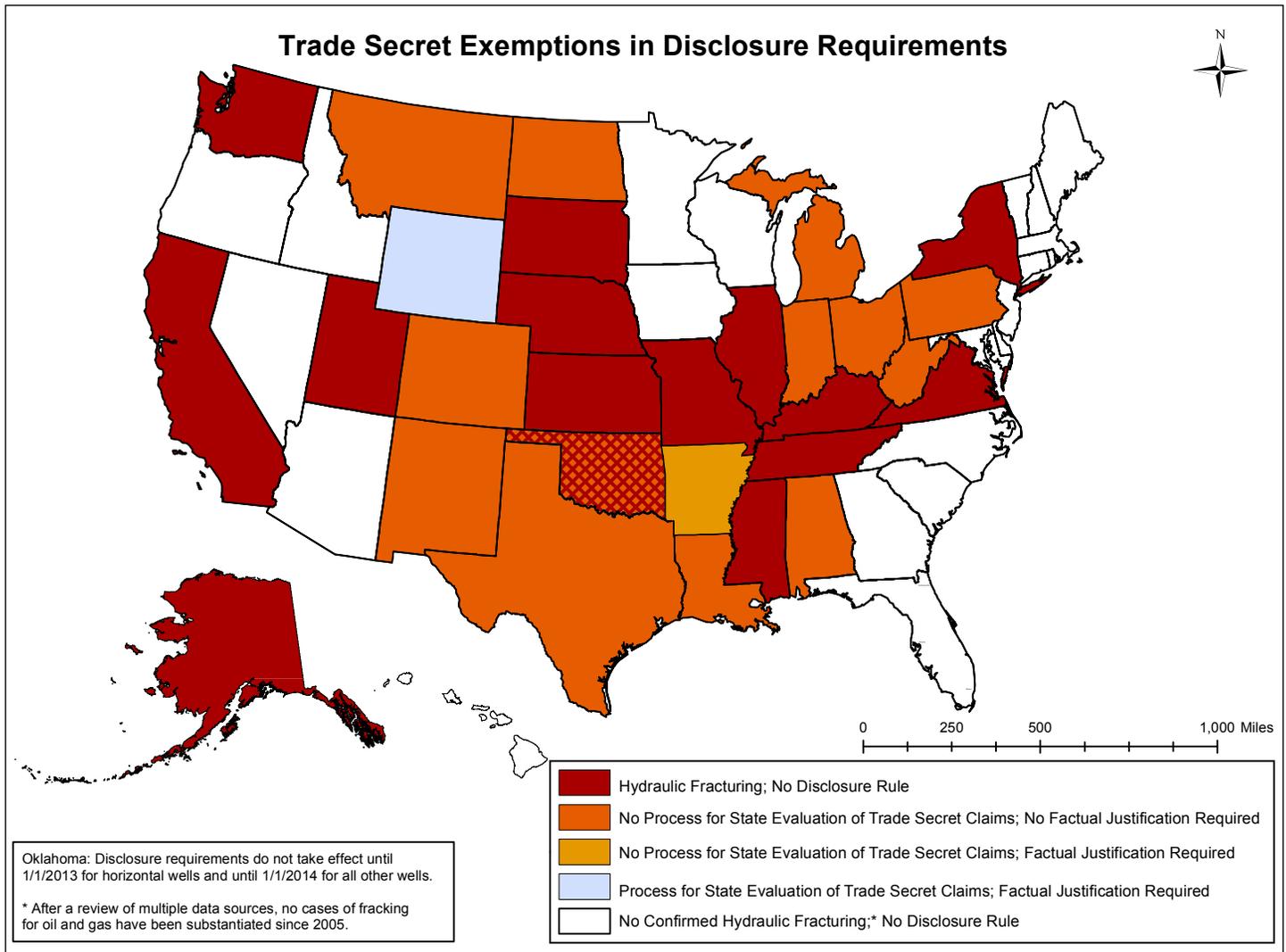


Fluid type also provides information on what substances may be in the fracturing fluids, other than the additives. For instance, many constituents of flowback and produced water may remain in recycled water.³² At minimum, disclosing the fluid type makes clear whether there are constituents in the fluid that are not disclosed as chemical additives. No state requires reporting the contents of recycled water that is used in fracturing.

Proppant is a granular material used in hydraulic fracturing to prevent the pressure-induced fractures from closing after the pressure is released. Often, sand is used as a proppant, but manmade materials may also be used. Some proppants are coated with chemicals to improve

performance. Hundreds of thousands or even millions of pounds of proppant may be used in an individual fracture treatment. This makes it essential that chemical coatings are disclosed, as they may be present in large amounts, and will not otherwise be included in the list of fluid additives. Unfortunately, only six states clearly require that all chemicals (and their CAS numbers) in proppant be disclosed: Arkansas, Colorado, Montana, Ohio, Pennsylvania, and Wyoming.

For more information on disclosure of hydraulic fracturing treatments, see Table III.



TRADE SECRET EXEMPTIONS

States provide an exemption to the disclosure requirements for information deemed to be a proprietary “trade secret.”³³ A trade secret is a formula or other information about a product that gives a company a competitive advantage in the marketplace, such as the secret formula for Coca-Cola. When a law requires disclosure of chemicals, companies may desire to keep what they consider to be trade secrets confidential. Regulators must have in place a legitimate and transparent process to determine what information genuinely deserves trade secret protection.

Unfortunately, most states have effectively given the fracking industry a free pass to avoid disclosure requirements when a company claims trade secrets are involved. Only Wyoming and Arkansas require submission of factual justification to substantiate a claim that information should be kept confidential. Yet Arkansas has no clear process for evaluating the facts to determine whether claims are legitimate. Wyoming does have such a process, but unfortunately the state appears to be granting exemptions even when companies do not provide specific facts to justify those exemptions.³⁴ Company submissions approved by Wyoming regulators frequently recite only generalized claims

about secrecy and spending on research and development.³⁵ And the state has approved trade secret status for upwards of thirty substances based on a single four-page letter claiming protection was justified.³⁶

Four states provide a process for challenging trade secret exemptions. Texas allows challenges only from landowners who own land on which the well is located or adjacent to it. Unfortunately, however, landowners are given little basis on which to determine whether trade secret protections are justified because there is no requirement that companies submit anything to substantiate their claim for an exemption. Colorado, Ohio, and Pennsylvania provide processes for public challenges to trade secret protection. Yet in none of these states are companies required to submit any specific factual information to substantiate their claim for protection. This gives the public little basis to evaluate the validity of a particular company's exemption.

For more information on trade secret exemptions, see Table V.

INFORMATION PROVIDED TO HEALTH PROFESSIONALS

Six states provide for access to trade secret information by health care providers. These states are: Arkansas, Colorado, Montana, Ohio, Pennsylvania, and Texas. Four of the six states (all but Ohio and Arkansas) require that providers sign a confidentiality agreement before gaining access to the information, except in emergency situations. Health care professionals and health law experts have questioned the wisdom of such provisions and whether they violate doctors' ethical obligations.³⁷ Ohio, does not require a confidentiality agreement, but prohibits medical professionals from sharing confidential information given for the purposes of diagnosis or treatment of a patient. Ohio's law provides that it does not "preclude[] a medical professional from making any report required by law or professional ethical standards."³⁸ However, because the limits of what a medical professional can and cannot disclose are not clearly delineated, medical professionals may be prevented from sharing information because of fears that doing so could subject them to a lawsuit. Arkansas' rules allow medical professionals to obtain trade secret information but appear to have no confidentiality requirement.

For more information on the information provided to health professionals, see Table V.

WASTEWATER GENERATION AND DISPOSAL

After fracking, a portion of the fluids blasted into the well return to the surface. This flowback water contains fracturing chemicals as well as potentially high levels of salts, hydrocarbons, metals, and naturally occurring radioactive material from the fractured formation. Because flowback contains a wide range of hazardous substances, storage, treatment and disposal may pose challenges. Most flowback is disposed of in underground injection wells,³⁹ but injection wells used for oil and gas waste are less stringently regulated than other injection wells used for the disposal of dangerous wastes.⁴⁰ Treatment and discharge of flowback may also pose hazards.⁴¹ Data about wastewater and the methods of handling and disposal reveal these risks so that they can be understood and addressed.

Oil and gas wastes are exempt from federal hazardous waste handling and disposal requirements.⁴² Therefore, even if flowback is dangerous, there is no legal requirement that it be handled or treated based on minimum federal safety standards for other hazardous wastes. Because minimum federal standards do not apply, state requirements in this area are particularly important. At minimum, the public needs basic information on the amount of wastewater that is generated, its contents, and how it is stored and disposed of.

Three states, Indiana, Michigan and Wyoming, require that the volume of flowback be reported.⁴³ Five states require disclosure of how flowback is disposed: Indiana, New Mexico, Ohio, West Virginia, and Wyoming.⁴⁴ And three (New Mexico, Ohio, and Pennsylvania) require that companies specify the methods of storage at the well site. No state, however, requires analysis and disclosure of the contents of the flowback itself, making a true accounting of the risks it poses elusive.

For more information on wastewater provisions, see Table IV.

IV. CONCLUSION

DESPITE CLAIMS THAT STATE RULES HAVE DONE THE JOB, WORK REMAINS TO BE DONE

State disclosure rules differ greatly on many dimensions. Despite the differences, the oil and gas industry and its allies have consistently used the creation of these rules to argue that state regulation is adequate and that federal standards are unnecessary.

Despite these claims, no state can boast a comprehensive disclosure rule. Each of the state rules we analyzed has significant gaps in its requirements. Trade secret exemptions create loopholes in most rules, allowing companies to deem information proprietary and prevent disclosure. In many states, disclosure requirements written into state rules are not consistently enforced. We found multiple states where disclosures we reviewed consistently failed to meet requirements. And some states provide certain information to the public only via physical inspection of well records, severely limiting its availability.

States that have enacted disclosure rules have taken an important first step. But our analysis contradicts assertions that state disclosure rules are a success story which negate the need for federal disclosure rules. On the contrary, the review of state rules reinforces the need for federal disclosure standards. The majority of states with hydraulic fracturing have no disclosure requirements at all. And of the states that do, not one requires disclosure of all the information that regulators and the public need to know. In the absence of federal disclosure standards, states can and should do more.

Thousands of wells are hydraulically fractured each year. Therefore it is essential that new disclosure rules are put in place immediately to adequately inform the public. Hydraulic fracturing disclosure rules should contain the following key elements:

- Prior notice of hydraulic fracturing to landowners and residents, and disclosure of the chemicals to be used, at least 30 days before fracking commences.
- Complete disclosure concerning the geological and environmental context of the well, including nearby groundwater and surface waters, the geological formations the well penetrates, and whether there are abandoned oil and gas wells nearby.
- Chemical identification of all substances used in fracking, including the Chemical Abstract Service numbers and actual concentrations.
- Disclosure of other important information about the hydraulic fracturing treatment, including the volume, source, and type of the base fluid, the maximum pressure used, a record of all annulus pressures, and the fracture length.
- Information concerning the waste generated, its contents, and the methods of waste storage and disposal
- Requirement that confidential information is provided to state regulators and a process for the public to challenge confidentiality claims.
- Immediate access for medical professionals and first responders to confidential information in order to diagnose and treat patients.

Endnotes

1 Thus, we do not include a state like Idaho because, though the state requires some disclosure of fracking fluids to the Oil and Gas Conservation Commission, those records are only available via the state's public records act. We also do not include states like Nebraska, which allow an operator to keep information confidential for a period of one year before it is made public.

2 The fourteen states are: Alabama, Arkansas, Colorado, Indiana, Louisiana, Michigan, Montana, New Mexico, North Dakota, Ohio, Pennsylvania, Texas, West Virginia, and Wyoming. Oklahoma has enacted a rule, but the rule does not take effect until January 1, 2013 for horizontal wells and until January 1, 2014 for all other wells. Though Kansas recently passed a law that may lead to hydraulic fracturing disclosure its law makes disclosure regulations optional and no rule has been enacted that would permit further analysis. 2012 H.B. 2526 § 1 (enacted Apr. 12, 2012).

3 See Theo Colborn et al., *Natural Gas Operations from a Public Health Perspective*, 17 Hum. & Ecological Risk Assessment: An Int'l J. 1039, 1040, 1045-46.

4 See *Id.* at 1050, tbl.2; International Agency for Research on Cancer, List of Classifications by CAS Number Registry, available at <http://monographs.iarc.fr/ENG/Classification/index.php>.

5 See, e.g., Andrew Maykuth, *Pa. Investigating Marcellus Well Blowout*, Philadelphia Inquirer (Jan. 26, 2011); Laura Legere, *Natural Gas Well Suffers Blowout, Releasing Fluids in Bradford County*, The Times-Tribune (Apr. 21, 2011).

6 See, e.g., U.S. Environmental Protection Agency, Draft Report: Investigation of Ground Water Contamination near Pavillion, Wyoming, EPA 600/R-00-000 (Dec. 2011).

7 See, e.g., Michelle Bamberger & Robert E Oswald, *Impacts of Gas Drilling on Human and Animal Health*, 22 New Solutions: A J. of Env'tl. & Occupational Health Pol'y 51 (2012).

8 See, e.g., Lisa M. McKenzie et al., *Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources* (2012).

9 See T. Hayes, Gas Technology Institute, *Sampling and Analysis of Water Streams Associated with the Development of Marcellus Shale Gas: Final Report*, 36 tbl.9 (Dec. 31 2009); E.L. Rowan et al., *Radium Content of Oil- and Gas-Field Produced Waters in the Northern Appalachian Basin (USA): Summary and Discussion of Data*, U.S. Geological Survey Scientific Investigations Report 2011-5135, 11 fig.6 (2011).

10 For example, stormwater drains and other inlets that may channel fluid spills or leaks into a drainage system or a waterway.

11 The base fluid is the fluid, often water, to which chemicals and other substances are added.

12 "Produced water" is water that naturally exists in subsurface geologic formations and is co-produced from a well along with the oil and gas.

13 Often flowback is only a small portion of the cumulative wastewater stream from an oil and gas well, with produced water comprising a larger share. Because this analysis focuses exclusively on hydraulic fracturing disclosure, it discusses only on the generation, management, and disposal of flowback, which is uniquely associated with fracking. Produced water may pose similar hazards, and information concerning its generation and

management is essential to a complete picture of the societal costs of oil and gas production. See Rebecca Hammer & Jeanne VanBriesen, *In Fracking's Wake: New Rules are Needed to Protect Our Health and Environment from Contaminated Wastewater* (May 2012) available at <http://www.nrdc.org/energy/fracking-wastewater.asp>.

14 Confirmed fracking activity is based on substantiated cases of hydraulic fracturing for oil and gas in each state since 2005.

15 While there is a current moratorium in New York on "high-volume hydraulic fracturing" (fracking using greater than 300,000 gallons of water) fracturing using lower volumes has occurred in New York since 2005 and continues to be permissible.

16 Oklahoma's disclosure requirements will take effect on January 1, 2013 for horizontal wells and on January 1, 2014 for all other wells.

17 Other states also have proposed disclosure rules. For instance, California has no disclosure rule at this time but has a bill (AB 591) under consideration in the State Legislature. AB 591 was not included in the analysis due to the frequent amendments it has undergone, which limit the usefulness of an analysis of any one version.

18 The BLM proposal would govern hydraulic fracturing activities associated with wells drilled into federally-managed oil and gas. This oil and gas may lie beneath federally-managed lands managed the BLM itself, or by other agencies such as the U.S. Forest Service, the U.S. Fish and Wildlife Service, or the U.S. Army Corps of Engineers. The rule would also apply where federally-owned oil and gas lies beneath state or private lands.

19 In some cases, state rules and the FracFocus disclosure form are directly contradictory. For instance, Texas rules require companies to report on FracFocus the amount and type of the base fluid used (for instance recycled water, fresh water, or some other base fluid). See 16 Tex Admin Code 3.29 (c)(2)(A)(viii). However, the FracFocus form provides no field for entry of base fluid type and explicitly states that the figure reported in the "Total Water Volume" field "may include fresh water, produced water, and/or recycled water."

20 Due to the fact that many rules have been passed recently, some states may have disclosures available at the time of publication that were not available at the time of review. Indiana was not included because although it has permit applications available for review, which provide very basic pre-disclosure for some coal bed methane wells, the vast majority of the information available to the public will not be disclosed until post-fracking reports are made available.

21 In Ohio many completion reports are not even available months after the well was fractured. (Note that disclosures under Ohio's newly-passed rule are not yet available. Therefore, in order to evaluate enforcement in Ohio, we compared available disclosures to the previous disclosure requirements, which were in force when the disclosures were made.)

22 A number of states require companies to provide notice of drilling operations, but not fracking. Fracking may be performed immediately after drilling or at a later date, and refracturing may be performed on multiple occasions throughout the life of a well. Notice provisions which simply inform a landowner or water well owner of a general plan of operations are inadequate for multiple reasons. First, they do not necessarily give clear notice about when the first fracturing treatment will be performed. It is essential that baseline testing be performed shortly before fracking so that intervening causes of any changes to water quality can be eliminated. Second, refracturing may cause problems even where an initial treatment did not. Yet no notice of refracturing is assured where only general notice of an operations plan is required.

23 Note that there are advantages and disadvantages to the different systems used in Wyoming and Arkansas. In Arkansas, those wishing to conduct baseline testing are provided only with a master list of the chemicals a company uses in the state. This system may require unnecessary, and potentially expensive, testing of many chemicals that will not be actually used, but it does provide a landowner with information about all chemicals that may be injected during fracking. In Wyoming, the company provides a list of chemicals it plans to use. This provides a much more manageable list of chemicals for baseline testing. However, new chemicals may be added during the actual fracturing process, of which the water well owner has no notice until after the fracturing occurs.

24 The West Virginia disclosure requirement applies only to wells which require water withdrawals from state waters greater than 210,000 gallons in a 30-day period. The Indiana requirement applies only to wells drilled for the extraction of coal bed methane.

25 As noted above, the West Virginia pre-disclosure requirement applies only to wells which require water withdrawals from state waters greater than 210,000 gallons in a 30-day period.

26 Montana requires the identification of water wells within one half mile (2,640 feet). Wyoming requires identification of wells within one quarter mile (1,320 feet), Michigan within 600 feet, and Colorado within 400 feet. Alabama, Indiana and Ohio all limit the requirement to water wells near a subset of fractured oil and gas wells. For more information, see Table II.

27 Colorado requires identification of all abandoned wells within 400 feet, while Arkansas requires identification of abandoned wells within the lease or unit the well lies in. Indiana requires identification of only those abandoned wells near proposed coal bed methane (CBM) wells. Abandoned wells must be identified if they are within 500 feet, or the estimated distance from the CBM wellbore to the tip of the longest fracture intersecting the wellbore, whichever is greater.

28 Other examples of the functions of products used in fracking include: acid, surfactant, scale inhibitor, polymer, cross linker, corrosion inhibitor, pH control agent, gel breaker, and clay control agent.

29 Unfortunately, some other states use the terms "additive" and "chemical," respectively, to refer to these same concepts. In order to avoid confusion, we adopt the terms "product" and "additive" in the analysis even where the terms are described differently in state rules.

30 For more information see Table III. Note that Texas requires identification of all chemicals but only requires concentrations of hazardous substances to be reported.

31 See 29 CFR § 1910.1200.

32 See Hayes, Gas Technology Institute, *Sampling and Analysis of Water Streams Associated with the Development of Marcellus Shale Gas: Final Report*, 30 (Dec. 31 2009).

33 The only cases in which such an exemption is not provided are in states where the disclosure requirements are so general that no submission of trade secret information is needed to fulfill the disclosure obligations.

34 A lawsuit challenging this practice was recently filed. See Jennifer Dlouhy, *Environmentalists Challenge Trade Secret Protections for Hydraulic Fracturing, Fuel Fix* (March 26, 2012) available at <http://fuelfix.com/blog/2012/03/26/environmentalists-challenge-trade-secret-protections-for-hydraulic-fracturing/>.

35 See, e.g., http://wogcc.state.wy.us/tradesecrets/TS2010_2%20Halliburton.pdf.

36 See http://wogcc.state.wy.us/tradesecrets/TS2010_12%20BJ%20Svcs.pdf.

37 See, e.g., Susan Phillips, *Leading Public Health Official Says Impact Fee Law Violates Medical Ethics, StateImpact Pennsylvania* (Feb. 16, 2012) available at <http://stateimpact.npr.org/pennsylvania/2012/02/16/leading-public-health-official-says-impact-fee-law-violates-medical-ethics/>; Susan Phillips, *Health Law Expert Says Pa. Doctors Should Fear the New Drilling Law, StateImpact Pennsylvania* (April 19, 2012) available at <http://stateimpact.npr.org/pennsylvania/2012/04/19/health-law-expert-says-pa-doctors-should-fear-the-new-drilling-law/>.

38 Ohio Rev. Code. § 1509.10 (H)(2) as modified by Senate Bill 315.

39 See U.S. Government Accountability Office, *GAO-12-156 Energy-Water Nexus: Information on the Quantity, Quality, and Management of Water Produced during Oil and Gas Production 2* (Jan. 2012) (noting federal estimates that greater than 90% of produced water, including flowback, is managed by underground injection).

40 For instance, less geological data is required when permitting oil and gas waste injection wells, but fluid injection wells have been shown to induce earthquakes in some cases. See, e.g., S.A. Shapiro *et al*, *Probability of a Given-magnitude Earthquake Induced by a Fluid Injection*, 34 *Geophys. Res. Lett.* L22314 (Nov. 2007) available at <http://www.agu.org/pubs/crossref/2007/2007GL031615.shtml>.

41 For instance, in Pennsylvania, a 2011 investigation by the *New York Times* showed that that wastewater from some oil and gas wells carried more than 1,000 times the level of radioactive materials deemed safe under federal drinking water standards. Ian Urbina, *Regulation Lax as Gas Wells' Tainted Water Hits Rivers*, *N.Y. Times* (Feb. 27, 2011). Yet wastewater with radioactive elements was being only partially treated (at facilities designed to process municipal sewage) and released into rivers upstream of drinking water intakes. While Pennsylvania has asked companies to voluntarily cease taking oil and gas wastewater to ill-equipped facilities, treatment challenges remain.

42 See Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6921 (b)(2)(A).

43 Indiana only applies the requirement to coal bed methane wells.

44 Two of these five states require disclosure only for a subset of wells. West Virginia only requires disclosure if greater than 210,000 gallons are withdrawn from state waters in a 30-day period in order to perform the frack job, and Indiana only applies the disclosure requirement to coal bed methane wells.