



Who Pays the Cost of Fracking?

**Weak Bonding Rules
for Oil and Gas Drilling
Leave the Public at Risk**

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2013

Acknowledgments

Environment Texas Research & Policy Center sincerely thanks Sara Kendall of the Western Organization of Resource Councils and Jonathan Shefftz of JShefftz Consulting for their review of drafts of this document, as well as their insights and suggestions. Thanks also to all those who shared information or perspectives for this report, and to Elizabeth Ridlington of Frontier Group for her editorial support.

Environment Texas Research & Policy Center thanks the Colcom Foundation for making this report possible.

The authors bear responsibility for any factual errors. The recommendations are those of Environment Texas Research & Policy Center. The views expressed in this report are those of the authors and do not necessarily reflect the views of our funders or those who provided review.

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Layout: To the Point Publications, www.tothepointpublications.com

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Executive Summary

“Fracking” operations pose a staggering array of threats to our environment and health – contaminating drinking water, harming the health of nearby residents, marring forests and landscapes, and contributing to global warming. Many of these damages from drilling have significant “dollars and cents” costs.

To the extent that this dirty drilling is allowed to continue, policymakers must require, among other things, that the oil and gas industry provide **up front financial assurance** commensurate with the potential for damage. By holding operators fully accountable, strong financial assurance requirements deter some of the riskiest practices and ensure that the industry, rather than the public, bears the brunt of the costs. Requiring such assurance *up front* – i.e., before drilling occurs – helps ensure that the public is not left holding the bag when the boom is gone and drilling operators have left the scene.

Unfortunately, current state and federal requirements for bonding or other financial assurance are wholly inadequate to protect the public.

- *Financial assurance is not required for important impacts of fracking* – Most states require financial assurance only for the costs of plugging a well and reclaiming the site – leaving no guarantee that funds will be available to fix environmental damage or compensate victims. States also generally do not require financial assurance to remain in place after a well has been plugged and the well site has been reclaimed, leaving the public at risk of having to pay for environmental damages that might emerge years or even decades later.
- *Bonding levels are much too low* – Only eight states require drillers to post bonds of \$50,000 or more per well for plugging and reclamation at well

To the extent that this dirty drilling is allowed to continue, policymakers must require, among other things, that the oil and gas industry provide up front financial assurance commensurate with the potential for damage.



The storage and disposal of contaminated wastewater from fracking can lead to pollution of rivers, streams and groundwater. Pictured is a containment pond for wastewater at a Marcellus Shale natural gas drilling operation in Potter County, Pennsylvania.

depths commonly reached by fracking, despite documented instances in which fracking wells have cost \$700,000 or more to plug. In addition, most states have “blanket bonding” options that further reduce the amount of financial assurance a driller must provide – in some cases to less than \$100 per well.

- *States allow types of financial assurance that don't protect the public* – Some states allow drillers to avoid financial assurance requirements by submitting statements demonstrating their financial health. These provisions leave the public at risk

in the event that drillers run into unexpected financial trouble – a common occurrence in the “boom-bust” fossil fuel industry.

- *Loopholes and exemptions let oil and gas companies off the hook* – Lobbyists for the oil and gas industry have succeeded in convincing Congress and federal agencies to exempt the industry from a host of environmental laws, including those that would require the industry to provide financial assurance. Some states, meanwhile, allow drillers to escape financial assurance requirements by paying a small fee.

State and federal officials must adopt new financial assurance rules that ensure that oil and gas companies – not taxpayers – are held fully accountable for the costs of fracking.

To protect the public, an adequate blueprint for bonding must adhere to the following principles:

Require broad accountability for fracking-related costs. Drillers should be required to provide financial assurance to cover well plugging and reclamation, restoration of damage to the environment and natural resources, compensation to victims for damage to property and health, provision of alternative sources of drinking water in case of water contamination, and full restoration of damage to public infrastructure, such as roads. Additional taxes and fees should be used to recover fracking-related costs that are relevant at a regional, national or international scale, such as costs resulting from emissions of smog-forming pollutants, emissions of global warming pollution, and impacts on local public services.

Require levels of financial assurance that are sufficient to protect the public. Drillers should be required to post financial assurance of *at least* \$250,000 per well for the cost of plugging and reclamation and at least \$5 million per well for damage to private property, health and natural resources, as well as environmental cleanup. Some measure of financial assurance should be required for at least 30 years to protect the public against problems that emerge only over time. Drillers should also be required to pay into industry-wide cleanup funds to act as a backstop source of funds for cleanup and victim compensation in the event that financial assurance rules are violated or fail to offer adequate protection.

Eliminate loopholes, exemptions and discounts. Federal officials should end the oil and gas industry's exemptions from major environmental laws. "Blanket bonding" that provides an unjustified bulk discount on financial assurance should be eliminated. Provi-

sions of state regulations that allow drillers to avoid posting financial assurance by undergoing financial tests, paying annual fees, or demonstrating a history of compliance with state regulations should also be eliminated.

Require forms of financial assurance that truly protect the public. Surety bonds, collateral bonds backed by irrevocable letters of credit or cash equivalents, and fully-funded trust funds provide strong guarantees that funds will be available for cleanup when needed and these should form the foundation of any financial assurance system. Liability insurance can play an important role in protecting the public against the cost of damage to neighboring properties and natural resources, including damage that occurs long after plugging and reclamation are complete.

Integrate financial assurance rules into a comprehensive system of oil and gas regulation. State and federal governments must implement and enforce financial assurance requirements by ensuring that each well is covered by financial assurance and that financial assurance remains in place as long as the possibility of damage persists. In addition, regular inspection of wells and enforcement of environmental rules is essential to limit the potential for major mishaps that result in monetary damage that exceeds financial assurance requirements. Financial assurance rules can help hold drillers accountable for following the law if they contain provisions allowing bonds to be forfeited in cases where rules are broken or fines and penalties are not paid.

Time and again, resource extraction booms have given way to busts – leaving the companies that profited from mining or drilling unwilling or unable to clean up the damage they have caused. Absent swift action by policymakers to dramatically ramp up financial assurance for fracking, we could see a similar grim legacy from the new oil and gas rush.

Introduction

America is in the midst of a fracking boom ... and a fracking bust.

In North Dakota, times are booming. The state has rapidly become the nation's second-largest oil producer due to the use of horizontal drilling and hydraulic fracturing (the combination of technologies used in fracking) to tap oil supplies from the Bakken Shale formation. North Dakota has seen its oil production triple over the span of just three years.¹ Each month, about 200 new shale oil wells are drilled in the state, roughly four times as many as three years earlier. And with that intense drilling activity has come jobs; the state's unemployment rate in October 2012 was a rock-bottom 3.1 percent.²

North Dakota isn't the only place experiencing a fracking boom. In the Niobrara Shale in Colorado and the Eagle Ford Shale in Texas, drillers can't move quickly enough to tap oil-bearing shale formations, seeking to take advantage of persistently high world oil prices.

But other areas that have experienced similar "gold rush"-like conditions in recent years are now beginning to see the flip side of the fracking boom.

In western Colorado, drilling in the Piceance Basin has dropped dramatically, leaving towns and businesses that were thriving just a few years ago in difficult financial straits.³ Statewide, gas drilling activity dropped by nearly two-thirds between mid-2008 and mid-2012, even as oil drilling in another region of Colorado boomed.⁴

In Texas' Barnett Shale, drilling activity has fallen by three-quarters from its peak.⁵ Even in the Marcellus Shale basin of Pennsylvania, Ohio and West Virginia, visions of a massive and continuing economic boom have faded as drilling activity has waned. As of July 2012, the number of drilling rigs in Pennsylvania's Marcellus Shale was 29 percent lower than the year before.⁶

The leading culprit in the decline in natural gas drilling has been the dramatic fall in natural gas prices triggered by the boom in shale gas and other forms of unconventional gas.

The recent experience in these regions is a startling reminder that resource extraction booms are ephemeral by their very nature. But the impacts left by oil and gas drilling on landscapes, water resources, public health and public infrastructure are anything but temporary – they can last for years, even decades. Even today, America still bears the scars of coal mining and oil drilling activity that took place a century ago.

Cruel experience has shown that unless government requires fossil fuel companies to set aside money for environmental cleanup during the years when profits are being made, few resources will remain when the inevitable bust arrives – leaving polluted sites uncared-for and taxpayers to bear the costs of cleanup.

For areas experiencing widespread fracking, history shows that the time to ensure that adequate resources exist to repair the damage caused by drilling is *now*. Unfortunately, the oil and gas industry is exempt from many federal environmental laws that would require the industry to set aside resources for cleanup. Moreover, most state oil and gas laws are ill-equipped to protect the public from the impacts of conventional oil and gas drilling, much less the far greater impacts resulting from fracking.

This paper documents the many ways in which current state and federal laws leave taxpayers dangerously exposed due to inadequate requirements for financial assurance. It also proposes a framework for reform of the nation's financial assurance rules for oil and gas drilling, ensuring that they are robust enough to address the new challenges posed by fracking.

THE COSTS OF FRACKING

The Price Tag of Dirty Drilling's Environmental Damage



DAMAGE TO NATURAL RESOURCES

- \$\$ Threats to rivers and streams
- \$\$ Habitat loss and fragmentation
- \$\$ Contribution to global warming



DRINKING WATER CONTAMINATION

- \$\$ Groundwater cleanup
- \$\$ Water replacement
- \$\$ Water treatment costs



BROADER ECONOMIC IMPACTS

- \$\$ Value of residents' homes at risk
- \$\$ Farms in jeopardy



HEALTH PROBLEMS

- \$\$ Nearby residents getting sick
- \$\$ Worker injury, illness and death
- \$\$ Air pollution far from the wellhead



PUBLIC INFRASTRUCTURE AND SERVICES

- \$\$ Road damage
- \$\$ Increased demand for water
- \$\$ Cleanup of orphaned wells
- \$\$ Emergency response needs
- \$\$ Social dislocation and social service costs
- \$\$ Earthquakes from wastewater injection

Infographic design: Jenna Leschuk; Photos: boy drinking water, Ken Bosma, flickr, Creative Commons; construction roadwork, Doug Tone, flickr, Creative Commons; doctor and patient, AntoAB, flickr, Creative Commons; house for sale, David Smith, flickr, Creative Commons; fracking from above, Allegheny Defense Project.

The Costs of Fracking

Over the past decade, the oil and gas industry has combined two technologies – horizontal drilling and hydraulic fracturing – to extract fossil fuels from previously inaccessible rock formations deep underground. The use of high-volume horizontal hydraulic fracturing – colloquially known as “fracking” – has expanded dramatically from its origins in the Barnett Shale region of Texas a decade ago to tens of thousands of wells nationwide today.

That dramatic expansion has occurred despite the impact of fracking on the environment, public health, and communities. Environment America Research & Policy Center’s September 2012 report, *The Costs of Fracking*, documented that these damages also carry significant “dollars and cents” costs – costs that are often borne not by those who profit from drilling but instead by the public at large.

Contaminating Drinking Water

Fracking can contaminate drinking water supplies in a variety of ways. Spills and blowouts on well pads and failures of wastewater pits have released fracking chemicals and wastewater into groundwater, rivers, streams and lakes.⁷ Poor well construction has enabled methane and other contaminants to foul groundwater supplies.⁸ And scientific studies have suggested that hydraulic fracturing may – over a period of time – enable contamination from the underground formations targeted for oil and gas production to reach groundwater supplies.⁹

Water contamination has been a common result of oil and gas production – including fracking operations – across the country:

- In New Mexico, there have been more than 400 instances in which materials from oil and gas waste pits leached into groundwater;¹⁰

Defining “Fracking”

In this report, when we refer to the impacts of “fracking,” we include impacts resulting from all of the activities needed to bring a well into production using hydraulic fracturing, to operate that well, and to deliver the gas or oil produced from that well to market. The oil and gas industry often uses a more restrictive definition of “fracking” that includes only the actual moment in the extraction process when rock is fractured – a definition that obscures the broad changes to environmental, health and community conditions that result from the use of fracking in oil and gas extraction.

- In Colorado, approximately 340 leaks or spills from drilling operations have reached groundwater;¹¹
- In Pennsylvania, state regulators identified 161 instances in which drinking water wells were impacted by drilling operations between 2008 and the fall of 2012.¹²

Groundwater contamination is so difficult and expensive to clean up that remediation is rarely even attempted. In Colorado in 2004, a poorly cemented well leaked natural gas into West Divide Creek. The company responsible for the well installed equipment to remove pollutants from the water supply – at a likely cost of hundreds of thousands of dollars – that continued in operation through at least mid-2012.¹³

Residents whose water is contaminated by fracking also require expensive replacement sources of water. In Colorado, households within a two-mile area of the West Divide Creek seep received potable water deliveries and water systems until 2006, at a cost of \$350,000 to the drilling company.¹⁴

The presence of many fracking wells in a small geographic area can also result in increased flow of sediment and other pollutants into waterways, which can trigger increased water treatment costs. New York City, for example, faces potential costs of \$6 billion to build the world’s largest water filtration plant if pollution from fracking or any other activity were to degrade the quality of the upstate New York watersheds on which the city depends for drinking water.¹⁵

Making Residents Sick

Fracking pollution threatens the health of workers, nearby residents, and even people living far away. The chemical components of fracking fluids have been linked to cancer, endocrine disruption, and neurological and immune system problems,¹⁶ while

oil and gas drilling brings produced water to the surface that can contain substances such as volatile organic compounds with potential impacts on human health.¹⁷

Those who live close to fracking sites can get sick from emissions from wells. A study from the Colorado School of Public Health documented an increased risk of illness for residents living within a half-mile of natural gas wells in one area of Colorado due to air pollutant exposure.¹⁸ Studies near fracking sites in Texas, Pennsylvania and Arkansas have detected components of natural gas in the air, in some cases at levels that pose immediate or long-term health concerns.¹⁹

Workers at fracking sites face dangers typical of other oil and gas workers, who are seven times more likely to die on the job than other American workers.²⁰ They also, however, face an additional threat from exposure to silica sand, which is used in the fracking process and can cause silicosis. In 2012, the National Institute for Occupational Safety and Health (NIOSH) issued a hazard alert after discovering elevated levels of silica in the air at fracking sites in multiple states.²¹

Emissions from fracking can even harm the health of people living far away by contributing to regional air pollution problems. Fracking can make a significant contribution to smog and soot pollution that threatens public health – a 2009 study of five counties in the Dallas-Fort Worth area, for example, found air pollution caused by fracking to be a larger source of smog-forming emissions than cars and trucks.²²

The economic costs of fracking’s health impacts on nearby residents, workers and residents of regions where extensive fracking takes place are significant. The air emissions produced by fracking in Arkansas’ Fayetteville Shale region in 2008, for example, imposed public health costs of greater than \$10 million.²³

Damaging Natural Resources

Fracking transforms rural and natural areas into industrial zones complete with drilling pads, supply roads and pipelines. This not only damages the physical beauty and integrity of landscapes, but also their economic value.

The contamination of waterways with fracking chemicals and wastes, along with the ecological impacts of excessive water withdrawals for fracking, can damage waterways to the point of causing fish kills, harming local outdoor-related economies. In Pennsylvania, for example, where fracking has contributed to several fish kills, recreational fishing was a \$1.6 billion industry in 2001.²⁴

Widescale oil and gas development across a broad area can also contribute to regional water pollution problems and fragment habitat for wildlife. In Wyoming, for example, extensive natural gas development in the Pinedale Mesa region has coincided with a significant reduction in the region's population of mule deer – an important species that attracts hunters and wildlife watchers to the state. At Wyoming's "restitution value" of \$4,000 per mule deer,²⁵ the decline of 2,910 mule deer in the mesa since the beginning of fracking operations would represent lost value of more than \$11.6 million.²⁶

Ruining Roads, Straining Services

As a result of its heavy use of publicly available infrastructure and services, fracking imposes both immediate and long-term costs on taxpayers.

The trucks required to deliver water to a single fracking well cause as much damage to roads as 3.5 million car journeys, putting massive stress on roadways not constructed to handle such volumes of heavy traffic. Pennsylvania estimates that repairing roads affected by Marcellus Shale drilling would cost \$265 million.²⁷

Increased demand for water imposes additional strains on public infrastructure. One county in Texas projects that fracking will consume 40 percent of its water by 2020 and such increases may lead to calls for increased public investment in water infrastructure.²⁸ A new state water plan in Texas, for instance, calls for a \$53 billion public investment in the state water system, including \$400 million for needs in the mining sector (including fracking).²⁹

Fracking also strains public services. Increased heavy vehicle traffic has contributed to an increase in traffic accidents in drilling regions. At the same time, the influx of temporary workers that typically accompanies fracking puts pressure on housing supplies, thereby causing social dislocation. Governments respond by increasing their spending on social services and subsidized housing, squeezing tax-funded budgets.

Governments may even be forced to spend tax money to clean up orphaned drilling wells. Though oil and gas companies face a legal responsibility to plug wells and reclaim drilling sites, they have a track record of leaving the public holding the bag. (See page 15.)

Risks to Property, Farms, and Local Businesses

Fracking does not necessarily benefit local economies, especially in the long run, after the initial rush of drilling activity has ended. A 2008 study by the firm Headwaters Economics found that Western counties that have relied on fossil-fuel extraction for growth are doing worse economically than their peers, with less-diversified economies, a less-educated workforce, and greater disparities in income.³⁰

Other negative impacts on local economies include downward pressure on home values and harm to agricultural activity. Pollution, stigma and

uncertainty about the future implications of fracking can depress the prices of nearby properties. One Texas study found that homes valued at more than \$250,000 and located within 1,000 feet of a well site lost 3 to 14 percent of their value.³¹

Fracking also has the potential to affect agriculture, both directly, through damage to livestock from exposure to fracking fluids, and indirectly through economic changes that undermine local agricultural economies.

Photo: Brandi Lukas of BrandiLynnDesign.com



Transporting the water, equipment, sand and other materials needed to hydraulically fracture a natural gas well requires considerable truck traffic that often damages local roads. Here, a procession of trucks pulls up to a gas drilling site.

Financial Assurance: What it Is and Why it Matters

Financial assurance requirements protect the public from having to bear the cost of cleaning up polluted sites. Such requirements also provide a clear financial incentive for companies to protect the environment and public health. Simply put, financial assurance rules require drillers to demonstrate – often by setting aside money in a special fund or by obtaining bonds or insurance – that they will have the money needed to clean up after themselves once they have finished producing oil or gas at a particular well.

Financial assurance is a cornerstone of environmental protection. The history of pollution from previous extractive booms in the United States demonstrates why state and federal governments must get financial assurance right.

Why Financial Assurance Matters: Encouraging Good Environmental Practice and Protecting the Public

Financial assurance plays three important roles in environmental protection: protecting the public from having to pay to clean up damages left behind by polluters, providing an incentive for industries to avoid pollution, and enabling faster cleanup of environmental pollution and quicker compensation of victims.

Protecting the public from the costs of environmental cleanup – Financial assurance is intended, first and foremost, to protect the public from having to absorb the cost of cleaning up environmental damage. It achieves that goal by

requiring those engaged in polluting activities to provide a financial guarantee that those obligations will be met.

Incentivizing good environmental practices – Financial assurance provides an incentive for companies to avoid risky practices that threaten the environment or the public by ensuring that they will be held accountable for those costs. Companies with poor environmental track records, or those intending to use risky practices or drill in vulnerable areas, might find themselves unable to obtain required bonds or insurance coverage, or be forced to pay higher premiums. In this way, financial assurance creates market-based pressure on oil and gas drillers to adopt better practices and avoid drilling in areas that pose the greatest risk to communities and critical natural resources.

Speeding cleanup and victim compensation – Financial assurance mechanisms can provide tools that help regulators ensure that environmental cleanup occurs promptly and, in some cases, that victims are compensated. Good financial assurance rules reverse the burden of proof in cases of environmental damage. Instead of regulators having to go through protracted litigation or other legal processes to compel cleanup – leaving the public at risk in the interim – they can tap funds directly to finance immediate cleanup or, in some cases, threaten forfeiture of a bond if the driller fails to take prompt action to correct environmental problems.

According to James Boyd of the environmental economics think tank Resources for the Future, mechanisms such as letters of credit “allow almost instant access by regulators to reserved funds. This

shifts the burden of proof from the government to the plaintiff. Instead of the government's having to prove that compensation is due and seek the funds, the burden falls to the polluter to demonstrate that it is not liable."³²

Even in cases where regulators do not have instant access to funds, provisions in financial assurance laws can give regulators a powerful tool to compel immediate action. Some states allow for the forfeiture of bonds in cases where drillers violate regulations or fail to follow regulatory orders. These provisions provide a potentially powerful tool that regulators can use to protect the public.

How Financial Assurance Works

State and federal governments provide many ways for oil and gas companies to demonstrate that they will have the resources to plug their wells and reclaim their well sites. Among the most commonly used forms of financial assurance are the following:

- **Surety bonds** – A surety bond represents a commitment by a third party (a "surety") to meet the financial obligations of a driller that is unable or unwilling to do so. To obtain a surety bond, a driller pays a premium to the surety company representing a small percentage of the full value of the bond (for example, 1 to 3 percent of a \$100,000 bond). In the event that a driller fails to meet its obligations, or *defaults*, the surety is responsible for paying the entire sum of the bond to the regulator. In some cases, sureties have the option of completing the cleanup themselves

Bonds may be *forfeited* (that is, immediate payment of the full value of the bond demanded from the surety company) if a driller fails to meet certain conditions laid out in law or regulation, such as plugging a well within a certain period of time or violating a state rule. Regulations also lay out the conditions for *release* of a bond (the lifting of the surety's obligation to pay), such as proper

plugging of wells, reclamation of well sites, and filing of required forms.

- **Personal or collateral bonds** – Personal bonds (sometimes known as "collateral bonds") are those that are backed by cash or near equivalents to cash. For example, a driller might back his promise to pay for cleanup with a cashier's check made out to the regulator. If the driller fulfills his obligations under the law, the check is returned to the driller; if he fails, the regulator simply cashes the check. Among the forms of collateral commonly accepted are cash, certificates of deposit, bank checks, government securities and irrevocable letters of credit (which are promises by a driller's bank to supply funds to cover the value of the bond). Some forms of collateral can earn interest for the driller during the period in which the bond is in effect (such as certificates of deposit). Deposits of cash or checks generally do not.³³
- **Trust funds** – A trust fund is a dedicated pot of money set aside for the express purpose of paying for cleanup and reclamation. Trust funds are often used to fund environmental cleanup for facilities that operate for a long period of time and have predictable cleanup costs (such as landfills or nuclear power plants.) In these situations, a company might make small payments into the trust fund over time in order to amass the full funds needed for cleanup by the time the facility is ready to close. However, trust funds are effective only if they are fully funded at the time cleanup must begin. Trust funds can also be tied to an individual well and be transferred along with transfers of ownership, ensuring that each owner of a well has paid for a share of the ultimate cleanup responsibility.³⁴
- **Insurance** – Some states allow or require drillers to take out insurance policies to ensure that certain cleanup obligations are covered. Unlike bonds – in which the fundamental responsibil-

ity to address environmental obligations remains with the driller – insurance policies shift the responsibility for resolving problems to the insurance company. A driller might purchase an insurance policy, for example, to cover damages its activities cause to third parties, but its obligation to pay is limited to its insurance premium (as long as the amount of damage falls within the limits of its insurance coverage).

- **Financial tests** – In some cases, firms may simply need to demonstrate that they have sufficient assets to meet their cleanup obligations. Firms may do this by demonstrating that they (or, in some cases, their parent companies) possess sufficient assets or an investment-grade bond rating.³⁵ Financial tests do not guarantee that funds *will* be available to fund cleanup, merely that a company is financially capable of paying for cleanup at the moment at which the test was imposed. The burden continues to rest on regulators to force drillers to fulfill their obligations through regulatory proceedings or litigation.

In addition to financial assurance – which seeks to hold individual companies responsible for their obligations under the law – some states have created **industry-wide trust funds** that can be tapped to clean up polluted sites orphaned by the responsible party. Typically, oil and gas producers are required to pay a small fee, which is then used to provide funding for cleanup of priority sites. Industry-wide trust funds protect taxpayers from having to pay the costs of these cleanups, but do little to hold individual companies accountable.

The Importance of Financial Assurance: Lessons from Previous Extractive Booms

The oil and gas industry is notoriously prone to “boom-bust” cycles – sparking dramatic economic growth in a community one year, only to plunge it

into financial difficulty the next. The volatility of the oil and gas industry is typical of extractive industries. Extractive industries face inherent incentives to remove as much as they can from a given resource while spending as little as possible to limit the impacts on the public or the environment.

The history of previous extractive booms is littered with examples of lasting impacts on the environment and public:

- **Orphan oil and gas wells** – As of 2006, more than 59,000 orphan oil and gas wells were on state waiting lists for plugging and remediation across the United States, with at least an additional 90,000 wells whose status was unknown or undocumented.³⁶ Improperly plugged wells can contaminate land, surface water and groundwater with oil, gas or briny produced waters.³⁷ The potential liability for plugging these wells nationwide exceeds \$760 million.³⁸
- **Abandoned hard rock mines** – The U.S. Government Accountability Office estimated in 2008 that there were approximately 161,000 abandoned hard rock mines in the western United States, of which approximately 33,000 had degraded the environment.³⁹ Environmental risks from abandoned hard rock mines include drainage of toxic or acidic water into surface waterways and groundwater. The federal government spent \$2.6 billion over a 10-year period of the late 1990s and early 2000s on the reclamation of abandoned hard rock mines.⁴⁰
- **Abandoned coal mines** – As of 2002, Pennsylvania alone had more than 5,000 documented abandoned coal mines. Acid drainage from those mines has helped render more than 3,000 miles of rivers and streams in the state unsafe for fishing, swimming or other uses.⁴¹ The cost of cleaning up those abandoned mines has been estimated at \$15 billion.⁴²

Many abandoned mines and orphan oil and gas wells date back to the years before modern environmental regulations. Even today, however, extractive businesses often leave mines or wells behind without proper closure or reclamation. Between 2001 and 2008, for example, 127 mines in West Virginia forfeited the bonds they had posted to guarantee site reclamation; over a similar period, Pennsylvania saw 227 forfeitures.⁴³ In Wyoming in 2010, the state plugged 122 coalbed methane wells orphaned after a boom that began in the 1990s. State officials there are worried that continued low gas prices will send more drillers into bankruptcy, increasing the burden on the state's orphan well fund.⁴⁴

Previous resource extraction booms have left behind massive environmental contamination and multi-billion dollar cleanup liabilities for taxpayers. With tens of thousands of fracking wells having been drilled across the country – each with significant impacts on land and water – fracking has the potential to impose environmental damage on a par with or exceeding previous booms. The extent of the damage – and the degree to which taxpayers will ultimately be called upon to pay for fixing it – depends greatly on steps that states take now to require financial assurance for the cleanup of fracking well sites and associated pollution.

Principles for Financial Assurance

Every state in which oil and gas production takes place currently requires drillers to provide some form of assurance that funds will be available to pay for closure and cleanup of wells once production has ended. Often, however, these requirements have failed to protect taxpayers and the environment.

What separates an effective system of financial assurance from one that leaves the public at risk? Good financial assurance systems reflect five key principles.

Principle 1. Make Polluters Pay for *All* the Costs They Impose on the Public.

Fracking imposes a wide variety of costs on the environment, public health and society. Drillers must be held accountable for compensating the public for all of these costs, both as a matter of basic fairness and of sound economic and environmental policy.

Financial assurance plays a central role in holding drillers accountable for the damage they impose on the environment and the public. Specifically, financial assurance should be required for the following costs:

- Closure and remediation of well sites.
- Full restoration of damage to the environment and natural resources.
- Compensation to victims for damage to property and health inflicted by fracking.

Principle 1.

Make Polluters Pay for *All* the Costs They Impose on the Public.

Principle 2.

Require Enough Financial Assurance to Cover Worst-Case Potential Costs.

Principle 3.

Use Only Those Forms of Financial Assurance that Truly Protect the Public.

Principle 4.

No Loopholes. No Exemptions.

Principle 5.

Integrate Financial Assurance into Oil and Gas Regulation.

- Provision of alternative sources of drinking water and other temporary measures to mitigate the impact of environmental, health and property damage.
- Full restoration of damage to public infrastructure, such as roads.

In addition, financial assurance should be required to cover potential costs that may emerge long after production ends. The integrity of oil and gas wells can decay over time, creating the potential for damage long after oil and gas extraction has ended.⁴⁵

In addition, high-volume hydraulic fracturing is a relatively new technology, having been in use for only about a decade. Preliminary research has suggested – though not proven – that formation fluids or methane may be able to migrate from shale layers to groundwater supplies over a period of time.⁴⁶

Financial assurance isn't the most appropriate tool for holding drillers accountable for some categories of costs they impose on society. Taxes, impact fees and other charges may be more effective ways of recouping compensation for impacts of fracking that occur over a broad area – such as emissions of pollution that contributes to global warming or the formation of smog.

Principle 2. Require Enough Financial Assurance to Cover Worst-Case Potential Costs.

Financial assurance is effective only if the level of assurance required is sufficient to protect the public in case a driller goes bankrupt or is otherwise unable or unwilling to fulfill its responsibilities. To be effective, the level of a bond or other form of financial assurance must be enough to cover a “worst-case scenario” of potential costs. James Boyd of Resources for the Future writes that “[i]n theory, coverage must equal the maximum realistic costs of a future obligation covered by the bond.”⁴⁷

Because the “worst-case” costs of fracking depend on a variety of factors – such as the proximity of fracking to populated areas or precious natural resources – the level of required financial assurance may vary from well site to well site. However, allowing financial assurance levels to be set on a case-by-case basis imposes a significant burden on regulatory agencies and creates the potential for regulators to improperly reduce the level of required financial assurance. The latter is a particular concern should regulators come to rely on drillers themselves to

supply estimates of costs. A U.S. EPA analysis found that 89 out of 100 hazardous waste facilities required to post financial assurance under federal law had underestimated the cost of closure and post-closure care. At more than one-third of those facilities, costs were underestimated by 70 percent or more, resulting in those facilities providing far too little financial assurance.⁴⁸

In other words, while some variation in financial assurance requirements may be warranted, states should establish minimum levels of financial assurance required of all wells and ensure that any variations in financial assurance are based on sound and consistent methodologies.

Drillers also should not be given discounts that reduce their financial assurance requirements, such as those provided under “blanket bonds.” Blanket bonds set a maximum bonding requirement that covers all drilling by a particular company within a particular jurisdiction – for example, the Bureau of Land Management requires a \$10,000 bond for one well, but allows a company to bond all of its wells in an entire state for \$25,000. The vast majority of wells on federal land – representing 80 percent of the value of the bonds held by the BLM – are covered under statewide blanket bonds.⁴⁹ Blanket bonding violates the principle that financial assurance be sufficient to protect against worst-case costs, since the level of the bond is not tied directly to the level of risk posed by each individual well.

Principle 3. Use Only Those Forms of Financial Assurance that Truly Protect the Public.

Not all forms of financial assurance are equally protective of the public. Some provide a guarantee that funds will be available for cleanup of well sites at the moment those funds are needed, while others provide little protection for the public or the environment.

Surety bonds, personal bonds backed by adequate collateral (cash, cash-like instruments or irrevocable letters of credit), and fully funded trust funds provide the greatest level of protection for the public. Properly designed, they ensure that funds will be available to meet cleanup obligations when those obligations come due.

Trust fund models that allow for a graduated “pay-in” over time create the risk that the public will have to pay the unfunded portion of cleanup if the driller should end production or go bankrupt. Austin Mitchell and Elizabeth Casman of Carnegie Mellon University have proposed a trust fund model in which drillers are required to pay a substantial pre-drilling fee, augmented by a severance tax tied to production.⁵⁰ Such a system might be protective of the public if it results in full funding within a short time frame (less than five years). While such an approach would greatly reduce the risk of underfunding to the public, it would not eliminate it.

Financial tests should not be accepted as financial assurance. In the topsy-turvy oil and gas industry, volatile prices can quickly doom the financial prospects of otherwise solid-looking firms. Falling fossil fuel prices create an incentive for companies to slow down fossil fuel production at the same time they damage a driller’s financial bottom line. In other words, a prolonged fall in prices can increase the number of wells at risk of being orphaned at the same time it increases the likelihood that they will be.

Financial tests have other weaknesses as well. Environmental regulators often lack the expertise needed to analyze a company’s finances properly and determine its financial health.⁵¹ Moreover, because pollution from fracking has the potential to affect public health and the environment for a long period of time, an assessment of financial adequacy at a particular snapshot in time is insufficient to demonstrate that a company will continue to exist in a financially healthy state for decades to come.

Insurance can play an important – but limited – role in financial assurance for fracking. Unlike tools such as bonding and trust funds, which hold drillers directly responsible for meeting legal obligations, the use of insurance attenuates accountability, since it is the insurer, not the driller, who is ultimately responsible for paying out any claims. In addition, regulators seeking funds to address unmet legal obligations would be required to file a claim with the insurer, rather than obtain direct access to funds as would be the case with a bond or trust fund. Finally, insurance policies used as financial assurance must be closely scrutinized by regulators to guard against the insertion of provisions that limit the insurer’s liability.

As a result, insurance is likely a poor tool for financial assurance for impacts of fracking that are easily anticipated in advance – such as plugging and reclamation costs and damage to roads. However, insurance may be useful in addressing difficult-to-anticipate costs such as damage to third parties and natural resources – so long as there is a clear standard for liability that is protective of the public. Insurance companies are experts at evaluating and pricing risk. Requiring insurance to cover these types of expenses would help ensure that drillers bear the risks posed by fracking in the most efficient way possible.

Policymakers need to ensure that financial assurance remains effective in any conceivable circumstance. For example, regulations must include provisions that ensure that financial assurance remains in place even if a driller fails to pay insurance premiums or a surety company goes out business. Federal financial assurance requirements for hazardous waste sites, for example, require that a surety company provide 120 days notice before cancelling a bond and require companies affected by the bankruptcy of a surety to obtain replacement financial assurance within 60 days.⁵²

In addition, provisions must be put into place to prevent drillers from indefinitely delaying well plugging and reclamation by maintaining wells in “inactive” status. Often, oil and gas companies will temporarily cease production at wells that have become unprofitable to operate using current technology or at current prices. In some cases, however, these “temporary” closures have lasted decades, leaving wells in an unplugged and unreclaimed state that increases the risk of environmental contamination and raises the risk that the entity responsible for the well will run into financial difficulty. State and federal rules should set strict time limits and criteria for maintaining wells in “inactive status” and make especially sure that sufficient financial assurance exists for these wells, given their higher risk.

Principle 4. No Loopholes. No Exemptions.

A wide variety of federal environmental laws require that companies engaged in polluting activities set aside resources to pay for environmental cleanup. The details of those laws differ, but they are all alike in one respect: none of them apply to oil and gas drillers.⁵³

The financial assurance requirements for facilities handling hazardous waste are a good example of how financial assurance works in federal environmental law – as well as the perverse effects of exemptions for the oil and gas industry. The Resource Conservation and Recovery Act (RCRA) requires that facilities handling hazardous waste must provide financial assurance sufficient to cover the safe closure of the facility as well as the long-term monitoring and care of the facility for a period of 30 years.⁵⁴ In addition, owners of hazardous waste facilities must demonstrate financial assurance to cover the “sudden” or “non-sudden” impacts of accidents occurring at the facility on the environment and the public.⁵⁵

Fracking wells handle significant quantities of materials that are “hazardous” under any reasonable definition of the term, including toxic fracking chemicals and contaminated produced water from underground formations that is brought to the surface during drilling. Under pressure from the oil and gas industry, however, Congress refused to require the regulation of drilling fluids and produced waters under RCRA, instead allowing the EPA to decide whether to regulate them.⁵⁶ EPA decisions in 1988 and 1993 exempted produced water (and any fracking chemicals that return with it) from the definition of hazardous waste under RCRA.⁵⁷

Oil and gas production is also exempt from provisions of the federal Superfund law as well as other environmental statutes, and hydraulic fracturing is exempt from the Safe Drinking Water Act.⁵⁸

Such exemptions are unjustified. So too are loopholes in many state oil and gas regulations that allow oil and gas drillers to avoid providing financial assurance, or that unreasonably reduce companies’ financial assurance responsibilities.

Principle 5. Integrate Financial Assurance into Oil and Gas Regulation.

Financial assurance rules are an integral part of a comprehensive system of oil and gas regulation. Strong financial assurance rules are not a substitute for strong regulations on oil and gas operations or the enforcement of those regulations. Proper enforcement of oil and gas rules is a necessary precondition to effective financial assurance, while effective financial assurance can play a key role in encouraging compliance with oil and gas rules.

Regular inspection of wells and enforcement of environmental rules is essential to limit the potential for major mishaps that cause such severe damage to the environment and health that they threaten to

exceed the amount of financial assurance required in state regulations. State and federal governments can also use their power to issue drilling leases or permits to ensure that drillers meet their financial assurance obligations. The Federal Onshore Oil and Gas Leasing Reform Act of 1987, for example, bars the issuance of an oil and gas lease to any entity that has failed to carry out its responsibilities for reclamation on a previous lease.⁵⁹

On the other hand, financial assurance rules can help hold drillers accountable for following the law if they contain provisions allowing bonds to be forfeited in cases where rules are broken or fines and penalties are not paid.

Conclusion

Financial assurance rules that follow these five principles provide reliable guarantees that the public will not be saddled with the cost of cleaning up damage from fracking. Such rules also create financial and other incentives that encourage companies engaged in fracking to use the safest possible practices.

Unfortunately, current state and federal financial assurance rules fall far short of these standards. Indeed, in many cases, weak financial assurance rules leave the public and the environment at serious risk.

Putting the Public at Risk: How Current Financial Assurance Requirements for Fracking Fall Short

Inadequate financial assurance for oil and gas drilling leaves the public at risk of being saddled with the costs of plugging orphaned wells; reclaiming well pads, pits and other surface disturbances; cleaning up water pollution; fixing broken roads; and caring for those whose health has been harmed by fracking. Inadequate financial assurance also represents a missed opportunity to encourage oil and gas drillers to use safer practices that are less likely to cause harm in the first place.

Today's financial assurance requirements for the oil and gas industry fall well short of what is needed to protect the public.

1. Current Financial Assurance Rules Fail to Cover All the Costs of Fracking

Current state and federal financial assurance rules for fracking are intended to ensure that oil and gas wells are plugged and well sites are reclaimed when production is complete. Few states, however, require financial assurance in amounts sufficient to complete plugging and reclamation, much less account for damage to natural resources, broader environmental cleanup, or the compensation of victims. By releasing drillers from financial assurance requirements too early, current rules also leave the public potentially liable for environmental and public health damage that emerges over a longer period of time. Finally, while some states have used financial assurance tools to recoup costs imposed by fracking on

infrastructure and public services, these tools have been insufficient to fully protect taxpayers.

Financial Assurance Rules Rarely Account for Damage to Third Parties and Natural Resources

State bonding requirements for the oil and gas industry are intended to ensure that wells are plugged and reclaimed. Few states, however, require drillers to post financial assurance sufficient to cover the full range of costs resulting from fracking.

Some states require drillers to provide financial assurance for damage to surface landowners or for other costs resulting from fracking. At the moment, however, these provisions are largely ineffective because they do not carry sufficient financial disincentives for firms that fail to meet their responsibilities to surface owners, the environment and public health.

Colorado, for example, requires additional bonding to protect the rights of surface land owners on whose property drilling is taking place, requiring drillers to compensate surface owners for crop or land damage before the bonds can be released.⁶⁰ Pennsylvania requires that drillers provide replacement water supplies for any water supplies damaged by fracking, and uses a clear standard to determine when drillers are responsible for doing so.⁶¹ Texas requires that drillers “control, abate, and clean up pollution associated with the oil and gas operations and activities covered under the required

financial security in accordance with applicable state law and permits, rules, and orders of the Commission.”⁶²

Provisions such as these should be a part of any oil and gas financial assurance program. However, in each of these states, the level of financial assurance required of drillers is so low as to render these protections ineffective. In Colorado, for example, the bond for surface landowner protection is only \$2,000 to \$5,000.⁶³ In Pennsylvania and Texas, the amount of the bond is insufficient to cover the cost of plugging and reclamation, never mind impacts beyond the well site. Drillers whose activities harm surface landowners are legally liable for certain damages, even if those damages exceed the bonded amount. But inadequate financial assurance requirements do little to protect landowners in case a driller goes bankrupt or is otherwise unwilling or unable to pay.

No Protection Against Damage that Emerges Over Time

Plugging and reclamation bonds are typically released once a well has been plugged and a site reclaimed to the satisfaction of state regulators. Releasing bonds quickly after plugging and reclamation are complete provides the public with no protection against the costs of natural resource, property or health damage that may become apparent only over a prolonged period of time.

Ohio, for example, requires bonds until the “well has been plugged and all restoration requirements [have been] performed.”⁶⁴ Pennsylvania’s rules keep wells under bond coverage for a year after they have been plugged and reclaimed.⁶⁵

States that fail to require drillers to provide long-term financial assurance run the risk of being forced to spend taxpayer money to address environmental and public health risks from fracking years or decades down the road.

Federal laws such as RCRA acknowledge that the environmental and health impacts of polluting activities are not always immediately apparent. RCRA, for example, requires companies handling hazardous waste to provide financial assurance for post-closure care for a period of 30 years.⁶⁶ By contrast, states free oil and gas companies from bonding requirements before the full impact of their activities is known – leaving the public at risk.

Bonding for Impacts on Roads and Bridges Is Often Inadequate

Perhaps the most common form of financial assurance for fracking impacts away from the well site is bonding for road damage. Fracking requires the transportation of massive amounts of water, sand and fracking chemicals to and from well sites, often on roads that were never designed to carry such heavy loads.

To ensure that oil and gas companies – rather than taxpayers – pay the cost of repairing roads damaged by fracking, some state and local governments require oil and gas operators to post road bonds. West Virginia law requires operators to meet with highway engineers to discuss maintenance needs and provide bonds either per mile, or across an entire district or the state. The state caps single bonds at \$100,000 per mile of paved road or \$25,000 per mile of gravel road. District-wide bonds covering multiple roads are available for \$250,000 and an operator can cover liabilities across the entire state for \$1,000,000.⁶⁷

In other states, local governments may pursue road bonds. Ohio, for instance, is a “home rule” state where the construction and maintenance of highways passing through a municipality is a local responsibility.⁶⁸ Ohio municipalities may, but are not required to, negotiate agreements with oil and gas companies. In August 2012, for example, Holmes County, Ohio, required Devon Energy Corp. to post

road bonds totaling \$250,000 per mile of road, plus a further \$250,000 for each bridge.⁶⁹

Texas also has no systematic road bonding requirements. Texas allows haulers to exceed weight limits when they apply for a special permit, but the permit fee bears no relation to the cost of the damage an overweight truck can do. In recent testimony before the Texas House Committee on Energy Resources, Phil Wilson, the Executive Director of the Texas Department of Transportation, explained that “while a ... permit can cost as little as \$255 per year. . . , the amount of road damage a truck with such a permit can cause is essentially unlimited.”⁷⁰

To address this, Texas counties have typically relied on good will and cooperation from oil and gas companies. DeWitt County, for example, receives a financial contribution from two oil companies for each new well and others contribute on an *ad hoc* basis.⁷¹ Voluntary donations from fracking companies are far from reliable sources of revenue to repair and maintain crumbling roads. In the Barnett Shale region, local officials found large operators like Devon Energy Corp. and Chesapeake Energy “eager” to volunteer repair money when they were new in town and gas prices were high. But as drilling activity slowed and the big companies gave way to smaller firms, it has become more difficult to get oil and gas companies to cover road maintenance costs.⁷²

Even in those states where statewide road bonding exists, bonding fails to cover all of the costs imposed by fracking. In West Virginia, for example, bonding requirements cover only secondary roads and leave out state and federal highways, while the state’s blanket bonding system allows drillers to reduce their financial responsibility for road repairs even further.⁷³

In some states, revenue from impact fees or severance taxes (see page 30) can also be directed toward road repair. In general, however, while several states have used road bonding to recoup some of

the costs of repairing roads damaged by fracking, the use of these bonds has been inconsistent and insufficient to address the full scale of infrastructure damage.

2. Current Financial Assurance Levels Are Insufficient to Cover Worst-Case Costs

States vary greatly in the amount of financial assurance they require drillers to provide. But virtually all of them fail to require financial assurance sufficient for plugging and reclaiming a fracking well and well site, let alone paying for damage to property, health and natural resources that might result from drilling.

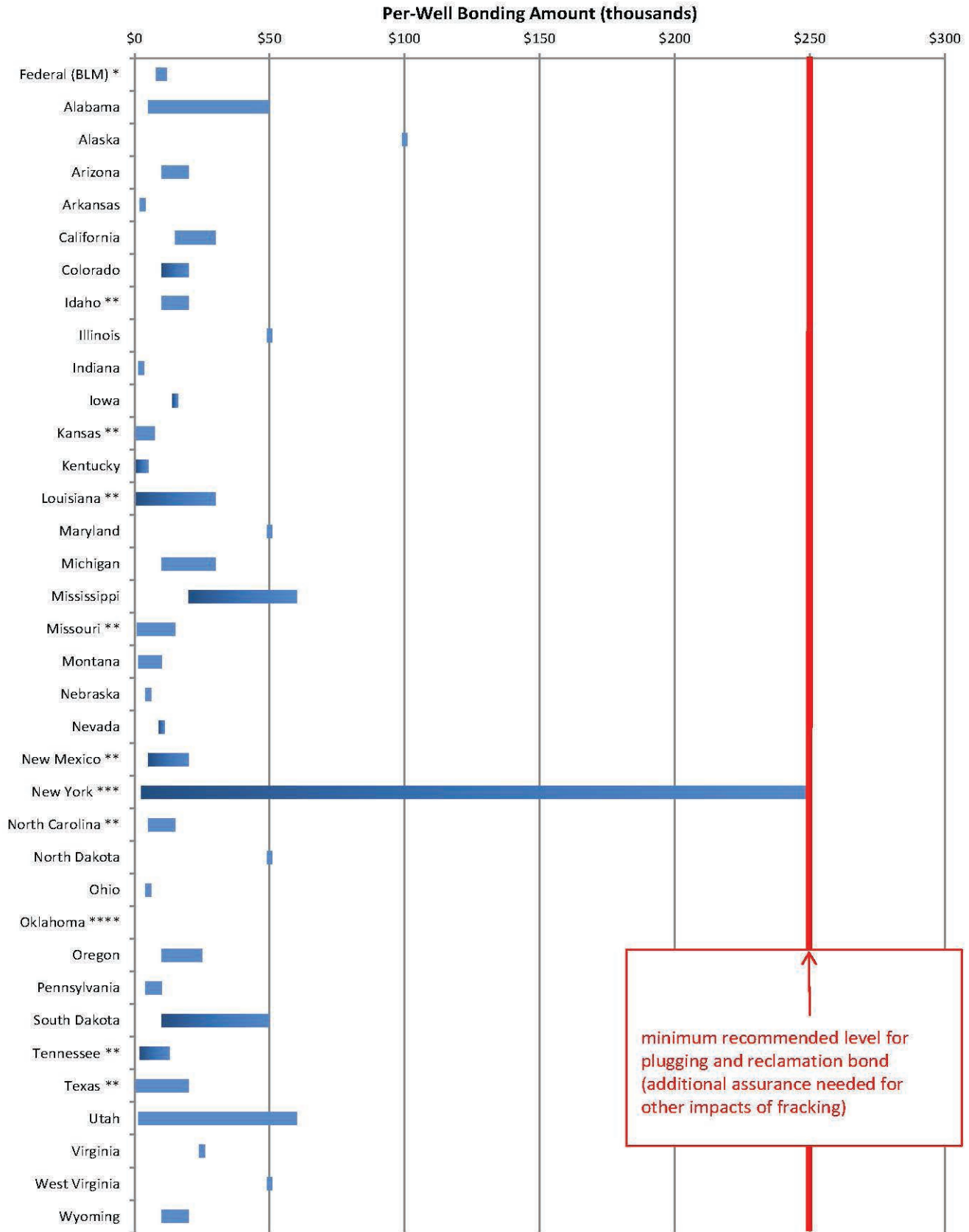
The amount of financial assurance required for a single-well varies from as little as \$1,000 for a shallow gas well in Kentucky to as much as \$250,000 per well in New York.⁷⁴ (See Figure 1.) In many states, the amount of financial assurance required varies depending on well depth. Only eight states, however – Alaska, Illinois, Maryland, Mississippi, North Dakota, South Dakota, Utah and West Virginia⁷⁵ – require bonds of at least \$50,000 at depths commonly reached in fracking. In many states, drillers are permitted to put up plugging and reclamation bonds of \$10,000 per well or less – levels that are well below the “worst case” of potential costs.

Bonding requirements for drilling on federal lands are no better. The Bureau of Land Management sets the minimum bond amount at \$10,000 per lease (although each lease may include multiple wells).⁷⁶

Time and again, the cost of reclaiming orphan wells has exceeded the bonding levels required under federal and state laws, suggesting that the bonding levels required by state and federal officials fall far short of being enough to pay for the “worst case” of potential costs:

(continued, page 27)

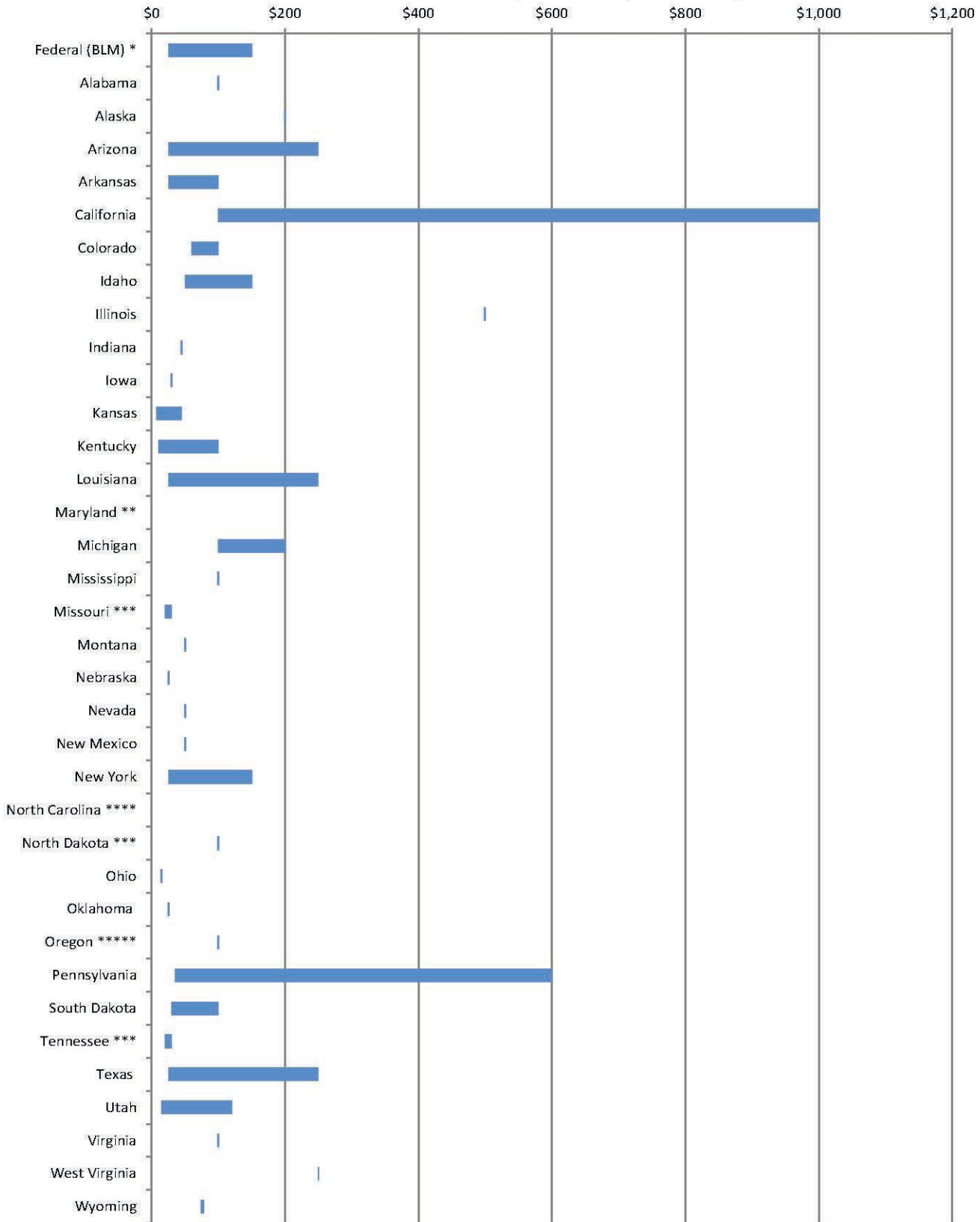
Figure 1. Per-Well Bonding Requirements (See Appendix for Details)



* = bonding amount per lease; each lease may have more than one well
 ** = varies by depth; cost shown for depths of 0 to 10,000 feet
 *** = based on estimate of plugging and reclamation costs; capped at \$250,000
 **** = based on estimate of plugging and reclamation costs; no minimum or maximum level

Figure 2. Blanket Bonding Amounts (See Appendix for Details)

Blanket Bonding Amounts (thousands)



* = Lower bound is statewide blanket bond amount; upper bound is nationwide blanket bond amount.

** = No specified blanket bonding level. Takes effect October 2013.

*** = Covers limited number of wells; no statewide blanket bond exists.

**** = No blanket bonding.

***** = Blanket bond level corresponds with sum of individual well bond requirements; minimum blanket bond level is \$100,000.

- The Bureau of Land Management (BLM) spent \$582,829 to close a single orphan well in Wyoming in fiscal year 2008 – an amount over 58 times the \$10,000 maximum per-lease bonding requirement. According to a Government Accountability Office (GAO) report, the BLM has estimated the projected *average* cost of reclaiming 102 wells on federal land at \$16,505 per well, which is roughly nine times the average bond value per well of \$1,833.⁷⁷
- In 2010, Cabot Oil and Gas, a major operator in Pennsylvania’s Marcellus Shale region, spent almost \$2.2 million to abandon just three sites in Susquehanna County, Pennsylvania – more than \$700,000 each.⁷⁸ A study by researchers from Carnegie Mellon University estimated the average cost of plugging and abandoning gas wells in Pennsylvania’s Marcellus Shale region at approximately \$100,000 per well – 10 times Pennsylvania’s \$10,000 maximum per-well bonding requirement.⁷⁹
- A recent study in Wyoming found an *average* reclamation cost of \$29,136 per well for 255 wells in the state, well above the state’s bonding requirements of \$10,000 to \$20,000 per well.⁸⁰ Well closure bonds covered only 37 percent of the cost of reclaiming the 122 orphaned wells addressed by the state of Wyoming in 2010, with the remainder of the funds coming from the state’s orphan well fund, which is supported by a conservation tax assessed on sales by oil and gas producers.⁸¹
- The Colorado Oil and Gas Conservation Commission spent \$985,000 to plug and reclaim abandoned wells covered by bonds between 1996 and 2008, of which only \$499,000 – roughly half – was paid for through bond receipts.⁸²

Financial assurance requirements generally become less adequate over time because most are not indexed to inflation. For example, the BLM’s bonding requirements for federal lands were implemented

more than 50 years ago and have not been updated since.⁸³ Had the bonding requirement been indexed for inflation, drillers would now be required to post bonds of more than \$60,000 per lease, rather than the minimum \$10,000 per lease bond currently required.⁸⁴

Blanket Bonds Further Reduce Financial Assurance Requirements

State and federal regulations provide drillers with many ways to reduce their already inadequate financial assurance requirements. One of the most frequently used mechanisms is “blanket bonding,” which provides a sort of bulk discount for oil and gas operators drilling many wells within a given jurisdiction.

Blanket bonds enable a drilling company to provide financial assurance for all of its wells for a single, usually low, rate. The Bureau of Land Management (BLM), for example, requires companies drilling on federal lands to post a plugging and reclamation bond of at least \$10,000 per lease. Using blanket bonds, however, a company can bond for \$25,000 for all of its activities on federal land in a given state, or \$150,000 to cover all of its wells nationwide.⁸⁸ For companies with many wells, these blanket bond requirements can dramatically reduce the amount of financial assurance required. A 2005 report by the Western Organization of Resource Councils found that a single company – Encana Oil & Gas – had 3,652 wells on record in Colorado. With a statewide blanket bond of \$235,000, the amount of financial assurance provided by the company amounted to \$64 per well.⁸⁹

The use of blanket bonds can leave taxpayers exposed to significant costs. In 2001, the bankruptcy of a Wyoming oil producer left the federal and state governments liable for more than \$3 million in estimated cleanup costs for 120 wells. The producer’s use of a blanket bond dramatically reduced the amount of financial assurance it was required to

provide and shifted liability for the cost of cleanup to the state's conservation fund when the company failed.⁹⁰

Liability Insurance Requirements Fail to Cover the Gap

A few states require oil and gas drillers to hold liability insurance to cover the cost of damage to health or property resulting from drilling activity. Ohio, for example, requires drillers to hold \$1 million to \$5 million in liability insurance coverage for bodily injury and damage to property, covering all of the driller's wells within the state.⁹¹ Colorado requires oil and gas operators to hold \$1 million in general liability insurance.⁹² Maryland requires, as a condition of permitting, that drillers maintain general liability insurance of \$500,000 per occurrence and environmental pollution liability insurance of at least \$1 million per loss. The environmental pollution liability insurance must be maintained for five years after the well has been closed and the site cleaned up.⁹³

These provisions, which add an additional layer of financial assurance to cover the dangers of fracking to people and property, appear to be the exception rather than the rule. The amount of insurance required in some of these states also appears to be inadequate in cases of major incidents involving injury or damage to property. For example, Chesapeake Energy agreed in 2012 to a \$1.6 million settlement to compensate three families affected by a single instance of groundwater contamination in Pennsylvania, far above the amount of insurance required in states such as Colorado.⁹⁴

3. States Allow Types of Financial Assurance that Do Not Protect the Public

Many states provide drillers with the option of using types of financial assurance that provide little or no

real guarantee that the companies will be able to meet their cleanup obligations.

Financial tests – provisions that allow drillers to escape bonding by demonstrating that they have the current financial wherewithal to close and reclaim wells, even though the closure and reclamation might not occur until far into the future – are inadequate to protect the public, especially in the volatile oil and gas industry, where financial fortunes can change in a heartbeat. But some states have established financial tests that are so easy to meet as to be essentially meaningless. Ohio, for instance, allows operators to prove financial responsibility with a sworn statement documenting net financial worth in the state of twice the amount of the bond for which it substitutes.⁹⁵ Given Ohio's per-well bonding level of \$15,000, that is an exceedingly easy test to meet.

Loopholes Allow Drillers to Escape Financial Assurance Requirements

As discussed above, exemptions allow the oil and gas industry to evade financial assurance requirements and other protections in key federal environmental laws. Some state laws, however, also provide drillers with ways to avoid their responsibility to post adequate financial assurance.

In Kansas, companies with a three-year record of "acceptable" compliance can meet their financial assurance requirements by simply paying a \$100 annual fee.⁹⁶ In Illinois, drillers can avoid bonding by paying an annual well fee in the maximum amount of \$150 per permit.⁹⁷ In Indiana, bonding requirements apply only to first-time applicants for drilling permits and those who have recent rules violations or have failed to pay a fine or the annual drilling fee.⁹⁸

Federal Financial Assurance Rules Fall Far Short of Protecting the Public

The federal Bureau of Land Management (BLM) controls the mineral rights to more than 1 million square miles of land – an area equivalent to a third of the area of the contiguous United States.⁸⁵ These areas not only include surface lands managed by BLM, but also other federal lands and even private lands for which the federal government has retained mineral rights. Approximately half of this land is believed to have the potential to produce oil or gas.⁸⁶

The BLM's financial assurance policies, however, do a poor job of ensuring that oil and gas drillers – rather than the public at large – will bear the costs of cleaning up damage caused by fracking.

In 2011, the Government Accountability Office released a report that was critical of BLM's approach to financial assurance. Specifically, the GAO:

- Noted that the value of the bonds required by the BLM – which had not been changed in more than 50 years – “may not be sufficient to encourage all operators to comply with reclamation requirements.”
- Found that there were at least 2,300 “idle” wells on BLM land that had been inactive for seven years or more, but that BLM offices frequently failed to conduct reviews to identify idle or orphan wells. Idle wells – particularly those left idle for a long period of time – pose the greatest risk of causing environmental damage.
- Found that BLM offices rarely conducted reviews to determine whether higher bond requirements should be set for specific wells and that, when they did, the criteria used to determine those requirements were inconsistent.⁸⁷

With more than 93,000 oil and gas wells under its jurisdiction, it is critical that the BLM adopt stronger financial assurance requirements to protect taxpayers and the environment. Unfortunately, while the BLM is currently considering a package of rules to address the threat posed by fracking on federal land, that package includes no strengthening of federal financial assurance rules.

Impact Fees, Severance Taxes and Other Compensation

Financial assurance isn't the only way to recoup costs imposed by fracking. Impact fees and taxes are additional ways in which drillers may compensate the public for some of the indirect costs of fracking.

Colorado, for example, allows local governments to assess an "impact fee" on developers, including fracking companies, to account for their impact on local infrastructure. According to the enacting statute, Colorado's impact fees may be imposed to "defray the projected impacts on capital facilities caused by proposed development."⁹⁹ Rio Blanco County in northwestern Colorado has taken advantage of this legal provision and, worried about consequences of fracking for its roads, imposed one-time impact fees on oil and gas companies of \$17,700 per well. This will offset future capital requirements for road reconstruction and development.¹⁰⁰

In 2012, Pennsylvania allowed counties to assess an impact fee on shale gas drillers. All 27 counties with shale production, as well as another 16 without active wells, assess the \$50,000 per-well fee, which will vary from year to year in line with gas prices and inflation.¹⁰¹ By law, the fee is administered and collected by the Pennsylvania Public Utilities Commission which must distribute 60 percent of revenue to local authorities for use on road maintenance, environmental programs, emergency preparedness, and other initiatives. The rest goes to state agencies such as the Department of Environmental Protection, Department of Transportation, and Fish and Boat Commission, county conservation districts, and others.¹⁰² Analysts question whether the fee is enough to address the myriad impacts of fracking on Pennsylvania's communities.¹⁰³

Another potential avenue for state and local governments to recoup some of the costs of fracking is through the assessment of "severance taxes" – taxes assessed based on the volume of oil or gas extracted from underground. According to the National Conference of State Legislatures, 31 states specifically levy taxes on oil and gas extraction.¹⁰⁴

Severance taxes, however, are not used exclusively – or even primarily – to compensate local governments or residents for the impacts of fossil fuel extraction. Typically, states deposit most of their severance tax collections into the general fund and earmark the remainder for distribution to local governments or use in specific conservation and environmental protection efforts. Some states also direct a portion of severance tax revenue to permanent funds.¹⁰⁵ Wyoming, for example, distributes the vast majority of total severance tax revenue to the state's general fund, budget reserve account, and permanent trust fund.¹⁰⁶

In Texas, severance tax revenues collected by the state often do not find their way to the county governments, which bear most of the day-to-day costs related to fracking. DeWitt County, in the heart of the Eagle Ford Shale, generated \$57.5 million in severance tax receipts in fiscal year 2011, but received just \$122,000 from fees for overweight truck permits and gasoline taxes.¹⁰⁷ An engineering study conducted for the county estimated the cost of road maintenance and reconstruction to accommodate the industry at an average of \$133,000 per well.¹⁰⁸

Impact fees and severance taxes can play a role in helping to defray some of the costs imposed on the public by fracking. However, those fees and taxes should be sufficient not only to address the damage caused by fracking, but also to ensure that the revenues brought in by resource extraction provide long-term benefit to a state's population.

Reforming Oil and Gas Financial Assurance: Recommendations for Policymakers

Fracking imposes serious, costly impacts on the environment, public health and communities. Many of those costs are borne not by those who benefit financially from fracking, but by neighboring residents and even those living far away who are affected by pollution.

The history of previous extractive booms – and the current experience of some states experiencing widespread fracking – suggests that many drillers will fail to meet their responsibilities to the public and the environment. In those cases, financial assurance requirements are essential for protecting the public from having to bear the full cost of cleanup.

Financial assurance is particularly important for fracking, due to the relative newness of the technology and its rapid spread across the country. The potential long-term impacts of fracking – including the potential for fracking chemicals, methane and dangerous substances in formation waters to migrate to the water table or the surface over time – are still poorly understood. With no requirement for firms to provide up-front financial assurance to address those costs down the line, the potential for the public to bear a significant environmental, public health and economic burden in years to come is large.

To protect the public against having to bear the costs of fracking – and to hold the oil and gas industry accountable for repairing the damage it causes – the public needs strong financial assurance rules.

A Framework for Effective Financial Assurance

A financial assurance system can be structured in many different ways that meet the principles described in this paper. A framework follows below for what one such system might look like.

Require broad accountability for fracking-related costs: Drillers should be required to provide financial assurance to cover at least the following categories of fracking-related costs: well plugging and reclamation, restoration of damage to the environment and natural resources, compensation to victims for damage to property and health, provision of alternative sources of water, and full restoration of damage to public infrastructure, such as roads.

Additional taxes and fees should be used to recover fracking-related costs that are relevant at a regional, national or international scale, such as emissions of smog-forming pollutants, emissions of global warming pollution, and impacts on local public services.

Require levels of financial assurance that are sufficient to protect the public: Financial assurance should be required in amounts sufficient to cover the worst-case potential costs of fracking. Experience shows that the cost of plugging and reclaiming fracking wells can exceed \$500,000, while one recent lawsuit over drinking water contamination from fracking was settled for \$1.6 million.¹¹¹ These are not necessarily worst-case costs – the cost of restoring

Changes to Financial Assurance Rules Since January 2013

Rising concern about the environmental and societal costs of fracking has led a number of states to take a second look at their rules for financial assurance. Significantly, in two of the three states, improvements to financial assurance rules were only adopted in the context of growing public demands to bar or halt fracking entirely. Moreover, even these new rules fall far short of what financial assurance policy should do to protect taxpayers or the environment from damage inflicted by fracking.

Illinois: Faced with growing citizen support for a moratorium on fracking, this year industry representatives agreed to, and the legislature adopted a bill to regulate the drilling practice, including a provision requiring drillers to obtain a \$50,000 plugging and reclamation bond per permit, with a blanket bond of \$500,000 for all permits statewide. The proposal would allow bonds to be released upon proper closure of the well and would require forfeiture of bonds in the event that a driller fails to address violations of oil and gas regulations.¹⁰⁹

Maryland: Sidestepping environmental groups' calls for a ban or moratorium on fracking, the Maryland General Assembly instead approved legislation to change the per-well bonding amount from a limit of \$100,000 to a minimum of \$50,000 or the estimated cost of plugging and reclamation, whichever is higher. The new law requires environmental pollution insurance of \$1 million per loss to remain in place for five years after plugging of the well.¹¹⁰

South Dakota: South Dakota has adopted new bonding requirements, effective July 2013, which require individual bonds of \$10,000 per well for wells of less than 5,500 feet and \$50,000 per well for wells greater than 5,500 feet, or blanket bonds of \$30,000 for wells under 5,500 feet or \$100,000 for wells greater than 5,500 feet. The bonding requirement for surface restoration has been repealed.

polluted groundwater supplies can easily run into the hundreds of thousands if not millions of dollars.

To ensure that the public is protected without imposing an undue burden on responsible oil and gas drillers, we recommend that fracking operators should be required to obtain two tiers of financial assurance for each well:

- Tier 1 would require bonds or fully paid-in trust funds of \$250,000 or more to cover the costs of well plugging and reclamation. Tier 1 financial assurance should be released only once wells are adequately plugged, well sites reclaimed, and all regulatory orders fulfilled.
- Tier 2 would require bonds, trust funds, and/or insurance policies sufficient to cover the worst-case costs of damage to private property, health and natural resources, as well as the cost of providing replacement drinking water supplies in cases of water contamination. Financial assurance of \$5 million per well (or insurance of up to \$5 million per occurrence) should be the minimum amount required.¹¹² Some measure of Tier 2 assurance should be required to be maintained over a longer term to cover potential impacts of fracking that emerge over time. A 30-year timeframe for this protection should be required until the long-term impacts of fracking are better understood.

Note that the levels of financial assurance suggested here should be considered *minimum* requirements – additional financial assurance should be required in cases in which proximity to populated areas or precious natural resources increase the potential for damages, or in cases in which the type of drilling activity undertaken poses additional risks to the public or the environment. Any variations in financial assurance requirements should be calculated based on standard methodologies and not left to regulatory discretion or be based on cost estimates by drillers with self-interest in minimizing their level of financial assurance. In addition, financial assurance requirements should be indexed to inflation.

Drillers should be required to pay into industry-wide cleanup funds to act as a backstop source of funds for cleanup and victim compensation in the event that financial assurance rules are violated or fail to offer adequate protection. Drillers should also be required to post bonds for impacts to roads and other public infrastructure. A strong road bonding system should have uniform statewide requirements, address the impact of fracking-related truck activity on all roads (not just local roads), and require fees or bonds of sufficient value to complete full repairs.

Eliminate loopholes, exemptions and discounts:

Current regulations provide many ways for drillers to escape responsibility for providing the full measure of financial assurance. Those loopholes and exemptions should be eliminated. Specifically:

- Exemptions for the oil and gas industry under federal environmental laws should be eliminated and oil and gas drillers should be required to meet the requirements of those laws, including financial assurance requirements.
- Blanket bonding provisions that reduce per-well financial assurance requirements should be eliminated.

- Provisions of state regulations that allow drillers to avoid posting financial assurance based on financial tests, the payment of annual fees, or a record of compliance with state regulations should be eliminated.

In addition, state and federal officials should enact strict policies and financial assurance requirements to prevent well owners from evading plugging and reclamation costs by maintaining their wells in “inactive” status indefinitely.

Require forms of financial assurance that truly protect the public:

Surety bonds, collateral bonds backed by irrevocable letters of credit, cash and cash-equivalents, and fully funded trust funds provide strong guarantees that funds will be available for cleanup when needed. These forms of financial assurance should form the foundation of any financial assurance system. Liability insurance can play an important role in protecting the public against the cost of damage to neighboring properties and natural resources, including damage that occurs long after plugging and reclamation are complete.

State regulations should ensure that financial assurance remains in place under all conceivable circumstances, including the driller’s failure to pay required premiums or the bankruptcy of an insurer or surety company. Insurance policies should include clear language delineating the circumstances under which the insurer is required to pay claims. Banks, surety companies or insurers should be barred from canceling financial assurance – even in the event of missed payments – without sufficient advance notice to regulators.

Integrate financial assurance into a strong program of oil and gas regulation:

Even the strongest financial assurance rules are of little use if they are not enforced. State and federal governments must implement and enforce financial

assurance requirements by ensuring that each well is covered by financial assurance and that financial assurance remains in place throughout the lifespan of a well. In addition, regular inspection of wells and enforcement of oil and gas rules is essential to limit the potential for major mishaps that result in damage to the environment and health so severe that the cost exceeds financial assurance requirements. States should design financial assurance rules in ways that encourage compliance with environmental

and health protections (for example, by allowing for the forfeiture of bonds in cases where drillers are in violation of oil and gas rules or have failed to pay required penalties) and design oil and gas regulations in ways that encourage compliance with financial assurance rules (for example, by denying permits to companies that have failed to meet their obligations to plug wells, reclaim well sites or remediate damage to the environment or public health).

Appendix. State Oil and Gas Bonding Requirements

Bonding requirements reflect those in effect as of the end of 2012. Proposed or pending changes to bonding requirements are noted where available.

Federal Lands (Bureau of Land Management)

Single-well bond amount: \$10,000 per lease.

Blanket bond amount: \$25,000 statewide; \$150,000 nationwide.

Types of financial assurance accepted: Surety or personal bond.

Conditions for release of bond: “[A]ll the terms and conditions of the lease have been met.”

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Notes: “The authorized officer may require an increase in the amount of any bond whenever it is determined that the operator poses a risk due to factors including, but not limited to, a history of previous violations, a notice from the Service that there are uncollected royalties due, or the total cost of plugging existing wells and reclaiming lands exceeds the present bond amount based on the estimates determined by the authorized officer. The increase in bond amount may be to any level specified by the authorized officer, but in no circumstances shall it exceed the total of the estimated costs of plugging and reclamation, the

amount of uncollected royalties due to the Service, plus the amount of monies owed to the lessor due to previous violations remaining outstanding.”

Source: 43 CFR 3104.1.

Alaska

Single-well bond amount: \$100,000.

Blanket bond amount: \$200,000.

Types of financial assurance accepted: Surety bond or personal bond. The latter must be accompanied by security in the form of a certificate of deposit or irrevocable line of credit.

Conditions for release of bond: “A bond and, if required, security must remain in effect until the abandonment of all wells covered by them and until the commission approves final clearance of the locations. The commission will then release the bond and security upon written request of the operator.”

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: The bond may be less than \$100,000 if the operator demonstrates that the cost of well abandonment and location clearance will be less than \$100,000.

Notes: “Commission approval of the abandonment of a well and the release of the bond ... constitutes a presumption of proper abandonment, but does not relieve the operator of further claim by the commission after the abandonment.” Bonding for wells on state land is \$100,000, with \$500,000 blanket bond.

Source: 20 AAC 25.025.

Alabama

Single-well bond amount: Varies by depth: \$5,000-\$50,000.

Blanket bond amount: \$100,000.

Types of financial assurance accepted: Surety bond, negotiable bonds of the United States or state, cash, or certificate of deposit.

Conditions for release of bond: That “person(s) shall drill, operate, produce, and plug and abandon, such well, and that such person(s) shall dispose of pit fluids, close the pit, restore the location, and maintain the site in compliance with all lawful rules, regulations, and orders of the Board ... and with the laws of the State of Alabama ...”

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: “Bond applies to disposal of pit fluids, location restoration, and site maintenance.”

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Notes: Board may require additional bonding after notice and hearing.

Source: State Oil and Gas Board of Alabama, *Administrative Code, Oil and Gas Report 1*, November 2011.

Arkansas

Single-well bond amount: \$3,000.

Blanket bond amount: Varies by number of wells: \$25,000-\$100,000.

Types of financial assurance accepted: Surety bond; cashier’s, personal or corporate check; money order; irrevocable letter of credit; or certificate of deposit.

Conditions for release of bond: The bond may not be released until “1. ... one year after the issuance of the permit to drill ... or 2. until the well(s) have been plugged and associated production site(s) restored ... or 3. the well(s) have been transferred to a new permit holder ... or 4. all outstanding notices of violation or orders of compliance issued against the permit holder have been satisfied; or 5. the permit holder has paid annual fee assessments to the Commission in accordance with section h. of this rule for two consecutive years, and such permit holder is not in violation of the Commission’s regulations or statutes; or 6. [the permit holder was a] holder of record with the Commission on January 1, 2006 who [was] assessed annual fees in accordance with section (h) of this rule and paid such fees, and who [was] not in violation of any Commission order or rule at the time the fees were paid.”

Conditions for forfeiture of bond: “Permit holder’s failure to comply with the Commission’s order to plug, replug or repair a well, or restore a well site, within thirty (30) days of the issuance of such order.”

Other costs subject to financial assurance: As of January 1, 2006, operators must also pay an annual fee to the Commission, variable relative to the number of wells in operation.

Liability insurance requirements: None specified

Loopholes or exemptions: If the operator does not violate the Commission’s regulations or statutes, and pays the annual fee assessment, for two consecutive years, the bond may be released.

Source: Arkansas Oil and Gas Commission, *General Rules and Regulations*, 8 February 2013.

Arizona

Single-well bond amount: Varies by depth: \$10,000-\$20,000.

Blanket bond amount: Varies by number of wells: \$25,000-\$250,000.

Types of financial assurance accepted: Surety bond, certified check or certificate of deposit.

Conditions for release of bond: “[T]he faithful performance by the operator of the duty to drill each well, plug each dry or abandoned well, repair each well causing waste or pollution, maintain and restore each well site and otherwise act in a manner that is consistent with A.R.S. Title 27 Chapter 4 and this Chapter.”

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Source: AAC R12-7-103.

California

Single-well bond amount: Varies by depth: \$15,000-\$30,000.

Blanket bond amount: Varies by number of active wells: \$100,000-\$250,000; all wells (including idle wells): \$1,000,000.

Types of financial assurance accepted: Surety bond, certified or cashier’s check, certificate of deposit or investment, or a share of passbook account.

Conditions for release of bond: Individual bond: when “well is completed or plugged and abandoned satisfactorily or another valid bond is substituted for it; all required well records are filed ... and all operations are in compliance.” Blanket bond: when “no wells require bond coverage; a new blanket bond and rider (for indemnity bonds) are filed in place of it; or individual well bonds and riders (for indemnity bonds) are filed for each uncompleted or unplugged well. Additionally, all required well records must be filed with the appropriate district office(s) and all operations must be in compliance.”

Conditions for forfeiture of bond: “Generally, a bond is forfeited when an operator fails to plug and abandon a well; but it can also be forfeited for other reasons, such as a failure to clean up a spill or screen a sump associated with a well.”

Other costs subject to financial assurance: Individual five-year idle wells: \$5,000.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Notes: Operators with a “substantial history of noncompliance, history of spills, etc. will be required to file life-of-well or life-of-production facility bonds.” The bond amount in this instance will vary according to cost of removal.

Source: California Department of Conservation, Division of Oil, Gas and Geothermal Resources, *Bond Information*, June 2012.

Colorado

Single-well bond amount: Varies by depth: \$10,000-\$20,000.

Blanket bond amount: Varies by number of wells: \$60,000-\$100,000.

Types of financial assurance accepted: Surety bond, guarantee of performance, general liability insurance, or an escrow account or sinking fund.

Conditions for release of bond: Bonds are released when “the Director determines an operator has complied with the statutory obligation.” (Such obligations relate to compliance with regulatory orders and proper restoration of land affected by oil and gas drilling.)

Conditions for forfeiture of bond: “Whenever an operator fails to fulfill any statutory obligation described herein, and the Commission undertakes to expend funds to remedy the situation.”

Other costs subject to financial assurance: Surface damage: \$2,000 per-well for non-irrigated land; \$5,000 per-well for irrigated land; \$25,000 statewide. “Excess inactive wells” require bonds of \$10,000 for each inactive well of less than 3,000 feet and \$20,000 for each inactive well greater than or equal to 3,000 feet.

Liability insurance requirements: \$1,000,000 in general liability coverage.

Loopholes or exemptions: An operator may seek a “variance” from the financial assurance requirements. Must be granted by the Director or Commission. Applicant must show a good faith effort to comply or an inability to comply.

Source: Colorado Oil and Gas Conservation Commission, *Rules and Regulations*, 1 May 2013.

Idaho

Single-well bond amount: \$10,000 + \$1/foot.

Blanket bond amount: Varies by number of wells: \$50,000-\$150,000.

Types of financial assurance accepted: Surety bond or cash bond pledge.

Conditions for release of bond: Well bond: “Said bond shall remain in force and effect until the plugging of said well is approved by the Department and the well site is reclaimed as described in Section

325 of these rules, or the bond is released by the Department.” Surface use bond: a surface use agreement between the two parties that negates the need for a bond, or reclamation of the surface disturbance.

Conditions for forfeiture of bond: Well bond: None specified. Surface use bond: “failure of the owner or operator to reclaim the disturbed area in a timely manner, or upon failure of the parties to reach a surface use agreement, upon the completion of drilling operations.”

Other costs subject to financial assurance: Surface use: minimum bond of \$5,000.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Notes: The Department may also impose additional bonding “given sufficient reason such as non-compliance, unusual conditions, horizontal drilling, or other circumstances ...”

Source: IDAPA 20.07.02.

Illinois

Single-well bond amount: \$50,000.

Blanket bond amount: \$500,000.

Types of financial assurance accepted: Surety bond, cash, certificates of deposit or irrevocable letters of credit.

Conditions for release of bond: “Upon abandoning a well to the satisfaction of the Department and in accordance with the Illinois Oil and Gas Act, the bond or other collateral securities shall be promptly released by the Department.”

Conditions for forfeiture of bond: “If ... the Department determines that any of the requirements of this Act or rules adopted under this Act or the

orders of the Department have not been complied with within the time limit set by any notice of violation issued under this Act, the permittee's bond or other collateral securities shall be forfeited."

Other costs subject to financial assurance: None specified.

Liability insurance requirements: "Proof of insurance to cover injuries, damages, or loss related to pollution or diminution in the amount of at least \$5,000,000."

Loopholes or exemptions: None specified.

Notes: Bonding requirements listed here are specifically for wells where high-volume hydraulic fracturing is used. Lower bonding amounts are required for conventional wells. This law was enacted and took effect in June 2013.

Source: Illinois Public Act 098-0022.

Indiana

Single-well bond amount: \$2,500.

Blanket bond amount: \$45,000.

Types of financial assurance accepted: Surety bond, cash or certificate of deposit.

Conditions for release of bond: "[O]wner or operator plugs and abandons each well covered under the blanket bond in accordance with: (i) this article; and (ii) rules adopted under this article."

Conditions for forfeiture of bond: "The director shall order forfeiture of a bond or alternative security...when a permit is revoked under IC 14-37-13."

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: Bond requirements apply only to applicants who have never previously been granted a permit; who have demonstrated a pattern of violation under this article within the previous two years; who have failed to pay a civil penalty; or who have failed to pay an annual fee. An oil and gas well owner/operator must pay an annual fee of \$150 for a single permit, \$300 for two through five permits, \$750 for six through 25 permits, \$1,500 for 26 through 100 permits, with an additional \$15 for each permit over 100. If the fund collecting annual fees exceeds \$1,500,000 on November 1 of a given year, the annual fee must be reduced by 75% to no less than \$50.

Source: IC 14-37-5; IC 14-37-6.

Iowa

Single-well bond amount: \$15,000.

Blanket bond amount: \$30,000.

Types of financial assurance accepted: Surety bond.

Conditions for release of bond: Full compliance with "the provisions of Iowa Code Chapter 458A, as amended, and the rules, regulations, and orders of the Iowa Department of Natural Resources have been fully complied with in the plugging and abandonment of all wells for oil or gas or for metallic minerals on said land."

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Source: Iowa Department of Natural Resources, *Release of Bond*, accessed at www.igsb.uiowa.edu/EconomicResources/form_gsb3a.pdf, 29 May

2013; Iowa Department of Natural Resources, *Bond for Conformance with Laws, Rules and Regulations Governing Oil, Gas and Metallic Mineral Operations in the State of Iowa*, accessed at www.igsb.uiowa.edu/EconomicResources/form_gsb3.pdf, 29 May 2013.

Kansas

Single-well bond amount: \$0.75/foot multiplied by the total footage of all wells of the operator.

Blanket bond amount: Varies by number and depth of wells: \$7,500-\$45,000.

Types of financial assurance accepted: Surety bond or letter of credit.

Conditions for release of bond: None specified.

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: Operators may elect to pay a non-refundable fee of 6% of the blanket bond required in place of the blanket bond only, or provide the state with first lien on tangible property associated with oil and gas production of the operator with a salvage value equal to or greater than the bond otherwise required. Other operators with an “acceptable compliance record over the last three years” may pay an annual fee of \$100 in lieu of a bond.

Source: Kansas Corporation Commission, *Financial Assurance for Kansas Oil & Gas Operators*, accessed at www.kcc.state.ks.us/conservation/financial_assurance.htm, 29 May 2013; KSA 55-155.

Kentucky

Single-well bond amount: Varies by depth: \$500-\$5,000.

Blanket bond amount: Varies by number of wells, qualifications of operator: \$10,000-\$100,000. (“Qualified” operators are eligible for lower blanket bond amounts. To be “qualified,” an operator shall have a blanket bond in place filed prior to July 15, 2006, demonstrate compliance with statutes and regulations in the preceding 36 months, or provide proof of financial ability to plug and abandon wells covered by the blanket bond.)

Types of financial assurance accepted: Surety bond, certified or cashier’s check, money order, certificate of deposit, or irrevocable letter of credit.

Conditions for release of bond: “A bond shall be released after a well has been properly plugged with all required records submitted to the Division of Oil and Gas.”

Conditions for forfeiture of bond: “If the operator has not reached an agreement with the department or has not complied with the requirements set forth by it within forty-five (45) days after mailing of the [noncompliance] notice, the bond shall be forfeited to the department.”

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Notes: An operator is ineligible for blanket bonding if it has more than 10 violations of the rules and regulations within the 36 month period; any outstanding, unabated violations of the rules and regulations which have not been appealed; a forfeiture of a bond; or a permit(s) upon which a bond or portion of a bond has been forfeited and the

proceeds from the forfeiture have been spent by the department to plug or reclaim the permitted well(s), unless the operator has paid the department for all costs.

Source: KRS 353.590; Kentucky Division of Oil and Gas, *Bonds and Transfers*, accessed at oilandgas.ky.gov/Pages/BondsandTransfers.aspx, 29 May 2013.

Louisiana

Single-well bond amount: Varies by depth: \$1/foot-\$3/foot.

Blanket bond amount: Varies by number of wells: \$25,000-\$250,000.

Types of financial assurance accepted: Surety bond, irrevocable letter of credit or certificate of deposit.

Conditions for release of bond: “[P]ugging and abandonment and associated site restoration is completed and inspection thereof indicates compliance with applicable regulations ...”

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: An operator with no outstanding violations and a 48-month record of compliance with the statutes, rules and regulations of the Office of Conservation is exempt from the bonding requirement.

Source: LAC 43: XIX.104.

Maryland

Single-well bond amount: \$50,000 or the estimated cost of closure, whichever is higher.

Blanket bond amount: No specific amount for blanket bonding.

Types of financial assurance accepted: Legislation authorizes the state to allow forms of financial assurance including performance bonds, blanket bonds, cash, certificates of deposit, self-insurance, corporate guarantees or “any other surety the Department determines to be good and sufficient.” Exact types of financial assurance permitted will be decided via regulation.

Conditions for release of bond: According to regulations adopted under Maryland’s prior bonding regime, bonds are released when “[the] Department has approved the: (a) physical plugging of the well; (b) reclamation of the well site; (c) receipt of all logs, plugging records, and sample; and (d) performance of all requirements of these regulations and the drilling and operating permit ...” See below for conditions regarding lifting of insurance requirements.

Conditions for forfeiture of bond: According to regulations enacted under Maryland’s prior bonding regime, “The performance bond shall be forfeited on failure of the permittee to perform in a manner set forth in the authorized drilling and operating permit and the reclamation plan, or upon revocation of the permit.”

Other costs subject to financial assurance: Bond applies to site restoration.

Liability insurance requirements: Drillers must maintain comprehensive general liability insurance of \$300,000 per person or \$500,000 per occurrence or accident for “sudden, accidental” occurrences and environmental pollution liability insurance of not less than \$1,000,000 per loss for bodily injury to

persons and natural resource damage, including the cost of environmental cleanup, for sudden and non-sudden releases of pollution. Drillers must maintain environmental pollution liability insurance for five years after the closure of the well and remediation of the well site.

Loopholes or exemptions: None specified.

Notes: This description based on legislation adopted in Maryland in 2013, which will take effect in October 2013.

Source: COMAR 26.19.01.13; COMAR 26.19.01.06; 2013 Md. Laws Ch. 568.

Michigan

Single-well bond amount: Varies by depth: \$10,000-\$30,000.

Blanket bond amount: Varies by number and depth of wells: \$100,000-\$200,000.

Types of financial assurance accepted: Surety bond, certified check/money order, certificate of deposit, letter of credit or statement of financial responsibility.

Conditions for release of bond: “[I]f the well has been plugged and proper site restoration has been performed pursuant to R 324.1003, including the filing of the mandatory records.”

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: Operators may file a statement of financial responsibility rather than file a bond.

Source: Michigan Department of Environmental Quality, *Bonds for Permits to Drill Oil and Gas Wells in*

Michigan – Information and Forms, accessed at www.michigan.gov/deq/0,4561,7-135-3311_4111_4231-44518--,00.html, 29 May 2013.

Mississippi

Single-well bond amount: Varies by depth: \$20,000-\$60,000.

Blanket bond amount: \$100,000

Types of financial assurance accepted: None specified.

Conditions for release of bond: None specified.

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: Operators may pay into the Emergency Plugging Fund an annual fee equal to 5% of the “financial responsibility” otherwise required.

Source: Mississippi State Oil and Gas Board, *Statutes (sic), Rules of Procedure, Statewide Rules and Regulations*, 3 April 2009.

Missouri

Single-well bond amount: Varies by depth: \$1,000-\$5,000 + \$1/foot.

Blanket bond amount: For wells 1-800 feet, a blanket bond of \$20,000 is available to cover up to 50 wells. For wells between 800 and 1,200 feet, a blanket bond of \$30,000 is available to cover up to 15 wells. Wells deeper than 1,200 feet, or additional shallow wells above the cap for blanket bonding, are required to bond at the single-well bond level.

Types of financial assurance accepted: Surety bond, letter of credit or certificate of deposit.

Conditions for release of bond: "This bond shall remain in force and effect until plugging of the well or hole is approved by the state geologist and is released by the state geologist."

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Source: 10 CSR 50-2.020.

Montana

Single-well bond amount: Varies by depth: \$1,500-\$10,000.

Blanket bond amount: \$50,000.

Types of financial assurance accepted: Surety bond, letter of credit or certificate of deposit.

Conditions for release of bond: "A well must remain covered by a bond, and such bond must remain in full force and effect until: (a) the plugging and restoration of the surface of the well is approved by the board; or (b) a new bond is filed by a successor in interest and such bond is approved by the board."

Conditions for forfeiture of bond: None specified

Other costs subject to financial assurance: Bond applies to surface restoration.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Notes: Bonding amounts may be greater at the discretion of the Montana Board of Oil and Gas.

Source: ARM 36.22.1308

Nebraska

Single-well bond amount: \$5,000.

Blanket bond amount: \$25,000.

Types of financial assurance accepted: Surety bond, certified or cashier's check, legal tender, or a certificate of deposit.

Conditions for release of bond: "Said bond shall remain in force and effect until plugging of said well or hole is approved by the Director or his authorized deputy ..."

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Source: Nebraska Admin. Code, Title 267, Chapter 3, Section 004.

Nevada

Single-well bond amount: \$10,000.

Blanket bond amount: \$50,000.

Types of financial assurance accepted: Surety bond, cash, savings certificate, or certificate of deposit.

Conditions for release of bond: "[T]he well has been properly abandoned and plugged or repaired in accordance with this chapter or until it is formally released by the division."

Conditions for forfeiture of bond: "Any bond, savings certificate or time certificate of deposit required by this section must remain in effect until the well has been properly abandoned and plugged

or repaired in accordance with this chapter or until it is formally released by the division.”

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: The owner of the well does not need a state bond if the well is on federal land and covered by a federal bond.

Source: NAC 522.230.

New Mexico

Single-well bond amount: Varies by county: \$5,000 + \$1/foot - \$10,000 + \$1/foot.

Blanket bond amount: \$50,000.

Types of financial assurance accepted: Surety bond, cash or irrevocable letter of credit.

Conditions for release of bond: “The division shall release a financial assurance document ... upon written request if all wells drilled or acquired under that financial assurance have been plugged and abandoned and the location restored and remediated ...”

Conditions for forfeiture of bond: “[F]ailure to properly plug and abandon and restore and remediate the location of a well or wells ...”

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Source: NMAC 19.15.8.

New York

Single-well bond amount: Varies by depth: \$2,500-\$5,000 for wells under 6,000 feet. For wells deeper than 6,000 feet, bond requirement is based on the estimated cost of plugging and reclamation, up to \$250,000.

Blanket bond amount: Varies by the number and depth of wells: \$25,000-\$150,000.

Types of financial assurance accepted: Surety bond, irrevocable letter of credit or certificate of deposit

Conditions for release of bond: Compliance with “all applicable provisions of the laws of the State of New York and the rules, regulations, orders and amendments thereof of the Department of Environmental Conservation ...”

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Source: New York Department of Environmental Conservation, *Financial Security*, accessed at www.dec.ny.gov/energy/1622.html, 29 May 2013; New York Department of Environmental Conservation, *Well Plugging and Surface Restoration Bond*, accessed at www.dec.ny.gov/docs/materials_minerals_pdf/bond_fm.pdf, 29 May 2013; New York Department of Environmental Conservation, *Regulations*, 551.4, accessed at www.dec.ny.gov/regs/4466.html#15481, 29 May 2013.

North Carolina

Single-well bond amount: \$5,000 + \$1/foot.

Blanket bond amount: None specified.

Types of financial assurance accepted: None specified.

Conditions for release of bond: None specified.

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance:
Operators shall pay a drilling fee of \$3,000 per well, and an abandonment fee of \$450 per well.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Source: 2011 N.C. Sess. Laws 2011-276.

North Dakota

Single-well bond amount: \$50,000.

Blanket bond amount: \$100,000 (6 well limit).

Types of financial assurance accepted:
Surety bond or cash. An alternative form of security "may be approved by the commission after notice and hearing, as provided by law."

Conditions for release of bond: The bond "is to endure up to and including approved plugging of all oil, gas, and injection wells as well as dry holes. Approved plugging shall also include practical reclamation of the well site and appurtenances thereto."

Conditions for forfeiture of bond: "If the principal does not satisfy the bond's conditions, then the surety shall satisfy the conditions or forfeit to the commission the face value of the bond."

Other costs subject to financial assurance: Bond covers "practical reclamation of the well site."

Liability insurance requirements: None specified.

Loopholes or exemptions: "An alternative form of security may be approved by the commission after notice and hearing, as provided by law." Individual wells drilled to less than 2,000 feet may be bonded to less than \$50,000.

Notes: The commission may require higher bond amounts on account of a well's economic value or expected cost of plugging and reclamation.

Source: NDCC 43-02-03-15.

Ohio

Single-well bond amount: \$5,000.

Blanket bond amount: \$15,000.

Types of financial assurance accepted: Surety bond, cash, irrevocable letter of credit, certificate of deposit, or proof of financial responsibility.

Conditions for release of bond: "[T]he well has been plugged and all restoration requirements performed, including all logs, plugging records, or other information required by the Division of Oil and Gas Resources Management have been fulfilled ..."

Conditions for forfeiture of bond: "[A]n owner has failed to comply with the restoration requirements ... , plugging requirements ... , permit provisions ... , or rules and orders relating thereto ..."

Other costs subject to financial assurance: None specified.

Liability insurance requirements: Not less than \$1,000,000 bodily injury and property damage coverage, statewide. For owners of horizontal wells, not less than \$5,000,000 bodily injury and property damage coverage, statewide.

Loopholes or exemptions: Operators may avoid filing a bond by demonstrating net in-state worth of twice the bond amount (\$30,000).

Source: Ohio Department of Natural Resources, *Topical Summary of Ohio Oil and Gas Law*, 23 May 2011; ORC 1509; Ohio General Assembly, SB 315, 129th General Assembly.

Oklahoma

Single-well bond amount: Estimated cost of plugging the well (determined by an engineer).

Blanket bond amount: Bond or letter of credit of \$25,000, or demonstration of net worth of \$50,000.

Types of financial assurance accepted: Surety bond, irrevocable letter of credit, cash, cashier's check, certificate of deposit, bank joint custody receipt, or financial statement proving net worth of \$50,000+.

Conditions for release of bond: "[T]he conditions [of the bond] have been met or release of the bond is authorized by the Commission."

Conditions for forfeiture of bond: "If the Commission determines that the ... operator has neglected, failed, or refused to plug any well at the time and in the manner prescribed..."

Other costs subject to financial assurance: Surface restoration: additional \$25,000 bond. (Surface damage bonding requirements apply per operator, not per well.)

Liability insurance requirements: None specified.

Loopholes or exemptions: Amount varies with type of financial assurance.

Source: Oklahoma Corporation Commission, *Instructions for Completing the Forms of the Oklahoma Corporation Commission Surety Requirements*, 11 October 2004; Oklahoma Legislature, HB 3122, 53rd Legislature, 2nd Session; Oklahoma Cooperative Extension Service, *Understanding Oklahoma's Surface Damage Act*, accessed at pods.dasnr.

okstate.edu/docushare/dsweb/Get/Document-6036/AGEC1014web.pdf, 29 May 2013.

Oregon

Single-well bond amount: Varies by depth: \$10,000-\$25,000.

Blanket bond amount: \$100,000+ (equal to the sum of individual well bonds but not less than \$100,000).

Types of financial assurance accepted: Surety bond, letter of credit.

Conditions for release of bond: "Bonds are maintained until wells are plugged and sites reclaimed."

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Source: Oregon Department of Geology and Mineral Industries, Oil and Gas Program, *Procedure for Obtaining Permit*, accessed at www.oregon.gov/DOGAMI/Pages/oil/PROCED.aspx, 29 May 2013.

Pennsylvania

Single-well bond amount: Varies by depth: \$4,000-\$10,000.

Blanket bond amount: Varies by number and depth of wells: \$35,000-\$600,000.

Types of financial assurance accepted: Surety bond, cash, certified or cashier's check, certificate of deposit, negotiable securities or letter of credit.

Conditions for release of bond: "A well will be released from bond coverage one year after it has been properly plugged and the site satisfactorily restored."

Conditions for forfeiture of bond: Failure to “faithfully perform and conform to all of the applicable drilling, restoration, water supply replacement and plugging requirements.”

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Source: Pennsylvania General Assembly, HB 1950, Session of 2011; Pennsylvania Department of Environmental Protection, *Checklist for Submitting Bonds for Oil and Gas Wells*, accessed at www.elibrary.dep.state.pa.us/dsweb/Get/Document-57074/5500-FM-OG0060.pdf, 29 May 2013; Pennsylvania Department of Environmental Protection, *Guidelines for Submitting Oil and Gas Well Bonds*, 2 December 2009.

South Dakota

Single-well bond amount: \$10,000 for wells less than 5,500 feet; \$50,000 for wells greater than 5,500 feet.

Blanket bond amount: \$30,000 for all wells less than 5,500 feet; \$100,000 for all wells greater than 5,500 feet.

Types of financial assurance accepted: Surety bond or certificate of deposit.

Conditions for release of bond: “[P]erformance of the duty to plug each dry or abandoned well, to restore the premises, insofar as possible, to the condition that existed before the filing of the application to drill; and conditioned on the proper performance of all of the requirements of §§ 45-9-5 to 45-9-18, inclusive.”

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Notes: Description based on South Dakota SB1, adopted in 2013 and taking effect July 2013.

Source: South Dakota Legislature, SB1, 2013 session.

Tennessee

Single-well bond amount: Varies by depth: \$2,000-\$3,000 + \$1/foot.

Blanket bond amount: Varies by depth (max. 10 wells per bond): \$20,000-\$30,000.

Types of financial assurance accepted: Surety bond, cash, certified check, irrevocable letter of credit or certificate of deposit.

Conditions for release of bond: “[T]he proper plugging of the well and filing with the Supervisor of a Plug and Abandon Report, driller’s log, downhole surveys, well cuttings and cores, and other data as required, or if the permit has been cancelled because of a lack of proper activity.”

Conditions for forfeiture of bond: “If the operator has not reached an agreement with the Supervisor, or has not complied with the requirements set forth within thirty (30) days after mailing the [noncompliance] notice.”

Other costs subject to financial assurance: Restoration of well site and access road(s): \$1,500 performance bond per well site.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Source: Tennessee Department of Environment and Conservation, *Comprehensive Bond Identification*, accessed at www.tn.gov/environment/wpc/forms/cn0120_comprehensive_bond_id.pdf, 29 May 2013; Rules of the Tennessee Oil and Gas Board, Chapter 1040-02-01.

Texas

Single-well bond amount: \$2/foot

Blanket bond amount: Varies by number of wells: \$25,000-\$250,000

Types of financial assurance accepted:

Performance bond, letter of credit, cash or a well-specific plugging insurance policy.

Conditions for release of bond: “[T]he operator will plug and abandon all wells and control, abate, and clean up pollution associated with the oil and gas operations and activities covered under the required financial security in accordance with applicable state law and permits, rules, and orders of the Commission.”

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance:

Abatement and cleanup of pollution.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Source: Railroad Commission of Texas, *Changes in Fees, Financial Assurance Requirements, and Well Transfers Pursuant to Statutory Amendments Approved in Senate Bill 310 77th Legislature (2001), Effective 9/1/01*, accessed at www.rrc.state.tx.us/forms/reports/notices/ogpn75.php, 29 May 2013; Texas Admin. Code Title 16, Part 1, Rule 3.78.

Utah

Single-well bond amount: Varies by depth: \$1,500-\$60,000.

Blanket bond amount: Varies by depth: \$15,000-\$120,000.

Types of financial assurance accepted: Surety bond, irrevocable letter of credit, cash account, negotiable certificate of deposit, or negotiable bonds of the United States, a state or a municipality.

Conditions for release of bond: “[C]ompliance with the rules and orders of the Board.”

Conditions for forfeiture of bond: “The operator refuses or is unable to conduct plugging and site restoration; noncompliance as to the conditions of a permit issued by the division; the operator defaults on the conditions under which the bond was accepted.”

Other costs subject to financial assurance: None specified.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Source: Utah Admin. Code R649-3-1.

Virginia

Single-well bond amount: Exploratory well: \$10,000; production well: \$25,000.

Blanket bond amount: \$100,000.

Types of financial assurance accepted: Surety bond.

Conditions for release of bond: “Compliance with all statutes, rules, and regulations...” and “Plugging and abandoning the well as approved by the division director.”

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: Land stabilization: \$1,000 per acre of land disturbed.

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Notes: Blanket bonds granted at the discretion of the director.

Source: 4 VAC 25-170-30.

West Virginia

Single-well bond amount: \$50,000.

Blanket bond amount: \$250,000.

Types of financial assurance accepted: Surety bond; certificate of deposit; irrevocable letter of credit; escrow account; cash deposit; or bonds of the United States, the State of West Virginia or other states, or any country, district, or municipality in West Virginia or other states.

Conditions for release of bond: "Any such bond shall remain in force until released by the secretary, and the secretary shall release the same upon satisfaction that the conditions thereof have been fully performed."

Conditions for forfeiture of bond: None specified.

Other costs subject to financial assurance: "The initial horizontal drilling well at a location requires a \$10,000 permit fee; each additional horizontal drilling well requires a permit fee of \$5,000."

Liability insurance requirements: None specified.

Loopholes or exemptions: None specified.

Source: West Virginia Department of Environmental Protection, *Natural Gas Horizontal Well Control Act, Bonding & Notice Provisions*, accessed at www.dep.wv.gov/oil-and-gas/Horizontal-Permits/Horizontal%20Well%20Permit%20Packet/Documents/Workshop%20Presentations/Notice%20and%20Bonding.pdf, 29 May 2013; West Virginia Legislature, HB 401, 81st Legislature, 1st Session.

Wyoming

Single-well bond amount: Varies by depth: \$10,000-\$20,000.

Blanket bond amount: \$75,000.

Types of financial assurance accepted: Surety bond, cashier's check, certificate of deposit, letter of credit.

Conditions for release of bond: Compliance with rules and regulations "including, but not limited to, production facility removal, produced water pit closure, proper plugging of wells and seismic holes and reclamation of the surrounding affected area, with respect to all operations secured thereby."

Conditions for forfeiture of bond: "[T]he principal or person posting [the bond] fails to comply with the Oil and Gas Conservation Act, the Commission's Rules, or the orders of the Commission, the State Oil and Gas Supervisor, or their agents."

Other costs subject to financial assurance: Additional bonding of \$10/foot may be required for idle wells when their footage exceeds 2,500 feet or 7,500 feet depending upon the level of blanket bond in place. The operator may post monthly installments of at least 5.55% of the new bond for 18 months or until the total bond has been posted. The operator may request a different bonding level with a written cost estimate. The bond amount will increase every three years in line with the state's consumer price index.

Liability insurance requirements: None specified.

Loopholes or exemptions: In lieu of additional bonding for idle wells, "the Supervisor may accept a detailed plan of operation which includes a time schedule to permanently plug and abandon idle wells or take such action...to remove the well from idle status."

Source: Wyoming Oil and Gas Conservation Commission, *Operational Rules, Drilling Rules*, Chapter 3, Section 4.

Notes

1. Industrial Commission of North Dakota, Oil and Gas Division, *2009 Monthly Statistical Update*, updated 12 March 2010; Industrial Commission of North Dakota, Oil and Gas Division, *2012 Monthly Statistical Update*, downloaded from www.dmr.nd.gov/oilgas/stats/2012monthlystats.pdf, 3 December 2012.
2. U.S. Bureau of Labor Statistics, *Local Area Unemployment Statistics: North Dakota*, downloaded from data.bls.gov/timeseries/LASST38000003, 3 December 2012.
3. Jack Healy, "Western Colorado Struggles as Energy Jobs Fade," *New York Times*, 28 June 2012.
4. Headwaters Economics, *Report: Colorado's Oil and Natural Gas Industry: Activity Continues to Reflect Colorado's Overall Share of Nation's Fossil Fuel Reserves*, June 2012.
5. Jack Z. Smith, "Has the Barnett Shale Left its Best Days Behind?" *Star-Telegram* (Fort Worth, Tex.), 12 November 2011.
6. Carl Romanos, "Surplus of Natural Gas Causing Decline in Marcellus Production," *Pittsburgh Post-Gazette Pipeline* blog, 12 July 2012.
7. Ronald E. Bishop, *Chemical and Biological Risk Assessment for Natural Gas Extraction in New York*, 28 March 2011; Joanna Prukop, "Setting the Record Straight on Pit Rule," *Farmington Daily Times*, 17 September 2008.
8. For example, in 2007, improper cementing contributed to the infiltration of methane into several Ohio homes via groundwater wells, triggering a house explosion and the evacuation of 19 homes. Source: Cadmus Group, *Hydraulic Fracturing: Preliminary Analysis of Recently Reported Contamination, prepared for U.S. Environmental Protection Agency*, September 2009.
9. See, for example, Tom Myers, "Potential Contaminant Pathways from Hydraulically Fractured Shale to Aquifers," *Ground Water*, published online 17 April 2012, doi: 10.1111/j.1745-6584.2012.00933.x; Nathaniel R. Warner, et al., "Geochemical Evidence for Possible Natural Migration of Marcellus Formation Brine to Shallow Aquifers in Pennsylvania," *Proceedings of the National Academy of Sciences*, 109 (30): 11961-11966, 24 July 2012, doi: 10.1073/pnas.1121181109.
10. Joanna Prukop, "Setting the Record Straight on the Pit Rule," *Farmington Daily Times*, 17 September 2008.
11. Bruce Finley, "Drilling Spills Reaching Colorado Groundwater; State Mulls Test Rules," *Denver Post*, 9 December 2012.
12. Laura Legere, "Sunday Times Review of DEP Drilling Records Reveals Water Damage, Murky Testing Methods," *The Times-Tribune* (Scranton, Pa.), 19 May 2013.
13. Geoffrey Thyne, Science Based Solutions, *Analysis of the West Divide Creek Seep*, prepared for Garfield County, undated; Scotty Mann, Rule Engineering LLC, *Letter to Mr. Charlie Jensen, Encana Oil & Gas, Re: West Divide Creek 2012 Second Quarter Seep Status – Remediation #1815*, 7 August 2012.
14. Encana Oil & Gas (USA), Inc., *Letter to Morris Bell, State of Colorado Oil & Gas Conservation Commission, Re: Notice of Alleged Violation, Schwartz 2-15B Well*, 18 May 2004.
15. \$6 billion: New York City Independent Budget Office, *The Impact of Catskill/Delaware Filtration on Residential Water and Sewer Charges in New York City*, November 2000.
16. Theo Colborn, et al., "Natural Gas Operations from a Public Health Perspective," *Human and Ecological Risk Assessment: An International Journal*, 17(5): 1039-1056, 2011, doi: 10.1080/10807039.2011.605662.
17. Tom Hayes, Gas Technology Institute, *Characterization of Marcellus Shale and Barnett Shale Flowback Water and Technology Development for Water Reuse*, Powerpoint presentation, 30 March 2011.
18. L.M. McKenzie, et al., "Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources," *Science of the Total Environment*, 424: 79-87, 1 May 2012.
19. Shannon Ethridge, Texas Commission on Environmental Quality, *Memorandum to Mark R. Vickery Re: Health Effects Review of Barnett Shale Formation Area Monitoring Projects*, 27 January 2010; Pennsylvania Department of Environmental Protection, *Northeastern Pennsylvania Marcellus Shale Short-Term Ambient Air Sampling Report*, 12 January 2011; Arkansas Department of Environmental Quality, *Emissions Inventory and Ambient Air Monitoring of Natural Gas Production in the Fayetteville Shale Region*, 22 November 2011.
20. Kyla Retzer, Ryan Hill and George A. Conway, National Institute for Occupational Safety and Health, *Mortality Statistics for the U.S. Upstream Industry*, Powerpoint presentation to Society of Petroleum Engineers SPE Americas 2011 E&P Health, Safety, Security, Environmental Conference, Houston, 21-23 March 2011.

21. U.S. Occupational Safety and Health Administration, *Hazard Alert: Worker Exposure to Silica During Hydraulic Fracturing*, downloaded from www.osha.gov/dts/hazard-alerts/hydraulic_frac_hazard_alert.html, 3 July 2012.
22. Al Armendariz, *Emissions from Natural Gas in the Barnett Shale Area and Opportunities for Cost-Effective Improvements*, prepared for Environmental Defense Fund, 26 January 2009.
23. For derivation of this figure, see Tony Dutzik and Elizabeth Ridlington, Frontier Group, and John Rimpler, Environment America Research & Policy Center, *The Costs of Fracking: The Price Tag of Dirty Drilling's Environmental Damage*, September 2012.
24. Pennsylvania Fish and Boat Commission, *Economic Value of Fishing and Boating in Pennsylvania* (fact sheet), downloaded from fishandboat.com/promo/funding/fact_economic_impact.htm, 20 June 2012.
25. Wyoming Fish & Game Department, *2011 Annual Report*, undated.
26. "3,140 mule deer": Hall Sawyer and Ryan Nielson, Western Ecosystems Technology, Inc., *Mule Deer Monitoring in the Pinedale Anticline Project Area: 2011 Annual Report*, prepared for the Pinedale Anticline Planning Office, downloaded from www.wy.blm.gov/jio-papo/papo/wildlife/meetings/2011/MuledeerMonitoringUpd.pdf, 29 August 2012.
27. Scott Christie, Pennsylvania Department of Transportation, *Protecting Our Roads*, testimony before the Pennsylvania House Transportation Committee, 10 June 2010.
28. Kate Galbraith, "Texas Fracking Disclosures to Include Water Totals," *Texas Tribune*, 16 January 2012.
29. Texas Water Development Board, *Water for Texas: 2012 State Water Plan*, January 2012.
30. Headwaters Economics, *Fossil Fuel Extraction as a County Economic Development Strategy: Are Energy-Focused Counties Benefiting?*, revised 11 July 2009.
31. Integra Realty Resources, *Flower Mound Well Site Impact Study*, prepared for Town of Flower Mound (Texas), 17 August 2010.
32. James Boyd, Resources for the Future, *Financial Responsibility for Environmental Obligations: Are Bonding and Assurance Rules Fulfilling Their Promise?*, August 2001.
33. See, for example, Pennsylvania Department of Environmental Protection, *Guidelines for Submitting Oil and Gas Well Bonds*, 2 December 2009.
34. Austin L. Mitchell and Elizabeth A. Casman, "Economic Incentives and Regulatory Framework for Shale Gas Well Site Reclamation in Pennsylvania," *Environmental Science and Technology*, 45(22): 9506-9514, 10 October 2011, doi: 10.1021/es2021796.
35. See note 32.
36. "At least" because the number of undocumented wells in Pennsylvania was greater than all of these states combined. Source: Interstate Oil and Gas Compact Commission and U.S. Department of Energy, *Protecting Our Country's Resources: The States' Case*, undated.
37. Matt Kelso, FracTracker, *Problems with Abandoned and Orphaned Wells*, 3 June 2011.
38. Based on the average cost of plugging a well in 1999 of \$5,160 from Interstate Oil and Gas Compact Commission and U.S. Department of Energy, *Protecting Our Country's Resources: The States' Case*, undated.
39. Anu K. Mittal, U.S. Government Accounting Office, *Abandoned Mines: Information on the Number of Hardrock Mines, Cost of Cleanup, and Value of Financial Assurances*, testimony before the U.S. House of Representatives, Committee on Natural Resources, Subcommittee on Energy and Mineral Resources, 14 July 2011.
40. Ibid.
41. Pennsylvania Organization for Watersheds and Rivers, *Abandoned Mine Reclamation in Pennsylvania: The Abandoned Mine Reclamation Fund, Partnerships and Future Challenges*, undated.
42. Zach Geiger, "Abandoned Mine Bill Could Cost Pa. Millions," *Altoona Mirror*, 6 September 2012.
43. U.S. Environmental Protection Agency, *Coal Mining Detailed Study*, August 2008.
44. Dustin Bleizeffer, "CBM: Bugs vs. Bankruptcy," *WyoFile*, downloaded from wyofile.com/2011/12/california-company-wyo-legislator-look-to-delay-well-plugging-with-hopes-that-microbes-will-rebuild-production/, 5 November 2012.
45. See note 34.
46. See note 9.
47. James Boyd, "Bonding Requirements for Coal and Hardrock Mines in the U.S.," *Centre for Energy, Petroleum and Mineral Law and Policy Internet Journal*, 12:11, downloaded from www.dunee.ac.uk/cepmlp/journal/html/vol12/article12-11.html, 5 November 2012.
48. Susan Patterson, PRC Environmental Management, Inc., *Revised Draft Report on Analysis of Cost Estimates for Closure and Post-Closure Care*, prepared for U.S. Environmental Protection Agency, 15 October 1996.
49. U.S. Government Accountability Office, *Oil and Gas Bonds: Bonding Requirements and BLM Expenditures to Reclaim Orphaned Wells*, January 2010.
50. See note 34.
51. U.S. Environmental Protection Agency, *EPA's Plan for Addressing Concerns with the Existing Financial Assurance Regulations*, October 2006.

52. U.S. Environmental Protection Agency, *RCRA Subtitle C Financial Assurance Instrument Fact Sheet: Surety Bond*, downloaded from www.epa.gov/osw/hazard/tsd/td/ldu/financial/documents/sbond-fs.pdf, 3 December 2012.

53. Except under certain, very limited circumstances. For example, the EPA retains the authority to regulate fracking using diesel fuel under the Safe Drinking Water Act.

54. 30 years: 40 CFR 264.117.

55. 40 CFR 264.147.

56. 42 USC 6921 (b)(2).

57. 53 FR 25447, 6 July 1988; 58 FR 15284, 22 March 1993.

58. Renee Lewis Kosnik, Earthworks Oil & Gas Accountability Project, *The Oil and Gas Industry's Exemptions to Major Environmental Statutes*, October 2007.

59. 30 USC 226 (g).

60. Colorado Oil and Gas Conservation Commission, *Rules and Regulations*, Section 703.

61. 58 Pa. Consol. Stat. §3218 (a).

62. 16 Tex. Admin. Code §3.78 (h).

63. See note 60.

64. Ohio Department of Natural Resources, Division of Oil and Gas Resources Management, *Surety Bond (Form 2)*, downloaded from [www.ohiodnr.com/portals/11/oil/forms/Bonding-Insurance_Forms/Surety_Bond\(Form_2\).xls](http://www.ohiodnr.com/portals/11/oil/forms/Bonding-Insurance_Forms/Surety_Bond(Form_2).xls), 4 December 2012.

65. See note 33.

66. 40 CFR 264.117

67. Paul A. Mattox, West Virginia Department of Transportation, *Memorandum Re: Oil and Gas Road Policy*, 3 January 2012.

68. Interstate highways are the exception to this rule. Jerry Wray, Ohio Department of Transportation, *Financial and Policy Implications of Assuming Primary Responsibility for All State Routes Throughout Ohio Regardless of Local Government Jurisdiction*, 11 March 2011.

69. Paul Locher, "Fredericksburg in Road Protection Mode; Drilling Trucks Want Access," *The Daily Record* (Wooster, Ohio), 30 August 2012.

70. Phil Wilson, Texas Department of Transportation, *Impact of Energy Development Activities on the Texas Transportation Infrastructure*, testimony before the Texas House Committee on Energy Resources, 26 June 2012.

71. Daryl Fowler, DeWitt County Judge, *Press Release: Road Damage Cost Allocation Study*, 2 July 2012.

72. Barry Shlachter, "Drilling Trucks Have Caused an Estimated \$2 Billion in Damage to Texas Roads," *Star-Telegram* (Fort Worth, Tex.), 3 July 2012.

73. Associated Press, "DOH Monitors Drilling-Related Road Damage," *Charleston Gazette*, 27 May 2011.

74. See Appendix for full list of bonding requirements by state.

75. Alabama allows for bonds of up to \$50,000 depending on well depth, but the \$50,000 bond is only required for wells at depths greater than those commonly reached in fracking. New York sets bonding levels based on the estimated plugging and reclamation costs of the well; these bonds can be of up to \$250,000 per well. Mississippi's maximum per-well bonding level is \$60,000, but only for wells of greater than 16,000 feet in depth.

76. U.S. Department of the Interior, Bureau of Land Management, *Eastern States: Bonding*, downloaded from www.blm.gov/es/st/en/prog/minerals/bonds.html, 5 November 2012.

77. See note 49. Average bond value per well of \$1,833 based on \$162 million value of bonds held by the BLM for 88,357 wells on federal land.

78. See note 34.

79. *Ibid.*

80. Matt Andersen, Roger Coupal and Bridgette White, "Reclamation Costs and Regulation of Oil and Gas Development with Application to Wyoming," *Western Economics Forum*, 8(1): 40-48, Spring 2009.

81. See note 44; State of Wyoming, "Oil and Gas Conservation Commission" in *Wyoming State Government 2009 Annual Report*, undated.

82. Colorado Oil and Gas Conservation Commission, *Testimony of David Dillon, Engineering Manager, Oil and Gas Conservation Commission in the Matter of Changes to the Rules and Regulations of the Oil and Gas Conservation Commission of the State of Colorado*, Cause No. 1-R, Docket No. 0803-RM-02, 18 April 2008.

83. The per-lease requirement was last set in 1960 while both the statewide and nationwide bond levels were last set in 1951. See note 49.

84. Lucas Davis, The Hamilton Project, *Modernizing Bonding Requirements for Natural Gas Producers*, 2012.

85. 700 million subsurface acres: U.S. Department of the Interior, Bureau of Land Management, *Leasing of Onshore Federal Oil and Gas Resources*, accessed at www.blm.gov/wo/st/en/prog/energy/oil_and_gas/leasing_of_onshore.html, 29 May 2013.

86. *Ibid.*

87. U.S. Government Accountability Office, *Oil and Gas Bonds: BLM Needs a Comprehensive Strategy to Better Manage Potential Oil and Gas Well Liability*, February 2011.

88. *Ibid.*

89. Western Organization of Resource Councils, *Filling the Gaps: How to Improve Oil and Gas Reclamation and Reduce Taxpayer Liability*, August 2005. Figure does not include additional financial assurance for drilling on federal lands.

90. Ibid.

91. Ohio General Assembly, SB 315, 129th session, downloaded from www.legislature.state.oh.us/bills.cfm?ID=129_SB_315, 4 December 2012.

92. See note 60.

93. 2013 Md. Laws Ch. 568.

94. Susan Phillips, "Chesapeake to Pay \$1.6 Million for Contaminating Water Wells in Bradford County," *StateImpact: Pennsylvania*, 21 June 2012.

95. Ohio Rev. Code 1509.07 (B)(3).

96. Kan. Stat. Ann. 55-155 (d)(3).

97. 62 Ill. Admin. Code 240.1500(a)(1); 62 Ill. Admin. Code 240.1705.

98. Ind. Code 14-37-6-1.

99. Colo. Sess. Laws Chap. 7 (SB 01S2-015), 2001.

100. Colorado Department of Local Affairs, *Oil and Gas Guide for Local Governments*, amended 2012.

101. Pennsylvania Budget and Policy Center, *Pennsylvania Enacts Among the Lowest Natural Gas Drilling Fees in the Nation*, downloaded from pennbpc.org/gas-drilling-tax, 5 November 2012.

102. Pennsylvania Public Utilities Commission, *Act 13 of 2012 – The Unconventional Gas Well Impact Fee, Frequently Asked Questions*, April 2012.

103. Pennsylvania Budget and Policy Center, *Natural Gas Impact Fees through 2011 About Half of What a Drilling Tax Would Have Raised*, 11 September 2012.

104. Jacquelyn Pless, National Conference of State Legislatures, *Oil and Gas Severance Taxes: States Work to Alleviate Fiscal Pressures Amid the Natural Gas Boom*, updated February 2012.

105. Ibid.

106. Wyoming Taxpayers Association, *Severance Taxes*, downloaded from www.wyotax.org/severance_taxes.aspx, 5 November 2012.

107. Mark Collette, "Study Shows One Eagle Ford Shale County's Road Repair Bill: \$432 Million," *Corpus Christi Caller-Times*, 2 July 2012.

108. Naismith Engineering, *Road Damage Cost Allocation Study*, prepared for the DeWitt County (Texas) Commissioners Court, 27 June 2012.

109. Illinois Public Act 098-0022.

110. 2013 Md. Laws, Ch. 568.

111. Kevin Begos, "\$1.6M Settlement in Pa. Gas Drilling Lawsuit," *Philadelphia Inquirer*, 23 June 2012.

112. The \$5 million liability requirement corresponds with the maximum level required by current state regulations.