

Not At Any Cost:

Government policies to make natural gas drilling safer for people and the environment

September 2010



Natural gas rig in Montana
State of Montana

KEY POINTS

1. Natural gas is becoming increasingly important to America's energy mix, especially with the discovery of new "shale gas" plays across the country and the rising prominence of drilling techniques like hydraulic fracturing and horizontal drilling.
2. Natural gas development poses serious environmental and safety concerns that must be addressed. These concerns are augmented by the fact that companies enjoy weak regulations, unmerited exemptions from federal environmental laws, and understaffed state and federal regulatory agencies.
3. There are many policies and types of regulations that local, state, and federal governments can enact to make drilling safer.
4. Regulatory policies to protect air, land, water and human health must be strengthened if drilling is to continue to grow and play such a key role in our energy future.

INTRODUCTION

Natural gas drilling and hydraulic fracturing—a method of drilling used in 90% of wells across the country¹—have been called “game-changers” in terms of American and world-wide energy policy. Vast reserves of shale and other unconventional natural gas plays have been discovered throughout the United States, from the Rocky Mountain West to Texas to the Marcellus Shale in the Northeast.

The Wilderness Society believes that natural gas is an important part of our energy mix. However, the drilling, extraction, and processing of natural gas can and does have significant adverse impacts on water, air, lands, and human safety. Therefore, several improvements must be made to the current regulatory framework governing all aspects of natural gas drilling and development, in order to assure that the continuing development of new natural gas plays are conducted in an environmentally safe and protective manner. If there is anything to be learned from BP’s Deepwater Horizon oil spill, it is that lax oversight, supervision, and regulation only lead to disaster. There are many parallels between onshore and offshore drilling, including a pressing need for better industry governance.

Outlined below are six categories where drilling regulations and procedures have proven to be inadequate. We detail these shortcomings, why they are of concern, and suggest methods by which federal, state, and/or local governments can mandate, encourage, and ensure safer drilling. The natural gas industry certainly has the financial and technical means to operate in much safer ways, but this will only occur if our state and federal governments play their role in protecting the environment and the health and safety of people and communities put at risk by irresponsible industry practices.²

WATER QUALITY REGULATIONS

Water quality has perhaps been the most galvanizing issue for local community members uniting to address natural gas drilling. This is likely due to the increasing number of incidents of spills and of water contamination associated with the mishandling of drilling fluids documented by the media.³

Water quality protection issues related to natural gas drilling take many forms, including groundwater protection, surface water protection, waste water, and water sourcing. There are many practical improvements in drilling practices that can be made to ensure that natural gas extraction and development does not endanger our water resources.

Although most natural gas wells are drilled well below drinking water aquifers, the potential for groundwater pollution through faulty casings and cementing and/or fluid and methane migration still exists. Furthermore, with passage of Section 322 of the Energy Policy Act of 2005, Congress

¹ House Energy and Commerce Committee, 109th Congress. Testimony of Victor Carrillo, Chairman, Texas Railroad Commission, Representing the Interstate Oil and Gas Compact Commission. February 10, 2005. <http://www.rrc.state.tx.us/commissioners/carrillo/press/energytestimony.php>

² See Lustgarten, Abraham. “Underused Drilling Practices Could Avoid Pollution.” *ProPublica*. December 14, 2009. <http://www.propublica.org/article/underused-drilling-practices-could-avoid-pollution-1214>

³ “...more than 1,000 other cases of contamination have been documented by courts and state and local governments in Colorado, New Mexico, Alabama, Ohio and Pennsylvania.” See Lustgarten, Abraham. *ProPublica*. “Buried Secrets: Is Natural Gas Drilling Endangering U.S. Water Supplies?” November 13, 2008. <http://www.propublica.org/article/buried-secrets-is-natural-gas-drilling-endangering-us-water-supplies-1113>

exempted hydraulic fracturing from compliance with the Safe Drinking Water Act, and the implications of this exemption can have major impacts on groundwater.

To protect groundwater:

- Regulations must be put in place that mandate strong minimum standards for well casings and cementing.
- Congress should repeal the loophole in Section 322 of the Energy Policy Act of 2005 that exempts hydraulic fracturing from compliance with the Safe Drinking Water Act. This would set requirements for injection wells to guarantee that fluids stay where they are intended to go, and mandate that injected fluids do not violate drinking water standards or otherwise adversely affect public health.
- Operators should be required to conduct groundwater quality surveys before drilling begins.
- Mandatory inspections of all wells should be required.

Surface water resources must also be better protected. Water sources near natural gas waste pits are at risk from potential spills and fluid leaks, many of which have occurred.⁴ Complicating these risks is the fact that the natural gas industry is exempt from the stormwater provisions of the Clean Water Act as a result of Section 323 of the Energy Policy Act of 2005.

To protect surface water:

- Closed loop and pitless drilling systems should be obligatory.
- Blowout preventers and other top-of-the-line technologies for avoiding spills should be required.
- Section 323 of the Energy Policy Act should be repealed.
- Companies should be required to adhere to EPA stormwater best management practices.
- Wells and infrastructure should be prohibited in riparian areas, near lakes, wetlands, and other sensitive areas.
- Operators should be required to conduct surface water quality surveys before drilling begins.

The disposal of wastewater from natural gas wells has been another major issue that will only get more complicated as the number of drilling projects continues to increase substantially. Given the large volumes of water needed to complete natural gas drilling projects—millions of gallons for each drilling operation—many states new to drilling are finding that local wastewater treatment facilities are not equipped to treat the large amounts of hazardous wastes that are by-products of hydraulic fracturing.⁵

To manage wastewater:

- New regulations should require that wastewater be treated by plants capable of handling total dissolved solids and other hazardous wastes.

⁴ See, for example, Shankman, Sabrina. "Pennsylvania's Gas Wells Booming—But So Are Spills." *ProPublica*. January 27, 2010. <http://www.propublica.org/article/pas-gas-wells-booming-but-so-are-spills-127>

⁵ See, for example, Sapien, Joaquin. "With Natural Gas Drilling Boom, Pennsylvania Faces Flood of Wastewater." *Scientific American*. October 5, 2009. <http://www.scientificamerican.com/article.cfm?id=wastewater-sediment-natural-gas-mckeesport-sewage>

- Costs of wastewater treatment and upgrades for facilities must be borne by the operators, not taxpayers.
- Illegal dumping must be vigorously policed and fines must be increased.
- Re-injection of coalbed methane wastewater should be required, as is currently the case in Colorado.

Water sourcing restrictions must also be enumerated and enforced, as hydraulic fracturing requires millions of gallons of water per “frac job” often amounting to a high percentage of total water drawn from rivers and streams.⁶ This can affect water availability for agriculture, municipal use, instream flows and other uses that already strain many river systems.

To control water sourcing:

- Water withdrawals must occur in a way and at a rate that do not adversely affect ecosystems.
- Recycling and reuse of fluids and produced water should be required to minimize the use on freshwater supplies.

CHEMICAL DISCLOSURE

One of the greatest controversies accompanying the use of hydraulic fracturing techniques is the unfortunate fact that companies are not required to publicly disclose the chemicals that they inject underground and store onsite. Many of the chemicals used in hydraulic fracturing fluids are known carcinogens.⁷ And though the proportion of chemicals used in fracking fluids is a small proportion of the overall volume of fluids used for each job, tens of thousands of gallons are usually required for each operation. By identifying the components of hydraulic fracturing fluids, regulators and the public will be able to react to contamination more quickly and comprehensively. Since the industry claims that hydraulic fracturing is “safe,” this disclosure should not cause concern—indeed, two natural gas companies have stated that they will disclose the chemicals they use in their operations.⁸

- Companies and well operators should be required to publicly disclose all chemicals and volumes of chemicals to be used in drilling and hydraulic fracturing operations, through the appropriate state or federal government regulatory agency.
- In cases of medical emergencies, companies must disclose proprietary chemical formulas and identities to professional medical personnel.

AIR QUALITY CONTROLS

Although the natural gas industry promotes itself as a “clean” alternative to other fossil fuels, the production of natural gas nevertheless releases multiple harmful emissions when extracted, transported, processed, and burned. In fact, the burning of natural gas contributed more than 21

⁶ See New York State Water Resources Institute. “Water Withdrawals for Hydrofracking.” http://wri.eas.cornell.edu/gas_wells_water_use.html

⁷ United States Environmental Protection Agency. “Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs: Hydraulic Fracturing Fluids.” June 2004. http://www.epa.gov/OGWDW/uic/pdfs/cbmstudy_attach_uic_ch04_hyd_frac_fluids.pdf

⁸ See Soraghan, Mike. “Natural Gas Company’s Disclosure Decision Could Change Fracking Debate.” *New York Times*. July 15, 2010. <http://www.nytimes.com/gwire/2010/07/15/15greenwire-natural-gas-companys-disclosure-decision-could-5706.html>

percent of the country's carbon dioxide emissions in 2008.⁹ This is partially due to relatively inevitable pollution related to combustion and fugitive emissions, but also due to many common industry practices that can be avoided or modified. For example, such practices as intentional flaring and venting and use of older, diesel powered equipment should be eliminated. Indeed, methane emissions from natural gas infrastructure are the third largest source of this pollution in the country,¹⁰ and in some places, like very rural Sublette County, Wyoming, production emissions have caused periodic ozone spikes reaching levels comparable to bad-air days in Los Angeles or Denver.

- Companies must be required to prevent or capture air pollutants, including fugitive emissions, using the best available technology.
- Vehicle traffic to support drilling and development operations should be minimized. This can be accomplished by using remote monitoring of production infrastructure, piping of condensates, and recycling water onsite to decrease disposal traffic.
- Rigs and associated infrastructure should be powered by renewable energy, natural gas, or electric motors, rather than diesel fuel.

LAND PROTECTION MEASURES

Natural gas development can have substantial impacts on wildlife, habitats, and ecosystems due to the extensive infrastructure “footprint” intensive development entails—well pads, roads, pipelines, staging areas, compressor stations, and others. Direct impacts from this infrastructure include complete loss of habitat from the construction of roads and well pads and wildlife mortality from collisions on roads. More extensive and pervasive are the indirect and cumulative impacts that extend well beyond the physical footprint of the infrastructure. Examples include the fragmentation of once-connected habitat by roads and other structures, the displacement of wildlife from previously occupied habitat because of noise and human activities, degradation of aquatic habitats through sedimentation and chemical additions, and the spread of exotic species by vehicles.¹¹ TWS research has shown that closely-spaced pads can have severe cumulative habitat impacts.¹²

- Drilling should be prohibited in locations with ecological, scenic, wilderness, or cultural values which are incompatible with industrial development. On federal public lands, this includes areas with wilderness qualities or cultural significance and sensitive wildlife habitats. It also includes any areas in close proximity to human residences.
- Broad landscape-level planning should be required, that includes a build-out design of development infrastructure in advance of construction and the evaluation of the ecological impact of that infrastructure based on the best available wildlife research. Plans should be modified if needed to minimize impacts on local wildlife species.

⁹ United States Energy Information Administration. “Emissions of Greenhouse Gases in the United States 2008.” December 2009. <http://ftp.eia.doe.gov/pub/oiaf/1605/cdrom/pdf/ggrpt/057308.pdf>

¹⁰ Bracmorr, K. et al. Congressional Research Service. “Methane Capture: Options for Greenhouse Gas Emission Reduction.” September 17, 2009. <http://fpc.state.gov/documents/organization/130799.pdf>

¹¹ For a substantial literature review, see Wyoming Game and Fish Department. “Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitat: A Strategy for Managing Energy Development Consistently with the FLPMA Principles of Multiple Use and Sustained Yield.” 2004. <http://gf.state.wy.us/habitat/index.asp>

¹² Wilbert, Mark and Nada Culver. The Wilderness Society. “Analysis of Habitat Fragmentation from Oil and Gas Development and its Impact on Wildlife: A Framework for Public Land Management Planning.” May 20, 2008. <http://wilderness.org/content/analysis-habitat-fragmentation-oil-gas>

- Requirements should be put in place to minimize the footprint of development, such as requiring directional drilling, multiple wells from one pad, and sharing roads and other infrastructure.
- Phased development and/or phased leasing should be required in order to reduce the ecological (and community) impacts at any one time.¹³
- Development should be clustered to leave blocks of intact and unfragmented habitat.
- Monitoring should be required to track the impacts of development and production stages on local habitat and species. Monitoring must include specific thresholds that when crossed automatically trigger adaptive management actions to protect human and wildlife needs.

REGULATORY AND ENFORCEMENT RESOURCES

Federal, states and local governments have had trouble keeping up with the rush to drill for natural gas. Several recent investigations have found that while permits to drill and wells drilled have skyrocketed, the ability (measured in part by staffing) of regulating agencies to enforce environmental protection and other regulations has stayed the same.¹⁴ This can have major safety repercussions, as diminished enforcement staffs are pressed to adequately inspect the multiplying number of drilling projects in areas subject to the natural gas boom.

- Agency enforcement staffing and resources must be increased to meet the growing need associated with escalating natural gas drilling.
- Careful planning and phased development of drilling can help local staff process applications, do inspections, and regulate, as well as mitigate the environmental impacts of such development.

IMPROVED GOVERNANCE

Natural gas companies unfortunately have a history of violating the federal, state, and local laws that exist to ensure safety and environmental protection. For example, the Pennsylvania Department of Environmental Protection issued 1,435 violations to natural gas companies in only two and a half years, and 952 of those were identified as likely to harm the environment.¹⁵ Additionally, when a spill or water contamination occurs, local communities frequently find themselves bearing most of the clean-up costs.

- Governments must impose stronger penalties for violations, to guarantee that companies do not view fines as merely a cost of doing business.
- Adequate reclamation bonding should be required to ensure that communities and cash-strapped governments do not pay the price for an accident and site clean-ups.

¹³ See Haeefe Michelle and Pete Morton 2009. "The influence of the pace and scale of energy development on communities: Lessons from the natural gas drilling boom in the Rocky Mountains." *Western Economics Forum*. 8(2): 1-13. <http://ideas.repec.org/a/ags/weecfo/92810.html>

¹⁴ United States Government Accountability Office. GAO-05-418. "Oil and Gas Development: Increased Permitting Activity Has Lessened BLM's ability to Meet Its Environmental Protection Responsibilities." Report to the Ranking Minority Member, Committee on Homeland Security and Governmental Affairs. United States Senate. June 2005. <http://www.gao.gov/new.items/d05418.pdf>

Western Organization of Resource Councils. "Law and Order in the Oil and Gas Fields: A Review of Inspection and Enforcement Programs in Five Western States." 2005 and 2009. <http://www.worc.org/Law-Order-Report/>

Larson, Jeff. "How Big is the Gas Drilling Regulatory Staff in Your State?" *ProPublica*. <http://projects.propublica.org/gas-drilling-regulatory-staffing/>

¹⁵ Gilliland, Donald. "Marcellus Shale gas drillers committed 1,435 violations in 2.5 years, report says." *The PatriotNews*. August 2, 2010. http://www.pennlive.com/midstate/index.ssf/2010/08/marcellus_shale_gas_drillers_c.html

- Companies need to develop more responsible attitudes toward their obligation to protect the air we breathe, the water we drink, the wildfire impacted by their actions, and be better citizens in the communities where they operate.

CONCLUSION

In order to ensure that natural gas drilling is done safely, federal, state, and local governments must design and implement more effective regulation of drilling practices. At this point in time, the laws and regulations providing for the safeguard of air and water, the safe use and disposal of toxic chemicals, and the protection of ecological values of areas subject to natural gas development are generally inadequate to assure that natural gas development occurs in appropriate places and in a responsible manner. We have a long way to go to assure that natural gas is truly a “clean” fossil fuel.

ADDITIONAL READING

[“Doing it Right: Ensuring Responsible Natural Gas Development on Our Public Lands.”](#) The Wilderness Society. Spring 2010.

[“Needed Policy Reforms Not Hindering Natural Gas Production.”](#) The Wilderness Society. February 2010.

[“Analysis of Habitat Fragmentation from Oil and Gas Development and its Impact on Wildlife: A Framework for Public Land Management Planning.”](#) The Wilderness Society. May 20, 2008.

[“Fragmenting Our Lands: The Ecological Footprint from Oil and Gas Development.”](#) The Wilderness Society. March 20, 2004.

[“Drilling in the Rocky Mountains: How Much and at What Cost?”](#) The Wilderness Society. March 1, 2004.

[“Drilling Down: Protecting Western Communities from the Health and Environmental Effects of Oil and Gas Production.”](#) Natural Resources Defense Council. October 2007.

[“Our Drinking Water At Risk: What EPA and the Oil And Gas Industry Don’t Want Us to Know About Hydraulic Fracturing.”](#) Oil and Gas Accountability Project. April 2005.

[“Drilling Around the Law.”](#) Environmental Working Group. January 2010.

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ABOUT THE WILDERNESS SOCIETY

Since 1935, The Wilderness Society has led the conservation movement in wilderness protection, writing and passing the landmark Wilderness Act and winning lasting protection for 109 million acres of Wilderness, including 56 million acres of spectacular lands in Alaska, eight million acres of fragile desert lands in California and millions more throughout the nation. It is our calling and our passion to protect America's wilderness, not as a relic of our nation's past, but as a thriving ecological community that is central to life itself. To meet our goals, we use science and collaboration with communities and conservation groups to bring about sensible policies and positive change in land conservation. Above all, we work to achieve our mission: *to protect wilderness and inspire Americans to care for our wild places.*