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# HYDRAULIC FRACTURING: CRITICAL FOR ENERGY PRODUCTION, JOBS, AND ECONOMIC GROWTH

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WASHINGTON -- The following information was released by the Heritage Foundation:

By Nicolas Loris

**Abstract:** Energy production on private lands in the United States has been one of the most promising success stories in recent years, at a time when the country has struggled to grow economically. A large part of the success behind this tremendous oil and gas production and jobs creation is due to an energy-extraction process known as hydraulic fracturing. Misconceptions about hydraulic fracturing abound. The Heritage Foundation's Nicolas Loris explains how, regulated effectively, hydraulic fracturing is safe-as well as necessary for energy production and job creation in the United States.

While Americans continue to be disappointed by dismal jobs reports and a high unemployment rate, one of the few recent bright spots in the U.S. economy has been energy production, particularly the shale oil and shale gas revolution. In fact, the Yale Graduates Energy Study Group calculated that in 2010 alone, the consumer surplus (the consumer savings or gain from reductions in price) from shale gas production was worth over \$100 billion.[1] The technological one-two punch of horizontal drilling and hydraulic fracturing has created a remarkable energy boom and created hundreds of thousands of jobs in the U.S. The possibility of continuously low natural gas prices is turning the United States into a prime destination for chemical companies and other businesses that rely on abundant amounts of natural gas. While the energy development has been substantially positive, the process of hydraulic fracturing has come under scrutiny over concerns about contamination of drinking water, the use of chemicals, wastewater management, and the potential for causing earthquakes.

All 35 of the oil and gas producing states have an impressive and long track record of regulating hydraulic fracturing, yet the federal government is proposing onerous and duplicative regulations. Congress should recognize the states' effectiveness in regulating hydraulic fracturing and prevent federal attempts that would unreasonably slow down the success of oil and gas development.

## How Does Hydraulic Fracturing Work?

Hydraulic fracturing, known as "fracking," is a process during which producers inject a fluid consisting of water, sand, and chemical additives deep into the ground in order to free resources, including oil, natural gas, geothermal energy, and even water trapped in deep rock formations.[2] With respect to shale gas (natural gas lodged in shale rock formations), producers drill wells that are on average 7,500 feet below the surface, thousands of feet below drinking water aquifers. After a company completes the well drilling (approximately two to four weeks), it then fracks the rock formation at high pressures that extend for several hundred feet away from the gas well. This process takes between three and five days, at which point the well will produce natural gas for 20 years to 50 years, or longer. After the drilling, the company also restores the land with soil and new vegetation, leaving only the wellhead and collection tanks. Some of the fracking fluid rises to the surface through steel-cased well bores and is temporarily stored in lined pits or steel tanks. Companies then recycle and reuse the wastewater or store it in an injection well deep underground.[3]

Used in over one million wells in the United States for more than 60 years, fracking has been successfully used to retrieve more than 7 billion barrels of oil and over 600 trillion cubic feet of natural gas.[4] Just one trillion cubic feet of natural gas is enough to heat 15 million homes for one year.[5] The development of hydraulic fracturing and horizontal drilling has increased access to proven reserves for oil and natural gas in Alabama, Arkansas, Colorado, Illinois, Louisiana, Michigan, New York, North Dakota, Oklahoma, Pennsylvania, Texas, and Wyoming.

Although geologists and energy companies have long been aware of the shale oil and shale gas reserves, the technological advancements in horizontal drilling and hydraulic fracturing are helping some regions of the country extract those resources and buck the economic downturn. In North Dakota, 4,600 wells produced 7.5 million barrels of crude oil in December 2009. In January 2012, North Dakota had 6,600 wells pumping out 16.9 million barrels of oil.[6] In Pennsylvania, natural gas production more than

quadrupled between 2009 and 2011.[7] The oil and gas boom has created work for geologists, engineers, rig workers, truck drivers, and pipe welders. That also means a higher demand for restaurants, repair shops, hardware stores, hotels, and laundromats in those areas. Energy production could be a catalyst of economic revitalization across the country, and the fracking process will be essential for the development of America's future oil and gas production.

#### Fracking: Critical for Economic Growth

Natural gas is already a critical part of America's energy portfolio and consequently a critical part of the country's economic growth. Not only does natural gas provide over 25 percent of electricity generation, natural gas, and other gases extracted from natural gas provide a feedstock for fertilizers, chemicals and pharmaceuticals, waste treatment, food processing, fueling industrial boilers, and much more. Although natural gas prices in the United States have historically been volatile, the abundance of shale gas brings the possibility of low, stable prices. North America has approximately 4.2 quadrillion (4,244 trillion) cubic feet of recoverable natural gas that would supply 175 years worth of natural gas at current consumption rates. Further, the National Petroleum Council estimates that fracking will allow 60 percent to 80 percent of all domestically drilled wells during the next 10 years to remain viable.

The abundance of natural gas makes the United States an attractive place to do business, especially for energy-intensive industries. In what could be a growing trend, Royal Dutch Shell recently announced plans to build a petrochemical plant in western Pennsylvania and cited the proximity to natural gas production as the reason for the location. The \$2 billion plant will create 10,000 construction jobs and thousands of permanent jobs for Beaver County, Pennsylvania.[8] A new KPMG analysis of the U.S. chemical industry emphasizes that "[w]ith a new and abundant source of low-cost feedstock, the US market has transformed to become one of the most advantageous markets for chemical production in the world." [9] Shuttered steel towns like Youngstown, Ohio, are seeing a re-emergence of manufacturing employment opportunities. In Youngstown, VandM Star, the pipe and tube producer, is building a factory to manufacture seamless pipes for hydraulic fracturing that will employ 350 people.[10]

#### Hydraulic Fracturing: Facts and Myths

Despite the length of time that hydraulic fracturing has been used, and despite the fact that fracking has helped create a burst in American energy production and economic growth, fracking has received much negative attention due to misreporting and dramatic exaggerations. Much of the public's concern over hydraulic fracturing has been over the possibility of contaminated drinking water, the chemicals used in fracking, the potential to create earthquakes, and wastewater management. Such concerns do not take into account the federal and state laws and regulations that address these very issues. Following are the four most prevalent myths- followed by the facts:

Myth #1: Hydraulic fracturing threatens underground water sources and has led to the contamination of drinking water.

Fact: Hydraulic fracturing is subject to both federal and state regulations, and there have been no instances of fracking causing contamination of drinking water.

Groundwater aquifers sit thousands of feet above the level at which fracking takes place, and companies construct wells with steel-surface casings and cement barriers to prevent gas migration. Studies by the Environmental Protection Agency (EPA), the Groundwater Protection Council, and independent agencies have found no evidence of groundwater contamination.[11] In May 2011, EPA Administrator Lisa Jackson stated before the U.S. House Oversight and Government Reform Committee that "I am not aware of any proven case where the fracking process itself affected water although there are investigations ongoing." [12] Three of those investigations are in Texas, Wyoming, and Pennsylvania, and thus far the EPA has found no evidence of contamination; in the case of Wyoming, however, the EPA published faulty data with speculative and heavily contested conclusions. In all three cases the EPA ignored state regulators' management of the alleged problems.[13] Although previous EPA analysis of hydraulic fracturing found the process to be safe, the EPA now plans to publish a full study on hydraulic fracturing and drinking water that ostensibly demonstrates lack of safety. Analysis of the EPA's "Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources" by the nonprofit technology research and development organization Battelle highlighted a number of concerns, including cherry-picking of data, lack of peer review, poor quality control, and a lack of transparency.[14]

Myth #2: The chemicals used in the fracking process are foreign chemicals that industry hides from the public.

Fact: Fracking fluid, made primarily of sand and water, uses a small percentage of chemicals that have common household applications and are regulated by the state.

The fluid used in hydraulic fracturing is 99.5 percent water and sand. The 0.5 percent of additives (typically between three and 12 different chemicals) depends on the composition of the shale formation that varies by region and by well. The combination of additives function to dissolve minerals, prevent bacteria growth and pipe corrosion, minimize friction, and keep the fractures open or propped up. All chemicals used in the fracking process have common applications from swimming-pool cleaners and laundry detergents to cosmetics, and even ice cream.[15] None of these chemicals is hidden from the public, and federal law stipulates that a company must provide detailed chemical information sheets to emergency personnel in case of an accident. While states that have hydraulic fracturing laws have their own stipulations for chemical disclosure, the U.S. Department of Energy, in collaboration with the Groundwater Protection Council and industry, created the website FracFocus.org. The site provides a full list of chemicals used in the fracking process and companies voluntarily disclose the chemical makeup for specific wells across the country.[16] FracFocus allows users to search wells by operator, state, and county.

Myth #3: Wastewater from hydraulic fracturing is dangerous and unregulated.

Fact: Companies dispose of, and recycle, wastewater using many different methods, all of which are compliant with existing federal and state laws.

Companies typically use around 4 million gallons of water-what a golf course uses in one week-to fracture a well by using water from lakes, rivers, or municipal supplies. Much of that water remains in the ground; about 15 percent to 20 percent of the water returns to the surface by flowing back through the well.[17] The flowback water contains the chemicals used in the fracking process and can also collect other naturally harmful substances in the ground. This water is never used for drinking and the disposal is subject to federal and state regulations. States have different regulations for disposal, and companies employ a variety of methods including temporary storage of wastewater in steel tanks or contained pits. More companies are recycling or reusing the flowback water because it makes both economic and environmental sense. Other disposal methods include storing wastewater underground in injection wells that states regulate individually, and the EPA regulates under the Safe Water Drinking Act.[18] The demand for wastewater disposal and recycling is creating opportunities for new companies with emerging technologies to treat wastewater.[19]

There have been concerns, in Pennsylvania for instance, that treating wastewater at sewage treatment plants that discharge into rivers supplying drinking water would contaminate drinking water with radioactive material. But Pennsylvania's Department of Environmental Protection found levels of radioactivity well within federal and state standards. Norm Zellers, manager of the Sunbury Generation treatment facility in Snyder County, Pennsylvania, emphasized that "[y]ou can have more radioactivity on a bunch of bananas in the store or on a granite countertop." [20] Wastewater management is another aspect of the fracking process that has been well regulated by existing federal and state laws, and the increased demand for wastewater treatment has driven the process to be cleaner and cheaper.

Myth #4: Fracking causes earthquakes.

Fact: The fracking process itself does not cause earthquakes; in rare instances, the use of underground injection wells (for storage) has caused earthquakes. Induced seismic activity from many underground energy activities is not a new phenomenon and has been closely monitored by the Department of Energy.

After a series of small earthquakes-ranging from 2.1 to 4.0 on the Richter scale-in Ohio and Arkansas near oil and gas sites, many have raised concerns about future tremors resulting from hydraulic fracturing. But the fracking process itself did not cause these earthquakes. The use of injection wells, an efficient and cost-effective way to dispose of briny wastewater, produced the seismic activity. Instances of seismic activity are rare; out of 30,000 injection wells, there have only been eight events of induced seismic activity-none of which caused significant property damage or injury. Induced seismicity does not occur only from oil and gas extraction. A recent National Research Council study highlights the fact that geothermal activities (capturing and using heat stored in the earth's core) have caused relatively small earthquakes (some felt, some not) at more frequent rates from far fewer projects.[21] The study also warns that continuously injecting carbon dioxide at high pressures (carbon capture and sequestration from coal plants) could induce earthquakes of higher magnitudes.[22]

Seismic activity as a result of underground activity is also not a new phenomenon. The U.S. Department of Energy has been observing and monitoring induced seismic activity from energy-related activities since the 1930s. While companies that induce seismic activity should be liable for any damage they cause, calls for bans of hydraulic fracturing or the use of underground injection wells are unfounded.

State Regulation, Federal Redundancy

One of the reasons why hydraulic fracturing has been so successful in promoting oil and gas development, while maintaining a strong environmental record, is the state regulatory regime. States in which fracturing takes place each have comprehensive regulation that ensures that oil and gas companies operate safely and in an environmentally sensible manner, and administer fines and implement punitive measures to correct any wrongdoing. In November 2011, the EPA's Lisa Jackson acknowledged the states' role: "States are stepping up and doing a good job. It doesn't have to be EPA that regulates the 10,000 wells that might go in." [23] But states are not just now stepping up-states have effectively regulated oil and gas production and hydraulic fracturing for decades. In Pennsylvania, fracking has been taking place since the 1960s with nearly 100,000 oil and gas wells fracked and no instances of contamination of groundwater. The same clean record is true for Ohio, where over 70,000 oil and gas wells have been fracked since the 1960s. The Interstate Oil and Gas Compact Commission has compiled statistics for all 50 states, each of which has a flawless record when it comes to fracking and groundwater protection.[24] Detailed in the appendix of this paper is an overview of each state's regulations regarding chemical disclosure, groundwater protection, and wastewater management, as well as links to each state's statutes and regulations that pertain to oil and gas operations.

Despite the states' effectiveness in regulating hydraulic fracturing and despite Jackson's comments, the EPA is pursuing onerous and duplicative regulations with weak scientific support. Many activities of oil and gas production are already subject to a number of major federal regulations, including the Clean Air Act (emissions), the Clean Water Act (surface water discharge), the Safe Drinking Water Act (wastewater management), the Emergency Planning and Community Right-to-Know Act (chemical disclosure for emergency responders), and the National Environmental Policy Act (production on federal lands), among others.[25]

While many of these statutes are in need of serious reform,[26] the White House's recently proposed fracking rules are unneeded and duplicative. The Department of the Interior released a draft rule on public disclosure of chemicals on federal lands despite the fact that states have successfully managed chemical disclosure.[27] Congress has also introduced legislation that would regulate fracking fluids under the Safe Drinking Water Act (SDWA) despite the fact that the 2005 Energy Policy Act codified that Congress never intended to regulate fracking (except when using diesel oil in the fracking process under SDWA).[28] Hydraulic fracturing had been safely regulated for a quarter century before Congress even enacted SDWA in 1974.

In April 2012, the EPA announced its first air-emission rules for hydraulic fracturing. Rather than being aimed at fracking itself, this is a backdoor global warming regulation: The rule highlights the supposed environmental benefits of reducing emission of methane, a greenhouse gas. The EPA's rule miserably fails the cost-benefit test; the agency's own analysis projects \$745 million in annual costs and just \$11 million to \$19 million in environmental benefits. Moreover, the EPA has grossly overestimated methane emissions from

the wells.[29] The rule also fails to quantify any benefits from reducing volatile organic compounds (VOC) and hazardous air pollutants (HAP).[30] While the rule asserts that benefits exist, the draft also says that "with the data available, we [the EPA] are not able to provide credible health benefit estimates for the reduction in exposure to [hazardous air pollutants], ozone and [particulate matter] (2.5 microns and less) (PM2.5) for these rules." [31]

#### Congress: Prevent Federal Overreach on Fracking

The states' effective regulation underscores the need for Members of Congress to prevent federal intervention that would unnecessarily stall the oil and gas boom and drive up costs for producers (and thus consumers). The states with tremendous oil and natural gas reserves have the most to gain economically, and have the greatest incentive to protect their environments. States have qualified experts to handle the regulatory requirements surrounding hydraulic fracturing. To that end, Congress should:

Prevent any federal agency from adding new regulations to hydraulic fracturing. The proposed federal regulations are unnecessary and duplicative.

Prohibit federal regulators from using any statute to regulate greenhouse gas emissions. Greenhouse gas regulations would drive up the cost of energy for no meaningful change in the Earth's temperature.

Reaffirm the states' authority and effectiveness in regulating hydraulic fracturing. The states have effectively handled the disclosure of chemicals used in the fracking process and have effectively protected drinking water for decades.

#### Fracking: It's Important

Hydraulic fracturing and horizontal drilling should be celebrated as important technological progress that has opened new opportunities for the safe development of affordable, reliable energy. The facts and history of hydraulic fracturing indicate that many of the fears associated with the process are exaggerated or unsubstantiated. Entrepreneurs created an energy boom and state regulators have been ensuring that energy production occurs in an environmentally sensible way. Congress should keep it that way.

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