

TESTIMONY OF FRANCES BEINECKE
PRESIDENT, NATURAL RESOURCES DEFENSE COUNCIL
HEARING ON
“OPPORTUNITIES AND CHALLENGES FOR NATURAL GAS”
BEFORE THE COMMITTEE ON ENERGY & NATURAL RESOURCES
U.S. SENATE

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Thank you, Chairman Wyden and Ranking Member Murkowski, for the opportunity to testify today. My name is Frances Beinecke and I am the President of the Natural Resources Defense Council (NRDC). I have worked with NRDC for more than 30 years. Prior to becoming NRDC’s President in 2006, I served as NRDC’s Executive Director for eight years. In addition to my work at NRDC, I was appointed by President Obama in 2010 to the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling.

NRDC is a nonprofit organization of more than 350 scientists, lawyers and environmental specialists dedicated to protecting public health and the environment in the United States and internationally, with offices in New York, Washington D.C., Montana, Los Angeles, San Francisco, Chicago, and Beijing. Founded in 1970, NRDC uses law, science and the support of 1.3 million members and online activists to protect the planet's wildlife and wild places and to ensure a safe and healthy environment for all living things.

I. Introduction

Today's hearing addresses "opportunities and challenges for natural gas." This is a timely and critically important topic. We all know that shale gas is changing our nation's energy profile. If strong national and state environmental standards for natural gas -- that is, standards to protect health and limit climate change -- were in place and strictly enforced, natural gas could be one part of a broader strategy to reduce carbon emissions, with potential economic gain, even as our country moves forward to a clean energy future centered on renewable energy and energy efficiency. We must make sure that the shale gas boom does not distract us from, or prevent investment in, these crucial clean energy strategies, which represent the best path forward.

My testimony focuses on the significant environmental, health and community risks of natural gas production as it takes place today. NRDC opposes expanded fracking until effective safeguards are in place.¹

Today, there is an extraordinary mismatch between the ever-growing scale of fracking --which is occurring in about thirty states -- and the limited scope of measures to govern it. Indeed, companies engaged in fracking are not even required to provide enough information to enable scientists and the public to fully

¹ See <http://www.nrdc.org/energy/gasdrilling/>.

understand the nature or extent of the environmental and health risks that fracking poses.

We can't eliminate all the risks of natural gas production, but there are many actions the federal government – both Congress and the Administration – as well as the states can and must take to reduce them. Now shale gas production is expanding with supersonic speed without having in place even the basic environmental and public health requirements that apply to other industries. And the passionate and growing community opposition to shale gas production, spurred by concern about its environmental and health impacts, is becoming a major challenge for the natural gas industry.

Even George P. Mitchell, the Texas oil and gas magnate known as the “grandfather of fracking,” has recognized the need for stronger federal oversight of fracking. In an article in Forbes last year, Mitchell was quoted as saying: “The administration is trying to tighten up controls. . . . I think it's a good idea. They should have very strict controls.”²

Improved regulation at both the federal and state level can greatly reduce the risks presented by shale gas development by, among other things, requiring the use of best practices and technologies, coupled with strict enforcement. Some

² [Billionaire Father of Fracking Says Government Must Step Up Regulation](http://www.forbes.com/sites/christopherhellman/2012/07/19/billionaire-father-of-fracking-says-government-must-step-up-regulation/), July 19, 2012, Christopher Hellman, Forbes, <http://www.forbes.com/sites/christopherhellman/2012/07/19/billionaire-father-of-fracking-says-government-must-step-up-regulation/>.

companies are already using such practices as green completions, wastewater recycling, closed-loop waste management systems, and more in some locations. These methods have proved to be both economically and technically feasible. But these practices are not being used by all companies in all locations even though they can often save companies money by, for example, capturing more natural gas rather than wasting it and by reducing other forms of waste. Rigorous federal standards and requirements designed to improve environmental performance are needed to mandate that all operators employ best practices wherever hydraulic fracturing occurs.

II. The Environmental and Public Health Challenges of Natural Gas Production

Oil and natural gas production are expanding across the nation, largely because advanced hydraulic fracturing (also known as “fracking”) and horizontal drilling have made it easier to extract oil and gas from previously inaccessible or uneconomical sites. Fracking involves injecting water and chemicals deep into the earth at extremely high pressure to break up layers of rock that harbor deposits of natural gas and/or oil. Hundreds of thousands of new oil and gas wells have been drilled in the past decade. Oil and gas development is now occurring in about

thirty states and under consideration in other states.³ According to some reports, about 90 percent of new wells in North America are fracked.⁴

Shale gas production comes with the risk of a range of environmental and health impacts, including contaminated drinking water supplies; the release of methane, a potent greenhouse gas; unhealthy air quality; poorly managed toxic waste disposal; impairment of rivers and streams; disruption of communities; and destruction of landscapes and wildlife habitat. These impacts stem from all aspects of the shale gas extraction process, including hydraulic fracturing itself; site development; well construction; water, wastewater and waste management; and well operation, trucking and other activities that result in air emissions, especially emissions of air toxics, ozone-forming pollutants and methane.⁵

Real world impacts are occurring right now across the country. Just last week, Ohio regulators observed 20,000 gallons of fracking waste being illegally dumped into a waterway.⁶

³ U.S. Crude Oil, Natural Gas, and Dry Development Wells Drilled, U.S. Energy Information Administration, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=E_ERTW0_XWCD_NUS_C&f=M.

⁴ Fracking Hazards Obscured in Failure to Disclose Wells, Benjamin Haas, Bloomberg (Aug. 14, 2012), <http://www.bloomberg.com/news/2012-08-14/fracking-hazards-obscured-in-failure-to-disclose-wells.html>.

⁵ For that reason, when I refer to hydraulic fracturing or fracking in this testimony, I am referring to all aspects of shale gas production including site preparation, drilling, fracking, well integrity, waste storage and management and air emissions.

⁶ Ohio EPA Investigating Dumping of Drilling Waste Water in Youngstown Area, Feb. 4, 2013, Bob Downing, Beacon Journal, <http://www.ohio.com/news/ohio-epa-investigating-dumping-of-drilling-waste-water-in-youngstown-area-1.370584>.

The risks and impacts of fracking are becoming more widely acknowledged by a broad range of stakeholders. In 2011, Department of Energy Secretary Steven Chu appointed a Shale Gas Subcommittee of the Secretary of Energy Advisory Board (SEAB Shale Gas Subcommittee).⁷ In their report, the members of this subcommittee, which included leading academic experts with a range of perspectives, identified four major areas of concern: possible pollution of drinking water from methane and chemicals used in fracturing fluids; air pollution; community disruption during shale gas production; and cumulative adverse impacts that intensive shale production can have on communities and ecosystems.

The Subcommittee concluded:

There are serious environmental impacts underlying these concerns and these adverse environmental impacts need to be prevented, reduced and, where possible, eliminated as soon as possible. Absent effective control, public opposition will grow, thus putting continued production at risk.⁸

The SEAB Shale Gas Subcommittee recommended that the federal government take a series of actions to address these issues, but many of these recommendations have not yet been acted upon.

⁷ I serve on the Secretary of Energy's Advisory Board, but not the Shale Gas Subcommittee.

⁸ Secretary of Energy Advisory Board, Shale Gas Production Subcommittee 90-Day Report, (Aug. 18, 2011) available at http://www.shalegas.energy.gov/resources/081111_90_day_report.pdf.

Public concern is also increasing. A December 2012 Bloomberg National Poll found that 66 percent of Americans want more government oversight of fracking, an increase from 56 percent in a September poll.⁹

The concerns are well founded. Let's look in more detail at each of the problems and risks associated with fracking.

A. Chemical Disclosure

Natural gas producers are not required by any federal law to identify the chemicals in the fracking fluids that they are injecting into the ground, and state disclosure requirements vary widely. Of the states where fracking takes place, only fourteen states require some level of public hydraulic fracturing disclosure and none of these provides comprehensive disclosure. An NRDC analysis found that even where some disclosure is required, the public is hampered in getting this most basic information about fracking. For example,

- In some states it is difficult for the public to access the information disclosed;
- Only seven of fourteen states mandate the chemical identification of all additives used in fracking fluids;
- Only one state has a clear process for evaluating and approving or denying trade secret exemption claims; and

⁹ Tougher Fracking Regulations Backed By 66%, Poll Shows, Dec. 13, 2012, Mark Drajem, Bloomberg, <http://www.bloomberg.com/news/2012-12-14/tougher-fracking-regulations-backed-by-66-poll-shows.html>.

- Only six states provide for access to trade secret information by health care providers.¹⁰

In addition, enforcement of state rules is uneven: NRDC has found that state agencies have accepted disclosure reports that lack required information.

The lack of a standardized national disclosure law greatly hampers the ability of researchers to study the impacts of fracking on health and the environment. Scientists need transparent, thorough and consistent information on what chemicals different communities are being exposed to. The variation in disclosure requirements among states makes it difficult for scientists to do comparative studies and deprives communities of information that they have a right to know.

B. Health Concerns Related to Drinking Water and Air Pollution

Scientific concern about the health impacts of fracking are growing. In April 2012, the Institute of Medicine (IOM), part of the National Academy of Sciences, convened a two-day workshop of public health experts that included more than a dozen presentations raising concerns about the health implications of

¹⁰ NRDC Issue Brief, State Hydraulic Fracturing Disclosure Rules and Enforcement: A Comparison (July 2012), Matthew McFeeley, <http://www.nrdc.org/energy/files/Fracking-Disclosure-IB.pdf>.

natural gas development.¹¹ Additionally, government agencies, including the Agency for Toxic Substances Disease Registry (ATSDR) within the Department of Health and Human Services (HHS) and the Environmental Protection Agency (EPA), have investigated and found risks from individual sites and practices.¹² Health-related advisories and informational resources have been made available by the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA)¹³ and the Pediatric Environmental Health Specialty Units (PEHSU).¹⁴

A growing number of people have reported health problems that they attribute to chemical exposures from nearby fracking and production activities. As noted above, research is stymied by the lack of disclosure of information on chemicals used in fracking. In addition, little if any on-site monitoring of air and

¹¹ Institute of Medicine. 2012. Workshop on the Health Impact Assessment of New Energy Sources: Shale Gas Extraction. April 30-May 1, 2012. Washington, DC.

<http://www.iom.edu/Activities/Environment/EnvironmentalHealthRT/2012-APR-30.aspx>.

¹² Masten, S. 2012. HHS & NIEHS Activities Related to Hydraulic Fracturing and Natural Gas Extraction. Presentation made at the 2012 Shale Gas Extraction Summit: October 2, 2012.

<http://environmentalhealthcollaborative.org/images/ScottPlenary.pdf>; ATSDR, Health Consultation: Public Health Implications of Ambient Air Exposures to Volatile Organic Compounds as Measured in Rural, Urban, and Oil & Gas Development Areas Garfield County Colorado (2008); United States Environmental Protection Agency (US EPA). 2012. EPA's Study of Hydraulic Fracturing and Its Potential Impact on Drinking Water Resources.

<http://www.epa.gov/hfstudy/>.

¹³ Occupational Safety and Health Administration (OSHA) 2012. Hazard Alert, Worker Exposure to Silica During Hydraulic Fracturing.

http://www.osha.gov/dts/hazardalerts/hydraulic_frac_hazard_alert.html.

¹⁴ Pediatric Environmental Health Specialty Units and the American Academy of Pediatrics. 2011. PEHSU Information on Natural Gas Extraction and Hydraulic Fracturing for Health Professionals.

http://aoec.org/pehsu/documents/hydraulic_fracturing_and_children_2011_health_prof.pdf.

water emissions is required. But some of the pollutants associated with fracking are also known to cause the same types of respiratory and/or neurological problems that are the focus of concern in impacted communities. Some of these chemicals are also well established as carcinogens.¹⁵

Fracking also can generate pollution from hazardous substances, including metals, radioactive materials, methane, and other volatile organic compounds (VOCs), that are found in the geologic deposits being exploited and brought to the surface in the drilling, fracking, and production processes.

Chemicals in Drinking Water. Because fracking is exempt from many environmental monitoring requirements, there are inadequate data on the impact of natural gas production on water contamination. However, data from private wells and a published investigation raise concerns that water contamination from fracking is creating health risks. Potential contaminants include methane, organic chemicals (including benzene, a known carcinogen), metals and radioactive elements.

A published study from Pennsylvania documented evidence of drinking water contamination in the form of methane associated with shale gas extraction. These researchers found increased levels of methane in wells closer to well sites

¹⁵ ATSDR, Health Consultation: Public Health Implications of Ambient Air Exposures to Volatile Organic Compounds as Measured in Rural, Urban, and Oil & Gas Development Areas Garfield County Colorado (2008).

including levels that present an explosion hazard for residents.¹⁶ Other household-level investigations conducted by state and federal agencies have also found methane levels in drinking water in homes near drill sites that were caused or are suspected to have been caused by oil and gas operations and which present an explosion hazard as well as an asphyxiation hazard for residents.¹⁷

One study reported severe impacts to livestock, including reproductive abnormalities, acute kidney or liver failure, and death, in animals that drank from polluted ponds and creeks near fracking operations.¹⁸

The same study also documented a family living near a fracking site that reported symptoms such as headaches, nosebleeds, and skin rashes; the symptoms subsided when the family was relocated, suggesting a causal link with the nearby fracking operations.

Studies linking specific health impacts to drinking water contamination resulting from fracking operations have not yet been conducted, which illustrates

¹⁶ Osborn SG, Vengosh A, Warner NR, Jackson RB. 2011. Methane Contamination of Drinking Water Accompanying Gas-Well Drilling and Hydraulic Fracturing. Proceedings of the National Academy of Sciences, U.S.A. 108:8172-8176.

<http://www.biology.duke.edu/jackson/pnas2011.pdf>.

¹⁷ See, e.g., USEPA 2011. Draft Investigation of Ground Contamination near Pavillion, Wyoming. EPA 600/R-00/000;

USEPA 2012. Action Memorandum -Request for Funding for a Removal Action at the Dimock Residential Groundwater Site, Intersection of PA Routes 29 & 2024 Dimock Township, Susquehanna County, Pennsylvania.

¹⁸ Bamberger M, Oswald RE. Impacts of Gas Drilling on Human and Animal Health. *New Solut.* 2012;22(1):51-77.

the results of under-regulating this industry, but the evidence suggests that current practices may be exposing families to unsafe levels of contaminants.

Air Emissions. Fracking operations release air pollutants that can have health consequences at the local and regional level. As with water, researchers are hampered because fracking operations have been exempted from many monitoring requirements. But some of the health complaints reported by people living near fracking sites, particularly respiratory and neurological symptoms, are consistent with exposure to the chemical contaminants identified in some monitoring reports.¹⁹ All of this underscores the urgent need to require effective pollution control equipment and community-level air quality monitoring to better assess the exposures and potential health risks. In the meantime, there is a strong rationale for reducing this contamination immediately to prevent potentially harmful exposures.

The research, monitoring data, and public health expertise available to date indicate that natural gas facilities produce air pollution that can increase health risks. These risks increase with proximity, particularly for populations more vulnerable to the impacts of air pollution, which include children, elderly, and those with underlying health problems.

¹⁹ McKenzie LM, Witter RZ, Newman LS, Adgate JL. 2012. Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources. *Sci Total Environ.* 2012 May 1;424:79-87.

Fracking activities expose communities to a range of harmful air pollutants, including known carcinogens, and respiratory, neurological, immunological, and reproductive toxins. These pollutants are present in the diesel emissions released by truck traffic and heavy equipment use. Additionally, fracking operations can expose communities to silica dust, which causes lung disease. Workplace investigations at fracking sites have identified both silica and diesel as posing a health hazard for workers exposed on the job site.²⁰ Since state laws allow drilling as close as 100 feet to residences, sensitive populations, such as children, may also be threatened by this pollution.

VOCs released from natural gas wells and processing facilities have been shown to play a significant role in increasing unhealthy air quality, including from ground-level ozone. In the past year, four published studies have identified pollution from oil and gas facilities where fracking is being deployed as a source of pollutants contributing to regional ozone in Colorado, Texas, and Pennsylvania.²¹

²⁰ Esswein E et al 2012. NIOSH Field Effort to Assess Chemical Exposures in Oil and Gas Workers: Health Hazards in Hydraulic Fracturing. Presentation made at IOM Roundtable: The Health Impact Assessment of New Energy Sources: Shale Gas Extraction. April 30-May 1, 2012.

²¹ Pétron G, Frost G, Miller BR, Hirsch AI, Montzka SA, Karion A, Trainer M, Sweeney C, Andrews AE, Miller L, Kofler J, Bar-Ilan A, Dlugokencky EJ, Patrick L, Moore CT, Ryerson TB, Siso C, Kolodzey W, Lang PM, Conway T, Novelli P, Masarie K, Hall B, Guenther D, Kitzis D, Miller J, Welsh D, Wolfe D, Neff W, Tans P. 2012. Hydrocarbon Emissions Characterization in the Colorado Front Range: A Pilot Study. *Journal of Geophysical Research*, VOL. 117.

²² ²³ ²⁴ Ground-level ozone is a powerful respiratory toxicant that is well known to aggravate asthma and other respiratory conditions.

Additionally, a study in Colorado found elevated levels of air pollutants close to well sites during well production. Taken together, these pollutants were found to be high enough to put nearby residents at risk for respiratory and neurological health impacts.²⁵

In addition, proximity to these facilities can also subject individuals to light and noise pollution, wastewater spills, noxious odors, and increased health and safety risks from explosions and other malfunctions. For this reason, as noted above, separating vulnerable populations from sources of air pollution and other hazards should be an integral part of ensuring health and safety.

All of these indications of health risks are cause for concern, underscoring the need to better protect the public. That means requiring mandatory disclosure of all chemicals used in fracking, thorough evaluations of potential health threats, use of the best possible pollution controls and drilling and fracking standards, and

²² Gilman JB, Lerner BM, Kuster WC, de Gouw JA. 2013. Source Signature of Volatile Organic Compounds (VOCs) from Oil and Natural Gas Operations in Northeastern Colorado. Environ Sci Technology DOI: 10.1021/es304119a.

²³ Litovitz A, Curtright A, Abramzon S, Burger N, Samaras C. 2013. Estimation of Regional Air-Quality Damages from Marcellus Shale Natural Gas Extraction in Pennsylvania. Environ. Res. Lett. 8.

²⁴ Olaguer E. 2012. The Potential Near-Source Ozone Impacts of Upstream Oil and Gas Industry Emissions. Journal of Air and Waste Management. 62:8, 966-977.

²⁵ McKenzie LM, Witter RZ, Newman LS, Adgate JL. 2012. Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources. Sci Total Environ. 2012 May 1;424:79-87.

increased air and water monitoring both before and after drilling and fracking begin.

C. Climate Change Impacts

When natural gas is burned at a power plant to generate electricity, it emits far less carbon pollution than coal-based electricity.²⁶ But the *production* of natural gas produces significant methane emissions.²⁷ Methane, which makes up as much as 90 percent of natural gas, is a potent global warming pollutant, trapping at least 25 times more solar radiation than carbon dioxide over a 100-year period. According to both the EPA's national inventory of greenhouse gas emissions and the EPA's tabulation of individual companies' emission data reports,²⁸ the oil and gas industry is the nation's second largest industrial emitter of greenhouse gases (mainly methane and carbon dioxide), surpassed only by electric power plants.²⁹

Currently, methane leaks into the atmosphere at many points in the natural gas production and distribution process -- from wells during extraction, from processing equipment while compressing or drying gas, and from poorly sealed

²⁶ U.S. Environmental Protection Agency, Clean Energy - Air Emissions, available at <http://www.epa.gov/cleanenergy/energy-and-you/affect/air-emissions.html>.

²⁷ NRDC, *Leaking Profits: The U.S. Oil and Gas Industry Can Reduce Pollution, Conserve Resources, and Make Money by Preventing Methane Waste* (Mar. 2012), available at <http://www.nrdc.org/energy/leaking-profits.asp>.

²⁸ EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2010, Table ES-2*, <http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2012-Main-Text.pdf>.

²⁹ EPA, *Greenhouse Gas Reporting Program, 2011 Data*, <http://epa.gov/ghgreporting/ghgdata/reported/index.html>.

equipment while transporting and storing natural gas. While much better data are needed, EPA estimates that at least 2 to 3 percent of all natural gas produced by the U.S. oil and gas industry is lost to leaks or vented into the atmosphere each year,³⁰ and some recent studies suggest that the actual leak rate could be much higher.³¹ Preventing the leakage and venting of methane from natural gas facilities would reduce pollution, enhance air quality, improve human health, and conserve energy resources.

The oil and gas industry can afford methane control technologies. Indeed, capturing currently wasted methane for sale could bring in more than \$2 billion of additional revenue each year. Together, ten technically proven, commercially available, and profitable methane emission control technologies can capture up to 80 percent of the methane currently going to waste.³² EPA, other federal agencies, and the states should move to require use of these technologies for methane control and industry itself should move quickly to adopt these measures.

³⁰ U.S. Energy Information Administration, Natural Gas Gross Withdrawals and Production, 2010 data. available at http://www.eia.gov/dnav/ng/ng_prod_sum_dcu_NUS_a.htm; U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks (1990-2009) (Apr. 15, 2012). Net emissions of methane were just over 600 bcf (billions of standard cubic feet), while gross withdrawals were approximately 26,800 bcf; this implies a net leakage of approximately 2.3 percent.

³¹ Howarth R et al., Methane Emissions from Natural Gas Systems, Background Paper Prepared for the National Climate Assessment (reference number 2011-0003) (Feb. 25, 2012), available at <http://www.eeb.cornell.edu/howarth/Howarth%20et%20al.%20--%20National%20Climate%20Assessment.pdf>.

³² NRDC, Leaking Profits: The U.S. Oil and Gas Industry Can Reduce Pollution, Conserve Resources, and Make Money by Preventing Methane Waste (Mar. 2012), available at <http://www.nrdc.org/energy/leaking-profits.asp>.

Last year, EPA issued a Clean Air Act rule to curb VOC emissions from new and modified sources in the oil and gas industry.³³ While this is a step forward, the rule is not strong enough and doesn't cover existing sources. EPA should also regulate methane directly, which would achieve much larger emission reductions.

D. Water Pollution

In addition to the risk of contaminating drinking water, shale gas extraction can pollute streams, rivers, lakes, and other water bodies.³⁴ This can happen in a number of ways, including the following:

1. Depletion of Water Resources. Large volumes of water are required for fracking operations. Fresh water is often taken from local waterbodies. Because water can be contaminated when it has been used for fracking, it cannot easily be returned to these water bodies. Permanent loss of water from fresh water resources can harm water quality and availability and also aquatic species and habitat.³⁵
2. Spills and Leaks of Fracking Chemicals and Fluids. Fluids, including hazardous chemicals and proppants used in the fracking process, are typically stored in tanks or pits on site. If not stored properly, they can leak or spill, polluting nearby waterbodies. Fluids can also be stored at a centralized facility near multiple wellpads and then be transported to the

³³ U.S. Environmental Protection Agency, Federal Register Vol. 77, No. 159, Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews (Aug. 16, 2012), available at <https://www.federalregister.gov/articles/2012/08/16/2012-16806/oil-and-natural-gas-sector-new-source-performance-standards-and-national-emission-standards-for>.

³⁴ Hydraulic Fracturing Can Potentially Contaminate Drinking Water Sources, NRDC, <http://www.nrdc.org/water/files/fracking-drinking-water-fs.pdf>.

³⁵ Soeder, DJ, and Kappel WM, 2009, Water Resources and Natural Gas Production from the Marcellus Shale: U.S. Geological Survey Fact Sheet 2009-3032, 6 p., available at: <http://pubs.usgs.gov/fs/2009/3032/>.

well by trucks or by pipeline, providing another opportunity for leaks and spills during transit. Fracking fluid can also spill during the fracking process. Leaks from tanks, valves, and pipes, as a result of mechanical failure or operator error at any point during these processes, can and do contaminate groundwater and surface water.³⁶

3. Mismanagement of fracking waste. After fracking, some of the fracking fluid, often referred to as flowback, returns up the wellbore to the surface. In addition, naturally occurring fluid is brought to the surface along with the produced oil or gas (referred to as “produced water”). This waste, consisting of both flowback and produced water, can be toxic, and the oil and gas industry generates hundreds of billions of gallons of it each year.³⁷ In addition to the chemicals that were initially injected, flowback and produced water may also contain hydrocarbons, heavy metals, salts,³⁸ and naturally occurring radioactive material. The wastewater is sometimes stored in surface pits. If the pits are inadequately regulated³⁹ or constructed, they run the risk of leaking or overflowing and can pollute groundwater and surface water.⁴⁰ The waste may also be disposed of on the surface, reused in another well, re-injected underground, or transported to a treatment facility. Each of these forms of wastewater management carries its own inherent risks, including spills, leaks, earthquakes (in the case of underground injection) and threats to groundwater and surface water.

³⁶ See, e.g., Press Release, Pa. Dep’t of Env’tl. Protection, DEP Investigating Lycoming County Fracking Fluid Spill at XTO Energy Marcellus Well, (Nov. 22, 2010), <http://www.portal.state.pa.us/portal/server.pt/community/newsroom/14287?id=15315&typeid=1>.

³⁷ U.S. Gov’t Accountability Office, Energy-Water Nexus: Information on the Quantity, Quality, and Management of Water Produced during Oil and Gas Production, GAO-12-156 (Jan 9, 2012).

³⁸ Otton, JK, 2006, Environmental Aspects of Produced Water Salt Releases in Onshore and Estuarine Petroleum-Producing Areas of the United States: Bibliography: U.S. Geological Survey Open-File report 2006-1154, 223p.

³⁹ NRDC, “Petition for Rulemaking Pursuant to Section 6974(a) of the Resource Conservation and Recovery Act Concerning the Regulation of Wastes Associated with the Exploration, Development, or Production of Crude Oil or Natural Gas or Geothermal Energy,” September 8, 2010, 18-23.

⁴⁰ See, e.g., Press Release, Pa. Dep’t of Env’tl. Protection, DEP Fines Atlas Resources for Drilling Wastewater Spill in Washington County, (Aug. 17, 2010), <http://www.portal.state.pa.us/portal/server.pt/community/newsroom/14287?id=13595&typeid=1>.

4. Stormwater Pollution. During a rainstorm or snowstorm, flowing water causes soil erosion and picks up pollutants along the way, including toxic materials and sediment, and these materials can flow into local waterbodies. Stormwater from fracking operations can be particularly polluted because of chemical and oil and gas residues. (Yet, as is described below, the oil and gas industry is exempt from the stormwater permitting requirements of the Clean Water Act).

I must stress that there are numerous examples of these types of water pollution impacts occurring. I mentioned that just last week, Ohio regulators observed 20,000 gallons of fracking waste being illegally dumped into a waterway.⁴¹ And a September 2011 *Denver Post* investigation found that four oil and natural gas companies were responsible for 350 spills in Colorado since January, 2010. The *Post* reported that one of these companies was responsible for three spills in one month alone, including benzene, a known carcinogen, and had contaminated both local lands and water.⁴² Ironically, state regulators had lauded these four companies as “outstanding operators.” Overall, the investigation found that spills took place in Colorado at the rate of seven per week and that from January to September 2011, more than two million gallons of diesel, oil, drilling wastewater, and chemicals were spilled, and state regulators issued few fines. A 2012 *Post* investigation found that over a five year period, oil and gas operations

⁴¹ Ohio EPA investigating dumping of drilling waste water in Youngstown area, Feb. 4, 2013, Bob Downing, *Beacon Journal*, <http://www.ohio.com/news/ohio-epa-investigating-dumping-of-drilling-waste-water-in-youngstown-area-1.370584>.

⁴² Four Oil and Gas Companies Responsible for 350 Spills Named “Outstanding Operators” by Regulators, Sept. 12, 2011, Bruce Finley, *Denver Post*, http://www.denverpost.com/breakingnews/ci_18880544.

were responsible for 2,078 spills and slow releases and that 17 percent of these spills had reached groundwater. In one county alone, Weld County, 40 percent of spills reached groundwater.⁴³

E. Impacts on Wildlife Habitat and Sensitive Lands

Oil and gas development can destroy wildlife habitat and sensitive lands if siting does not take these factors into account. Natural gas production operations involve extensive road building and well pad construction that can fragment and destroy habitat and cause species to leave their historic breeding and nesting grounds. Light and noise disturb wildlife populations and may drive them to lower-quality habitat. Runoff and spills can also pollute aquatic habitat.⁴⁴

F. Community Impacts

Oil and gas development can fundamentally change the nature of communities. Fracking is a heavy industrial activity that entails substantial construction, heavy truck traffic, traffic accidents, and noise and light pollution.⁴⁵ It often attracts an influx of out-of-state workers that can bring increases in crime

⁴³ Drilling Spills Reaching Colorado Groundwater; State Mulls Test Rules, Dec. 9, 2012, Bruce Finley, Denver Post, http://www.denverpost.com/environment/ci_22154751/drilling-spills-reaching-colorado-groundwater-state-mulls-test.

⁴⁴ Energy Development and Impacts on Wildlife (Sept. 11, 2012), Center for Western Priorities, <http://westernpriorities.org/2012/09/11/energy-development-and-impacts-on-wildlife/>.

and violence, sexually transmitted diseases and community strife that can stress local emergency, health and other community resources.⁴⁶

Under many state laws, oil and gas rights take precedence – or are interpreted as taking precedence – over surface ownership, so oil and gas wells and the associated industrial activity, including chemical and waste storage and disposal, can be located in residential or agricultural areas regardless of zoning or even the wishes of individual property owners. To address these issues, NRDC has launched a Community Defense initiative to provide legal assistance to localities that seek to hold natural gas extraction to appropriate scientific standards, protect their property, or exclude oil and gas production from their communities.⁴⁷

III. Congress Should Close Federal Loopholes for Oil and Gas Production

The oil and gas industry has succeeded over many years in getting statutory exemptions from standard environmental protection laws and practices. These unjustifiable loopholes appear in the Clean Air Act, the Clean Water Act, the Superfund statute, the Resource Conservation and Recovery Act, and the Safe Drinking Water Act, among others.

⁴⁶ Whitter R. 2012. Community Impacts of Natural Gas Development and Human Health. Presentation made at IOM Roundtable: The Health Impact Assessment of New Energy Sources: Shale Gas Extraction. April 30-May 1, 2012.

⁴⁷ Kate Sinding, [NRDC Launches Community Fracking Defense Project](http://switchboard.nrdc.org/blogs/ksinding/nrdc_launches_community_fracki.html), Sept. 19, 2012, http://switchboard.nrdc.org/blogs/ksinding/nrdc_launches_community_fracki.html.

There is simply no justification for exempting fracking from the basic environmental laws that have applied to other industrial activities for four decades. Fracking presents at least as many risks as other regulated activities and has just as many interstate implications. Moreover, the current level of disclosure and regulation clearly demonstrates that states lack the technical resources and political wherewithal to govern fracking. Congress must close the loopholes in cornerstone federal environmental laws.

This is not to say that states have no role to play. Under our system of “cooperative federalism,” states can play the lead role in the regulation, permitting, and oversight process. They can try out and adopt different regulatory approaches, as long as they meet federal minimum requirements. But all citizens deserve the protection of federal standards.

Some of the key exemptions for oil and gas production facilities in bedrock U.S. environmental laws are:

1. Safe Drinking Water Act (SDWA). Pursuant to a provision enacted in the Energy Policy Act of 2005, fracking is exempted from the SDWA unless diesel is used in the fracking process.⁴⁸ This exemption prevents the Safe Drinking Water Act from protecting underground sources of drinking water from fracking impacts and exempts the siting, construction, operation, maintenance, monitoring, testing, and closing of fracking sites from regulation under the SDWA.

⁴⁸ Energy Policy Act of 2005, Pub. L. No. 109–58, § 322, 42 U.S.C. § 300h(d)(1)(B)(ii). This provision bypassed a court decision that had previously ordered the EPA to regulate hydraulic fracturing under the SDWA. Legal Environmental Assistance Foundation v. United States Environmental Protection Agency, 118 F.3d 1467 (11th Cir. 1997).

2. Clean Water Act. Oil and gas operations are exempt from the stormwater runoff permitting requirements of the Clean Water Act.⁴⁹ With this exemption, there is no way to know if a company has an adequate Storm Water Pollution Prevention Plan in place to reduce the discharge of pollutants to receiving waters and to eliminate illegal discharges.
3. Clean Air Act. The oil and gas exploration and production industry is exempt from critical Clean Air Act requirements to adequately assess, monitor and control hazardous air pollutants.⁵⁰ This makes it impossible, under existing regulatory statutes, to perform an adequate assessment of air pollution health risks to nearby communities and require adequate safeguards. Excluding this important category of air pollution and air contaminants significantly underestimates the health risks posed by this industry.
4. Hazardous Waste Management and Superfund Statutes. Oil and gas waste is exempt from the central federal hazardous waste management law -- the Resource Conservation and Recovery Act -- including testing, treatment and disposal provisions that govern the assessment, control and clean-up of hazardous waste.⁵¹ Similarly, the oil and gas industry is protected from liability for spills under the Comprehensive Environmental Response, Compensation and Liability Act (the Superfund statute), which adopts the same definition of hazardous waste.⁵²
5. National Environmental Policy Act (NEPA). Under a special provision of NEPA, when oil and gas companies lease federal lands, they are often exempt from customary environmental review requirements applicable to other industries.⁵³ A recent Government Accountability Office study found that in a sample from fiscal years 2006-2008, the oil and gas industry received almost 6,900 categorical exclusions (CXs) that waived further environmental review under

⁴⁹ 33 U.S.C. § 1342(1)(2); 33 U.S.C. § 1362(24).

⁵⁰ 42 U.S.C. § 7412(a)(1)-(2); 42 U.S.C. § 7412(n)(4).

⁵¹ 42 U.S.C. § 6921(b)(2). Under this provision, EPA may act to close this gap under specified circumstances, but has not done so.

⁵² 42 U.S.C. § 9601(14).

⁵³ 42 U.S.C. § 15942.

NEPA. Of that total, almost 6,100 of those CXs were used to waive requirements for permits to drill.⁵⁴

IV. BLM's Potential Role in Providing National Leadership on Best Practices for Natural Gas Production

Given this Committee's jurisdiction, I want to stress an important opportunity for the Bureau of Land Management (BLM) to show leadership on this issue. The BLM oversees approximately 700 million subsurface acres of Federal mineral estate and 56 million subsurface acres of Indian mineral estate across forty states. As of 2011, 38.5 million acres of oil and gas resources were leased by the federal government. These lands include private property in a split estate situation and national forests that are watersheds for large populations. A March 2012 Department of Interior report found that 56 percent of federal onshore leases were not yet either in exploration nor production - an area about the size of South Carolina. This is the time to minimize the impacts that will come with future fracking. As Chairman Wyden noted in his recent letter to BLM, new BLM rules must require best practices for fracking and protect environment and health. But the latest indications are that BLM is going in exactly the wrong direction.

⁵⁴ U.S. Gov't Accountability Office, GAO-11-941T, Energy Policy Act of 2005: BLM's Use of Section 390 Categorical Exclusions for Oil and Gas Development (2011).

A version of the draft rule leaked to the press last week indicates that BLM is in the process of weakening disclosure requirements and environmental protections in its proposed rule.⁵⁵

The BLM rule should:

- provide adequate and comprehensive disclosure of chemical and other information to the public;
- place sensitive areas off limits;
- require safe setbacks for homes, schools, and streams;
- establish strong standards for well construction that ensure mechanical integrity;
- require baseline testing of water sources; and
- increase the safety of toxic waste management by prohibiting open air pits.

Details on NRDC's proposals are available in our comments to the BLM.⁵⁶

V. Climate Change and Energy Policy

Federal law and policy must also take into account the need to move the U.S. away from the use of fossil fuels, including natural gas. The United States' largest source of climate-changing pollution remains the air emissions from hundreds of existing power plants. We must curb this dangerous source of

⁵⁵ Revised Interior rule loops in industry-favored FracFocus, EnergyWire, Feb. 8, 2013, Mike Soraghan and Ellen M. Gilmer, <http://www.eenews.net/energywire/2013/02/08/1>.

⁵⁶ NRDC et al, Comments on Proposed Rule on Oil and Gas; Well Stimulation, Including Hydraulic Fracturing, on Federal and State Lands (Sept. 2012) available at http://docs.nrdc.org/energy/files/ene_12091101a.pdf.

pollution and do so in a way that will build the economy and promote energy efficiency and renewable energy. NRDC has crafted a groundbreaking proposal⁵⁷ that will help the United States create jobs, grow the economy, and curb climate change by reducing emissions from hundreds of existing power plants. NRDC's proposal shows how EPA, in partnership with the states, can set new carbon pollution standards under existing authority in the Clean Air Act that will cut existing power plant emissions 26 percent by 2020 (relative to peak emissions in 2005).

The approach includes an innovative provision that will provide states with flexibility and drive investment in cost-effective electric energy efficiency, substantially lowering the cost of compliance, lowering electricity bills, and creating thousands of jobs across the country. The benefits of this approach -- in saved lives, reduced illnesses, and climate change -- exceed the costs by as much as 15-to-one. The Administration should move quickly to finalize the carbon standards they have proposed for new power plants and propose a system of regulation for existing plants, building on the ideas we have proposed.

After electricity generation, other primary uses of natural gas energy are in buildings and industrial applications. There are many opportunities to use natural

⁵⁷ Daniel A. Lashof et al., Closing the Power Plant Carbon Pollution Loophole: Smart Ways the Clean Air Act Can Clean Up America's Biggest Climate Polluters, NRDC (Dec. 2012), <http://www.nrdc.org/air/pollution-standards/files/pollution-standards-report.pdf>.

gas more efficiently in these settings. Enhanced building energy codes and stronger efficiency standards for appliances, equipment and cooling and heating systems are among the best ways to use natural gas more efficiently. As is explained in a recent report by the Alliance to Save Energy's Commission on National Energy Efficiency Policy (on which I served), it is important that DOE stay on track to meet all of its statutory deadlines and responsibilities to strengthen energy efficiency standards for natural gas and electric appliances.⁵⁸ After a strong start at the beginning of the last term, DOE has fallen behind on this important responsibility.

VI. Next Steps: Building the Overdue Regulatory Framework for Addressing the Impacts of Fracking

I've discussed above the need for Congress to take strong action to protect the environment and health, including by requiring full disclosure of fracking chemicals and closing loopholes in existing environmental statutes. And I've reviewed the need for BLM to issue rules properly governing fracking on public lands. Other significant actions that the federal government should take to limit the damaging impacts of fracking include:

⁵⁸ Doubling U.S. Energy Productivity by 2030, Alliance Commission on National Energy Efficiency Policy (Feb. 7, 2013), http://ase.org/sites/default/files/full_commission_report.pdf.

Congress

Congress should:

- Mandate and fund comprehensive studies on the environmental and health impacts of fracking and on how to address them. EPA is conducting a comprehensive scientific study into the risks of fracking on drinking water, due in 2014. This will be the first independent study of its kind. The Agency for Toxic Substances and Disease Registry, the National Institute of Environmental Health Sciences and the National Institute for Occupational Safety and Health should conduct worker and community health investigations.
- Ensure that both the BLM and EPA have sufficient funding to inspect natural gas production facilities and to enforce compliance. These agencies must be able to vigorously investigate complaints.
- Congress and the Administration should take action to implement the recommendations of the 2011 Shale Gas Subcommittee of the Secretary of Energy Advisory Board.

Bureau of Land Management

BLM should:

- Revise all of its rules for natural gas production, including leasing and management plans, to reflect current technologies and the extent of development so that it protects the resources used by Americans for hunting, fishing, hiking, and other activities. The BLM too often allows oil and gas development without conducting the proper environmental analysis or considering the impacts on human health, the environment, wildlife, and vital natural resources.
- Together with other federal land management agencies, protect the most sensitive public lands, placing them off limits to oil and gas development. This includes important drinking water sources and wilderness quality lands. For example, the George Washington National Forest in Virginia is home to the headwaters of the Potomac and James Rivers which supply water for approximately four million people, including all of Washington, D.C. and

Maryland and Virginia suburbs, yet the Forest Service is considering allowing fracking there.

EPA

EPA should use its existing authority to the fullest extent possible to address the impacts and risks of fracking, including taking the following actions:

- Issue stringent standards to limit methane, carbon dioxide, and hazardous emissions from natural gas production from both new and existing sources. Cost-effective technology exists to do so, as noted above. In addition, EPA must adopt standards for VOCs and methane from fracked oil wells, which can emit huge amounts of this ozone-forming pollutant.
- Ban the use of diesel in fracking fluid to protect drinking water and water bodies.
- Issue strong Clean Water Act rules for the discharge of wastewater generated by natural gas fracking and production.
- To the extent possible under existing law, conduct a thorough assessment of air toxic emissions, health threats, and available pollution control technology that includes all relevant sources of emissions of all contaminants. Based on this assessment, EPA should set strong standards to limit pollution that threatens nearby populations from new and existing facilities.
- Make resources available to state and local clean water agencies as needed for the monitoring of groundwater, investigation of drinking water contamination and remediation.

VII. Conclusion

This testimony has focused on the scientific and legal issues posed by the expansion of fracking, but in closing I want to bring us back to the experiences and fears of real people to underscore what is at stake. On a recent trip to western

Pennsylvania, I spoke to many families affected by shale gas production. These families told me that they fear that their water is contaminated with toxic substances from shale gas operations. They worry the air pollution coming from compressor stations or well pads is harming their families. And they believe their property values have been compromised. I witnessed two instances of flammable water -- one in a field, another in a jug of drinking water. I don't know what caused them, and sadly the state doesn't seem to have investigated to determine the causes, but I could see how disturbing it was for homeowners to have flaming water. Every single person we spoke with had stories of contaminated water or air.

I sensed a lot of fear in the communities I visited in Pennsylvania. It reminded me of when I served on the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling and people in Louisiana and Mississippi told me how scared they were for the health of their families. They knew they had been exposed to oil and to chemicals used in the dispersants, but they didn't know if that exposure would be harmful or how to keep their families safe.

I know that we can do better for these families and communities, and hope that today's hearing will provide the basis for positive change.

As I've indicated, a lot of action is needed, and it is needed now. The federal government has been asleep at the switch – although it may be more accurate to say it's been anesthetized, given all of the exemptions that have been

worked into federal statutes. NRDC stands ready to assist this Committee in its further deliberations. Thank you again for the opportunity to participate in this discussion.